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# NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT

# VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

## Project Description and Location

The City of Delano "Vineyard at Delano and Delano West Pavilion Projects" consists of two separate projects to be phased over an estimated 10 year period. The projects analyzed in the Draft Environmental Impact Report (EIR) include the Vineyard at Delano residential project and the Delano West Pavilion residential, commercial, and office project. The project sites are located adjacent to each other on Stradley Avenue/Albany Street and Woollomes Avenue. State Route 99 is located approximately 0.5 miles east of the sites.

Together, the project sites total approximately 110 acres and include parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the City in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future. The project includes pre-zoning of this parcel for community retail and residential uses.

The Vineyard at Delano project site is 33 acres in size and is currently fallow land. This land was used for agricultural purposes in the past, however it is no longer used for that purpose and is in a fallow undeveloped state. The Vineyard at Delano project includes 432 multi-family low-rise apartment units (one- and two-story). Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center.

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past, however it is no longer used for that purpose and is in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of retail and restaurant space.

## Anticipated Significant Environmental Effects

The Draft EIR concludes that significant and unavoidable environmental effects may occur with regard to air quality, noise, and traffic and circulation. The project site is not included on any list of hazardous waste sites enumerated under Section 65962.5 of the Government Code.

How to Comment

The Draft EIR is being circulated to the general public and to public agencies for a 45-day public comment period, beginning on **August 14, 2015** and ending on **September 28, 2015**. The Draft Environmental Impact Report is available for review at Delano City Hall (address below) and on the City's website at www.cityofdelano.org. The complete project file for the project is also available for review, by appointment (please email Jerome Keene at ccdadmin@cityofdelano.org, or call 661-721-3340).

Please submit any comments, no later than September 28, 2015, to:

Jerome Keene, Interim Community Development Director
City of Delano
1015 Eleventh Avenue
Delano, CA 93216

Comments may also be emailed to Mr. Keene's attention at: ccdadmin@cityofdelano.org

Print Form

*Appendix C*

# Notice of Completion & Environmental Document Transmittal

*Mail to:* State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
*For Hand Delivery/Street Address:* 1400 Tenth Street, Sacramento, CA 95814

SCH #2014091039

**Project Title:** Vineyard at Delano and Delano West Pavilion Projects

Lead Agency: City of Delano — Contact Person: Jerome Keene
Mailing Address: 1015 Eleventh Avenue — Phone: 559-449-2400 ext. 6015
City: Delano — Zip: 93216 — County: Kern

**Project Location:** County: Kern — City/Nearest Community: Delano
Cross Streets: Stradley Avenue/Albany Street and Woollomes Avenue — Zip Code: 93216
Longitude/Latitude (degrees, minutes and seconds): ___° ___′ ___″ N / ___° ___′ ___″ W — Total Acres: 110
Assessor's Parcel No.: 521-010-19, 521-010-20 — Section: 23 — Twp.: 25S — Range: 25E — Base: Mt Diablo
Within 2 Miles: State Hwy #: 99 — Waterways: ___
Airports: Delano Municipal Airport — Railways: ___ — Schools: ___

**Document Type:**

CEQA:
- ☐ NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☐ Mit Neg Dec
- ☒ Draft EIR
- ☐ Supplement/Subsequent EIR (Prior SCH No.) ___
- Other: ___

NEPA:
- ☐ NOI
- ☐ EA
- ☐ Draft EIS
- ☐ FONSI

Other:
- ☐ Joint Document
- ☐ Final Document
- ☐ Other: ___

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**Local Action Type:**

- ☐ General Plan Update
- ☒ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☒ Site Plan
- ☒ Rezone
- ☒ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☒ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- ☐ Other: ___

**Development Type:**

- ☒ Residential: Units 872 Acres 63
- ☐ Office: Sq.ft. ___ Acres ___ Employees ___
- ☒ Commercial: Sq.ft. 340,000 Acres 43 Employees ___
- ☐ Industrial: Sq.ft. ___ Acres ___ Employees ___
- ☐ Educational: ___
- ☐ Recreational: ___
- ☐ Water Facilities: Type ___ MGD ___
- ☐ Transportation: Type ___
- ☐ Mining: Mineral ___
- ☐ Power: Type ___ MW ___
- ☐ Waste Treatment: Type ___ MGD ___
- ☐ Hazardous Waste: Type ___
- ☐ Other: ___

**Project Issues Discussed in Document:**

- ☒ Aesthetic/Visual
- ☒ Agricultural Land
- ☒ Air Quality
- ☒ Archeological/Historical
- ☒ Biological Resources
- ☐ Coastal Zone
- ☒ Drainage/Absorption
- ☐ Economic/Jobs
- ☐ Fiscal
- ☒ Flood Plain/Flooding
- ☐ Forest Land/Fire Hazard
- ☒ Geologic/Seismic
- ☒ Minerals
- ☒ Noise
- ☒ Population/Housing Balance
- ☒ Public Services/Facilities
- ☒ Recreation/Parks
- ☒ Schools/Universities
- ☐ Septic Systems
- ☒ Sewer Capacity
- ☒ Soil Erosion/Compaction/Grading
- ☒ Solid Waste
- ☒ Toxic/Hazardous
- ☒ Traffic/Circulation
- ☒ Vegetation
- ☒ Water Quality
- ☒ Water Supply/Groundwater
- ☒ Wetland/Riparian
- ☒ Growth Inducement
- ☒ Land Use
- ☒ Cumulative Effects
- ☐ Other: ___

**Present Land Use/Zoning/General Plan Designation:**

Currently vacant undeveloped land/ Zoning is General Commercial (GC) (City of Delano) and Exclusive Agriculture (Kern County)

**Project Description:** *(please use a separate page if necessary)*

The development of 872 medium density residential units and 340,000 square feet of commercial uses on approximately 110 acres in southwestern Delano.

*Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.*

Revised 2010

## Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

x Air Resources Board
___ Boating & Waterways, Department of
___ California Emergency Management Agency
___ California Highway Patrol
x Caltrans District #6
___ Caltrans Division of Aeronautics
___ Caltrans Planning
x Central Valley Flood Protection Board
___ Coachella Valley Mtns. Conservancy
___ Coastal Commission
___ Colorado River Board
___ Conservation, Department of
___ Corrections, Department of
___ Delta Protection Commission
___ Education, Department of
___ Energy Commission
x Fish & Game Region #4
x Food & Agriculture, Department of
x Forestry and Fire Protection, Department of
___ General Services, Department of
___ Health Services, Department of
___ Housing & Community Development
x Native American Heritage Commission

___ Office of Historic Preservation
___ Office of Public School Construction
___ Parks & Recreation, Department of
___ Pesticide Regulation, Department of
___ Public Utilities Commission
x Regional WQCB #5
___ Resources Agency
___ Resources Recycling and Recovery, Department of
___ S.F. Bay Conservation & Development Comm.
___ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
___ San Joaquin River Conservancy
___ Santa Monica Mtns. Conservancy
___ State Lands Commission
___ SWRCB: Clean Water Grants
x SWRCB: Water Quality
___ SWRCB: Water Rights
___ Tahoe Regional Planning Agency
___ Toxic Substances Control, Department of
___ Water Resources, Department of

___ Other: ___
___ Other: ___

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**Local Public Review Period (to be filled in by lead agency)**

Starting Date August 14, 2015 Ending Date September 28, 2015

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**Lead Agency (Complete if applicable):**

Consulting Firm: Michael Baker International
Address: 6020 Cornerstone Court West
City/State/Zip: san Diego, CA 92121
Contact: Bob Stark
Phone: 858-453-3602

Applicant: Grapevine Villa, LLC
Address: 10508 Lower Azusa Road, Suite 200
City/State/Zip: El Monte, CA 91731
Phone: 626-444-6668

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**Signature of Lead Agency Representative:** ___ **Date:** 8/14/15

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

# DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE

# VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

SCH# 2014091039

*PREPARED FOR:*

**CITY OF DELANO**
1015 11th Avenue
Delano, CA 93216

*PREPARED BY:*

Michael Baker INTERNATIONAL
6020 CORNERSTONE COURT WEST, SUITE 260
SAN DIEGO, CA 92121

**AUGUST 2015**

# DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE

---

# VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

---

SCH# 2014091039

*Prepared for:*


**CITY OF DELANO**
1015 11TH AVENUE
DELANO, CA 93216
Contact: Jerome Keene


*Prepared by:*


Michael Baker INTERNATIONAL

6020 Cornerstone West, Suite 260
San Diego, California 92121


AUGUST 2015

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# 1.0 Introduction

This Environmental Impact Report (EIR) was prepared in accordance with and in fulfillment of the California Environmental Quality Act (CEQA) and the CEQA Guidelines. As described in CEQA Guidelines Section 15121(a), an EIR is a public informational document that assesses the potentially significant environmental impacts of a project, identifies ways to minimize the significant impacts, and describes a reasonable range of alternatives to the project. CEQA requires that an EIR be prepared by the agency with primary responsibility over the approval of a project (the lead agency). The City of Delano (City) is the lead agency for the proposed Vineyard at Delano and Delano West Pavilion Projects (proposed project; project). Public agencies are charged with the duty to consider and minimize environmental impacts of proposed development where feasible, and are obligated to balance a variety of public objectives including economic, environmental, and social factors in their decision-making.

## 1.1 PURPOSE OF THE EIR

CEQA requires the preparation of an EIR prior to approving any project that may have a significant effect on the environment. With respect to the proposed project, the City has determined that the current proposal is a project under CEQA.

The City of Delano has determined that an EIR is the appropriate CEQA documentation due to the potential for significant environmental impacts that could result from approval of the requested actions and development of the proposed project. This Draft EIR evaluates the existing environmental resources in the area, analyzes potential impacts on those resources due to the proposed project (particularly as they relate to prior CEQA analyses and clearances), and if necessary, identifies feasible mitigation measures that could avoid or reduce the magnitude of those impacts. This EIR provides an analysis and evaluation of on-site and off-site environmental impacts resulting from the construction and operation of the proposed project.

## 1.2 KNOWN TRUSTEE, RESPONSIBLE, AND INTERESTED AGENCIES

For the purpose of CEQA, the term *trustee agency* means a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California. In CEQA, the term *responsible agency* includes all public agencies other than the lead agency that may have approval authority in some regard associated with the proposed project. Interested agencies may have a general interest in the proposal with respect to issues germane to their organization. The following agencies have been identified as potential responsible, trustee, or interested agencies with direct or indirect interest in the project:

- California Department of Conservation
- California Department of Toxic Substances Control
- California Department of Transportation, District 6
- California Department of Fish and Wildlife, Region 4
- Native American Heritage Commission
- Regional Water Quality Control Board, Region 5
- San Joaquin Valley Air Pollution Control District
- Kern County Local Agency Formation Commission

- State Water Resources Control Board
- US Army Corps of Engineers
- US Fish and Wildlife Service

The project may require approvals, permits, or entitlements from these or other public agencies for which this EIR may be used.

## 1.3 TYPE OF DOCUMENT

CEQA and the CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. This EIR has been prepared as a "project EIR" pursuant to CEQA Guidelines Section 15161. The analysis associated with a project EIR focuses primarily on the changes in the environment that would occur as a result of specific project implementation and examines all phases of development of the site (i.e., planning, construction, and operation).

## 1.4 INTENDED USE OF THE EIR

This EIR in its final form will be used by the City of Delano in considering approval of the proposed project. In accordance with CEQA Guidelines Section 15126, the EIR will be used as the primary environmental document in consideration of all subsequent planning and permitting actions associated with the project, to the extent such actions require CEQA compliance and as otherwise permitted under applicable law. These City actions (both discretionary and ministerial) may include, but are not limited to, the following:

- Prezoning for Annexation of Parcel in Unincorporated Kern County
- Zoning Map Amendment
- Tentative Map
- Approval of Public Improvement Plans (for streets and utilities)
- Grading and Building Permits

## 1.5 ORGANIZATION AND SCOPE

Sections 15122 through 15132 of the CEQA Guidelines identify content requirements for EIRs. An EIR must include a description of the environmental setting, an environmental impact analysis, feasible mitigation measures, a reasonable range of alternatives, significant irreversible environmental impacts, and growth-inducing and cumulative impacts. The environmental issues addressed in this EIR adhere to state law requirements and were established through review of prior environmental documentation developed for the project site, environmental documentation for nearby projects, and responses to the Notice of Preparation, as appropriate. Based on this information, comments received, agency consultation, review of the project application and other relevant materials, the City, in its discretion, determined the scope for this EIR.

This EIR is organized in the following sections:

### SECTION 1.0 – INTRODUCTION

This section provides an overview that describes the intended uses of the EIR, as well as the EIR review and certification process.

### SECTION 2.0 – EXECUTIVE SUMMARY

This section provides a project narrative and identifies environmental impacts and mitigation measures in a summary table consistent with CEQA Guidelines Section 15123.

### SECTION 3.0 – PROJECT DESCRIPTION

This section provides a detailed description of the proposed project and project objectives, the project's relationship to prior approvals, and other background information and physical characteristics consistent with CEQA Guidelines Section 15124.

### SECTION 4.0 – ENVIRONMENTAL SETTING, PROJECT IMPACTS, AND MITIGATION MEASURES

This section contains technical analysis relative to each environmental topic. Included in this section is a comprehensive analysis related to impacts and mitigations that correspond to project implementation, particularly as they relate to prior CEQA analyses and clearances. Each subsection contains a description of the existing setting of the project area. The environmental topics are summarized as follows:

4.1 Aesthetics

4.2 Agriculture and Forestry Resources

4.3 Air Quality

4.4 Biological Resources

4.5 Cultural Resources

4.6 Greenhouse Gas Emissions and Climate Change

4.7 Geology, Soils, and Mineral Resources

4.8 Hazards and Hazardous Materials

4.9 Hydrology and Water Quality

4.10 Land Use

4.11 Noise

4.12 Population and Housing

4.13 Public Services and Utilities

4.14 Traffic and Circulation

### SECTION 5.0 – PROJECT ALTERNATIVES

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project which could feasibly attain most of the basic objectives of the project and avoid and/or substantially lessen any of the significant effects of the project. This section discusses alternatives to the proposed project, including the CEQA-mandated "No Project" alternative, which are intended to avoid or reduce significant environmental impacts of the proposal.

### SECTION 6.0 –CUMULATIVE IMPACTS SUMMARY

This section discusses a summary of the cumulative impacts associated with the proposed project that, when combined with past, present, and reasonably foreseeable future developments, may have a cumulative impact. For this analysis, the cumulative condition is based on continued implementation and buildout of the Delano General Plan, with the appropriate geographic scope for each cumulative discussion referenced in each section, as necessary. A full cumulative impact discussion is included for each environmental topic in the relevant section throughout this EIR.

### SECTION 7.0 – OTHER SECTIONS REQUIRED BY CEQA

This section contains discussions of effects determined not to be significant, including forest and mineral resources, and significant irreversible environmental changes which would be involved in the proposed action should it be implemented, as well as unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance.

### SECTION 8.0 – REPORT PREPARERS

This section lists all authors and agencies that assisted in the preparation of the report by name, title, and company or agency affiliation.

### TECHNICAL APPENDICES

This volume includes all notices and other procedural documents pertinent to the EIR, as well as all technical material prepared to support the analysis.

## 1.6 ENVIRONMENTAL REVIEW PROCESS

The review and certification process for the EIR will involve the following general procedural steps:

### NOTICE OF PREPARATION

In accordance with Section 15082 of the CEQA Guidelines, the City prepared a Notice of Preparation (NOP) of an EIR for the project that was distributed to responsible agencies and the public for a 30-day comment period, beginning on September 17, 2014, and concluding on October 17, 2014. One public scoping meeting was held on October 8, 2014, to receive additional comments and input from the public as to the scope and content of the EIR. Comments received in response to the NOP were considered during preparation of the EIR. The NOP and comments received from interested parties and agencies are presented in **Appendix 1.0-A.** Written comments were received from the following parties:

**TABLE 1.0-1**
**LIST OF NOP COMMENT LETTERS**

| Interested Party/Agency | Date | Summary of Comment (s) |
|---|---|---|
| *Dayne L Frary, P.G. California Department of Conservation, Division of Oil, Gas, and Geothermal Resources* | September 29, 2014 | • The proposed projects are situated in the SW/4 of Section 14 and the NW/4 of Section 23 in T25S, R25E. The sites are not located within the boundaries of any oil field, and no wells are known to have been drilled within the boundaries of either proposed project. |
| *Katy Sanchez, Native American Heritage Commission* | September 25, 2014 | • NAHC recommends the contacting of the appropriate regional archaeological Information Center for a record search.<br>• If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.<br>• Contact NAHC for a Sacred Land File Check and a list of the appropriate Native American contacts for consultation.<br>• The lack of surface evidence of archeological resources does not preclude their subsurface existence and lead agencies should include mitigation for unknown archeological resources, cultural resources and Native American human remains. |
| *Jeffery R. Single, Ph.D., California Department of Fish and Wildlife* | October 14, 2014 | • DWF has determined that the site has appropriate habitat for nesting denning or foraging opportunities for the San Joaquin kit fox, Swainson's hawk, and the burrowing owl.<br>• DWF is a Trustee Agency under CEQA and a Responsible Agency over projects that result in the "take" of any listed species.<br>• DWF provides potential impacts and recommendations for the San Joaquin kit fox, Swainson's hawk, the burrowing owl, and nesting birds.<br>• DWF recommends consulting with the United States Fish and Wildlife Service for potential impacts to the federally listed San Joaquin kit fox. |
| *Alec Kimmel, California Department of Transportation* | October 17, 2014 | • The project could have impacts to the SR 99/Woollomes Avenue interchange and that a traffic study is needed.<br>• The traffic study should reference the Caltrans Guide for the Preparation of Traffic Impact Studies and send the scope of the TIS to Caltrans before the traffic study is conducted. |

## DRAFT EIR

This document constitutes the Draft EIR. The Draft EIR contains a description of the project, description of the environmental setting, identification of project impacts, and feasible mitigation measures for impacts found to be significant, as well as an analysis of project alternatives. Upon completion of the Draft EIR, the City will file the Notice of Completion (NOC) with the California Office of Planning and Research to begin the public review period (Public Resources Code Section 21161).

## PUBLIC NOTICE/PUBLIC REVIEW

Concurrent with the NOC, the City will provide public notice of the availability of the Draft EIR for public review and invite comment from the general public, agencies, organizations, and other interested parties. The public review and comment period is 45 days. Public comment on the Draft EIR will be accepted in written form (via common carrier or in electronic mail form) and orally at public hearings (if held during the review period). Notice of the time and location of any public meetings and hearings will be published prior to the meeting/hearing in accordance with applicable law. All comments or questions regarding the Draft EIR should be addressed to:

**City of Delano**
Community Development Department, Planning Division
Jerome Keene, Interim Community Development Director
1015 11th Avenue
Delano, CA 93215

Electronic communications can be e-mailed to Jerome Keene at cddadmin@cityofdelano.org.

## RESPONSE TO COMMENTS/FINAL EIR

Following the public review period, a Final EIR (FEIR) will be prepared. The FEIR will respond to all comments received during the public review period that raise significant environmental concerns and may contain revisions to the Draft EIR, if necessary. The Draft EIR, as revised and combined with responses to comments, will constitute the Final EIR.

## CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The City of Delano Planning Commission will review and make recommendations to the City Council regarding certification of the EIR and action on the proposed project. The City Council will then review and consider the FEIR. If the City finds that the FEIR is "adequate and complete," the City may certify the FEIR. Upon review and consideration of the FEIR, the City may take action to approve, revise, or reject the proposed project. Any decision to approve the project would be accompanied by written findings in accordance with CEQA Guidelines Section 15091 and Section 15093. A Mitigation Monitoring and Reporting Program (MMRP), as described below, must also be adopted for mitigation measures that have been incorporated into or imposed on the project to reduce or avoid significant effects on the environment. The MMRP will be designed to ensure that these measures are enforceable and carried out during project implementation.

## MITIGATION MONITORING AND REPORTING PROGRAM

CEQA Section 21081.6(a) requires lead agencies to adopt an MMRP to describe measures that will be adopted and made a condition of project approval in order to mitigate or avoid significant effects on the environment. The specific reporting or monitoring program required by CEQA is not required to be included in the EIR; however, it must be presented to the City Council for adoption. Throughout the EIR, mitigation measures have been clearly identified and presented in language that will facilitate establishment of an MMRP. Any mitigation measures adopted by the City as conditions for approval of the project will be included in an MMRP to ensure enforceability and verify compliance.

# 2.0 Executive Summary

This section provides an overview of the project and the environmental analysis. For additional detail regarding specific issues, please consult the appropriate technical section (Sections 4.1 through 4.14).

## 2.1 PURPOSE AND SCOPE OF THE ENVIRONMENTAL IMPACT REPORT

The California Environmental Quality Act (CEQA) requires the preparation of an environmental impact report (EIR) when there is substantial evidence that a project could have a significant effect on the environment. The purpose of an EIR is to provide decision-makers, public agencies, and the general public with an objective and informational document that fully discloses the potential environmental effects of the proposed project. The term "proposed project" or "project" as used in this EIR, refers to the proposed Vineyard at Delano and Delano West Pavilion Projects. The EIR process is specifically designed to describe the objective evaluation of potentially significant direct, indirect, and cumulative impacts of the proposed project; to identify alternatives that reduce or eliminate the project's significant effects; and to identify feasible measures that mitigate significant effects of the project, when applicable and appropriate. In addition, CEQA requires that an EIR identify those adverse impacts determined to remain significant after mitigation. This EIR provides an analysis of the potential environmental effects associated with future development that could result from the construction and operation of the proposed project, located in Delano.

## 2.2 PROJECT SUMMARY

The City of Delano Vineyard at Delano and Delano West Pavilion Projects is a combination of two separate projects. The projects to be analyzed in EIR include the Vineyard at Delano (Vineyard) residential project and the Delano West Pavilion (West Pavilion) residential and commercial project. The project sites are located adjacent to each other on the eastern side of the Stradley Avenue/Albany Street and Woollomes Avenue intersection.

The Vineyard at Delano project site is 33 acres in size and is currently fallow land. This land was used for agricultural purposes in the past; however, it is no longer used for that purpose. The Vineyard at Delano project proposes 432 multi-family low-rise apartment (one- and two-story) units in 36 separate apartment buildings. Other amenities within the residential development would include a swimming pool, a community athletic field, and a community building and leasing center.

The Vineyard project site is currently designated in the City of Delano General Plan as Medium Residential and zoned General Commercial (GC). Approval of the proposed project would necessitate a zoning amendment for the Vineyard at Delano site from GC to Multiple-Family Residential (R-3).

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past, though it is no longer used for that purpose and is in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of commercial and restaurant space.

The West Pavilion project site is currently within the jurisdiction of Kern County. It is zoned Exclusive Agriculture by the County and has the Kern County General Plan land use designation of Intensive Agriculture. The City of Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial. Approval of the proposed project would require annexation of the West Pavilion site by the City and prezoning of the West Pavilion site to GC and R-3.

The Vineyard and West Pavilion projects will connect to the City's existing storm drainage retention facilities located on Stradley Avenue adjacent to the West Pavilion site. In order to provide storm drainage for the proposed project, the City's stormwater drainage retention facility will be expanded by 33.4 acre-feet of volume. The expansion of the retention basin will entail the movement of approximately 74,000 cubic yards of dirt. Approximately 24,000 cubic yards of this dirt will be graded and compacted on the City stormwater basin site to construct the expanded retention basin. Approximately 50,000 cubic yards will be excavated and transported to the West Pavilion site for use as fill. Connection of the proposed project storm drainage facilities to the retention basins also requires undergrounding new stormwater drainage piping beneath Stradley Avenue, which will require the demolition and reconstruction of Stradley Avenue at the connection site.

## 2.3 PROJECT ALTERNATIVES SUMMARY

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project which could feasibly attain the basic objectives of the project and avoid and/or lessen the environmental effects of the project. Further, CEQA Guidelines Section 15126.6(e) requires that a "no project" alternative be evaluated in an EIR. The Draft EIR evaluates the following alternatives:

### ALTERNATIVE 1 –NO PROJECT ALTERNATIVE

This alternative includes analyses includes a project that would be proposed at some point in the future consistent with the General Plan and zoning designations for the project site.

For this alternative analysis, it is assumed that this site would be developed as residential uses consistent with the General Plan land use designation. Residential uses were chosen instead of commercial uses, as the zoning is required to comply with the General Plan land use designation, not vice versa. The Medium Residential designation allows up to 14 dwelling units per gross acre. As such, for this alternative the 33-acre Vineyard site would accommodate 462 multi-family dwelling units.

The West Pavilion project site is currently within the jurisdiction of Kern County, with a Kern County General Plan land use designation of Intensive Agriculture and zoned as Exclusive Agriculture. The Kern County Intensive Agriculture designation requires a minimum parcel size of 20 acres and allows one single-family home per parcel. Thus, the 77-acre West Pavilion site would accommodate up to three parcels with agriculture-related activities and three single-family homes. Because this area would not be annexed by the City of Delano but would remain under Kern County's jurisdiction, those utility services provided by the City—water, sewer, and storm drainage—would not be provided for these parcels.

If the project site is developed to its General Plan land use designation potential, all of the potential impacts would be reduced in impact level. It should be noted that this alternative would only satisfy the project's residential objectives, however, only producing about 60 percent of the residential units. None of the proposed project's commercial objectives would be accomplished with this alternative.

### ALTERNATIVE 2 – REDUCED INTENSITY ALTERNATIVE

Alternative 2 would result in 635 multi-family units and 340,000 square feet of commercial area. The residential density would be approximately 10.1 dwelling units per gross acre. Alternative 2

would result in the decrease of residential units by 27 percent as compared to the proposed project.

Under the proposed project, nitrogen oxide (NOx) emissions would be significant and unavoidable, despite mitigation. NOx emissions under the Reduced Residential Density Alternative would also exceed the SJVAPCD significance threshold which may not be mitigated to a less than significant level.

For the issue areas of aesthetics, greenhouse gas emissions and climate change, land use, population and housing, and public services and utilities, the Reduced Residential Density Alternative would result in reduced impacts. However, the proposed project did not result in significant and unavoidable impacts for these impact areas. As such, while Alternative 2 had a reduced physical impact in these areas, the level of impact determination was similar to the proposed project.

Impacts associated with increases in traffic levels would be less under Alternative 2 than the proposed project. This is due to the smaller amount of residential units. It cannot be determined with the limited traffic analysis for the alternative whether the reduced number of Alternative 2 vehicle trips would reduce impacts to those intersections and roadways that were identified as having a significant and unavoidable impact in the proposed project analysis to a less than significant level. However, the reduced number of trips would likely have fewer traffic impacts than the proposed project.

### ALTERNATIVE 3 – REDUCED PROJECT DEVELOPMENT ALTERNATIVE

Alternative 3 would result in the decrease of residential units by 50 percent over the proposed project. Alternative 3 would have 436 single-family units and 170,000 square feet of commercial area.

The Reduced Project Development Alternative would result in reductions in impacts associated with air quality, climate change and greenhouse gas emissions, and traffic and circulation. Additionally, because this alternative would have approximately 50 percent of the development potential of the proposed project, the public services and utilities demand to serve the residents and commercial uses would be less than with the proposed project.

Alternative 3's total air quality emissions associated with reactive organic gases (ROG), NOx, $PM_{10}$, $PM_{2.5}$, carbon monoxide (CO), and sulfur dioxide ($SO_2$) would be lower than the proposed project. Alternative 3 would only exceed the San Joaquin Valley Air Pollution Control District (SJVAPCD) significance threshold for ROG and $NO_x$. Under the proposed project, NOx emissions would be significant and unavoidable, despite mitigation. NOx emissions under the Reduced Project Development Alternative would also exceed the SJVAPCD significance threshold, which may not be mitigated to a less than significant level.

For the issue areas of aesthetics, greenhouse gas emissions and climate change, land use, population and housing, and public services and utilities, the Reduced Project Development Alternative would result in reduced impacts. However, the proposed project did not result in significant and unavoidable impacts for these impact areas. As such, while Alternative 3 had a reduced physical impact in these areas, the level of impact determination was similar to the proposed project.

Impacts associated with increases in traffic levels would be less under Alternative 3 than with the proposed project. This is due to the smaller number of residential units and reduced commercial square footage. It cannot be determined with the limited traffic analysis for the alternative whether the reduced number of Alternative 3 vehicle trips would reduce impacts to those intersections and roadways that were identified as having a significant and unavoidable impact in the proposed project analysis to a less than significant level. However, the reduced number of trips would have fewer traffic impacts than the proposed project.

## 2.4 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

The City of Delano is the lead agency for the proposed project. In accordance with Section 15082 of the CEQA Guidelines, the City prepared and distributed a Notice of Preparation (NOP) of an EIR on September 17, 2014. This notice was circulated to the public, local, state, and federal agencies, and other interested parties to solicit comments on the proposed project and determine potential areas of controversy. The NOP is presented in **Appendix 1.0-A**. Comments received in response to the NOP are shown in **Table 2.0-1**. The letters are also included in **Appendix 1.0-A**.

No known or specific issues of controversy were raised during the scoping process beyond the issues raised in response to the NOP.

**TABLE 2.0-1**
**SUMMARY OF NOP COMMENTS**

| Interested Party/Agency | Date | Summary of Comment (s) |
|---|---|---|
| Dayne L. Frary, P.G., California Department of Conservation, Division of Oil, Gas, and Geothermal Resources | September 29, 2014 | • The proposed projects are situated in the SW/4 of Section 14 and the NW/4 of Section 23 in T25S, R25E. The sites are not located within the boundaries of any oil field, and no wells are known to have been drilled within the boundaries of either proposed project. |
| Katy Sanchez, Native American Heritage Commission (NAHC) | September 25, 2014 | • The NAHC recommends the contacting of the appropriate regional archaeological Information Center for a record search.<br>• If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.<br>• Contact the NAHC for a Sacred Land File Check and a list of the appropriate Native American contacts for consultation.<br>• The lack of surface evidence of archeological resources does not preclude their subsurface existence and lead agencies should include mitigation for unknown archeological resources, cultural resources, and Native American human remains. |
| Jeffery R. Single, PhD, California Department of Fish and Wildlife (CDFW) | October 14, 2014 | • The CDFW has determined that the site has appropriate habitat for nesting, denning, or foraging opportunities for the San Joaquin kit fox, Swainson's hawk, and the burrowing owl.<br>• The CDFW is a trustee agency under CEQA and a responsible agency over projects that result in the "take" of any listed species.<br>• The CDFW provides potential impacts and recommendations for the San Joaquin kit fox, Swainson's hawk, burrowing owl, and nesting birds.<br>• THE CDFW recommends consulting with the US Fish and Wildlife Service for potential impacts to the federally listed San Joaquin kit fox. |

| Interested Party/Agency | Date | Summary of Comment (s) |
|---|---|---|
| Alec Kimmel, California Department of Transportation (Caltrans) | October 17, 2014 | • The project could have impacts to the SR 99/Woollomes Avenue interchange, and a traffic study is needed.<br>• The traffic study should reference the Caltrans Guide for the Preparation of Traffic Impact Studies, with the scope of the study sent to Caltrans before the traffic study is conducted. |

## 2.5 SUMMARY OF ENVIRONMENTAL IMPACTS

**Table 2.0-2** presents a summary of project impacts and proposed mitigation measures that would avoid or minimize potential impacts. In the table, the level of significance of each environmental impact is indicated both before and after the application of the recommended mitigation measure(s).

For detailed discussions of all project impacts and mitigation measures, the reader is referred to the topical environmental analysis in Section 4.0.

**TABLE 2.0-2**
**SUMMARY OF IMPACTS AND MITIGATION MEASURES**

| Impact | | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
|---|---|---|---|---|---|
| **4.1 Aesthetics** | | | | | |
| **Impact 4.1.1** | Implementation of the proposed project would result in conversion of the project site from vacant open land agricultural use to residential and commercial uses. | LTS | None required. | | LTS |
| **Impact 4.1.2** | The proposed project is not located adjacent to or near an identified scenic highway. | NI | None required. | | NI |
| **Impact 4.1.3** | The proposed project would introduce new sources of lighting and glare that could adversely affect existing and proposed development in the vicinity of the project site. | PS | **MM 4.1.3a** | The project applicant shall prepare and submit a detailed exterior lighting plan showing conformance with Sections 20.10.140 and 20.12.80 of the Delano Municipal Code. All external lighting shall be indicated on project improvement plans, subject to review and approval by the City of Delano, and the applicant shall comply with said approved plans in the construction and operation of the project. | LTS |
| | | | **MM 4.1.3b** | All proposed buildings on the project site will use non-reflective materials in order to reduce the potential for daytime glare. These building materials shall be reviewed and approved by the Planning Director. | |
| **Impact 4.1.4** | The proposed project, in combination with cumulative development in the region, would add to the urbanization of the project area, resulting in a visual change in Delano. | LTCC | None required. | | LTCC |

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| Impact | | Level of Significance Without Mitigation | Mitigation Measure | Resulting Level of Significance |
|---|---|---|---|---|
| **4.2 Agriculture and Forestry Resources** | | | | |
| **Impact 4.2.1** | Implementation of the proposed project would result in the loss of approximately 110 acres of land identified as Grazing Land. | LTS | None required. | LTS |
| **Impact 4.2.2** | Implementation of the proposed project would not result in or prematurely trigger the cancellation of Williamson Act contracts. | LTS | None required. | LTS |
| **Impact 4.2.3** | Implementation of the proposed project would not be located in an area identified as forestland and would not result in the loss of forestland. | NI | None required. | NI |
| **Impact 4.2.4** | Implementation of the proposed project would introduce nonagricultural land uses in an area adjacent to active agricultural uses. | LTS | None required. | LTS |
| **Impact 4.2.5** | Implementation of the proposed project, in combination with other approved, proposed, and reasonably foreseeable projects, would not result in the direct or indirect conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use. | LTCC | None required. | LTCC |
| **Impact 4.2.6** | Implementation of the proposed project, in combination with other approved, proposed, and reasonably foreseeable projects, would not result in the direct and indirect | NI | None required. | NI |

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| Impact | | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
|---|---|---|---|---|---|
| | conversion of forestland to nonagricultural use. | | | | |
| **4.3 Air Quality** | | | | | |
| **Impact 4.3.1** | Construction activities such as off-road construction equipment, construction vehicle traffic, asphalt paving, and painting would generate ozone precursor emissions that would temporarily affect local air quality for adjacent land uses. | PS | **MM 4.3.1** | In accordance with SJVAPCD Rule 9510, a detailed air impact assessment (AIA) shall be prepared detailing the specific construction requirement (i.e., equipment required, hours of use, etc.) and operational characteristics associated with the proposed on- and off-site improvements. In accordance with this rule, emissions of $NO_x$ from construction equipment greater than 50 horsepower used or associated with the development project shall be reduced by 20 percent from baseline (unmitigated) emissions. The project will demonstrate compliance with Rule 9510, including payment of all applicable fees, before issuance of the first building permit. To reduce short-term air quality impacts attributable to the proposed project, the following measures shall be implemented:<br>• During all construction activities through the year 2021, all diesel-fueled construction equipment including, but not limited to, rubber-tired dozers, graders, scrapers, excavators, asphalt paving equipment, cranes, and tractors shall be California Air Resources Board (CARB) Tier 3 Certified or better as set forth in Section 2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 of the Code of Federal Regulations.<br>• During all construction activities after the year 2021, all diesel-fueled construction equipment including, but not limited to, rubber-tired dozers, graders, scrapers, excavators, asphalt paving equipment, cranes, and tractors shall be California Air Resources Board (CARB) Tier 4 Certified as set forth in Section 2423 of Title 13 of the California | LTS |

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| Impact | | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
|---|---|---|---|---|---|
| | | | | Code of Regulations, and Part 89 of Title 40 of the Code of Federal Regulations.<br>• All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. Equipment maintenance records shall be kept on-site and made available upon request by the SJVAPCD or the City of Delano.<br>• The project applicant shall comply with all applicable SJVAPCD rules and regulations. Copies of any applicable air quality permits and/or monitoring plans shall be provided to the City. | |
| **Impact 4.3.2** | Construction activities such as clearing, excavation and grading operations, construction vehicle traffic, and wind blowing over exposed earth would generate exhaust and fugitive particulate matter emissions that would temporarily affect local air quality for adjacent land uses. | LTS | None required. | | LTS |
| **Impact 4.3.3** | Project-generated operational emissions would exceed applicable significance thresholds. | PS | **MM 4.3.2** | In accordance with SJVAPCD Rule 9510, a detailed air impact assessment (AIA) shall be prepared detailing the operational characteristics associated with the proposed project. In accordance with this rule, operational emissions of $NO_X$ and $PM_{10}$ shall be reduced by a minimum of 33.3 percent and 50 percent, respectively. Emissions reductions are in comparison to the project's operational baseline (unmitigated) emissions. The project will demonstrate compliance with Rule 9510, including payment of all applicable fees, before issuance of the first building permit.<br>Based on the findings of the AIA, the applicant shall | SU |

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| Impact | | Level of Significance Without Mitigation | Mitigation Measure | Resulting Level of Significance |
|---|---|---|---|---|
| | | | pay to the SJVAPCD a monetary sum necessary to offset the required operational emissions that are not reduced by the emission reduction measures contained in the AIA. The quantity of operational emissions that need to be offset will be calculated in accordance with the methodologies identified in Rule 9510, Indirect Source Review, and approved by the SJVAPCD. Operational emissions reduction methods will be selected under the direction of the SJVAPCD according to the AIA process detailed in and required by Rule 9510, Indirect Source Review (see Rule 9510, subsection 5). Methods for reducing operational emissions include, but are not limited to, a new bus or other public transit service provided every hour or within a quarter mile of the project, a project site connection with a Class I or Class II bike lane, and/or the provision of a pedestrian access network that internally links all project land uses and connects to existing external streets and pedestrian facilities. | |
| **Impact 4.3.4** | Implementation of the project would not contribute to localized concentrations of mobile-source carbon monoxide (CO) that would exceed applicable ambient air quality standards. | LTS | None required. | LTS |
| **Impact 4.3.5** | Implementation of the proposed project would not result in increased exposure of existing sensitive land uses to pollutant concentrations that would exceed applicable standards. | LTS | None required. | LTS |
| **Impact 4.3.6** | The proposed project would not include sources that could create objectionable odors affecting a substantial number of people or | LTS | None required. | LTS |

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SU = Significant and Unavoidable

| Impact | | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
|---|---|---|---|---|---|
| | expose new residents to existing sources of odor. | | | | |
| **Impact 4.3.7** | The proposed project would not conflict with the population growth assumptions used to develop the emissions inventories of SJVAPCD air quality attainment plans. | NI | None required. | | NI |
| **Impact 4.3.8** | The proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter. | PCC | See mitigation measure **MM 4.3.3**. | | PCC/SU |
| **Impact 4.3.9** | Implementation of the proposed project, in combination with cumulative development in the vicinity of the proposed project site, would result in a cumulatively considerable net increase of toxic air contaminants. | LTCC | None required. | | LTCC |
| **4.4 Biological Resources** | | | | | |
| **Impact 4.4.1** | Implementation of project-related activities could result in substantial adverse effects, either directly or through habitat modifications, to species identified as candidate, sensitive, or special-status species in local or regional plans, policies, regulations, or by CDFW or USFWS. | PS | **MM 4.4.1a** | **Preconstruction Surveys.** Preconstruction surveys for special-status wildlife species (i.e., blunt-nosed leopard lizard, burrowing owl, San Joaquin antelope squirrel, Tipton kangaroo rat, San Joaquin kit fox, and American badger) shall be conducted by a qualified biologist no more than 14 days prior to ground disturbance. If any evidence of occupation of the project site by special-status animal species is observed, a buffer shall be established by a qualified biologist that results in sufficient avoidance to comply with applicable regulations. If sufficient avoidance cannot be established, the CDFW and the USFWS shall be contacted for further guidance and | LTS |

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PCC = Potentially Cumulatively Considerable
SU = Significant and Unavoidable

| Impact | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
|---|---|---|---|---|
| | | | consultation on additional measures. The project proponent shall obtain any required permits from the appropriate wildlife agency. Copies of the preconstruction survey and results, as well as required permits and evidence of compliance with applicable regulations, shall be submitted to the City of Delano.<br>The following buffer distances shall be established prior to construction activities:<br>• San Joaquin kit fox or American badger potential den: 50 feet<br>• San Joaquin kit fox known den: 100 feet<br>• San Joaquin kit fox or American badger pupping den: contact the CDFW and the USFWS<br>• Burrowing owl burrows outside of breeding season (February 1–August 31): as recommended by the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012)<br>• Burrowing owl burrows during breeding season: as recommended by the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012)<br>• Other protected raptor/migratory bird nests during breeding season (March 15–August 15): as recommended by qualified biologist<br>• Other special-status wildlife species: as recommended by qualified biologist | |
| | | **MM 4.4.1b** | **Worker Environmental Awareness Training.** If any evidence of occupation of the project site by special-status species is observed during the preconstruction survey, the project proponent shall retain a qualified biologist to conduct mandatory contractor/worker awareness training for project personnel. The awareness training will be provided to all personnel to brief them on the identified location of sensitive | |

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| Impact | Level of Significance Without Mitigation | Mitigation Measure | | Resulting Level of Significance |
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| | | | biological resources, including how to identify species (visual and auditory) most likely to be present and the need to avoid impacts to biological resources (e.g., plants, wildlife, and jurisdictional waters), and to brief them on the penalties for not complying with biological mitigation requirements. If new personnel are added to the project, the project proponent will ensure that they receive the mandatory training before starting work. | |
| | | **MM 4.4.1c** | **Avoidance and Minimization Measures.** The following measures shall be implemented throughout project implementation:<br>a) If any San Joaquin kit fox dens are found during preconstruction surveys, the status of dens shall be evaluated no more than 14 days prior to project ground disturbance. Provided that no evidence of kit fox occupation is observed, potential dens shall be marked and a 50-foot avoidance buffer delineated using stakes and flagging or other similar material to prevent inadvertent damage to the potential den. If a potential den cannot be avoided, it may be hand excavated following USFWS standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance. If kit fox activity is observed at a den, the den status shall be changed to "known" per USFWS (2011) guidelines, and the buffer distance shall be increased to 100 feet. Absolutely no excavation of San Joaquin kit fox known or pupping dens shall occur without prior authorization from the USFWS and the CDFW.<br>b) To enable kit foxes and other wildlife to pass through the project site during construction, the perimeter security fence shall leave a 4- to 5-inch opening between the fence mesh and the ground | |

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| | | or the fence shall be raised 4 inches above the ground. The bottom of the fence fabric shall be knuckled (wrapped back to form a smooth edge) to protect wildlife that passes under the fence.<br>c) All pipes, culverts, or similar structures with a diameter of 4 inches or more that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS has been consulted. If necessary, under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity until the fox has escaped.<br>d) To prevent inadvertent entrapment of San Joaquin kit foxes, badgers, or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or provided with escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape. If listed species are trapped, the USFWS and the CDFW shall be contacted.<br>e) If San Joaquin kit fox known or pupping dens are observed in project areas, the project proponent shall contact the USFWS and the CDFW to discuss appropriate actions.<br>f) All vertical tubes used in project construction, such as chain-link fencing poles, shall be temporarily or | |

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| | | permanently capped at the time they are installed to avoid the entrapment and death of special-status birds.<br>g) Project-related vehicles shall observe a 15 mile per hour (mph) speed limit in all project areas, except on county roads and state and federal highways. Construction after sundown shall be prohibited. Off-road traffic outside of designated project areas shall be prohibited.<br>h) All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and removed at least once a week from the construction or project site.<br>i) No pets shall be allowed in project areas.<br>j) The use of herbicides for vegetation control in project areas shall be restricted. No rodenticides shall be used on the project. All uses of such herbicidal compounds shall observe label and other restrictions mandated by the US Environmental Protection Agency, California Department of Food and Agriculture, and federal and state legislation as well as additional project-related restrictions deemed necessary by the CDFW and/or the USFWS.<br>k) No plants or wildlife shall be collected, taken, or removed from the construction areas except as necessary for project-related vegetation removal or wildlife relocation. Salvage of native vegetation to be removed from construction areas is encouraged, but shall only be performed by qualified biologists and with written approval from the CDFW.<br>**MM 4.4.1d** **Agency Notification for Presence of Listed Species.** During project construction, if Tipton kangaroo rats, San Joaquin kit foxes, San Joaquin antelope squirrels, | |

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| | | | or blunt-nosed leopard lizards are found within the project area, temporary fencing shall be installed around the perimeter of the ground disturbance zone to prevent individuals from entering the construction zone. If the above species are found within the disturbance zone, work in the vicinity of the animal shall cease until a qualified biologist is on-site to determine the appropriate measures to be taken. Concurrent with this effort, the USFWS and the CDFW shall be consulted regarding any additional avoidance, minimization, or mitigation measures that may be necessary. Once the sensitive species is observed leaving the site, work in the area can resume. A report shall be prepared by the biologist to document the activities, and a copy of the report shall be submitted to wildlife and resource agency representatives and the City of Delano. | |
| **Impact 4.4.2** | Implementation of project-related activities will not result in the disturbance, degradation, and/or removal of riparian habitat or sensitive natural communities. | LTS | None required. | LTS |
| **Impact 4.4.3** | Implementation of project-related activities will not result in the disturbance, degradation, and/or removal of federally protected wetlands. | LTS | None required. | LTS |
| **Impact 4.4.4** | Implementation of project-related activities will not result in the disturbance, degradation, and/or removal of federally protected wetlands. | LTS | None required. | LTS |
| **Impact 4.4.5** | Implementation of project-related activities will not conflict with any | NI | None required. | NI |

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| | local policies or ordinances protecting biological resources. | | | | |
| **Impact 4.4.6** | Implementation of project-related activities will not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. | NI | None required. | | NI |
| **Impact 4.4.7** | Implementation of project-related activities will not reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels. | LTS | None required. | | LTS |
| **Impact 4.4.8** | The proposed project, in combination with other reasonably foreseeable projects, could result in mortality and loss of habitat for special-status species. | PCC | Project-related construction may result in disturbance to blunt-nosed leopard lizards, San Joaquin antelope squirrels, Tipton kangaroo rats, American badgers, San Joaquin kit foxes, burrowing owls, and/or other nesting migratory birds. Project-specific minimization measures would result in avoidance of these effects, and the project will not combine with other reasonably foreseeable development to create a significant cumulative effect. Implementation of mitigation measures **MM 4.4.1a** through **MM 4.4.1d** will reduce the proposed project's impact. | | LTCC |
| **4.5 Cultural Resources** | | | | | |
| **Impact 4.5.1** | The project site is located in an area containing existing historic resources. | PS | **MM 4.5.1** | If any subsurface deposits believed to be cultural or human in origin are discovered during construction, all work must halt within a 50-foot radius of the discovery. An on-site archaeological monitor or principal investigator, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology, shall be afforded | LTS |

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| | | | | a reasonable amount of time to evaluate the significance of the find. Work shall continue within a 50-foot radius of the discovery site until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either (1) not cultural in origin or (2) not potentially significant or eligible for listing on the National Register of Historic Places or California Register of Historical Resources. If a potentially eligible resource is encountered, the archaeologist, lead agency, and project proponent shall arrange for either (1) total avoidance of the resource, if possible, or (2) test excavations to evaluate eligibility and, if eligible, total data recovery as mitigation. The determination shall be formally documented in writing and submitted to the City as verification that the provisions in CEQA for managing unanticipated discoveries have been met. | |
| **Impact 4.5.2** | Implementation of the proposed project could indirectly result in the potential disturbance of undiscovered cultural resources (i.e., prehistoric sites and isolated artifacts and features) and unrecorded human remains. | PS | **MM 4.5.2** | In the event that evidence of human remains is discovered, construction activities within 50 feet of the discovery will be halted or diverted and the requirements above will be implemented. Depending on the occurrence, a larger radius may be necessary and will be required at the discretion of the on-site archaeologist. In addition, the provisions of California Health and Safety Code Section 7050.5, California Public Resources Code Section 5097.98, and Assembly Bill (AB) 2641 will be implemented. When human remains are discovered, state law requires that the discovery be reported to the county coroner (Health and Safety Code Section 7050.5) and that reasonable protection measures be taken during construction to protect the discovery from disturbance (AB 2641). If the coroner determines the remains are Native American, the coroner notifies the Native American Heritage Commission, which then | LTS |

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| | | | | designates a Native American Most Likely Descendant (MLD) for the project (Public Resources Code Section 5097.98). The MLD may not be the same person as the tribal monitor. The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Public Resources Code Section 5097.94). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Public Resources Code Section 5097.98). This will also include either recording the site with the NAHC or the appropriate Information center, using an open space or conservation zoning designation or easement, or recording a document with the county in which the property is located (AB 2641). | |
| **Impact 4.5.3** | Implementation of the proposed project could inadvertently result in the potential disturbance of paleontological resources (i.e., fossils and fossil formations) on the project site. | PS | **MM 4.5.3** | If subsurface deposits believed to be of paleontological significance are discovered during construction, all work must halt within a 50-foot radius of the discovery. An on-site paleontological monitor, meeting the Secretary of the Interior's Professional Qualification Standards for paleontology shall be retained by the project applicant, and shall be afforded a reasonable amount of time to evaluate the significance of the find. Work cannot continue at the discovery site until the paleontologist conducts sufficient research and data collection to make a determination that the resource is either (1) not a paleontological resource or (2) not potentially significant. If a potentially eligible resource is encountered, the paleontologist, lead agency, and project proponent shall arrange for either (1) total avoidance of the resource, if possible, or (2) test excavations to evaluate eligibility and, if eligible, total | | LTS |

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| | | | | data recovery as mitigation. The determination shall be formally documented in writing and submitted to the City as well as the Los Angeles Museum of Natural History, as verification that the provisions in CEQA for managing unanticipated discoveries have been met. | |
| **Impact 4.5.4** | Implementation of the project, along with any foreseeable development in the project vicinity, could contribute to cumulative impacts to historic, prehistoric, and previously undiscovered human remains. | PCC | Implementation of mitigation measures **MM 4.5.1** and **MM 4.5.2** would reduce the project's contribution to cumulative impacts to historic and prehistoric resources (see impact discussions above). | | LTCC |
| **Impact 4.5.5** | Implementation of the project, along with any foreseeable development in the project vicinity, could result in cumulative impacts to undiscovered paleontological resources in areas surrounding the project site, both in Delano and in Kern County. | PCC | Implementation of mitigation measure **MM 4.5.3** would reduce the project's contribution to cumulative impacts to paleontological resources. | | LTCC |
| **4.6 Greenhouse Gases and Climate Change** | | | | | |
| **Impact 4.6.1** | The proposed project could generate greenhouse gas emissions. | LTCC | None required. | | LTCC |
| **Impact 4.6.2** | The proposed project would be consistent with the goals of AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, etc.), as the project would achieve the GHG reduction targets established in the SJVAPCD threshold. | LTCC | None required. | | LTCC |
| **4.7 Geology, Soils, and Mineral Resources** | | | | | |
| **Impact 4.7.1** | Because of the seismically active nature of the region, subsequent development associated with | PS | **MM 4.7.1** | Prior to the issuance of grading permits, a final geotechnical engineering investigation by a qualified engineer shall be prepared for review and approval by | LTS |

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| | implementation of the proposed project would inherently result in the exposure of people, structures, and infrastructure to adverse effects associated with seismic ground shaking and seismic-related ground failure. | | the City. All recommend geotechnical mitigation measures shall be incorporated into the design plans to the satisfaction of the City Engineer. | |
| **Impact 4.7.2** | Construction of the proposed project would require grading, excavating, and other ground-disturbing activities that would expose topsoil, resulting in soil erosion. | LTS | None required. | LTS |
| **Impact 4.7.3** | Project site soils were determined to have moderate expansion potential. | PS | Implement mitigation measure **MM 4.7.1.** | LTS |
| **Impact 4.7.4** | Project wastewater systems have not been determined at this time. However, Delano General Plan policies require the connection to existing wastewater facilities. | NI | None required. | NI |
| **Impact 4.7.5** | The project is not located in an area identified as a mineral resource or on lands identified as a mineral resource by the City of Delano. | NI | None required. | NI |
| **Impact 4.7.6** | Development of the proposed project, in combination with other past, present, and reasonably foreseeable future development in the region as assumed under buildout of the General Plan, could result in the cumulative exposure of persons and structures to geologic hazards as well as cumulative soil erosion. However, compliance with | LTCC | None required. | LTCC |

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| | applicable laws and regulations and common engineering practices would ensure that future development is not adversely impacted by significant geologic hazards and that soil erosion is minimized to the extent feasible. | | | | |
| **4.8 Hazards and Hazardous Materials** | | | | | |
| **Impact 4.8.1** | Implementation of the proposed project would involve limited transport, use, storage, and disposal of hazardous materials during construction and operation. | LTS | None required. | | LTS |
| **Impact 4.8.2** | The project site was used for agricultural production during the past. Agricultural practices commonly use herbicides and pesticides that are toxic to humans, the residuals of which may still occur on the project site. This, along with the well and irrigation systems remaining on-site, may be hazardous. | PS | **MM 4.8.2a** | Due to the potential for soil contamination, prior to any land disturbance activities on the project site, a Phase II Environmental Site Assessment for the entire site, including the existing retention ponds on-site, shall be completed by a qualified Phase II environmental professional. The Phase II ESA shall provide recommendations for mitigation of any environmental hazards found on-site. The project applicant shall comply with those recommendations in order to remove any potential hazard. | LTS |
| | | | **MM 4.8.2b** | Due to the potential for asbestos from buried irrigation facilities, if during construction activities, irrigation lines or other potentially hazardous materials are uncovered, all work at the project site shall immediately stop. A qualified hazardous materials professional shall be contacted in order to assess the materials for potential hazards and make recommendations for removal of the material. If the materials are determined to be hazardous, the project applicant shall comply with all recommendations and remove the hazard in accordance with federal, state, | |

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| | | | | and local laws. | |
| **Impact 4.8.3** | The project could result in an increase in the potential for mosquito breeding areas, resulting in the potential for an increase of mosquito-borne disease. | PS | **MM 4.8.3a** | During construction and operations of the project, universally applicable mosquito control best management practices shall be implemented. These shall include, but are not limited to, the following:<br>• Examine outdoor areas and drain temporary and unnecessary water that may stand longer than 96 hours.<br>• Dispose of unwanted or unused artificial containers.<br>• Properly dispose of old tires.<br>• If possible, drill drainage holes, cover, or invert any container or object that holds standing water which must remain outdoors. Be sure to check for containers or trash in places that may be hard to see, such as bushes or buildings.<br>• Clean clogged rain gutters and storm drains. Keep outdoor drains flowing freely and clear of leaves, vegetation, and other debris.<br>• Aerate ornamental ponds to avoid letting water stagnate.<br>• Change water in birdbaths and fountains at least once per week.<br>• Ensure rain and/or irrigation water does not stand in plant containers, trash cans, or other containers on commercial properties.<br>• Maintain irrigation systems to avoid excess water use and runoff into storm drains.<br>• Minimize the sites that mosquitoes can use for refuge (harborage) by thinning branches, trimming and pruning ornamental shrubs and bushes, and keeping grass mowed short. | LTS |

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| | | • Contact the Delano Mosquito Abatement District to evaluate the project site for mosquito breeding areas and work cooperatively to prevent a mosquito problem on the site.<br>**MM 4.8.3b** The project applicant shall implement the following to manage the landscaped areas at the project site:<br>• Avoid over-irrigating to prevent excess pooling and runoff.<br>• Routinely inspect, maintain, and repair irrigation system components.<br>• All underground drain pipes shall be laid to grade in order to avoid low areas that may hold water for longer than 96 hours.<br>• Backfill tire ruts or other low areas that hold water for more than 96 hours.<br>• Improve drainage channels and grading to minimize potential for standing water.<br>• Keep drainage ditches free of excessive vegetation and debris to provide rapid drainage.<br>• Check and repair leaky outdoor faucets.<br>• Report any evidence of standing water to responsible maintenance personnel.<br>• Use waterfalls, fountains, aerators, and/or mosquitofish in ponds and ornamental water features. Landowners must consult with the local mosquito control agencies or the California Department of Fish and Wildlife regarding proper use of mosquitofish.<br>• Prevent mosquito breeding in rain barrels by properly screening all openings, preventing mosquito access to the stored water.<br>• For ponds and ornamental water features where | |

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| | | mosquitofish cannot be used, the landowner shall use one of several readily available larval mosquito control products to treat water when immature mosquitoes are seen.<br>**MM 4.8.3c** Mosquito control measures for temporary and permanent stormwater control basins or other open water control areas shall be implemented on the site during construction and operations. These shall include, but are not limited to:<br>1. General Stormwater Management Mosquito Control Best Management Practices<br>a) Manage sprinkler and irrigation systems to minimize runoff entering stormwater infrastructure.<br>b) Avoid intentionally running water into stormwater systems by not washing sidewalks and driveways, washing cars on streets or driveways, etc.<br>c) Inspect facilities weekly during warm weather for the presence of standing water or immature mosquitoes.<br>d) Remove emergent vegetation and debris from gutters and channels that accumulate water.<br>e) Consider mosquito production during the design, construction, and maintenance of stormwater infrastructure.<br>f) Design and maintain systems to fully discharge captured water in 96 hours or less.<br>g) Include access for maintenance in system design.<br>h) Design systems with permanent water sources such as wetlands, ponds, sumps, and basins to minimize mosquito habitat and plan for routine | |

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| | | larval mosquito inspection and control activities with the assistance of a local mosquito control program.<br>2. Stormwater Conveyance<br>a) Provide proper grades along conveyance structures to ensure water flows freely.<br>b) Inspect on a routine basis to ensure the grade remains as designed and to remove accumulations of sediment, trash, and debris.<br>c) Keep inlets free of accumulations of sediment, trash, and debris to prevent standing water from backing up on roadways and gutters.<br>d) Design outfalls to prevent scour depressions that can hold standing water.<br>3. Stormwater Storage and Infiltration Systems (Aboveground)<br>a) Design structures so that they do not hold standing water for more than 96 hours to prevent mosquito development. Features to prevent or reduce the possibility of clogged discharge orifices (e.g., debris screens) shall be incorporated into the design. The use of weep holes is not permitted due to rapid clogging.<br>b) Provide a uniform grade between the inlets and outlets to ensure all water is discharged in 96 hours or less. Routine inspection and maintenance are required to ensuring the grade remains as designed.<br>c) Avoid the use of loose rock riprap that may hold standing water.<br>d) Design distribution pumping and containment basins with adequate slopes to drain fully. The design slope should take into consideration | |

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| | | buildup of sediment between maintenance periods.<br>4. Stormwater Structures with Permanent-Water Sumps or Basins (Belowground)<br>a) Where possible, seal access holes (e.g., pickholes in manhole covers) to belowground structures designed to retain water in sumps or basins to minimize entry of adult mosquitoes. If using covers or screens, maximum allowable gaps of 1/16 inch (2 mm) will exclude entry of adult mosquitoes. Inspect barriers frequently and replace when needed.<br>b) If the sump or basin is completely sealed against mosquitoes, with the exception of the inlet and outlet, the inlet and outlet shall be completely submerged to reduce the available surface area of water for mosquitoes to lay eggs (female mosquitoes can fly through pipes).<br>c) Where possible, design belowground sumps with the equipment necessary to allow easy dewatering of the unit.<br>d) Contact the local mosquito control program for advice with problem systems.<br>5. Stormwater Treatment Ponds and Constructed Treatment Wetlands<br>a) Whenever possible, stock stormwater ponds and constructed wetlands with mosquito-eating fish available from local mosquito control programs.<br>b) Design and maintain accessible shorelines to allow periodic maintenance and/or control of emergent and shoreline vegetation, and routine monitoring and control of mosquitoes. Emergent plant density shall be routinely | |

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| | | managed so mosquito predators can move throughout the vegetated areas and are not excluded from pond edges.<br>c) Whenever possible, design and maintain deep zones in excess of 4 feet (1.2 meters) to limit the spread of invasive emergent vegetation such as cattails. The edges below the water surface shall be as steep as practicable and uniform to discourage dense plant growth that may provide immature mosquitoes with refuge from predators and increased nutrient availability.<br>d) Use concrete or liners in shallow areas to discourage plant growth where vegetation is not necessary.<br>e) Whenever possible, provide a means for easy dewatering if needed.<br>f) Manage the spread and density of floating and submerged vegetation that encourages mosquito production (i.e., water hyacinth, water primrose, parrot's feather, duckweed, and filamentous algal mats).<br>g) If possible, compartmentalize managed treatment wetlands so the maximum width of ponds does not exceed two times the effective distance (40 feet [12 meters]) of land-based application technologies for mosquito control agents.<br>6. General Access Requirements for Stormwater Treatment Structures<br>a) All structures shall be easily and safely accessible, without the need for special requirements (e.g., Occupational Safety and Health Administration [OSHA] requirements for | |

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| | | "confined space"). This will allow monitoring and, if necessary, abatement of mosquitoes.<br>b) If utilizing covers, the design should include spring-loaded or lightweight access hatches that can be easily opened.<br>c) Provide all-weather road access (with provisions from turning a full-size work vehicle) along at least one side of large aboveground structures that are less than 7 meters wide, or both sides if shore-to-shore distance is greater than 7 meters. Note: Mosquito larvicides are applied with hand-held equipment at small sites and with backpack- or truck-mounted high-pressure sprayers at large sites. The effective swath width of most backpack- or truck-mounted larvicide sprayers is approximately 20–25 feet (6–7 meters) on a windless day.<br>d) Build access roads as close to the shoreline as possible to allow maintenance and vector control crews to periodically maintain, control, and remove emergent vegetation and conduct routine mosquito monitoring and abatement. Remove vegetation and/or other obstacles between the access road and the structure that might obstruct the path of larvicides to the water.<br>e) Control vegetation (by removal, thinning, or mowing) periodically to prevent barriers to access. | |
| **Impact 4.8.4** The project could result in an increase the potential for infection from valley fever during construction. | PS | **MM 4.8.4a** In order to reduce the potential for exposure to valley fever during construction activities, the following actions shall be implemented by the project applicant and maintained during construction by the project | LTS |

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| | | | contractor:<br>• Suspend work during period of high winds or dust storms.<br>• When soil will be disturbed by heavy equipment or vehicles, wet the soil before disturbing it and continuously wet it while digging to keep dust levels down.<br>• Heavy equipment, trucks, and other vehicles generate heavy dust. Provide vehicles with enclosed, air-conditioned cabs and make sure workers keep the windows closed. Heavy equipment cabs should be equipped with high-efficiency particulate air (HEPA) filters.<br>• When digging a trench or fire line or performing other soil-disturbing tasks, position workers upwind when possible.<br>• When exposure to dust is unavoidable, require that workers wear NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA. | |
| | | **MM 4.8.4b** | To increase awareness to workers about the potential for valley fever, the following actions shall be required:<br>• Workers and supervisors shall be trained on:<br>o Symptoms of valley fever.<br>o Effective practices for preventing valley fever such as avoiding dust and working upwind of dust, using respirators when necessary.<br>o Showering as soon as possible after work to limit exposure and transport of the fungal spores.<br>• The following CDPH materials on valley fever shall be distributed to all workers and supervisors: | |

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| | | | o CDPH pamphlet *"Preventing Work-Related Coccidioidomycosis (Valley Fever)."*<br>o CDPH Valley Fever Fact Sheet. | |
| **Impact 4.8.5** | The project site is not located within one-quarter mile of an existing or proposed school site. | NI | None required. | NI |
| **Impact 4.8.6** | The project site has not been listed as a hazardous material release site. | LTS | None required. | LTS |
| **Impact 4.8.7** | The project site is located within Zone C and Traffic Pattern Zone for Delano Municipal Airport. However, commercial and residential uses are an allowed use in this zone. | LTS | None required. | LTS |
| **Impact 4.8.8** | There are no private airports in the vicinity of the proposed project site. | NI | None required. | NI |
| **Impact 4.8.9** | The proposed project would not substantially impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. | LTS | None required. | LTS |
| **Impact 4.8.10** | The project site is not designated by the California Department of Forestry and Fire Protection (Cal Fire) as a Fire Hazard Severity Zone and is not located in proximity to any wildlands. | LTS | None required. | LTS |
| **Impact 4.8.11** | Implementation of the proposed project, in combination with other existing, proposed, and reasonably foreseeable future development in | LTCC | The proposed project would not increase the exposure of persons or structures to wildland fires beyond current conditions. Mitigation identified under Impacts 4.8.2, 4.8.3, and 4.8.4 would reduce the proposed project's contribution to hazards and hazardous materials | LTCC |

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| Impact | | Level of Significance Without Mitigation | Mitigation Measure | Resulting Level of Significance |
|---|---|---|---|---|
| | the city, could cumulatively increase exposure of people, property, and the environment to hazardous materials and interference with emergency response. | | impacts under cumulative conditions. | |
| **4.9 Hydrology and Water Quality** | | | | |
| **Impact 4.9.1** | Construction activities associated with the proposed project could result in erosion and water quality degradation of downstream surface water and groundwater resources. Compliance with the requirements of the SWRCB's Construction General Permit would minimize the potential for such degradation. | LTS | None required. | LTS |
| **Impact 4.9.2** | Operation of the proposed project would introduce sediments and other contaminants typically associated with urban development into stormwater runoff, potentially resulting in the degradation of downstream surface water and groundwater quality. Implementation of proposed water quality treatment facilities and compliance with the post-construction standards of the SWRCB's General Construction Permit would minimize the potential for such degradation. | LTS | None required. | LTS |
| **Impact 4.9.3** | The proposed project would introduce impervious surfaces in the form of structures and parking lots to a previously undeveloped piece of land. This would result in an | LTS | None required. | LTS |

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| | incremental reduction in recharge of the local groundwater aquifer. | | | | |
| **Impact 4.9.4** | The proposed project would increase stormwater runoff and alter drainage patterns on the project site. However, the project proposes a drainage system to effectively manage drainage on the site to prevent erosion/sedimentation and localized flooding. | PS | Implement mitigation measure **MM 4.9.5.** | | LTS |
| **Impact 4.9.5** | Development is proposed within the portion of the site designated by FEMA as a special flood hazard area. | PS | **MM 4.9.5** | The project applicant shall be required to adhere to the following:<br>• All structures shall be elevated a minimum of 1 foot above the base flood elevation (BFE) as approved by the City of Delano. The BFE(s) shall be determined based on an analysis prepared for the developer, at the developer's expense, utilizing methods and procedures approved by the National Flood Insurance Program (NFIP) and shall be based on a fully developed project condition.<br>• Prior to recordation of a final map, or as otherwise determined by the City, the project applicant shall obtain a Letter of Map Revision (LOMR) from FEMA for project site areas currently zoned within Zone A. The LOMR shall identify the area of the proposed development that has been removed from the "Zone A" FEMA designation and shall be submitted to the City.<br>• The developer shall have prepared an analysis of the floodplain encroachment resulting from this project (in conjunction with all existing, proposed, and future developments), subject to the approval of the City of Delano. The resultant maximum encroachment shall not exceed 1 foot at any point | LTS |

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| | | | within the floodplain.<br>• The floodplain analysis prepared for this Environmental Impact Report (EIR) should be considered preliminary, as it is based on a conservative hydrologic determination of peak flows that may impact the project and the surrounding area. The base flood elevations may be revised on submittal to, review by, and approval of revised hydrologic and hydraulic analysis by the City of Delano.<br>• Any fencing or walls along the southern side of the project shall be designed so that floodwaters can pass through the fence structures. | |
| **Impact 4.9.6** | The project site is located approximately 50 miles west of Lake Isabella Dam. In addition, Lake Woollomes and the Friant-Kern Canal, which are retained by levees, are located 4.5 miles east of the project site. Failure of the dam or levees could result in inundation of portions of the project site. | LTS | None required. | LTS |
| **Impact 4.9.7** | The project site is not located in an area that is affected by seiches or tsunamis. | NI | None required. | NI |
| **Impact 4.9.8** | The project site is located in an area with flat topography. With an elevation gain of approximately 6 feet on the project site, the potential for mudflow does not exist. | NI | None required. | NI |
| **Impact 4.9.9** | The proposed project, in combination with existing, approved, proposed, and reasonably | LTCC | None required. | LTCC |

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| | foreseeable development in the Tulare Lake Hydrologic Region, would alter drainage conditions, rates, volumes, and water quality, which could result in potential flooding and stormwater quality impacts within the overall watershed. | | | | |
| **4.10 Land Use** | | | | | |
| **Impact 4.10.1** | Implementation of the proposed project would not physically divide an established community. | NI | None required. | | NI |
| **Impact 4.10.2** | Implementation of the proposed project would not result in inconsistencies with adopted plans and policies intended to avoid or mitigate physical environmental effects. | LTS | None required. | | LTS |
| **Impact 4.10.3** | The project site is not within the boundaries of or otherwise subject to any habitat conservation plans or natural community conservation plans. | NI | None required. | | NI |
| **Impact 4.10.4** | The project would introduce growth into an area that is currently undeveloped and could encourage growth on lands outside of the city. | LTCC | None required. | | LTCC |
| **4.11 Noise** | | | | | |
| **Impact 4.11.1** | Construction of the proposed project could result in exposure of persons to or generation of noise levels in excess of the City of Delano's | PS | **MM 4.11.1a** | The applicant shall require by contract specifications that the following construction best management practices (BMPs) be implemented by contractors to | LTS |

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| General Plan Noise Element or Noise Ordinance standards. | | reduce construction noise levels:<br>• Notification shall be mailed to owners and occupants of all developed land uses immediately bordering or directly across the street from the project site providing a schedule for major construction activities that will occur for the duration of the construction period. In addition, the notification will include the identification of and contact number for a community liaison and a designated construction manager who would be available on-site to monitor construction activities. The construction manager will be located at the on-site construction office during construction hours for the duration of all construction activities. Contact information for the community liaison and the construction manager will be located at the construction office, City Hall, and the police department.<br>• Noise-generating exterior construction activity shall be limited to weekdays between 7:00 AM and 7:00 PM and Saturdays between 9:00 AM and 6:00 PM., with no construction on Sundays or federally recognized holidays. Loading, unloading, and other exterior activities are prohibited in other than the above-noted hours. Interior construction that does not result in audible noise at the property lines may be allowed outside of the above-noted hours.<br>• The best available technology shall be utilized to reduce noise levels from construction activities, including but not limited to the use of noise blankets or temporary sound barriers.<br>• Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in | |

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| | | | | accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation. | |
| | | | **MM 4.11.1b** | The applicant shall require by contract specifications that construction staging areas, along with the operation of earthmoving equipment within the project site, are located as far away from vibration- and noise-sensitive sites as possible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed and approved by the City. | |
| **Impact 4.11.2** | Operation of stationary equipment and project-related traffic could result in exposure of persons to or generation of noise levels in excess of the City of Delano's General Plan Noise Element or Noise Ordinance standards. | PS | **MM 4.11.2a** | All heating, ventilation, and air conditioning (HVAC) systems shall be screened such that noise levels do not exceed the City's stationary noise standard of 55 dBA at the project's residential uses. | LTS |
| | | | **MM 4.11.2b** | Prior to issuance of a certificate of occupancy, the applicant shall prepare an acoustical analysis ensuring that interior noise levels due to exterior noise sources will be at or below 45 dBA CNEL in all units. One or a combination of the following measures will be incorporated as necessary to ensure interior noise will be at or below 45 dBA CNEL:<br>• Construct an exterior solid masonry wall along Woollomes Avenue and Albany/Stradley Street.<br>• Limit opening and penetrations on portions of buildings impacted by noise.<br>• Apply noise insulation to walls, roofs, doors, windows, and other penetrations.<br>• Install dual-paned windows. For some units, it may be necessary for the windows to be able to remain closed to ensure that interior noise levels meet the interior standard of 45 dBA CNEL. Consequently, a ventilation or air conditioning system would be required for these units to provide a habitable | |

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| | | | interior environment with the windows closed. | |
| **Impact 4.11.3** | Construction and operation activities associated with the proposed project would not generate or expose persons off-site to excessive groundborne vibration. | LTS | None required. | LTS |
| **Impact 4.11.4** | Operation of the proposed project would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in the project vicinity. | PS | No feasible mitigation available. | SU |
| **Impact 4.11.5** | The project site is located within Zone C and Traffic Pattern Zone for Delano Municipal Airport. However, the proposed project is not within the 60 dBA CNEL airport noise contour. | LTS | None required. | LTS |
| **Impact 4.11.6** | Long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels. | PCC | None feasible. | PCC/SU |
| **4.12 Population and Housing** | | | | |
| **Impact 4.12.1** | Implementation of the proposed project would result in an increase of 3,670 new residents in Delano. | LTS | None required. | LTS |
| **Impact 4.12.2** | Implementation of the proposed project would occur on vacant property and would not result in the displacement of a substantial number of housing or people. | NI | None required. | NI |

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| **Impact 4.12.3** | The proposed project, in combination with other existing, approved, proposed, and reasonably foreseeable development in Delano and the region, could result in substantial growth inducement. | LTCC | None required. | | LTCC |
| **4.13 Public Services and Utilities** | | | | | |
| **Impact 4.13.1.1** | Implementation of the proposed project would increase demand for fire protection services, which could trigger the need for additional fire stations, the construction of which could result in impacts on the physical environment. | LTS | None required. | | LTS |
| **Impact 4.13.1.2** | Implementation of the proposed project, in combination with other development in the city, would increase demand for fire protection and emergency medical services. | PCC | **MM 4.13.1.1** | The project applicant shall dedicate land not to exceed 0.75 acres to the City within the West Pavilion project site for potential development of a future fire station by the City and/or Kern County Fire Department. The project applicant shall not be responsible for planning and construction of the fire station, only the dedication of land described above. Any future development of a fire station will be the responsibility of the City, in coordination with the Kern County Fire Department. | LTCC |
| **Impact 4.13.2.1** | Implementation of the proposed project would increase demand for law enforcement services, which may trigger the need for additional law enforcement personnel, equipment, and facilities, the construction of which could result in impacts on the physical environment. | LTS | None required. | | LTS |

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| **Impact 4.13.2.2** | Implementation of the proposed project, in combination with other development within the City of Delano, would increase demand for law enforcement services. | LTCC | None required. | LTCC |
| **Impact 4.13.3.1** | Implementation of the proposed project would result in the generation of school-aged children that may require the construction of new public school facilities, the construction of which could have impacts on the physical environment. | LTS | None required. | LTS |
| **Impact 4.13.3.2** | Implementation of the proposed project, in combination with other development in the DUSD and DJUHSD service areas, would result in the generation of additional students. Each project would be required to pay development fees on a project-by-project basis, which would fund school facility construction. | LTCC | None required. | LTCC |
| **Impact 4.13.4.1** | Implementation of the proposed project would increase demand for park and recreation facilities, the construction of which could result in impacts on the physical environment. | LTS | None required. | LTS |
| **Impact 4.13.4.2** | Implementation of the proposed project, in combination with other development in the city, would result in a cumulative increase in | LTCC | None required. | LTCC |

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| | demand for parkland and recreational facilities, the construction of which could impact the physical environment. | | | | |
| **Impact 4.13.5.1** | The project proposes residential uses that may increase the demand for library services in the city. | LTS | None required. | | LTS |
| **Impact 4.13.5.2** | Implementation of the proposed project, in combination with other development in the city, would result in a cumulative increase in demand for library services and/or facilities, the construction of which could impact the physical environment. | LTCC | None required. | | LTCC |
| **Impact 4.13.6.1** | The proposed project would require the construction of wastewater conveyance infrastructure within the project site, but would not require off-site construction or expansion of facilities. Wastewater flows from the proposed project would not exceed the capacity of the Delano WWTP, so no new or expanded facilities are needed. | LTS | None required. | | LTS |
| **Impact 4.13.6.2** | The proposed project will increase the demand for water at the project site. The existing water system cannot adequately meet future water demands in the city with development of the proposed project. | PS | **MM 4.13.6.1** | The proposed project shall dedicate a 125-foot by 125-foot lot to the City within the Vineyard at Delano project site for development of a future 1,000 gpm well. The City will credit the project applicant the cost of the proposed well site from the development impact fees. | LTS |
| **Impact 4.13.6.3** | The proposed project includes | LTS | None required. | | LTS |

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| | drainage improvements and the construction of new stormwater drainage infrastructure, the construction of which could result in significant environmental effects. These effects are addressed in the appropriate technical sections of this EIR and, where necessary, are mitigated to a less than significant level with mitigation measures identified in this EIR. | | | |
| **Impact 4.13.6.4** | The proposed project would be served by area landfills with sufficient permitted capacity to serve the project. | LTS | None required. | LTS |
| **Impact 4.13.6.5** | The proposed project would need new on-site infrastructure but would not require new or upgraded public infrastructure for the conveyance and treatment of sewage. However, development of the proposed project would require the development of water supply facilities (well) under future conditions. | PCC | Implement mitigation measure **MM 4.13.6.1.** | LTCC |
| **Impact 4.13.6.6** | The proposed project would increase the amount of storm drainage to the city's storm drainage system. | LTCC | None required. | LTCC |
| **Impact 4.13.6.7** | The proposed project would add solid waste to the city's waste stream, which would be sent to regional landfills, but not in amounts that would be cumulatively considerable. This impact is less than | LTCC | None required. | LTCC |

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| | cumulatively considerable. | | | | |
| **4.14 Traffic and Circulation** | | | | | |
| **Impact 4.14.1** | The proposed project would result in significant increases in level of service at the study intersections. | PS | **MM 4.14.1a** | The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be reviewed and approved by the City's Public Works Department and/or Caltrans (where required).<br>a) Garces Highway/Albany Street<br>• Restripe the existing northbound approach to have a dedicated left turn lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.<br>b) Woollomes Avenue/Home Depot Driveway East<br>• Restrict the southbound left and through movement through the intersection. These vehicles could use the existing signalized intersection at the Home Depot Driveway West.<br>c) Woollomes Avenue/SR 99 northbound ramps<br>• Restripe the northbound through lane to a shared left plus through lane.<br>• Restripe the eastbound through lane to a shared left plus through lane.<br>• Widen the northbound on-ramp to accommodate two lanes at its split with High Street. Prior to the SR 99 mainline, the second on-ramp lane can merge to a single lane. This would accommodate two lanes of on-ramp traffic from the existing eastbound left turn lane and the new left turn plus shared lane. | SU |

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| | | | • Modify the traffic signal to have a split phase for the eastbound and westbound approaches.<br>**MM 4.14.1b** The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be reviewed and approved by the City's Public Works Department and/or Caltrans (where required).<br>a) Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps<br>• Restripe the existing two-lane westbound segment, approximately 100 feet west of the southbound off-ramp, to a three-lane segment. This segment would become a six-lane divided segment. There is adequate pavement width to accommodate this lane striping improvement.<br>b) Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps<br>• Convert the existing two-lane divided segment to a four-lane divided segment. | |
| **Impact 4.14.2** | Development of the proposed project would not result in conflicts with the air traffic patterns of the Delano Municipal Airport. | LTS | None required. | LTS |
| **Impact 4.14.3** | The proposed project would not result in or create other significant design hazards. | LTS | None required. | LTS |
| **Impact 4.14.4** | Implementation of the proposed project would not result in inadequate emergency access within the project area. | LTS | None required. | LTS |
| **Impact 4.14.5** | Implementation of the proposed | LTS | None required. | LTS |

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| | project would not disrupt or interfere with existing or planned transit, bicycle, or pedestrian facilities. | | | | |
| **Impact 4.14.6** | The proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would exceed the capacity of the city's roadway network or exceed the level of service standard. | PCC | **MM 4.14.6a** | The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.<br>a) Garces Highway/Albany Street<br>• Restripe the southbound right turn lane to a shared through plus right turn lane.<br>• Restripe the eastbound approach to have a shared left plus through lane and a dedicated right turn lane. Some minor widening of the approach may be required.<br>• Restripe the westbound approach to have a shared left plus through lane and a dedicated right turn lane. There is adequate pavement width to accommodate this lane striping improvement.<br>b) Garces Highway/Dover Place<br>• Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.<br>c) 1st Avenue/Dover Place<br>• Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.<br>• Convert the intersection to an all-way stop- | | PCC/SU |

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| | | controlled intersection.<br>d) Woollomes Avenue/Albany Street<br>• Modify the signal to have a right turn overlap phase for the westbound approach.<br>e) Woollomes Avenue/Belmont Street<br>• Construct a separate northbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.<br>• Construct a separate southbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.<br>f) Woollomes Avenue/Grapevine Driveway<br>• Restripe the northbound approach to have a separate left turn lane, a shared left plus through plus right turn lane, and a dedicated right turn lane. There is adequate right-of-way to implement this improvement.<br>• Stripe third eastbound through lane.<br>• Construct a second (dual) westbound left turn lane.<br>• Stripe a third westbound through lane.<br>g) Woollomes Avenue/Dover Parkway<br>• Modify the signal to have a right turn overlap phase for all approaches.<br>h) Woollomes Avenue/SR 99 southbound ramps<br>• Restripe the southbound approach to have a single left turn lane, a shared left plus through plus right turn lane, and dual right turn lanes.<br>• Convert the eastbound dual right turn lanes to free (movement) dual right turn lanes.<br>• This intersection is listed in the Development | |

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| | | Impact Fee Program; therefore payment of the Fee would mitigate the project's impact.<br>**MM 4.14.6b** The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.<br>a) Woollomes Avenue, Stradley Avenue-Albany Street to Belmont Street<br>• Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).<br>b) Woollomes Avenue, Belmont Street to Grapevine Driveway<br>• Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).<br>c) Woollomes Avenue, Grapevine Driveway to Dover Parkway<br>• Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).<br>d) Woollomes Avenue, Dover Parkway to Home Depot Driveway East<br>• No feasible mitigation<br>e) Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps<br>• No feasible mitigation<br>f) Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps<br>• No feasible mitigation | |

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| | | **MM 4.14.6c** The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.<br>a) SR 99 northbound on-ramp at Woollomes Avenue<br>• Construct a second on-ramp lane between Woollomes Avenue and SR 99.<br>b) SR 99 northbound off-ramp at Woollomes Avenue<br>• Construct a second off-ramp lane between Woollomes Avenue and SR 99.<br>c) SR 99 southbound on-ramp at Woollomes Avenue<br>• Construct a second on-ramp lane between Woollomes Avenue and SR 99.<br>d) SR 99 southbound off-ramp at Woollomes Avenue<br>• Construct a second off-ramp lane between Woollomes Avenue and SR 99. | |

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# 3.0 Project Description

## 3.1 REGIONAL LOCATION AND VICINITY

The City of Delano Vineyard at Delano and Delano West Pavilion Projects is a combination of two separate projects. The projects to be analyzed in the Environmental Impact Report (EIR) include the Vineyard at Delano (Vineyard) residential project and the Delano West Pavilion (West Pavilion) residential and commercial project. The project sites are located adjacent to each other on the eastern side of the Stradley Avenue/Albany Street and Woollomes Avenue intersection (**Figure 3.0-1**). Delano is located in Kern County, approximately 30 miles northwest of Bakersfield on State Route (SR) 99. Regional access to the project site would be provided via SR 99. Delano is the largest city in the immediate area, followed by McFarland, which is located approximately 5 miles to the south.

### PROJECT SITE AND IMMEDIATE VICINITY

The project site is located in the southwestern portion of Delano. The project site is roughly L-shaped and approximately 110 acres in size and includes parcels within the city (Vineyard; APNs 521-010-019 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion; APN 521-040-43). The Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial (GC). The West Pavilion project site is currently within the jurisdiction of Kern County, with a Kern County General Plan land use designation of Intensive Agriculture and zoned as Exclusive Agriculture. The Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial.

### SURROUNDING LAND USES

Surrounding land uses include agriculture, commercial, and public facilities. To the west of the 33-acre Vineyard at Delano site is fallow agriculture land under the jurisdiction of Kern County. These lands are designated by Kern County as Intensive Agriculture. The areas east and north of the project site are located in the City of Delano. To the north is a combination of vacant and residential land, with a City General Plan designation of Low Residential and zoning of Single-Family Residential (R-1). The land to the east of the Vineyard site is also vacant, but has recently been approved for commercial land uses by the City as the future Grapevine commercial development project. To the south is the 77-acre West Pavilion site. Areas east of the Vineyard site include General Plan designations of Commercial and zoning designations of Community Retail Commercial.

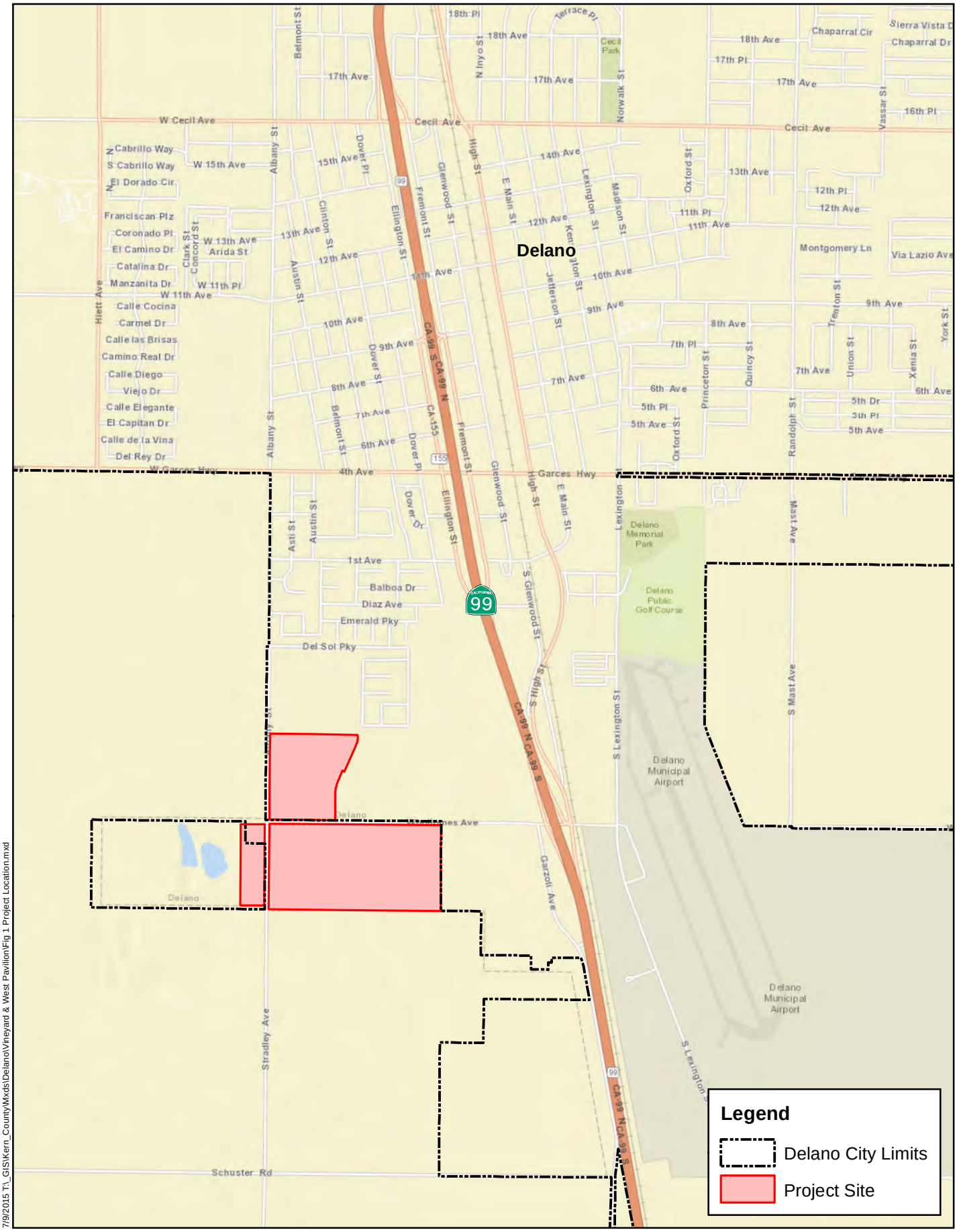
In addition to the Vineyard at Delano site, the West Pavilion site is also bordered by the recently City-approved Grapevine commercial development project to the north. The land directly east of the West Pavilion site has been developed as commercial/retail uses. Areas east of the West Pavilion site have General Plan designations of Commercial and Industrial and zoning of Community Retail Commercial and Industrial. The lands to the immediate west of the West Pavilion site have a Delano General Plan designation of Community Facility and are the location of the McFarland-Delano Transfer Station and Landfill and the Sunset Waste Paper Transfer Station and drainage sump. The areas to the south of the West Pavilion site are within the jurisdiction of Kern County, with a County designation of Intensive Agriculture and Solid Waste Facilities. This area once accommodated the McFarland-Delano Sanitary Landfill (MDSL) (also known as the Delano #2 Landfill); however, this landfill has been closed since 1996 (CalRecycle 2014). Currently, the Delano Soccer Park operates adjacent to the southern boundary of the West Pavilion site.

Delano Municipal Airport is located approximately 1 mile west of the site.

## 3.2 PROJECT OBJECTIVES

Consistent with California Environmental Quality Act (CEQA) Guidelines Section 15124(b), a clear statement of objectives and the underlying purpose of the project are to be discussed. The following is a statement of the project objectives based on information provided by the project applicant:

- To develop commercial and residential projects on the subject property that are consistent with the City's General Plan.
- To provide commercial and residential development that can be adequately served by public services and utilities in a feasible manner.
- To substantially reduce sales dollar leakage out of the city.
- To provide a commercial retail shopping center on a large, undeveloped lot in close proximity to an existing highway, near other commercial services and residential areas, in order to minimize vehicle travel distances and to utilize existing infrastructure to the fullest extent possible.
- To provide a retail development that meets the current and future unmet demand for goods and services from current and future consumers residing in the city.
- To provide a commercial retail shopping center that serves both the local and regional market areas to attract new customers and retailers into the city.
- To provide a commercial development that results in a net fiscal benefit to the city by generating new sales tax revenue from Delano residents and by increasing property tax revenues.
- To create a commercial development that can capture existing "pass-by" trip on State Route 99, thereby bringing new revenue to the city.
- To provide goods and services at a local site, thereby reducing the number of vehicles trips currently being made to shop for the same goods and services in neighboring cities.
- To provide a commercial development that creates new jobs for the city.
- To create a well-constructed, visually pleasing residential product that will serve Delano residents far into the future.




7/9/2015 T:_GIS\Kern_County\Mxds\Delano\Vineyard & West Pavilion\Fig 1 Project Location.mxd

Michael Baker INTERNATIONAL

0 500 1,000 2,000 Feet

Source: ESRI Streetmap, 2015

# Project Location

Figure 3.0-1

## 3.3 PROJECT CHARACTERISTICS

As discussed above, the project analyzed in this EIR is a combination of two development projects. One, the Vineyard at Delano project, is an all-residential project, while the other, the Delano West Pavilion project, is a combination residential and commercial project. While each of the projects is described separately, the actual "project" analyzed in this EIR is the combination of both projects. All environmental analysis is based on the development aspects/attributes of the combined projects.

### Vineyard at Delano

The Vineyard at Delano project site is 33 acres in size and is currently fallow land. This land was used for agricultural purposes in the past; however, it is no longer used for that purpose. The Vineyard at Delano project proposes 432 multi-family low-rise apartment (one- and two-story) units in 36 separate apartment buildings (**Figure 3.0-2**). Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center. All parking for the project would be accommodated on-site. **Table 3.0-1** identifies the phasing, unit count, and parking for the Vineyard project.

**TABLE 3.0-1**
**VINEYARD AT DELANO PROJECT**

| Phase | Number of Buildings | Unit Count | | |
|---|---|---|---|---|
| | | Total Units | 1 Bedroom | 2 Bedroom |
| I | 9 | 108 | 24 | 84 |
| II | 9 | 108 | 20 | 88 |
| III | 9 | 108 | 20 | 88 |
| IV | 9 | 108 | 20 | 88 |
| **Project Totals** | **36** | **432** | **84** | **348** |

### Delano West Pavilion

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past, though it is no longer used for that purpose and is in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of commercial and restaurant space, as shown in **Table 3.0-2**. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

**TABLE 3.0-2**
**DELANO WEST PAVILION PROJECT**

| Phase | Number of Buildings | Residential Units | | | Commercial (Sq. Ft.) |
|---|---|---|---|---|---|
| | | Total Units | 1 Bedroom | 2 Bedroom | |
| I | 24 | 220 | 48 | 172 | — |
| II | 23 | 220 | 44 | 176 | — |
| III | 12 | — | — | — | 170,000 |
| IV | 9 | — | — | — | 170,000 |
| **Project Totals** | **68** | **440** | **92** | **348** | **340,000** |

## PROJECT PHASING

It is anticipated that construction of the projects would be phased over an approximately 10-year time frame. The first phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard site. As shown in **Table 3.0-1**, residences would be constructed in four phases, each phase resulting in the development of 108 units. It is estimated that construction of each phase would last approximately 18 months. Thus, the Vineyard site would be completed in approximately three to four years.

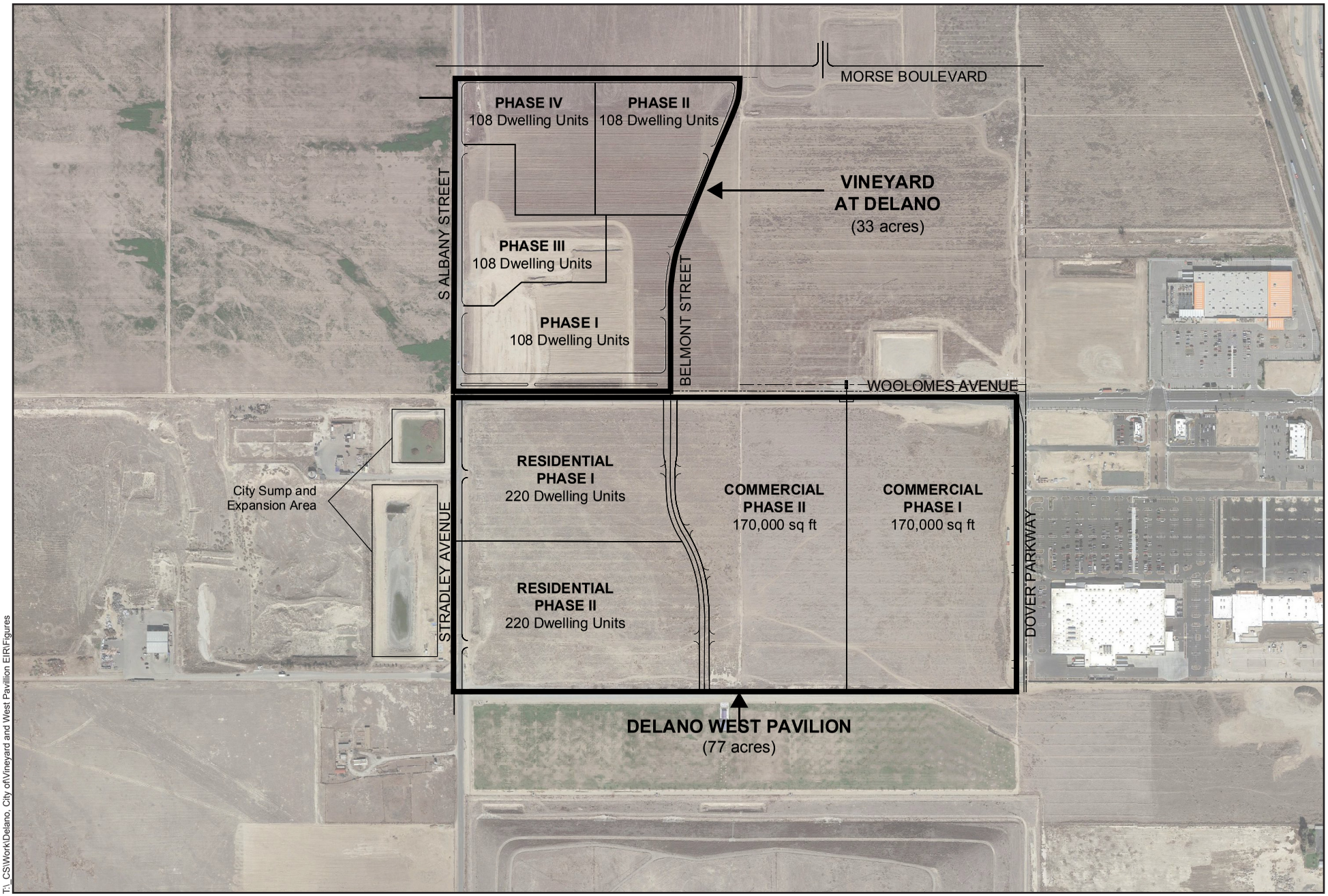
The Delano West Pavilion site would begin construction following the completion of the Vineyard at Delano site and last approximately six years. The Delano West Pavilion site would similarly be developed in four phases as shown in **Table 3.0-2**. Overlap and timing of the phases may also occur subject to market conditions at that time.

## PROJECT REQUIRED ZONING AMENDMENTS AND ANNEXATIONS

The Vineyard project site is currently designated in the City of Delano General Plan as Medium Residential and zoned General Commercial (GC). Approval of the proposed project would necessitate a zoning amendment for the Vineyard at Delano site from GC to Multiple-Family Residential (R-3).

The West Pavilion project site is currently within the jurisdiction of Kern County. It is zoned Exclusive Agriculture by the County and has the Kern County General Plan land use designation of Intensive Agriculture. The City of Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial. Approval of the proposed project would require annexation of the West Pavilion site by the City and prezoning of the West Pavilion site to GC and R-3.

See **Figures 3.0-3** and **3.0-4** for General Plan land use and zoning designations on the project site.




T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

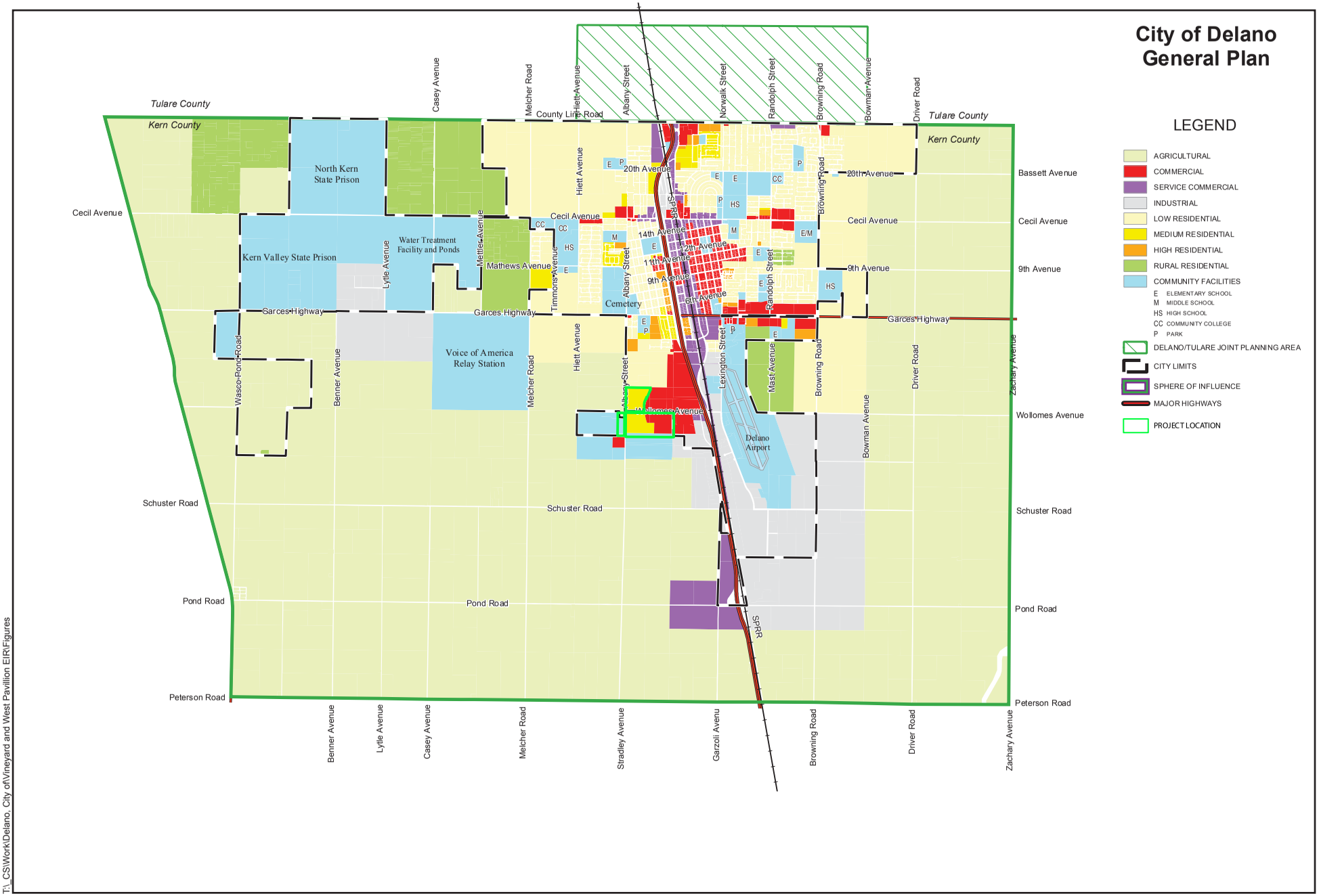
Michael Baker INTERNATIONAL

Not to scale

Source: PMC and YK America

# Site Plan

Figure 3.0-2




T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

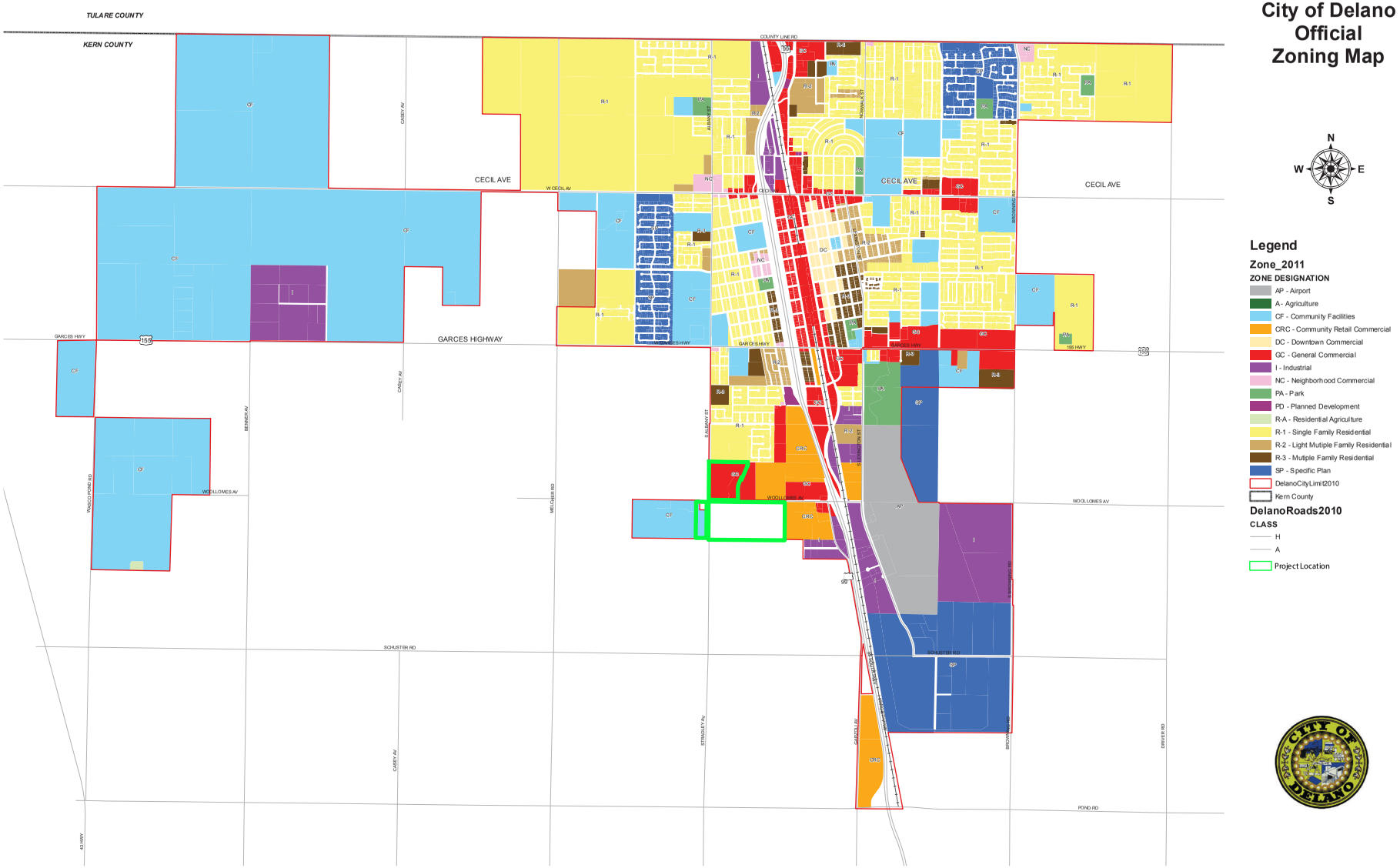
Michael Baker INTERNATIONAL

0 0.4 0.8 1.6 Miles

Source: City of Delano

# City Delano General Plan Land Use Map

Figure 3.0-3




T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

Michael Baker INTERNATIONAL

0 0.25 0.5 1 Miles

Source: City of Delano

# City of Delano Zoning Map

Figure 3.0-4

### SITE DRAINAGE

The project site contains no natural drainage channels. Under existing conditions, stormwater runoff from the project site is minimal due to the level topography and the fallow agricultural land on the project site. The proposed drainage system for the project will consist of various underground lateral mains connecting to 54-inch reinforced concrete piping, which will convey stormwater to an existing retention basin on City-owned land at the southwest corner of Woollomes Avenue and Stradley Avenue.

All stormwater from the proposed project site will be routed to this stormwater retention basin. The basin would be expanded by 33.4 acre-feet of volume to accommodate the stormwater runoff from a 25-year–24-hour storm event. The water will be retained in the basin and disposed of by percolation into the ground. The stormwater basin would continue to be owned and maintained by the City of Delano.

### CIRCULATION

The project site would be served by Woollomes Avenue and Dover Parkway. Woollomes Avenue runs between the Vineyard and West Pavilion sites in an east–west manner, and Dover Parkway runs along the eastern border of the sites. Woollomes Avenue provides access to SR 99.

The project proposes the extension of Belmont Street, which would bisect the project sites in a north–south direction, forming a new intersection at Woollomes Avenue and providing access between the Vineyard development and the West Pavilion development.

### LANDSCAPING AND LIGHTING

Landscaping and lighting would be included as a component of project design. Screening trees and shrubs are proposed to be planted and maintained along Woollomes Avenue and the proposed Belmont Street and throughout the new development.

On-site lighting would be provided on all areas of the project site, as needed for safety, security, and aesthetics. City of Delano Municipal Code Sections 20.10.140 and 20.12.80 require developments to reduce any nighttime lighting impact. These sections require proper shielding and illumination standards in order to direct lighting away from neighboring residential uses.

### PUBLIC SERVICES

The project site would receive service from the existing service providers, including the following:

- City of Delano for potable water, storm drainage in the public right-of-way (applicant will provide on-site drainage), and wastewater collection
- Southern California Edison for electricity
- Southern California Gas Company for natural gas

### OFF-SITE IMPACT AREAS

The project will connect to the City's existing storm drainage retention facilities located on Stradley Avenue adjacent to the West Pavilion site. In order to provide storm drainage for the

proposed project, the City's stormwater drainage retention facility will be expanded by 33.4 acre-feet of volume. The expansion of the retention basin will entail the movement of approximately 74,000 cubic yards of dirt. Approximately 24,000 cubic yards of this dirt will be graded and compacted on the City stormwater basin site to construct the expanded retention basin. Approximately 50,000 cubic yards will be excavated and transported to the West Pavilion site for use as fill. Connection of the proposed project storm drainage facilities to the retention basins also requires undergrounding new stormwater drainage piping beneath Stradley Avenue, which will require the demolition and reconstruction of Stradley Avenue at the connection site.

## 3.4 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS FROM OTHER PUBLIC AGENCIES

### PROJECT RELATIONSHIP TO EXISTING PLANNING DOCUMENTS

#### General Plan

California state law requires cities and counties to prepare a general plan describing the location and types of desired land uses and other physical attributes in the city or county. General plans are required to address land use, circulation, housing, conservation, open space, noise, and safety. The Delano General Plan is the City's basic planning document and provides a comprehensive, long-term plan for physical development in the city. As previously stated, the General Plan designates the Vineyard project site as Medium Residential and the West Pavilion site as Medium Residential and Commercial. The Medium Residential land use designation provides for a land use pattern characterized predominantly by small-scale multiple-family residential developments. The typical residential pattern includes duplexes and larger-scale, high-amenity apartments. This designation allows up to 14 dwelling units per gross acre. The City established the Commercial land use designation in order to ensure the provision of adequate commercial shopping opportunities and office space locations to meet anticipated needs.

The West Pavilion site is currently within the jurisdiction of Kern County and is identified as Intensive Agriculture in the County's General Plan. Approval by the City for the development of this project would require the City's annexation of the site.

#### Zoning Ordinance

The Zoning Ordinance implements the policies of the General Plan by classifying and regulating the lands uses and associated development standards in the city. The Vineyard site is currently zoned General Commercial (GC). Approval of the proposed project would require a rezone of the Vineyard site to Multiple-Family Residential (R-3).

The West Pavilion site is currently outside of the city and does not have a City of Delano zoning district identified for the parcel. The City's approval for development of the West Pavilion project would require annexation by the City as well as prezoning of the western portion to R-3 and the eastern portion to GC.

### PERMITS AND APPROVALS

This EIR will be used by the City of Delano in considering approval of the proposed project. In accordance with CEQA Guidelines Section 15126, the EIR will be used as the primary environmental document in consideration of all subsequent planning and permitting actions associated with the project, to the extent such actions require CEQA compliance. These City actions, both discretionary and ministerial, include, but are not limited to, the following:

- Zoning Map Amendment
- Pre-zoning for Annexation of Parcel in Unincorporated Kern County
- Tentative Map
- Development Agreement
- Approval of Public Improvement Plans (for streets and utilities)

In addition to the above City actions, the project may require approvals, permits, and entitlements from other public agencies for which this EIR may be used, including, without limitation, the following:

- California Department of Transportation, District 6
- California Department of Fish and Wildlife, Region 4
- Regional Water Quality Control Board, Region 5
- San Joaquin Valley Air Pollution Control District
- State Water Resources Control Board
- US Army Corps of Engineers
- US Fish and Wildlife Service

## REFERENCES

CalRecycle (California Department of Resources Recycling and Recovery). 2014. Facility/Site Summary Details: McFarland-Delano Sanitary Landfill (15-AA-0063). Accessed August 13. http://www.calrecycle.ca.gov/SWFacilities/Directory/15-AA-0063/Detail/.

Delano, City of. 2005. *City of Delano General Plan.* December 2005.

———. 2013. *Delano Zoning Ordinance, Chapter 30 of the Delano Municipal Code*. Adopted November 18, 2013. https://library.municode.com/index.aspx?clientId=15062.

# 4.0 Environmental Analysis

# 4.0 Introduction to the Environmental Analysis and Assumptions Used

The following is an introduction to the project-specific and cumulative environmental analysis and general assumptions used in the analysis. The reader is referred to the individual technical sections of this Draft Environmental Impact Report (Draft EIR) regarding specific assumptions, methodology, and significance criteria used in the analysis.

## Analysis Assumptions Generally Used to Evaluate the Impacts of the Project

### Baseline Environmental Conditions Assumed in the Draft EIR

Section 15125(a) of the California Environmental Quality Act (CEQA) Guidelines requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) is published. The CEQA Guidelines also specify that this description of the physical environmental conditions is to serve as the baseline physical conditions by which a lead agency determines whether impacts of a project are considered significant. For the proposed project, the physical environment as it existed at the time the NOP was published serves as the baseline.

The environmental setting conditions of the project area and the surrounding area are described in detail in the technical sections of this Draft EIR (see Sections 4.1 through 4.14). In general, these setting discussions describe the setting conditions as they existed when the NOP for the project was released in September 2014.

### Project Buildout Assumptions

The Draft EIR impact analysis is based on the proposed number of units and commercial square footage as shown in **Table 3.0-1** and **Table 3.0-2** (see Section 3.0, Project Description). The potential population of the project is based on the 2014 average household size of 4.21, as defined by the California Department of Finance (2014) for Delano.

### Approach to the Project Analysis

Sections 4.1 through 4.14 of this Draft EIR contain a description of current setting conditions (including applicable regulatory setting), an evaluation of the direct and indirect environmental effects resulting from implementation of the proposed project, identification of measures that mitigate the identified significant environmental effects, and, if applicable, identification of whether significant environmental effects of the proposed project would remain after application of proposed mitigation measures. The individual technical sections of the Draft EIR follow the following format.

#### Environmental Setting

This subsection includes a description of the physical conditions associated with the technical area of discussion, consistent with CEQA Guidelines Section 15125. As identified above, the existing setting is based on conditions as they existed when the NOP for the project was released.

#### Regulatory Setting

This subsection describes applicable federal, state, regional, and local plans, policies, laws, and regulations that apply to the technical area of discussion.

### Impacts and Mitigation Measures

The Impacts and Mitigation Measures subsection of each technical section identifies direct and indirect environmental effects associated with implementation of the proposed project and identifies proposed measures to mitigate environmental effects, where applicable. Environmental effects are determined by comparing the existing environmental setting with buildout of the proposed project. A statement is included in each impact discussion identifying the level of significance the impact will have before and after mitigation. Standards of significance are identified and utilized to determine whether identified environmental effects are considered "significant" and require the application of mitigation measures. Each environmental impact analysis is supported by substantial evidence included in the discussion.

Feasible mitigation measures that could minimize significant adverse impacts are discussed, after which the impact discussion notes whether the impact has been mitigated to a less than significant level or remains significant and unavoidable. CEQA requires that mitigation to lessen the environmental impact be feasible. CEQA Guidelines Section 15126.4(a)(1) states, "An EIR shall describe feasible measures which could minimize significant adverse impacts..." Feasible is defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Public Resources Code Section 21061.1).

## APPROACH TO THE CUMULATIVE IMPACT ANALYSIS

### Definition of Cumulative Setting

CEQA Guidelines Section 15130(a) requires that an EIR "discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." CEQA Guidelines Section 15130(b) states, "The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact."

For this project, the cumulative setting conditions considered in this Draft EIR generally encompass the cumulative setting conditions considered in the City of Delano General Plan (adopted December 2005) and include buildout of the development projects shown in **Table 4.0-1**. However, the cumulative setting varies for each environmental issue area, depending on the resources affected and any relevant boundaries, such as the San Joaquin Valley Air Basin for air quality resources. Each technical section of the Draft EIR includes a description of the geographic extent of the cumulative setting for that resource based on the characteristics of the environmental issues under consideration as set forth in CEQA Guidelines Section 15130(b).

**TABLE 4.0-1**
**CUMULATIVE PROJECTS**

| Project | Type | Units/Size |
|---|---|---|
| Grapevine Commercial | Shopping Center | 329,000 sq. ft. |
| Delano Vineyard Plaza Shopping Center Phases I & II | Shopping Center | 657,342 sq. ft. |
| Commercial-Industrial Parcels (Millennium III, LLC) | General Light Industrial | 17.65 acres |
| Pacific Holt Corp. (Tract 6470) | Single-Family Detached | 165 dwelling units |
| Ennis Homes (Tract 6327) | Single-Family Detached | 128 dwelling units |
| Kern County Housing Authority/Self-Help Enterprises | Single-Family Detached | 84 dwelling units |
| Belmont Meadows Apartments | Low-Rise Apartments | 70 dwelling units |

## Consideration of Cumulative Impacts

Each technical section in the Draft EIR considers whether the project's effect on anticipated cumulative setting conditions is cumulatively considerable (i.e., a significant effect). The determination of whether the project's impact on cumulative conditions is considerable is based on applicable public agency standards, consultation with public agencies, and/or expert opinion.

## REFERENCES

DOF (California Department of Finance). 2014. *E-5 Population and Housing Estimates for Cities, Counties and the State, January 1, 2011–2014 with 2010 Benchmark*.

# 4.1 AESTHETICS

This section describes the existing visual character of Delano and the project site, including existing sources of light and glare as well as existing views of the project site from surrounding vantage points. The impact analysis focuses on potential project impacts on the aesthetics and visual character of the project site and the overall change in character of the project area that would occur with implementation of the proposed project. The discussion in this section is based on site reconnaissance, photo documentation, aerial photographs, and review of existing policy documents, including the 2005-2020 City of Delano General Plan.

## 4.1.1 ENVIRONMENTAL SETTING

### REGIONAL SETTING

A small but growing community of approximately 52,591 people, Delano is located along the southern boundary of Tulare County in northwestern Kern County. The city is situated in the rich farmland of the San Joaquin Valley and is surrounded by agricultural uses. The city is approximately 10 miles from the western foothills of the Sierra Nevada to the east and 25 miles from the Coast Range Mountains to the west. The topography in the northwestern portion of Kern County, including the city, is typical of the relatively flat gradient encountered throughout the San Joaquin Valley, with uniform east- to west-trending slopes of about 3 to 10 feet per mile. The average elevation of Delano is 300–325 feet above sea level.

Delano does not have any actual surface water that runs through it, though irrigation canals traverse peripheral properties. Lake Woollomes, located approximately 4.5 miles southwesterly of the city, is a storage facility for the Friant-Kern Canal.

State Route (SR) 99 bisects the city, with commercial and industrial uses lining the highway. Delano serves as the regional commercial and service to the smaller communities of Earlimart, Wasco, and McFarland, which are all located within 15 miles of Delano. Approximately 70 percent of the housing in the city is single-family homes.

### VISUAL CHARACTER OF THE PROJECT SITE

The 110-acre project site is located on the east side of South Albany Road/Stradley Avenue and is split by Woollomes Avenue. Located in a relatively undeveloped portion of southwestern Delano, the site was previously used for agricultural uses but is now fallow, vacant land. The project site is generally flat and covered with ruderal vegetation, with no trees. Retention basins are located on the northwestern corner of the Vineyard at Delano project site and the southwestern portion of the West Pavilion project site. Both the Vineyard at Delano and West Pavilion sites have been used for illegal dumping and have an assortment of miscellaneous debris located on the edges of the project site. The project site is absent of structures except for agricultural wells/pumps located near the retention basins. No water features (i.e., rivers, streams, lakes) are located on the project site with the exception of the two retention basins.

#### Surrounding Land Uses

Surrounding land uses include agriculture, commercial, and public facilities. To the west of the 33-acre Vineyard at Delano site is fallow agricultural land under the jurisdiction of Kern County. To the north is a combination of vacant and residential land, which is designated Low Residential by the City. The land to the east of the Vineyard site is also vacant but has recently

been approved for commercial land uses by the City as the future Grapevine commercial development project. To the south is the 77-acre West Pavilion site.

In addition to the Vineyard at Delano site, the West Pavilion site is also bordered by the recently City-approved Grapevine commercial development project to the north. The land directly east of the West Pavilion site is also being developed with commercial uses. The lands to the immediate west of the West Pavilion site are the location of the McFarland-Delano Transfer Station and Landfill and the Sunset Waste Paper Transfer Station. The areas to the south of the West Pavilion once accommodated the Delano #2 landfill; however, this landfill has been closed since 1996 (CalRecycle 2014). Currently, the Delano Soccer Park operates adjacent to the southern boundary of the West Pavilion site.

#### SCENIC VISTAS, PUBLIC VIEWS, AND SIGNIFICANT VISUAL FEATURES

Scenic vistas, public views, and significant features are visually important aesthetic qualities of value to a community. These may include beaches, waterways, rolling hills, fields, or mountains that constitute the overall visual essence of a region. The Delano General Plan does not identify any areas considered to be scenic vistas that need to be protected and preserved within the city. Additionally, the project site is not considered to be in an area of significant visual qualities, nor does it have any significant visual features.

#### LIGHT AND GLARE

The project site is currently undeveloped and does not provide any sources of light or glare. Existing lighting in the project area is dominated by lit signage, exterior building lighting, and parking lot lighting at the commercial uses east of the project site.

### 4.1.2 REGULATORY SETTING

#### STATE

**California Scenic Highway Program**

The State Legislature created the California Scenic Highway Program in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The state laws governing the Scenic Highway Program are found in Section 260 of the Streets and Highways Code. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated.

There are no officially designated scenic highways in the vicinity of the project site (Caltrans 2014).

#### LOCAL

**City of Delano 2020 General Plan**

The Delano General Plan (2005) includes policies intended to protect the visual character of the city and promote visually attractive development through appropriate site and architectural

design. The Community Design Element provides a number of policies and standards that are designed to establish a framework to achieve quality and compatibility in the physical design of the developed portions of the city and to enhance existing developed areas. These policies and standards address streetscape design, residential development, and commercial and industrial development. General Plan Community Design Element objectives, policies, and programs regarding scenic views and visual character include the following:

*Gateways/Streetscape Design Policies*

Policy 2. The undergrounding of utilities along the City's main corridors is a priority. In developing areas, new development projects shall place all new utility lines underground. The City will also explore a range of options for undergrounding utilities in existing developed areas.

Policy 3. Preserve and protect views of the Sierras/foothills from the City's major roadways. Local streets should also be oriented to maximize such views.

*Residential Development Policies*

Policy 1. Encourage innovative site planning and housing design. The features that the community would like to see include landscaped parkways and sidewalks.

Policy 2. Require site plan review procedures for all single and multi-family residential development, including provisions for building setbacks, lot coverage, parking, access and circulation, outdoor lighting, signage, architecture and landscaping.

Policy 3. Encourage the planting of street trees in new single-family and multi-family residential subdivisions.

Policy 4. The following techniques should be used in the design of single and multi-family residential development:

a. Varying front yard setbacks within the same structure;

b. Staggered and/or reversed unit plans to provide variability in the outward appearance of the building(s);

c. Building materials and design that ensure consistency with adjacent land uses and structures;

d. Adequate open space and landscaping;

e. Dense landscaping adjacent to buildings;

f. Variety of orientations to the buildings to avoid monotony; and

g. Limitation on second story views to adjacent property.

*Commercial Development*

Policy 1. Establish site plan review procedures for all commercial and industrial development, including provisions for building setbacks, lot coverage, parking, access and circulation, outdoor lighting, signage, and landscaping.

Policy 5. Buildings on a site should be linked visually through architectural style, colors and materials, signage, landscaping, design details such as light fixtures, and the use of arcades, trellis or other open structures.

Policy 6. The height and scale of new development should be compatible with that of surrounding buildings where a desirable pattern or character has been established. New development should provide a transition from the height of adjacent structures to the maximum height of new development.

Policy 12. Buildings shall be designed with a precise concept for adequate signage. Signs shall be integrated into the design of buildings and should complement the architecture. All signage should be compatible with the building and site design relative to colors, materials and placement, and shall respect established architectural and/or historical character.

## City of Delano Municipal Code

Section 20.2.80 provides design review criteria for nonresidential and residential subdivision projects in the city. The City implemented this design review to ensure that construction of new buildings or structures and additions, renovations, conversions, and restorations to existing buildings or structures, including residential, institutional, commercial, and industrial development, do not have an adverse aesthetic, health, safety, or architecturally related negative impact on existing adjoining properties or the city in general.

Section 20.12.80 addresses light and glare in the city. This section requires that no operation, activity, sign, or lighting fixture create illumination which exceeds 0.5 foot-candles on any adjacent property, whether or not the illumination is from a direct or indirect light source. All lighting is required to be designed to project downward and may not create glare on adjacent properties.

Section 20.10.140 discusses lighting requirements and standards in the city. This section of the Municipal Code requires that lighting be shielded and directed away from surrounding residential uses. There are height restrictions and illumination restrictions for both residential land and nonresidential uses in the city.

Section 20.10.280 establishes scenic resources regulations that are intended to protect, preserve, and enhance the aesthetic resources of the city by incorporating design considerations which minimize interference with the preservation of unique natural resources, roadside views, and scenic corridors. The scenic resources regulations may be applied to areas with unique views of mountain and valley areas or any other aesthetic natural land formations. Section 20.10.280 includes the following development standards:

a. *Building and Structure Placement.* The building and structure placement shall be compatible with and shall not detract from the visual setting or obstruct significant views.

b. *Setbacks.* Intensive land development proposals, including, but not limited to, residential facilities, commercial, and industrial activities, shall be designed to blend into the natural landscape and maximize visual attributes of the natural vegetation and terrain. The design of such development proposals shall also provide for maintenance of a natural open space parallel to the right-of-way. This represents the visible land area outside the highway right-of-way, which may be described as the "view from the road."

c. *Access Drives.* Right-of-way access drives shall be minimized. Developments involving concentrations of commercial activities shall be designed to function as an integral unit with common parking and right-of-way access drives when feasible.

d. *Roads, Pedestrian Walkways, Parking and Storage Areas.* Large-scale development shall restrict the number of access points by providing common access roads. Parking and outside storage areas shall be screened from view, to the maximum extent feasible, from adjacent scenic or recreational resources by placement of buildings and structures, or by landscaping and plantings.

e. *Aboveground Utilities.* Utilities shall be constructed and routed underground except in those situations where natural features prevent the underground routing or where safety considerations necessitate aboveground construction and routing. Aboveground utilities shall be constructed and routed to minimize detrimental effects on the visual setting of the designated area. Where practical, aboveground utilities shall be screened from view from adjacent scenic or recreational resources by placement of buildings and structures.

f. *Grading.* The alteration of the natural topography of the site shall be minimized and shall, to the extent feasible and practical, avoid detrimental effects to the visual setting of the designated area and the existing natural drainage system.

g. *Storage Areas.* Outside storage areas associated with commercial or industrial activities shall be completely screened from view from the right-of-way with landscaping and plantings.

## 4.1.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

CEQA Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Have a substantial adverse effect on a scenic vista.

2) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a scenic highway,

3) Substantially degrade the visual character or quality of the site and its surroundings,

4) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

## METHODOLOGY

The following impact analysis is based on site reconnaissance and photographs of the project site and surrounding areas, as well as review of the proposed site plan and the City's General Plan and Zoning Ordinance.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Adversely Affect a Scenic Vista and Substantially Degrade the Visual Character of the Site (Standards of Significance 1 and 3)

**Impact 4.1.1** Implementation of the proposed project would result in conversion of the project site from vacant open land agricultural use to residential and commercial uses. This impact would be **less than significant.**

A scenic vista is a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Scenic vistas in the project area include views of the Sierra Nevada to the east. While the General Plan does not specifically establish important scenic vistas in the city, Gateways/Streetscape Design Policy 3 states "preserve and protect views of the Sierras/foothills from the City's major roadways. Local streets should also be oriented to maximize such views."

According to the General Plan Circulation Element, Woollomes Avenue is considered both an arterial and a collector roadway, depending on the location. Albany Street/Stradley Road is considered an arterial street. Both roadways are identified as gateway streets. The proposed project does not include the construction of major roadways in the city. Alterations to Albany Street/Stradley Road and Woollomes Avenue may be required to provide access to the Vineyard and West Pavilion sites. However, these alterations would not cause an adverse effect on views of the Sierras, as they would only include necessary improvements for traffic control such as turning lanes and/or traffic lights. As such, the proposed project would have a **less than significant** impact on scenic vistas.

The project site is vacant land covered with ruderal vegetation, with scattered areas used for illegal dumping. No trees exist on the site. The project site is located in an area with urban uses (commercial development, industrial uses (McFarland-Delano Transfer Station and Sunset Waste Paper Transfer Station), public facilities (Delano storm water retention pond, Delano Soccer Park), and agricultural uses.

The proposed project would alter the existing character of the site from vacant open land to residential and commercial uses. However, this change in character would not constitute an adverse aesthetic impact. The project site is identified as Medium Residential on the Delano General Plan land use map (Delano 2005, p. 2-10). Development of the project would be in accordance with this identified use and would continue the urban uses of adjacent properties to the east and north of the project site. Therefore, the project would be consistent with the urban growth of the area as well as consistent with the General Plan land use designations for the project site. Additionally, the project would be required to adhere to the City's design review procedures and General Plan policies regarding project design and development standards.

The proposed project's adherence to City standards and development guidelines would ensure the project would be consistent with the City's desire for the area as well as provide a product aesthetically equal to surrounding development. Therefore, the change in visual character would be **less than significant**.

Mitigation Measures

None required.

### Substantially Damage Scenic Resources on a Scenic Highway (Standard of Significance 2)

**Impact 4.1.2** The proposed project is not located adjacent to or near an identified scenic highway. The proposed project would have **no impact** on scenic resources on a scenic highway.

The California Department of Transportation (Caltrans) determines the eligibility of roadways within the state for designation as a state scenic highway. According to Caltrans, a highway may be designated scenic depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes on the traveler's enjoyment of the view.

Caltrans' scenic highway mapping program identifies adopted and eligible scenic highways throughout the state. According to this program, there are no adopted scenic highways in Kern County. State Routes 14 and 58 in the eastern part of the county are eligible state scenic highways but as of yet have not been officially designated. Neither of these roadways is near the project site. Therefore, the proposed project would have **no impact** on a scenic highway.

Mitigation Measures

None required.

### Light and Glare (Standard of Significance 4)

**Impact 4.1.3** The proposed project would introduce new sources of lighting and glare that could adversely affect existing and proposed development in the vicinity of the project site. This impact would be **potentially significant.**

The project site is located in an area with relatively low nighttime light except for existing commercial uses to the east of the project site. Construction of the proposed project would result in the introduction of new sources of glare and nighttime lighting. Current daytime glare and nighttime light sources include the existing Home Depot store and the Delano Marketplace shopping center located east of the project site. Additionally, the proposed Grapevine commercial project will be located directly east of the Vineyard at Delano site. This project will also introduce new sources of light and glare in the area.

City of Delano Municipal Code Sections 20.10.140 and 20.12.80 require developments and projects to reduce any nighttime lighting impact. These sections require proper shielding and illumination standards in order to direct lighting away from neighboring residential uses.

Daytime glare is generally associated with large windows or large expanses of unpainted metal. Because the actual building designs have not yet been determined for the project, the amount of daytime glare coming from these building cannot be determined. The proposed project would include lighting that would create nighttime lighting impacts if not shielded correctly. No detailed lighting plan was available for this analysis. Lighting that spreads to adjacent property could be considered a nuisance and contribute to the impact on nighttime views in the area. Due to the lack of building design plans and a lighting plan, the proposed project would be considered to have a **potentially significant** impact for light and glare.

Mitigation Measures

**MM 4.1.3a** The project applicant shall prepare and submit a detailed exterior lighting plan showing conformance with Sections 20.10.140 and 20.12.80 of the Delano Municipal Code. All external lighting shall be indicated on project improvement plans, subject to review and approval by the City of Delano, and the applicant shall comply with said approved plans in the construction and operation of the project.

*Timing/Implementation:* *Prior to issuance of building permits*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

**MM 4.1.3b** All proposed buildings on the project site will use non-reflective materials in order to reduce the potential for daytime glare. These building materials shall be reviewed and approved by the Planning Director.

*Timing/Implementation:* *Prior to issuance of building permits*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

Preparation and implementation of a detailed exterior lighting plan for the proposed project and the use of non-reflective building materials would reduce this impact to a **less than significant** level by minimizing potential light and glare at the project site and in surrounding areas.

### 4.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for visual resources consists of the project site, as well as all existing, approved, proposed, and reasonably foreseeable development in the immediate area. The area within this cumulative setting is characterized by residential and commercial development.

## CUMULATIVE IMPACTS AND MITIGATION MEASURES

### Cumulative Degradation of Visual Character

**Impact 4.1.4** The proposed project, in combination with cumulative development in the region, would add to the urbanization of the project area, resulting in a visual change in Delano. This impact would be **less than cumulatively considerable.**

Implementation of the proposed project, in combination with other past, present, and reasonably foreseeable future development in the broader project area, would contribute to the urbanization of the city. However, the City has not identified any areas of significant visual resources except for views of the Sierras/foothills from major streets in the city. The project site is designated as Medium Residential on the Delano General Plan land use map (Delano 2005, p. 2-10).

Development of the project would be in accordance with this identified use and would continue the urban uses of adjacent properties to the east and north of the project site. Therefore, the project would be consistent with the urban growth of the area as well as consistent with the General Plan land use designation for the project site. Additionally, the project would be required to adhere to the City's design review procedures and General Plan policies regarding project design and development standards. Adherence to the City's standards would further minimize the proposed project's contribution to degradation of visual character. Therefore, the project would not contribute to impacts to visual character and as such, would result in a **less than cumulatively considerable** impact.

#### Mitigation Measures

None required.

## REFERENCES

CalRecycle (California Department of Resources Recycling and Recovery). 2014. Facility/Site Summary Details: McFarland-Delano Sanitary Landfill (15-AA-0063). Accessed August 13. http://www.calrecycle.ca.gov/SWFacilities/Directory/15-AA-0063/Detail/.

Caltrans (California Department of Transportation). 2014. California Scenic Highway Mapping System. Accessed July 9. http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.

Delano, City of. 2005. *Delano General Plan*. Adopted December 2005. http://www.cityofdelano.org/index.aspx?nid=113.

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# 4.2 AGRICULTURE AND FORESTRY RESOURCES

This section describes the agricultural resources of the project site and discusses potential impacts focusing on the conversion of farmland, issues relating to the Williamson Act, and other changes that could result in the conversion of adjacent farmland. The following analysis is based on a review of the Delano General Plan (2005) and Kern County Important Farmland Map (DOC 2014a). Forestry resources are also addressed in this section.

## 4.2.1 ENVIRONMENTAL SETTING

According to the California Department of Conservation (DOC), Kern County had 1,595,142 acres of agricultural land in 2000, 531,203 acres of which were considered Prime Farmland. Prime Farmland is defined as land with the best combination of physical and chemical features able to sustain the long-term production of agricultural crops. These lands have the soil quality, growing season, and moisture supply needed to produce sustained high yields. By 2010, acreage of agricultural land in Kern County had fallen to 914,084 acres. However, Prime Farmland had increased to 608,789 acres (DOC 2014a).[1]

Delano is surrounded by land used for agricultural production. The agricultural community around Delano consists of both large and small farms. According to the Delano General Plan, crops grown around Delano consist of orchard fruits, grapes, almonds, cotton, and corn (Delano 2005, p. 2-2). Delano has approximately 5,000 acres of prime agricultural soil within the Urban Area Boundary as defined by the General Plan (Delano 2005, p. 2-2). The 110-acre project site currently comprises undeveloped vacant land.

A review of historic aerial photographs of the Vineyard at Delano site shows the site as vacant land in 1946. By 1956, aerial photographs indicate that all or a portion of the Vineyard site had been used for agricultural purposes. According to the Environmental Site Assessment (ESA) prepared for the project, the Vineyard at Delano site would continue to be used for dry crop or row crop agriculture through 2012 (MTA 2014, p. 9). The Vineyard site has a Delano General Plan land use designation of Medium Residential and is zoned General Commercial (GC).

A review of historic aerial photographs of the West Pavilion site shows the site as vacant land in 1946. By 1956, aerial photographs indicate that the site was vacant; however, several stormwater runoff channels were apparent in the western portion of the site. In the 1967 aerial, the site was developed for agricultural row crops, with a small pond in the southwest portion of the site. This site condition is similar in the 1972 and 1984 aerials. From 1994 to 2012, the site appears to have been fallow ground, and the small pond/retention basin was still located on the site. Additionally, a small dirt road traversed the central portion of the site in a north–south direction (MTA 2013, pp. 7–8). No structures existed on the property during this time. The West Pavilion site is currently within the jurisdiction of Kern County. It is zoned Exclusive Agriculture and has a Kern County General Plan land use designation of Intensive Agriculture. The City of Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial.

### FARMLAND CLASSIFICATION AND RATING SYSTEM

The Farmland Mapping and Monitoring Program (FMMP), administered by the California Department of Conservation (DOC), maps agricultural areas based on soil quality and land use,

[1] Totals do not include grazing land. 2010 data is the latest information available for Kern County through the DOC.

with categories such as Prime Farmland, Farmland of Statewide Importance, and Grazing Lands. More information about these classifications is provided below.

### Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program was established in 1982 to continue farmland mapping efforts begun in 1975 by the US Department of Agriculture (USDA) Natural Resources Conservation Service. The USDA's intent was to produce agricultural resource maps based on soil quality and land use across the nation. As part of the nationwide agricultural land use mapping effort, the USDA developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria, which classified land's suitability for agricultural production. Suitability included both the physical and chemical characteristics of soils and the actual land use. Important Farmland Maps are derived from the USDA soil survey maps using the LIM criteria.

Important Farmland Maps for California are compiled using the modified LIM criteria. The minimum mapping unit is 10 acres unless otherwise specified. Units of land smaller than 10 acres are incorporated into the surrounding classification. The Important Farmland Maps identify five agriculture-related categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land. According to the California Department of Conservation (2014b) Important Farmland Finder interactive mapping tool, the entire project site is considered to be Grazing Land. The DOC (2014c) defines Grazing Land as "land on which the existing vegetation is suited to the grazing of livestock."

### Storie Index Rating System

An additional method to determining farmland in California is the California Revised Storie Index. The Storie Index Rating System ranks soil characteristics according to their suitability for agriculture. Ratings range from Grade 1 soils (80 to 100 rating), which have few or no limitations for agricultural production, to Grade 6 soils (less than 10), which are not suitable for agriculture. Under this system, soils deemed less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or entirely removed. The Storie Index assesses the productivity of a soil from the following four characteristics: factor A, degree of soil profile development; factor B, texture of the surface layer; factor C, slope; and factor X, manageable features, including drainage, microrelief, fertility, acidity, erosion, and salt content. A score ranging from 0 to 100 percent is determined for each factor, and the scores are then multiplied together to derive an index rating.

According to the Custom Soil Resource Report for Kern County, California, Northwestern Part completed for the project site, approximately 54 percent of the project site comprises Garces silt loam, 38 percent is Kimberlina fine sandy loam, and 8 percent of the project site is Wasco sandy loam (NRCS 2014, p. 8) (see **Figure 4.2-1** for project soils; see **Appendix 4.7-A** for the Web Soil Survey). According to the Storie Index, the project site soils' use for agricultural production ranges from Grade Two – Good for Kimberlina fine sandy loam and Wasco sandy loam to Grade Four – Poor for Garces silt loam (NRCS 2014, p. 24).

T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

Michael Baker INTERNATIONAL

0 250 500 Feet

Source: Web Soil Survey, U.S. Department of Conservation

# Soils Map

Figure 4.2-1

### Land Capability Classification System

The Land Capability Classification (LCC) System designed by the USDA includes eight classes of land designated by Roman numerals I through VIII (NRCS 1992). The classes are arable land—suitable for cropland—in which the limitations on their use and necessity of conservation measures and careful management increase from I through IV. The criteria for placing a given area in a particular class involve the landscape location, slope of the field, and depth and texture of the soil. The remaining four classes, V through VIII, are not to be used for cropland but may have uses for pasture, range, woodland, grazing, wildlife, recreation, and aesthetic purposes. Within the broad classes are subclasses signifying special limitations such as erosion, excess wetness, problems in the rooting zone, and climatic limitations.

In order to determine the potential of the project site for agricultural use, the LCC was completed under two scenarios; one was nonirrigated land and the other was irrigated land. According to the Web Soil Survey completed for the project site (see **Appendix 4.7-A**), if the site were nonirrigated, all soil complexes on the project site would have an LCC rating of VII. Class VII soils have very severe limitations that make them unsuitable for cultivation and restrict their use mainly to grazing, forestland, or wildlife habitat. However, if the land were to be irrigated, the Garces silt loam would have a LCC rating of III, Kimberlina fine sandy loam a rating of I, and Wasco sandy loam would have a rating of II. Class I soils have few limitations that restrict their use. Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. Class III soils have severe limitations that reduce the choice of plants or require special conservation practices, or both (NRCS 2014).

### Land Evaluation Site Assessment

The Land Evaluation and Site Assessment (LESA) is an approach for rating measurable features of land resources. The California Agriculture LESA Model was developed to provide lead agencies with an optional methodology to ensure that significant effects on agricultural land conversions are quantitatively and consistently considered (Public Resources Code Section 21095). A LESA model was prepared for the proposed project to provide a site-specific evaluation of the six different factors for consideration when converting agricultural land to nonagricultural uses. These factors are discussed in detail below.

The Land Evaluation (LE) portion of the LESA model includes two separate factors: (1) the Land Capability Classification (LCC) rating, and (2) the Storie Index rating. However, the LESA refines these factors as a percentage rating. The Site Assessment (SA) portion of the LESA model rates four factors separately: project size, availability of irrigation water, surrounding agricultural land, and surrounding protected agricultural land (e.g., under a Williamson Act contract or conservation easement). The surrounding agricultural land was evaluated based on the Zone of Influence (ZOI), which is defined as the land near a given project, both directly adjoining and within one-quarter mile that is likely to influence and be influenced by the agricultural land use on the project site. The ZOI for the proposed project consists of approximately 610 acres.[2]

Of the 610 acres, approximately 158 acres are currently or have been in the recent past used for agricultural purposes. All of this acreage is under existing Williamson Act contracts, which are

[2] ZOI: 720 acres of parcels within a quarter mile of project boundary minus project site area (110 acres) = 610 acres of ZOI.

non-mandated state contracts administered by counties and cities to preserve agricultural land, as described fully below. According to the California Department of Conservation (2014c), none of the project site is under Williamson Act contract.

According to the LESA model (**Appendix 4.2-A**), the characteristics of the project site result in a project size score of 16.4, a water resource availability score of 12.0, a surrounding agricultural land score of zero, and a surrounding protected resource land score of zero. The LESA model manual calls for a score of zero when the percentage of remaining uncommitted surrounding agricultural land and surrounding protected resource land is less than 40 percent of the ZOI. In the case of the project site, approximately 26.7 percent of the ZOI is under agricultural use and is protected resource land (Williamson Act contract). When factor scores were weighted, the Site Assessment score was 28.4.

### Overall LESA Score

A single LESA score is generated after all the individual Land Evaluation and Site Assessment factors have been scored and weighted. The LESA model is weighted so that 50 percent of the total LESA score is derived from the Land Evaluation factors and 50 percent from the Site Assessment factors. The LESA model score for the proposed project site was determined to be 26.4 for the nonirrigated scenario and 55.0 for the irrigated scenario, as shown in **Table 4.2-1**.

**TABLE 4.2-1**
**FINAL LESA SCORE**

| Factor | Factor Rating (0–100 points) | X | Factor Weighting (Total = 1.00) | = | Weighted Factor Rating |
|---|---|---|---|---|---|
| LAND EVALUATION | | | | | |
| Land Capability Classification<br>Nonirrigated<br>Irrigated | <br>10.0<br>76.4 | X | 0.25 | = | <br>2.5<br>19.1 |
| Storie Index Rating | 47.6 | X | 0.25 | = | 11.9 |
| *Subtotal* | *Nonirrigated*<br>*Irrigated* | | | | *14.4*<br>*31.0* |
| SITE ASSESSMENT | | | | | |
| Project Size<br>Nonirrigated<br>Irrigated | <br>0<br>80 | X | 0.15 | = | <br>0<br>12.0 |
| Water Resource Availability | 80 | X | 0.15 | = | 12.0 |
| Surrounding Agricultural Lands | 0 | X | 0.15 | = | 0.0 |
| Protected Resource Lands | 0 | X | 0.05 | = | 0.0 |
| *Subtotal* | *Nonirrigated*<br>*Irrigated* | | | | *12.0*<br>*24.0* |
| **Total LESA Score** | **Nonirrigated** | | | | **26.4** |
| | **Irrigated** | | | | **55.0** |

*Source: DOC 1997; Michael Baker International 2014*

The California Agricultural LESA Model is designed to make determinations of the potential significance of a project's conversion of agricultural lands. Scoring thresholds are based on the total LESA score as well as the component LE and SA subscores. In this manner, the scoring thresholds are dependent on the attainment of a minimum score for the LE and SA subscores so that a single threshold is not the result of heavily skewed subscores (i.e., a site with a very high LE score but a very low SA score, or vice versa). Listed below are the scoring thresholds for the determination of significance (DOC 1997, p. 31):

- 0 to 39 points: not considered significant
- 40 to 59 points: considered significant only if LE and SA subscores are each greater than or equal to 20 points
- 60 to 79 points: considered significant unless either LE or SA subscore is less than 20 points
- 80 to 100 points: considered significant

## 4.2.2 REGULATORY SETTING

### FEDERAL

**Natural Resources Conservation Service**

Farmland Protection Policy Act

The Natural Resources Conservation Service (NRCS), a federal agency within the US Department of Agriculture, is the primary agency responsible for implementation of the Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize federal programs' contribution to the conversion of farmland to nonagricultural uses by ensuring federal programs are administered in a manner that is compatible with state, local, and private programs designed to protect farmland. The NRCS provides technical assistance to federal agencies, state and local governments, tribes, or nonprofit organizations that desire to develop farmland protection programs and policies.

Land Evaluation and Site Assessment

As discussed previously, the Land Evaluation and Site Assessment (LESA) system ranks lands for suitability and inclusion in the Farmland Protection Program. LESA evaluates several factors, including soil potential for agricultural use, location, market access, and adjacent land use. These factors are used to numerically rank the suitability of parcels based on local resource evaluation and site considerations. The LESA system has spawned many variations, including the California Agriculture LESA model described below.

### STATE

**California Department of Conservation**

The Department of Conservation (DOC) administers and supports a number of programs, including the Farmland Mapping and Monitoring Program, the California Agriculture LESA Model, and the Williamson Act. These programs are designed to preserve agricultural land and provide data on the conversion of agricultural land to urban use.

Farmland Mapping and Monitoring Program

The Important Farmland Inventory System initiated in 1975 by the US Department of Agriculture, Natural Resources Conservation Service (NRCS) classifies land based on ten soil and climatic characteristics. The Department of Conservation started a similar system of mapping and monitoring for California in 1980, known as the FMMP.

Under the California Environmental Quality Act (CEQA), the lead agency is required to evaluate agricultural resources in environmental assessments at least in part based on the FMMP. The state's system was designed to document how much agricultural land in California was being converted to nonagricultural land or transferred into Williamson Act contracts. The definitions of Important Farmland types are provided in the Farmland Mapping and Monitoring Program discussion in the Environmental Setting subsection above.

### California Agriculture Land Evaluation and Site Assessment Model

The California Agriculture LESA model was developed in 1997 based on the federal LESA system. It can be used to rank the relative importance of farmland and the potential significance of its conversion on a site-by-site basis. The California LESA model considers the following factors: land capability, Storie Index, water availability (drought and non-drought conditions), land uses within one-quarter mile, and protected resource lands (e.g., Williamson Act lands) surrounding the property. A score can be derived and used to determine if the conversion of a property would be significant. Under CEQA, lead agencies may refer to the LESA model in their environmental analysis but are not required to do so.

### Williamson Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, is a non-mandated state program administered by counties and cities to preserve agricultural land and discourage the premature conversion of agricultural land to urban uses. The act authorizes local governments and property owners to (voluntarily) enter into contracts to commit agricultural land to specified uses for 10 or more years. Once restricted, the land is valued for taxation based on its agricultural income rather than on unrestricted market value, resulting in a lower tax rate for owners. In return, the owners guarantee that these properties will remain under agricultural production for an initial 10-year period. The contract is renewed automatically unless the owner files a notice of nonrenewal, thereby maintaining a constant 10-year contract. The DOC is responsible for approving Williamson Act Easement Exchange Program agreements. Termination of a Williamson Act contract through the nonrenewal process is the preferred method to remove the enforceable restriction of the contract.

## LOCAL

### City of Delano General Plan

The Delano General Plan (2005) includes several policies to encourage agriculture and prevent the premature conversion of agricultural lands. Policies related to agriculture are as follows:

#### Land Use Element

*Residential Land Use Policies*

Policy 1. The following residential density designations shall be used:

a. Agricultural/Urban Reserve and Agriculture Preservation Area. In order to maintain the integrity of farm activities, an Agriculture Preservation Area is designated along the interior of the Delano Sphere of Influence as depicted on the General Plan map. Activities within this area are limited to those uses permitted by the exclusive agricultural zone districts of Kern County.

Open Space and Conservation Element

*Agriculture Policies*

Policy 2. New residential development shall be encouraged as infill parcels and within areas adjacent or in close proximity to existing development where infrastructure and services can be easily extended. This measure is intended to reduce the unnecessary removal of finite natural resources, such as prime soil, to reduce the cost of community services provided to residents, and to eliminate "leap frog" development.

Policy 3. Extension of urban improvements and services, including water, sewer lines and storm drain facilities, into agricultural areas shall be managed as a means to direct the location and timing of new urban development.

Policy 4. The City shall give preference to new development projects that are proposed for non-prime agricultural soils.

Policy 5. To protect human health from potential impacts due to agricultural spraying, dust, and traffic congestion, the City will encourage lower density developments adjacent to land planned for long-term agricultural uses.

### City of Delano Municipal Code

The Delano Municipal Code includes Section 20.10.270 establishing right-to-farm provisions. This section was created to conserve, protect, and encourage the development, improvement, and continued viability of agricultural land and industries for the long-term production of food and other agricultural products. Part 4 of this regulation requires that any proposed land division located within 300 feet of land zoned primarily for agricultural purposes give notice to future buyers of the City's right-to-farm provisions.

## 4.2.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

CEQA Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Natural Resources Agency, to nonagricultural use.

2) Conflict with existing zoning for agricultural use, or a Williamson Act contract.

3) Conflict with existing zoning for, or cause the rezoning of, forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).

4) Result in the loss of forestland or conversion of forestland to non-forest use.

5) Involve other changes in the existing environment, which due to their location of nature, could result in conversion of farmland to nonagricultural use.

## METHODOLOGY

### LESA Model

Preparing the LESA model is the primary method for evaluating agricultural land impacts for this project. A California Agriculture LESA Model was prepared to evaluate the impact of the conversion of the agricultural land on the project site. As discussed above, the California Agricultural LESA model is based on six different factors: two Land Evaluation factors are based on measures of soil resource quality, and four Site Assessment factors are based on a project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands.

Each of these factors are separately rated on a 100-point scale and weighted relative to one another and combined, resulting in a single numeric score, with a maximum attainable score of 100 points. The modeling was completed in accordance with the California Agriculture Land Evaluation Site Assessment Model – Instruction Manual (DOC 1997). The project score becomes the basis for making a determination of a project's potential significance, based on a range of established scoring thresholds, which are discussed further below.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Loss of Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Standard of Significance 1)

**Impact 4.2.1** Implementation of the proposed project would result in the loss of approximately 110 acres of land identified as Grazing Land (DOC 2014b). This is considered a **less than significant** impact.

As previously stated, the Department of Conservation Important Farmland Maps identifies five agriculture-related categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land. The significance threshold for Standard of Significance 1 is conversion of land identified as Prime Farmland, Unique Farmland, of Farmland of Statewide Importance to nonagricultural uses. The proposed project would result in the conversion of approximately 110 acres of land identified as Grazing Land by the DOC into urban uses, and therefore would not result in the conversion of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland.

In addition, the LESA model quantitatively evaluated the land resources on the project site under two scenarios, irrigated and nonirrigated land. Existing conditions of the project site would show the site as being nonirrigated. As shown in **Table 4.2-1**, the LESA model score for the proposed project site under the nonirrigated scenario was determined to be 26.4, and according to the Department of Conservation, LESA scores between 0 and 39 points are not considered significant.

Since the proposed project site is categorized as Grazing Land by the Department of Conservation Important Farmland Maps and would thus not result in the conversion Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, and additionally does not surpass the LESA model significance threshold of 39 points for nonirrigated land, this impact is considered **less than significant**.

Mitigation Measures

None required.

### Conflict with Williamson Act Contract (Standard of Significance 2)

**Impact 4.2.2** Implementation of the proposed project would not result in or prematurely trigger the cancellation of Williamson Act contracts. This impact is **less than significant.**

According to the DOC (2014c), no portion of the project site is under Williamson Act contract. Three adjacent parcels totaling approximately 158 acres of land are under Williamson Act contract. These three parcels (APNs 520-150-061, 520-150-079, and 250-150-095) are outside of the Delano city limits and under the jurisdiction of Kern County.

In order to terminate a Williamson Act contract, a landowner must file a notice of nonrenewal. Starting at the next contract anniversary date, the contract winds down over the remaining (usually 9-year) term, with the property taxes gradually rising to the full unrestricted rate at the end of the nonrenewal period. If the land is restricted by a Farmland Security Zone Contract, the contract winds down over the remaining 19 years, with the property taxes gradually rising to the full unrestricted rate at the end of the nonrenewal period. An immediate Williamson Act contract cancellation is an option under limited circumstances and conditions; however, this process is very costly to the landowner. Landowners may petition a city council or board of supervisors for Williamson Act contract cancellation. The board/council may grant tentative cancellation only if it makes required statutory findings. If the required findings are met, the landowner is required to pay a cancellation fee equal to 12.5 percent of the cancellation valuation (unrestricted fair market value) of the property. In some cases, the contract specifies a higher cancellation fee, and if the land is restricted by a Farmland Security Zone Contract, the cancellation fee is 25 percent.

As stated, the project site is not under Williamson Act contract. While adjacent areas are under Williamson Act contract, the project does not propose to convert these lands to urban uses. Additionally, any potential removal of Williamson Act contacts on these adjacent lands would be controlled to a certain extent because of the period of time or cost of opting out of this program. Furthermore, this land is currently zoned for agricultural uses by Kern County. Changing this zoning would be subject to Kern County regulations, as well as approval by the Kern County Board of Supervisors. Accordingly, the proposed project would result in a **less than significant** impact to land under Williamson Act contract.

Mitigation Measures

None required.

**Result in Incompatible Use That Could Result in the Loss of Forestland (Standards of Significance 3 and 4)**

**Impact 4.2.3** Implementation of the proposed project would not be located in an area identified as forestland and would not result in the loss of forestland. The project would have **no impact** in this area.

The proposed project is not located in an area identified as forestland or timberland. The project would have **no impact** in this area.

Mitigation Measures

None required.

**Result in Incompatible Use That Could Result in Conversion of Farmland to Nonagricultural Use (Standard of Significance 5)**

**Impact 4.2.4** Implementation of the proposed project would introduce nonagricultural land uses in an area adjacent to active agricultural uses. The potential for incompatibility (and secondary effect or additional conversion pressure) is considered a **less than significant** impact.

The project's compatibility with surrounding uses is largely based on the interaction of the proposed use and the extent to which adjacent land uses would be affected by this interaction. The conversion of agricultural land to nonagricultural uses is generally a result of residential/agricultural conflicts between the two uses. The only land near the project site under agricultural production is 158 acres located west of the Vineyard site.

Agricultural production can be adversely affected as a result of restrictions on pesticide, herbicide, and fungicide use, conflicts with agricultural equipment and vehicles, trespassing and pilferage, noise and odor complaints, and littering of fields. These potential land use interface conflicts can individually or cumulatively decrease the efficiency of farming operations, causing production costs to rise and make farming operation less appealing, which could induce the farmer into a land use conversion. As such, the project may result in significant impacts due to the impairment of productivity and land use conflicts.

From the perspective of the occupants of the proposed residential uses, adjacent agricultural land uses may result in a number of nuisances and perceived hazards, such as concern over pesticide, herbicide, and fungicide use on adjacent properties, odors, dust, noise, and slow-moving vehicles.

Agricultural Chemical Usage

Agricultural practices on-site and on parcels adjacent to the project area are anticipated to involve the use of restricted and nonrestricted pesticides, herbicides, and fungicides. These materials could be applied through either manual application or aerial spraying. Currently, the Kern County Department of Agriculture and Measurement Standards regulates and imposes limitations on the use of all restricted materials as part of the conditions for obtaining a permit for use. Based on state law, permit limitations would include, but are not limited to, not allowing

chemicals to drift onto adjacent properties (Food and Agricultural Code Section 12972), limiting the use of application of chemicals to periods when the pesticides are least likely to affect an adjacent land use, and requiring buffers for some restricted chemicals.

Kern County issues the permit application conditions for restricted chemicals on a case-by-case basis, taking into consideration surrounding land uses and the chemicals being applied. There is no single buffer distance that is applied to all chemicals. For instance, nonrestricted materials do not require a permit for application and include such materials as "Round-Up" and other chemicals commonly found in the household.

Agriculture Odors

Agricultural odors can come from various different types of agricultural use. For example, odors associated with dairy farm operations are generated due to the grazing activities by cows and the breakdown of manure. Odor related to orchards or row crops can come from the use of pesticides or herbicides or from other farming practices.

Fertilizer and pesticide use in agricultural areas can generate noticeable odors. The Kern County Agricultural Commissioner's Office imposes limitations on restricted pesticides as part of obtaining a permit for the use of chemicals. Limitations may include not allowing chemicals to drift to adjacent properties in accordance with Food and Agriculture Code Section 12972, limiting the use of aerial spraying of pesticides near residential land uses, and recommending the application of chemicals during periods when the pesticides are least likely to affect an adjacent land use.

As discussed above, the agricultural land adjacent to the Vineyard site is currently under Williamson Act contracts and is therefore theoretically protected from conversion to urban uses. Additionally, the Delano Municipal Code includes Section 20.10.270, which establishes right-to-farm provisions. This section was created to conserve, protect, and encourage the development, improvement, and continued viability of agricultural land and industries for the long-term production of food and other agricultural products. Part 4 of this regulation requires that any proposed land division located within 300 feet of land zoned primarily for agricultural purposes give notice to future buyers of the City's right-to-farm provisions. Because a portion of the project is the development of residential uses and these uses are adjacent to agricultural uses, the project would be subject to this requirement. As such, this is considered a **less than significant** impact.

Mitigation Measures

None required.

### 4.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

Agricultural and forestry resources are of statewide importance; as such, the cumulative setting consists of all agricultural and forestry resources in California. Throughout the state, development pressures are resulting in the conversion of thousands of acres of agricultural land. According to the latest statewide study by the FMMP (DOC 2014a), approximately 168,039 acres of

agricultural land were converted to nonagricultural use between 2008 and 2010. This acreage represents a 39 percent decrease from the 2006–2008 mapping cycle.

Based on statewide data from 2003 through 2007, the California Department of Forestry and Fire Protection (Cal Fire) annually received an average of 13 Timber Conversion Permit (TCP) applications totaling 416 acres. In addition, during this same time period, Cal Fire received an average of 13 Notices of Exemption from TCP requirements totaling 1,157 acres of timberland conversion. Finally, Cal Fire received an average of 666 notices of conversion of timberland parcels of less than 3 acres totaling 1,230 acres. This indicates that, on average, approximately 2,800 acres of timberland were converted each year between 2003 and 2007 (Cal Fire 2009).

## CUMULATIVE IMPACTS AND MITIGATION MEASURES

### Cumulative Agricultural Impacts

**Impact 4.2.5** Implementation of the proposed project, in combination with other approved, proposed, and reasonably foreseeable projects, would not result in the direct or indirect conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use. Therefore, cumulative impacts are considered **less than cumulatively considerable**.

During the two-year period between 2008 and 2010, 28,753 acres of Important Farmland (Prime Farmland, Unique Farmland, and Farmland of Statewide Importance) in Kern County were converted to urban uses. Additional agricultural acres have been converted to other uses since 2010; however, specific conversion acreage figures are not yet available. As previously discussed, implementation of the project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and thus would result in a less than significant impact. Since the project would not convert any Important Farmland, it would not contribute to the overall decline of this resource. Impacts are **less than cumulatively considerable.**

#### Mitigation Measures

None required.

### Cumulative Forestland Impacts

**Impact 4.2.6** Implementation of the proposed project, in combination with other approved, proposed, and reasonably foreseeable projects, would not result in the direct and indirect conversion of forestland to nonagricultural use. There are **no cumulative impacts.**

The proposed project is not located in an area identified as forestland or timberland. The project would have **no cumulative impact** for this topic.

#### Mitigation Measures

None required.

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This section examines the existing regional and local air quality conditions, includes a summary of applicable air quality regulations, and analyzes potential air quality impacts associated with the construction and operations of the proposed project. Mitigation measures are provided as necessary to avoid or reduce significant adverse air quality impacts.

## 4.3.1 ENVIRONMENTAL SETTING

### SAN JOAQUIN VALLEY AIR BASIN

The California Air Resources Board (CARB) has divided California into regional air basins according to topographic drainage features. Delano and the proposed project area are located in the San Joaquin Valley Air Basin (SJVAB) and are within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD).

#### Topography

The SJVAB occupies the southern two-thirds of the Central Valley and includes the western portion of Kern County. The SJVAB is mostly flat, less than 1,000 feet in elevation, and is surrounded on three sides by the Sierra Nevada, Tehachapi, and Coast Range mountains. This bowl-shaped feature forms a natural barrier to the dispersion (spreading over an area) of air pollutants. As a result, the SJVAB is highly susceptible to pollutant accumulation over time (SJVAPCD 2002b, p. 2).

#### Climate and Meteorology

The climate in the SJVAB is strongly influenced by the presence of mountain ranges. The mountains create a partial rain shadow over the valley and block the free circulation of air, trapping stable air in the valley for extended periods. The climate is semi-arid and is characterized by long, hot, dry summers and cool, wet, and foggy winters. Based on historical data obtained from the meteorological station located in Bakersfield, ambient temperatures range from an average minimum of 39˚F in January to an average maximum of 98˚F in July. The average monthly precipitation is approximately 6.24 inches per year, with January and February averaging 1.35 inches. The average daily wind speed is 5.9 miles per hour (mph). The air flow patterns are characterized by one of four directions depending on the season. For example, during the summer, winds are predominantly northwestern (upvalley), while winters typically feature a prevailing stagnant condition that leads to high incidence of valley fog (WRCC 2008, pp. 1–3; WRCC 2014; CARB 1994, p. 12).

#### Atmospheric Stability and Inversions

Stability describes the relative resistance of the atmosphere to vertical motion, which in turn mixes the air. The stability of the atmosphere is dependent on the vertical distribution of temperature with height. Unstable conditions often occur during daytime hours when solar heating warms the lower atmospheric layers while the upper layers remain cold. In contrast, an inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, which is the vertical depth available for diluting air pollution near the ground. The SJVAB experiences both surface-based and elevated inversions. The shallow surface-based inversions can be present in the morning but are often broken by daytime heating of the air layers near the ground. The deep, elevated inversions occur less frequently than the surface-based inversions but generally result in more severe air stagnation. The surface-based inversions occur more frequently in the fall, and the stronger elevated inversions usually occur during December and January. These naturally occurring conditions can make local air

quality significantly worse than they would be without the inversions and the stagnation created by regional weather and topography.

### AIR POLLUTANTS OF CONCERN

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state laws. These regulated air pollutants are known as "criteria air pollutants" and are categorized into primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxide ($NO_X$), sulfur dioxide ($SO_2$), coarse particulate matter ($PM_{10}$), fine particulate matter ($PM_{2.5}$), lead (Pb), and fugitive dust are primary air pollutants. Of these, CO, $SO_2$, $PM_{10}$, and $PM_{2.5}$ are criteria pollutants. ROG and $NO_X$ are criteria pollutant precursors and go on to form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone ($O_3$) and nitrogen dioxide ($NO_2$) are the principal secondary pollutants.

Other pollutants, such as carbon dioxide, a natural byproduct of animal respiration that is also produced in the combustion process, have been linked to such phenomena as climate change. While there are no adopted thresholds for their release, Assembly Bill (AB) 32 requires the state to reduce emissions to 1990 levels by 2020, which is discussed further in Section 4.6, Greenhouse Gases and Climate Change. These pollutants do not jeopardize the attainment status of the air basin. Sources and health effects commonly associated with criteria pollutants are summarized in **Table 4.3-1.**

**TABLE 4.3-1**
**CRITERIA AIR POLLUTANTS SUMMARY OF COMMON SOURCES AND EFFECTS**

| Pollutant | Major Man-Made Sources | Human Health & Welfare Effects |
|---|---|---|
| Carbon Monoxide (CO) | An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust. | Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death. |
| Nitrogen Dioxide ($NO_2$) | A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel. | Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere. |
| Ozone ($O_3$) | Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. VOCs are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills. | Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles and dyes. |

| Pollutant | Major Man-Made Sources | Human Health & Welfare Effects |
|---|---|---|
| Particulate Matter ($PM_{10}$ & $PM_{2.5}$) | Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others. | Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze). |
| Sulfur Dioxide ($SO_2$) | A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from oil; or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships. | Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain. |
| Lead (Pb) | Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries. | Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems. |

*Source: CAPCOA 2011*

## AMBIENT AIR QUALITY

Ambient air quality in the county can be inferred from ambient air quality measurements conducted at air quality monitoring stations. Existing levels of ambient air quality and historical trends and projections in the region are documented by measurements made by the SJVAPCD, the air pollution regulatory agency in the air basin that maintains air quality monitoring stations. The nearest air quality monitoring site to the project site is located at Walker Street in Shafter, approximately 18 miles south of the project site. This monitoring station monitors ambient concentrations of ozone. Ambient monitoring data for airborne particulates was obtained from the Bakersfield-5558 California Avenue monitoring station in Bakersfield. **Table 4.3-2** shows historical occurrences of ozone, $PM_{10}$, and $PM_{2.5}$ pollutant levels exceeding state and federal ambient air quality standards for the three-year period including 2011, 2012, and 2013. Ozone, $PM_{10}$, and $PM_{2.5}$ are the most important pollutants affecting the SJVAB.

**TABLE 4.3-2**
**AMBIENT AIR QUALITY MONITORING DATA**

| Pollutant Standards | 2011 | 2012 | 2013 |
|---|---|---|---|
| **Shafter-Walker Street Monitoring Station** | | | |
| **Ozone** | | | |
| Max 1-hour concentration (ppm) | 0.097 | 0.103 | 0.084 |
| Max 8-hour concentration (ppm) (state/federal) | 0.087 / 0.086 | 0.090 / 0.090 | 0.079 / 0.078 |
| Number of days above state 1-hour standard | 1 | 5 | 0 |
| Number of days above state/federal 8-hour standard | 43 / 18 | 64 / 30 | 3 / 1 |
| **Bakersfield-5558 California Avenue Road Monitoring Station** | | | |
| **Coarse Particulate Matter** | | | |
| Max 24-hour concentration ($\mu g/m^3$) (state/federal) | 154.0 / 97.4 | 125.8 / 99.6 | 116.9 / 120.7 |

| Pollutant Standards | 2011 | 2012 | 2013 |
|---|---|---|---|
| Number of days above state/federal standard | 116.4 / 0 | 89 / 0 | * / * |
| **Fine Particulate Matter** | | | |
| Max 24-hour concentration ($\mu g/m^3$) (state/federal) | 82.8 / 80.3 | 86.5 / 86.5 | 114.9 / 111.7 |
| Number of days above federal standard | 3 | 24.4 | 50.4 |

*Source: CARB 2014a*
*Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million*
** = No data is currently available from CARB to determine the value.*

## TOXIC AIR CONTAMINANTS

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

TACs are usually present in minute quantities in the ambient air. There are currently 250 compounds that are characterized as TACs (CDPH 2013, p. 4). Ambient concentrations and related health risks associated with the ten TACs of primary concern within the SJVAB, as defined by CARB, are summarized in **Table 4.3-3**. It is noted that the data presented in **Table 4.3-3** represents average population exposures and may not represent the health risk near local sources; localized impacts may involve exposure to different TACs or to higher or lower concentrations than the average basin-wide concentrations.

**TABLE 4.3-3**
**SUMMARY OF TOXIC AIR CONTAMINANTS WITHIN THE SAN JOAQUIN VALLEY AIR BASIN**

| Toxic Air Contaminant | Annual Average Concentration and Health Effects | | | | | |
|---|---|---|---|---|---|---|
| | Concentration[a] / Health Risk[b] | 2003 | 2004 | 2005 | 2006 | 2007 |
| Acetaldehyde | Annual Average | 1.34 | 1.14 | 1.42 | 1.33 | 1.15 |
| | Health Risk | 7 | 6 | 7 | 6 | 6 |
| Benzene | Annual Average | 0.463 | 0.372 | 0.374 | 0.362 | 0.318 |
| | Health Risk | 43 | 34 | 35 | 34 | 29 |
| 1,3 Butadiene | Annual Average | 0.095 | 0.08 | 0.082 | 0.069 | 0.065 |
| | Health Risk | 36 | 30 | 31 | 26 | 24 |

| Toxic Air Contaminant | Annual Average Concentration and Health Effects | | | | | |
|---|---|---|---|---|---|---|
| | Concentration[a] / Health Risk[b] | 2003 | 2004 | 2005 | 2006 | 2007 |
| Carbon Tetrachloride | Annual Average | 0.097 | — | — | — | — |
| | Health Risk | 26 | — | — | — | — |
| Para-Dichlorobenzene | Annual Average | 0.15 | 0.15 | 0.15 | 0.15 | — |
| | Health Risk | 10 | 10 | 10 | 10 | — |
| Formaldehyde | Annual Average | 3.02 | 2.27 | 2.52 | 2.78 | 2.51 |
| | Health Risk | 22 | 17 | 19 | 20 | 18 |
| Methylene Chloride | Annual Average | 0.14 | 0.11 | 0.12 | 0.11 | 0.1 |
| | Health Risk | <1 | <1 | <1 | <1 | <1 |
| Perchloroethylene | Annual Average | 0.033 | 0.027 | 0.032 | 0.032 | 0.026 |
| | Health Risk | 1 | 1 | 1 | 1 | 1 |
| Diesel Particulate Matter | Annual Average | — | — | — | — | — |
| | Health Risk | — | — | — | — | — |
| Average Basin Risk (without Diesel Particulate Matter) | | 157 | 111 | 114 | 105 | 90 |

*Source: CARB 2009, p. 5-69*
*Notes: — indicates no data is available.*
*a. Concentrations for hexavalent chromium are expressed as ng/m$^3$. Concentrations for all other TACs are expressed as parts per billion (ppb).*
*b. Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. Total Health Risk represents only those compounds listed in this table and only those with data for the year.*

The majority of the estimated health risk from TACs can be attributed to a relatively few compounds, with the most important being particulate matter from diesel-fueled engines. The next most important toxic air contaminants within the SJVAB include benzene and 1,3-butadiene.

## Diesel Particulate Matter

Diesel particulate matter (DPM) is a source of $PM_{2.5}$ because the size of diesel particles is typically 2.5 microns and smaller. In 1998, DPM made up about 6 percent of the total ambient $PM_{2.5}$ inventory nationwide (EPA 2002, p. 1-2). Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM exhaust is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine (EPA 2002, pp. 1-1 and 1-2). Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. Diesel particulate matter poses the greatest health risk among the TACs. For the SJVAB, the estimated health risk from DPM is 390 excess cancer cases per million people in 2000 (CARB 2009, p. 5-66). In the Kern County portion of the SJVAB, it was estimated that 1,640 tons per year (or 6 percent of the state total) was emitted (CARB 2009, p. 5-43). DPM in the air basin poses the greatest cancer risk of all the TACs.

### Benzene

Benzene is highly carcinogenic and occurs throughout California. CARB identified benzene as a toxic air contaminant in 1985. In addition to being a carcinogen, benzene also has non-cancer health impacts. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness (CARB 2009, p. 186).

The SJVAB accounts for 16 percent of the statewide total for benzene emissions. The predominant sources of total benzene emissions in the SJVAB are mobile sources (approximately 67 percent), with stationary sources accounting for 32 percent. Mobile sources include on-road gasoline and diesel vehicles accounting for 633 tons per year or 38 percent, and other mobile equipment accounting for 29 percent of the SJVAB's benzene emissions. The primary stationary sources of benzene emissions are crude petroleum and natural gas mining, petroleum refining, and electric generation (CARB 2009, p. 5-62).

### 1,3-Butadiene

In 1992, CARB identified 1,3-butadiene as a toxic air contaminant; it is also a carcinogen. The vapors are mildly irritating to the eyes and mucous membranes and cause neurological effects at very high levels. Most of the emissions of 1,3-butadiene are from incomplete combustion of gasoline and diesel fuels. Mobile sources account for approximately 85 percent of the total statewide emissions. Vehicles that are not equipped with functioning exhaust catalysts emit greater amounts of 1,3-butadiene than vehicles with functioning catalysts. Approximately 53 percent of the statewide 1,3-butadiene emissions can be attributed to mobile sources, with 27 percent attributed to other mobile sources such as recreational boats, off-road recreational vehicles, and aircraft. Area-wide sources such as agricultural waste burning and open burning associated with forest management contribute approximately 15 percent. The primary stationary sources emitting 1,3-butadiene include petroleum refining, manufacturing of synthetics and man-made materials, and oil and gas extraction (CARB 2009, p. 5-14)

## SENSITIVE RECEPTORS

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases.

Residential areas are considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation.

## VALLEY FEVER

Valley fever (*Coccidioidomycosis*) is caused by the fungus *Coccidioides immitis*. Valley fever is found in the southwestern United States including in Arizona, California, New Mexico, Nevada, and Utah, as well as in parts of Mexico. In about 50 to 75 percent of people, valley fever causes either no symptoms or mild symptoms and those infected never seek medical care; when

symptoms are more pronounced, they usually present as lung problems (cough, shortness of breath, sputum production, fever, and chest pains). The disease can progress to chronic or progressive lung disease and may even become disseminated to the skin, lining tissue of the brain (meninges), skeleton, and other body areas. The disease can also infect many animal types (for example, dogs, cattle, otters, and monkeys).

From 1998 to 2011, the incidence in the United States increased about tenfold to about 22,000 diagnosed individuals per year, according to the Centers for Disease Control and Prevention. People are infected by inhaling dust contaminated with *Coccidioides*; the fungus is not transmitted from person to person. About 30–35 percent of people who develop valley fever have flu-like symptoms (fever, cough, malaise, and chills) that dissipate over about two to six weeks without treatment. Some people may develop additional symptoms such as shortness of breath, night sweats, headaches, sputum production, and joint and muscle pains (symptoms resembling pneumonia). Women, more often than men, may develop erythema nodosum (reddish, painful, tender lumps, usually on the legs) or erythema multiforme (an allergic reaction similar to erythema nodosum in multiple body sites with rash). Usually these symptoms resolve in about two to six weeks. Several antifungal drugs are available to treat valley fever. However, in general, dosage (especially pediatric), length of time of drug administration, and the choice of drug are best decided in consultation with an infectious disease specialist (MedicineNet 2014).

## 4.3.2 REGULATORY SETTING

The proposed project has the ability to release gaseous emissions of criteria pollutants and dust into the ambient air; therefore, development activities under the proposed project entitlements fall under the ambient air quality standards promulgated at the local, state, and federal levels. The federal Clean Air Act of 1971 and the Clean Air Act Amendments (1977) established the national ambient air quality standards (NAAQS), which are promulgated by the US Environmental Protection Agency (EPA). The State of California has also adopted its own California ambient air quality standards (CAAQS), which are promulgated by CARB. Implementation of the project would occur in the Kern County portion of the SJVAB, which is under the air quality regulatory jurisdiction of the SJVAPCD and is subject to the rules and regulations adopted by the air district to achieve the national and state ambient air quality standards. Federal, state, regional, and local laws, regulations, plans, and guidelines are summarized below.

### AMBIENT AIR QUALITY STANDARDS

The Clean Air Act of 1971 established NAAQS, with states retaining the option to adopt more stringent standards or to include other pollution species. These standards are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both the State of California and the federal government have established health-based ambient air quality standards for six air pollutants. As shown in **Table 4.3-4**, these pollutants include ozone, CO, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

**TABLE 4.3-4**
**AIR QUALITY STANDARDS**

| Pollutant | Averaging Time | California Standards | National Standards |
|---|---|---|---|
| Ozone ($O_3$) | 8 Hour | 0.070 ppm (137$\mu$g/m$^3$) | 0.075 ppm |
| | 1 Hour | 0.09 ppm (180 $\mu$g/m$^3$) | — |
| Carbon Monoxide (CO) | 8 Hour | 9.0 ppm (10 mg/m$^3$) | 9 ppm (10 mg/m$^3$) |
| | 1 Hour | 20 ppm (23 mg/m$^3$) | 35 ppm (40 mg/m$^3$) |
| Nitrogen Dioxide ($NO_2$) | 1 Hour | 0.18 ppm (339 $\mu$g/m$^3$) | 100 ppb |
| | Annual Arithmetic Mean | 0.030 ppm (57 $\mu$g/m$^3$) | 53 ppb (100 $\mu$g/m$^3$) |
| Sulfur Dioxide ($SO_2$) | 24 Hour | 0.04 ppm (105 $\mu$g/m$^3$) | N/A |
| | 3 Hour | — | N/A |
| | 1 Hour | 0.25 ppm (665 $\mu$g/m$^3$) | 75 ppb |
| Particulate Matter ($PM_{10}$) | Annual Arithmetic Mean | 20 $\mu$g/m$^3$ | N/A |
| | 24 Hour | 50 $\mu$g/m$^3$ | 150 $\mu$g/m$^3$ |
| Particulate Matter – Fine ($PM_{2.5}$) | Annual Arithmetic Mean | 12 $\mu$g/m$^3$ | 15 $\mu$g/m$^3$ |
| | 24 Hour | N/A | 35 $\mu$g/m$^3$ |
| Sulfates | 24 Hour | 25 $\mu$g/m$^3$ | N/A |
| Lead (Pb) | Calendar Quarter | N/A | 1.5 $\mu$g/m$^3$ |
| | 30 Day Average | 1.5 $\mu$g/m$^3$) | N/A |
| Hydrogen Sulfide | 1 Hour | 0.03 ppm (42 $\mu$g/m$^3$) | N/A |
| Vinyl Chloride (chloroethene) | 24 Hour | 0.01 ppm (26 $\mu$g/m$^3$) | N/A |
| Visibility-Reducing Particles | 8 Hour (10:00 to 18:00 PST) | — | N/A |

*Source: CARB 2013a*
*Notes: mg/m$^3$ = milligrams per cubic meter; ppm = parts per million; ppb = parts per billion; $\mu$g/m$^3$ = micrograms per cubic meter*

## AIR QUALITY ATTAINMENT PLANS

The federal Clean Air Act Amendments of 1990 and the California Clean Air Act of 1988 mandate the preparation of clean air plans that provide an overview of air quality and sources of air pollution and identify pollution-control measures needed to meet federal and state air quality standards. As previously stated, the SJVAPCD is the agency primarily responsible for ensuring that national and state ambient air quality standards are not exceeded and that air quality conditions are maintained in the air basin. SJVAPCD responsibilities include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and implementing programs and regulations required by the federal Clean Air Act and the California Clean Air Act. In an attempt to achieve NAAQS and CAAQS and maintain air quality, the air district has completed the following air quality attainment plans and reports:

- **2004 Extreme Ozone Attainment Demonstration Plan and 2013 Plan for the Revoked 1-Hour Ozone Standard.** The SJVAPCD initially adopted this plan in 2004 to address EPA's 1-hour ozone standard. Although the EPA approved the SJVAPCD's 2004 plan in 2010, the EPA withdrew this approval as a result of a court ruling in November 2012. The

SJVAPCD adopted a new plan for the EPA's revoked 1-hour ozone standard in September 2013 (SJVAPCD 2013).

- **2007 Ozone Plan.** The Ozone Plan, approved in 2007, contains a comprehensive list of regulatory and incentive-based measures to reduce emissions and particulate matter with the goal of addressing the EPA's standards. The 2007 Ozone Plan calls for a 75 percent reduction of ozone-forming $NO_x$ emissions (SJVAPCD 2007a, p. ES-2). These $NO_x$ reductions are preferred and essential to meeting the new 8-hour ozone and $PM_{2.5}$ standards. The plan calls for new and more stringent rules and regulations for stationary sources, new and more stringent tail-pipe emission standards for mobile sources, emission standards for locomotives, local regulations and voluntary measures to reduce and/or mitigate mobile source emissions, incentive-based measures, and alternative compliance programs.

- **2009 Reasonably Available Control Technology Demonstration for Ozone State Implementation Plan.** The SJVAPCD adopted the Reasonably Available Control Technology (RACT) Demonstration for Ozone State Implementation Plan in 2009. The Clean Air Act requires RACT for certain sources in all nonattainment areas. The SJVAPCD is required to ensure the EPA's Control Techniques Guidance (CTG) is being implemented through SJVAPCD regulations. The 42 CTGs were developed to control major sources of emissions (SJVAPCD 2009, pp. 2-2 to 2-4).

- **2007 $PM_{10}$ Attainment Demonstration Plan.** In 2007, the SJVAPCD adopted the 2007 $PM_{10}$ Attainment Plan to ensure the continued attainment of the EPA's $PM_{10}$ standard. Since the EPA determined that the air basin had attained the federal $PM_{10}$ standards on October 30, 2006, the valley is designated as an attainment area (SJVAPCD 2007b, p. 3).

- **2012 $PM_{2.5}$ Plan**. In 2012, the SJVAPCD adopted the 2012 $PM_{2.5}$ Plan to address the EPA's 24-hour standards. The plan utilizes the best available information to develop a strategy to demonstrate attainment of the federal standard for $PM_{2.5}$. A number of local strategies are included in the plan, including regulations to address stationary sources, use of a risk-based approach to prioritize measures to expedite attainment standards, incentive measures, technology advances, policy efforts to shape new legislation, and public outreach (SJVAPCD 2012a, p. ES-2).

Areas with air quality that exceed adopted air quality standards are designated as nonattainment areas for the relevant air pollutants. Areas that comply with air quality standards are designated as attainment areas for the relevant air pollutants. State Implementation Plans (SIPs) must be prepared by states for areas designated as federal nonattainment areas to demonstrate how the area will come into attainment of the exceeded federal ambient air quality standard. **Table 4.3-5** shows the federal and state attainment status for the SJVAB. The region is nonattainment for federal ozone and $PM_{2.5}$ standards and is nonattainment for state ozone and $PM_{10}$ and $PM_{2.5}$ standards (CARB 2013b, 2014b).

**TABLE 4.3-5**
**FEDERAL AND STATE AMBIENT AIR QUALITY ATTAINMENT STATUS FOR THE SAN JOAQUIN VALLEY AIR BASIN**

| Pollutant | Federal | State |
|---|---|---|
| 1-hour Ozone ($O_3$) | — | Nonattainment |
| 8-hour Ozone ($O_3$) | Nonattainment | Nonattainment |
| Coarse Particulate Matter ($PM_{10}$) | Attainment | Nonattainment |
| Fine Particulate Matter ($PM_{2.5}$) | Nonattainment | Nonattainment |
| Carbon Monoxide (CO) | Unclassified/Attainment | Unclassified/Attainment |
| Nitrogen Dioxide ($NO_2$) | Attainment | Unclassified/Attainment |
| Sulfur Dioxide ($SO_2$) | Attainment | Attainment |

*Source: CARB 2013b, 2014b*

## San Joaquin Valley Air Pollution Control District

The SJVAPCD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded in the San Joaquin Valley Air Basin and that air quality conditions are maintained. SJVAPCD responsibilities include preparing plans for the attainment of ambient air quality standards, adopting and enforcing air pollution rules, issuing permits for and inspecting stationary air pollution sources, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing state and federal programs and regulations. The SJVAPCD has also adopted various rules and regulations for the control of stationary and area sources of emissions. Provisions applicable to the proposed project are summarized as follows:

- **Regulation II (Permits), Rule 2201, New and Modified Stationary Source Review Rule**. This rule provides for review of new and modified stationary sources of air pollution, with the aim of complying with state and federal ambient air quality standards.

- **Regulation IV (Prohibitions), Rule 4001, New Source Performance Standards**. This rule establishes standards, criteria, and operational/reporting requirements for all new sources of air pollution, as well as modifications of existing sources of air pollution.

- **Regulation IV (Visible Emissions), Rule 4101, Nuisance.** The purpose of this rule is to protect the health and safety of the public from source operations that emit or may emit air contaminants or other materials. It prohibits emissions of air contaminants or other materials "which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public."

- **Regulation IV (Visible Emissions), Rule 4601, Architectural Coatings.** The rule limits volatile organic compound (VOC) emissions from architectural coatings and specifies practices for proper storage, cleanup, and labeling requirements. Rule 4601 applies to "any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures, blends or repackages any architectural coating for use within the District." Materials covered by the rule include adhesives, architectural coatings, paints, varnishes, sealers, stains, concrete curing compounds, concrete/masonry sealers, and waterproofing sealers.

- **Regulation IV (Visible Emissions), Rule 4641, Cutback, Slow Curve and Emulsified Asphalt, Paving and Maintenance Operations.** The purpose of this rule is to limit VOC emissions by restricting the application and manufacturing of certain types of asphalt and maintenance operations and applies to the use of these materials. Specifically, certain types of asphalt cannot be used for penetrating prime coat, dust palliative, or other paving: rapid cure and medium cure cutback asphalt, slow cure asphalt that contains more than 0.5 percent of organic compound which evaporates at 500˚F or lower, and emulsified asphalt containing VOC in excess of 3 percent which evaporates at 500˚F or lower.

- **Regulation VIII (Fugitive $PM_{10}$ Prohibitions), Rules 8021–8071, Fugitive $PM_{10}$ Prohibitions.** The purpose of these rules is to limit airborne particulate emissions associated with construction, demolition, excavation, extraction, and other earthmoving activities, as well as with open disturbed land and emissions associated with paved and unpaved roads. Accordingly, these rules include specific measures to be employed to prevent and reduce fugitive dust emissions from anthropogenic sources.

- **Regulation IX (Mobile and Indirect Sources), Rule 9510, Indirect Source Review.** This rule is the result of state requirements outlined in California Health and Safety Code Section 40604 and the SIP. The air district's SIP commitments were originally contained in the SJVAPCD's 2003 $PM_{10}$ Plan and Extreme Ozone Attainment Demonstration Plans, which presented the SJVAPCD's strategy to reduce $PM_{10}$ and $NO_x$ in order to reach the ambient air pollution standards on schedule, which had been 2010. The plans quantify the reduction from current SJVAPCD rules and proposed rules, as well as state and federal regulations, and then model future emissions to determine whether the SJVAPCD may reach attainment for applicable pollutants.

  This rule will reduce emissions of $NO_x$ and $PM_{10}$ from new development projects that attract or generate motor vehicle trips. In general, new development contributes to the air pollution problem in the SJVAB by increasing the number of vehicles and vehicle miles traveled. Although newer, cleaner technology is reducing per-vehicle pollution, the emissions increase from new development partially offsets emission reductions gained from technology advances. Indirect Source Review applies to larger development projects that have not yet gained discretionary approval. A discretionary permit is a permit from a public agency, such as the City of Delano, which requires some amount of deliberation by that agency, including the potential to require modifications or conditions on the project. In accordance with this rule, developers of larger residential, commercial, and industrial projects are required to reduce smog-forming $NO_x$ and $PM_{10}$ emissions from their projects' baselines as follows (SJVAPCD 2005, pp. 9510-11 and 9510-12):

  - 20 percent of construction $NO_x$ exhaust
  - 45 percent of construction $PM_{10}$ exhaust
  - 33 percent of operational $NO_x$ over 10 years
  - 50 percent of operational $PM_{10}$ over 10 years

  These reductions are intended to be achieved through incorporation of on-site reduction measures. If, after implementation of on-site emissions reduction measures project emissions still exceed the minimum baseline reduction, the Indirect Source Review requires a project applicant to pay an off-site fee to the SJVAPCD, which is then used to fund clean-air projects within the air basin.

### City of Delano General Plan

The Delano General Plan (2005) includes several policies to support air quality. Policies related to air quality are as follows:

Circulation Element

*Transportation Systems and Congestion Management Policies*

Policy 2. Transportation System Management and Transportation Demand Management are the preferred strategies for the mitigation of traffic and parking congestion. Public transit, traffic management, ridesharing and parking management are to be used to the greatest extent practical to implement transportation management strategies.

Policy 4. Large development shall be encouraged to incorporate transit passenger facilities, bicycle racks or lockers, shower facilities, as well as on site services (eating, mail, banking, etc.) as ways to encourage alternative modes for commute trips.

*Pedestrian Policies*

Policy 7. The City shall require curb, gutter, and sidewalks in all areas of the community to accommodate pedestrian traffic, especially along routes with high pedestrian traffic such as schools, parks, and the Downtown area. Installation of these improvements shall be encouraged to the extent feasible in existing neighborhoods where they do not currently exist.

Open Space and Conservation Element

*Natural Resource Policies*

Policy 5. To assist the City in meeting the clean air quality requirements of the federal and state Clean Air Acts, the City will provide community planning guidance to help reduce potential air quality impacts.

Policy 8. Construction activities shall comply with the $PM_{10}$ control measures as set forth by the San Joaquin Valley Unified Air Pollution Control District's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI).

Policy 9. The Joaquin Valley Unified Air Pollution Control District's Guide for Assessing and Mitigating Air Quality Impacts will be used to evaluate and mitigate the effects of new developments to the extent feasible.

## 4.3.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following California Environmental Quality Act (CEQA) Guidelines Appendix G thresholds of significance. The project would result in a significant impact to air quality if it would:

1) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

2) Expose sensitive receptors to substantial pollutant concentrations.

3) Create objectionable odors affecting a substantial number of people.

4) Conflict with or obstruct implementation of any applicable air quality plan.

5) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

## METHODOLOGY

Air quality impacts were assessed in accordance with methodologies recommended by CARB and the SJVAPCD. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects.

As noted in Section 3.0, Project Description, construction of the proposed project would occur in distinct phases over several years. The first four phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard at Delano site. Following the completion of the Vineyard at Delano development, the Delano West Pavilion development would begin construction and would also be developed in four distinct phases. While implementation of each construction phase may take longer than a single year, for the purposes of this air quality analysis it is assumed that all of the construction activities proposed to occur within a single phase will take one year in order to provide a conservative analysis.[1] In addition, the City's existing storm drainage retention facilities located on Stradley Avenue adjacent to the West Pavilion site are proposed to be expanded by 33.4 acre-feet of volume. The expansion of the retention basin will entail the movement of approximately 74,000 cubic yards of dirt. Approximately 24,000 cubic yards of this dirt will be graded and compacted on the City stormwater basin site to construct the expanded retention basin. Approximately 50,000 cubic yards will be excavated and transported to the West Pavilion site for use as fill. For the purposes of this analysis, it is assumed that the expansion of the existing retention basin and associated soil movement would occur concurrently with Phase I of the Vineyard at Delano development.

## IMPACTS AND MITIGATION MEASURES

### Short-Term Construction-Generated Ozone Precursor Emissions (ROG and $NO_x$) Resulting in Violation of Air Quality Standards or Contributing to Existing Violations (Standard of Significance 1)

**Impact 4.3.1** Construction activities such as off-road construction equipment, construction vehicle traffic, asphalt paving, and painting would generate ozone precursor

[1] The SJVAPCD provides significance thresholds for estimated project emissions in tons per year. Therefore, more construction activity assumed to occur within a single year will result in an increased amount of estimated emissions.

emissions that would temporarily affect local air quality for adjacent land uses. This will result in a **potentially significant** impact.

Construction associated with the proposed project would generate short-term emissions of criteria air pollutants, including the ozone precursor emissions ROG and $NO_x$. Construction-generated emissions are short term and of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. Construction results in the temporary generation of ozone precursor emissions from motor vehicle exhaust associated with construction equipment and worker trips, asphalt paving, and painting.

The SJVAPCD's (2002A) Guide for Assessing and Mitigation Air Quality Impacts identifies significance thresholds for ozone precursors ROG and $NO_x$. Construction-generated emissions associated with development occurring as a result of the project could potentially exceed these SJVAPCD thresholds of significance. Construction-generated ROG and $NO_x$ emissions associated with the proposed project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Modeling was based primarily on the default settings in the computer program for Kern County. Construction equipment requirements and usage rates used in the model were based on model default assumptions. Predicted maximum daily construction-generated emissions for the proposed project are summarized in **Table 4.3-6**.

**TABLE 4.3-6**
**UNMITIGATED CONSTRUCTION-RELATED OZONE PRECURSOR EMISSIONS**
**(TONS PER YEAR)**

| Construction Activities | Reactive Organic Gas (ROG) | Nitrogen Oxide ($NO_x$) |
|---|---|---|
| **Vineyards at Delano** | | |
| Phase I (includes off-site emissions from retention basin expansion) | 1.96 | 8.04 |
| Phase II | 1.80 | 6.93 |
| Phase III | 1.73 | 6.34 |
| Phase IV | 1.63 | 5.52 |
| SJVAPCD Potentially Significant Impact Threshold | **10 Tons** | **10 Tons** |
| **Exceed SJVAPCD Threshold?** | **No** | **No** |
| **West Pavilion** | | |
| Phase I (includes off-site emissions from retention basin expansion) | 2.85 | 6.87 |
| Phase II | 2.77 | 6.12 |
| Phase III | 1.80 | 5.62 |
| Phase IV | 1.73 | 4.90 |
| SJVAPCD Potentially Significant Impact Threshold | **10 Tons** | **10 Tons** |
| **Exceed SJVAPCD Threshold?** | **No** | **No** |

*Source: CalEEMod version 2013.2.2.*
*Notes: Building construction, paving, and painting assumed to occur simultaneously. See **Appendix 4.3-A** for emission model outputs.*

As shown in **Table 4.3-6**, neither ROG or $NO_x$ emissions would exceed SJVAPCD significance thresholds.

However as shown, the project would generate more than 2 tons of $NO_X$ during each phase of construction. SJVAPCD Rule 9510, Indirect Source Review, applies to all construction projects within the jurisdiction of the SJVAPCD that are projected to generate more than 2 tons of $NO_X$. Therefore, the proposed project would be required to comply with this rule. In accordance with Rule 9510, the project applicant is required to prepare a detailed air impact assessment (AIA) for submittal to the SJVAPCD, which demonstrates the reduction of $NO_X$ emissions from the project's baselines by 20 percent. Therefore, the following mitigation is required.

Mitigation Measures

**MM 4.3.1** In accordance with SJVAPCD Rule 9510, a detailed air impact assessment (AIA) shall be prepared detailing the specific construction requirement (i.e., equipment required, hours of use, etc.) and operational characteristics associated with the proposed on- and off-site improvements. In accordance with this rule, emissions of $NO_X$ from construction equipment greater than 50 horsepower used or associated with the development project shall be reduced by 20 percent from baseline (unmitigated) emissions. The project will demonstrate compliance with Rule 9510, including payment of all applicable fees, before issuance of the first building permit. To reduce short-term air quality impacts attributable to the proposed project, the following measures shall be implemented:

- During all construction activities through the year 2021, all diesel-fueled construction equipment including, but not limited to, rubber-tired dozers, graders, scrapers, excavators, asphalt paving equipment, cranes, and tractors shall be California Air Resources Board (CARB) Tier 3 Certified or better as set forth in Section 2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 of the Code of Federal Regulations.[2]

- During all construction activities after the year 2021, all diesel-fueled construction equipment including, but not limited to, rubber-tired dozers, graders, scrapers, excavators, asphalt paving equipment, cranes, and tractors shall be California Air Resources Board (CARB) Tier 4 Certified as set forth in Section 2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 of the Code of Federal Regulations.[3]

[2] $NO_x$ emissions are primarily associated with use of diesel-powered construction equipment (e.g., graders, excavators, rubber-tired dozers, tractor/loader/backhoes). The Clean Air Act of 1990 directed the EPA to study, and regulate if warranted, the contribution of off-road internal combustion engines to urban air pollution. The first federal standards (Tier 1) for new off-road diesel engines were adopted in 1994 for engines over 50 horsepower and were phased in from 1996 to 2000. In 1996, a Statement of Principles pertaining to off-road diesel engines was signed between the EPA, CARB, and engine makers (including Caterpillar, Cummins, Deere, Detroit Diesel, Deutz, Isuzu, Komatsu, Kubota, Mitsubishi, Navistar, New Holland, Wis-Con, and Yanmar). On August 27, 1998, the EPA signed the final rule reflecting the provisions of the Statement of Principles. The 1998 regulation introduced Tier 1 standards for equipment under 50 horsepower and increasingly more stringent Tier 2 and Tier 3 standards for all equipment with phase-in schedules from 2000 to 2008. As a result, all off-road, diesel-fueled construction equipment manufactured in 2006 or later has been manufactured to Tier 3 standards.

[3] On May 11, 2004, the EPA signed the final rule introducing Tier 4 emission standards, which are currently phased in over the period of 2008–2015. The Tier 4 standards require that emissions of PM and NOx be further reduced by about 90 percent. All off-road, diesel-fueled construction equipment manufactured in 2015 or later will be manufactured to Tier 4 standards.

- All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. Equipment maintenance records shall be kept on-site and made available upon request by the SJVAPCD or the City of Delano.

- The project applicant shall comply with all applicable SJVAPCD rules and regulations. Copies of any applicable air quality permits and/or monitoring plans shall be provided to the City.

*Timing/Implementation:* *During the construction period*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measure **MM 4.3.1** would substantially reduce impacts resulting from $NO_X$ emissions associated with project construction as shown in **Table 4.3-7**. As demonstrated in **Table 4.3-7**, annual $NO_X$ emissions would be reduced by at least 21 percent during each phase, which is beyond the reduction needed to achieve the SJVAPCD Rule 9510 target of 20 percent.

**TABLE 4.3-7**
**CONSTRUCTION-RELATED NITROGEN OXIDE EMISSIONS – BASELINE AND MITIGATED**
**(TONS PER YEAR)**

| Construction Activities | Nitrogen Oxide ($NO_x$) – Baseline | Nitrogen Oxide ($NO_x$) – Mitigated | Percent Reduction |
|---|---|---|---|
| **Vineyards at Delano** | | | |
| Phase I (includes off-site emissions from retention basin expansion) | 8.04 | 3.95 | 50.8% |
| Phase II | 6.93 | 3.62 | 47.7% |
| Phase III | 6.34 | 3.57 | 43.6% |
| Phase IV | 5.52 | 3.53 | 36.0% |
| SJVAPCD Potentially Significant Impact Threshold | | | **20%** |
| **West Pavilion** | | | |
| Phase I (includes off-site emissions from retention basin expansion) | 6.87 | 4.93 | 28.2% |
| Phase II | 6.12 | 4.82 | 21.2% |
| Phase III[a] | 5.62 | 1.14 | 79.7% |
| Phase IV[a] | 4.90 | 1.03 | 78.9% |
| SJVAPCD Potentially Significant Impact Threshold | | | **20%** |

*Source: CalEEMod version 2013.2.2. See **Appendix 4.3-A** for emission model outputs.*
*a. These phases are projected to occur after the year 2021 in which Tier 4 Certified construction equipment would be required per mitigation measure **MM 4.3.1**.*

As previously stated, neither ROG nor $NO_X$ emissions would exceed SJVAPCD significance thresholds during project construction; however, construction activities would generate $NO_X$ emissions of more than 2 tons per year, instigating the implementation of SJVAPCD Rule 9510 and the requirement to reduce $NO_X$ emissions from the project's baseline by 20 percent. The employment of the specified off-road construction equipment manufactured to Tier 3 standards

or higher would result in a 20 percent reduction from baseline for all construction completed through the year 2021. Because of equipment efficiency improvements associated with future construction equipment, the use of specified off-road construction equipment manufactured to Tier 4 standards would be necessary in order to reduce baseline construction emissions by 20 percent after the year 2021. As shown in **Table 4.3-7,** annual $NO_X$ emissions would be reduced by a minimum of 21 percent and a maximum of nearly 80 percent as a result of mitigation measure **MM 4.3.1**.

Since the project would not exceed SJVAPCD significance thresholds and would also comply with SJVAPCD Rule 9510, this impact is **less than significant.**

**Short-Term Construction-Generated Particulate Matter (PM) Emissions Resulting in Violation of Air Quality Standards or Contributing to Existing Violations (Standard of Significance 1)**

**Impact 4.3.2** Construction activities such as clearing, excavation and grading operations, construction vehicle traffic, and wind blowing over exposed earth would generate exhaust and fugitive particulate matter emissions that would temporarily affect local air quality for adjacent land uses. This will result in a **less than significant** impact.

Construction associated with the proposed project would generate short-term emissions of criteria air pollutants, including $PM_{10}$ and $PM_{2.5}$. Construction-generated emissions are short term and of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. Construction results in the temporary generation of PM emissions from site grading, excavation, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities as well as weather conditions and the appropriate application of water.

The SJVAPCD identifies significance thresholds for $PM_{10}$ or $PM_{2.5}$. Construction-generated emissions associated with the project could potentially exceed these SJVAPCD thresholds of significance. Construction-generated PM emissions associated with the proposed project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Modeling was based primarily on the default settings in the computer program for Kern County. Construction equipment requirements and usage rates used in the model were based on model default assumptions. Predicted maximum daily construction-generated emissions for the proposed project are summarized in **Table 4.3-8**.

The SJVAPCD requires that specific PM reduction measures be applied to all construction projects. For instance, the project would be required to comply with SJVAPCD Regulation VIII, which includes the preparation of a dust control plan by the project applicant. Construction activities anywhere within the regulatory jurisdiction of the SJVAPCD, including the proposed project site, may not commence until the SJVAPCD has approved or conditionally approved the dust control plan, which must describe all fugitive dust control measures that are to be implemented before, during, and after any dust-generating activity. Regulation VIII specifies the following measures to control fugitive dust:

- Apply water to unpaved surfaces and areas.
- Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.

- Limit or reduce vehicle speed on unpaved roads and traffic areas to a maximum 15 miles per hour.
- Maintain areas in a stabilized condition by restricting vehicle access.
- Install wind barriers.
- During high winds, cease outdoor activities that disturb the soil.
- Keep bulk materials sufficiently wet when handling.
- Store and handle materials in a three-sided structure.
- When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
- Don't overload haul trucks. Overloaded trucks are likely to spill bulk materials.
- Cover haul trucks with a tarp or other suitable cover. Or, wet the top of the load enough to limit visible dust emissions.
- Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
- Prevent trackout by installing a trackout control device.
- Clean up trackout at least once a day. If along a busy road or highway, clean up trackout immediately.
- Monitor dust-generating activities and implement appropriate measures for maximum dust control.

The predicted maximum daily construction-generated emissions for the proposed project summarized in **Table 4.3-8** account for the application of water, limitation of vehicle speed on unpaved roads, application of dust suppressants on unpaved roads, and daily cleaning of adjacent paved roads as required by SJVAPCD Regulation VIII. Other requirements of Regulation VIII are unable to be quantified due to the emissions modeling software's limitations. In addition, the estimated emissions presented in **Table 4.3-8** account for mitigation measure **MM 4.3.1**, described above.

**TABLE 4.3-8**
**CONSTRUCTION-RELATED PARTICULATE MATTER EMISSIONS**
**(TONS PER YEAR)**

| Construction Activities | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) |
|---|---|---|
| **Vineyards at Delano** | | |
| Phase I (includes off-site emissions from retention basin expansion) | 0.39 | 0.29 |
| Phase II | 0.36 | 0.27 |
| Phase III | 0.35 | 0.26 |
| Phase IV | 0.34 | 0.25 |

| Construction Activities | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) |
|---|---|---|
| SJVAPCD Potentially Significant Impact Threshold | **15 Tons** | **15 Tons** |
| **Exceed SJVAPCD Threshold?** | **No** | **No** |
| **West Pavilion** | | |
| Phase I (includes off-site emissions from retention basin expansion) | 0.56 | 0.37 |
| Phase II | 0.55 | 0.36 |
| Phase III | 0.21 | 0.11 |
| Phase IV | 0.21 | 0.10 |
| SJVAPCD Potentially Significant Impact Threshold | **15 Tons** | **15 Tons** |
| **Exceed SJVAPCD Threshold?** | **No** | **No** |

*Source: CalEEMod version 2013.2.2.*
*Notes: Building construction, paving, and painting assumed to occur simultaneously. Emissions projections account for SJVAPCD Regulation VIII as well as mitigation measure **MM 4.3.1**. See **Appendix 4.3-A** for emission model outputs.*

As shown in **Table 4.3-8**, $PM_{10}$ and $PM_{2.5}$ emissions would not exceed SJVAPCD significance thresholds.

SJVAPCD Rule 9510, Indirect Source Review, applies to all construction projects within the air district's jurisdiction that are projected to generate more than 2 tons of exhaust $PM_{10}$ annually. Exhaust $PM_{10}$ emissions would not exceed this threshold since as shown in **Table 4.3-8**, total $PM_{10}$ emissions, which include both exhaust emissions and fugitive dust, would not be generated beyond 2 tons annually.

This impact is **less than significant.**

Mitigation Measures

None required.

### Long-Term Operational Emissions of Air Pollutants Resulting in Violation of Air Quality Standards or Contributing to Existing Violations (Standard of Significance 1)

**Impact 4.3.3** Project-generated operational emissions would exceed applicable significance thresholds. As a result, this impact is considered **potentially significant.**

Implementation of the project would result in long-term operational emissions of criteria air pollutants such as $PM_{10}$, $PM_{2.5}$, CO, and $SO_2$ as well as ozone precursors such as ROG and $NO_X$. Project-generated increases in emissions would be predominantly associated with motor vehicle use. To a lesser extent, area sources, such as the use of hearths, natural-gas-fired appliances, landscape maintenance equipment, and architectural coatings, would also contribute to overall increases in emissions.

Operational emissions associated with full implementation of the proposed project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects. Modeling was based primarily on the default settings in the computer program for Kern County. However, estimated traffic trip generation rates are derived from the traffic impact study prepared for the project, which

estimates 23,370 average daily weekday trips and 29,116 average daily weekend trips (Arch Beach Consulting 2015, p. 12).

The SJVAPCDD has established thresholds of significance for air quality for operational activities of project-level land use development projects such as that proposed. Long-term operational emissions attributable to the proposed project are summarized and compared to the SJVAPCD project-level significance thresholds in **Table 4.3-9**.

**TABLE 4.3-9**
**LONG-TERM OPERATIONAL EMISSIONS (TONS PER YEAR)**

| Source | Reactive Organic Gases (ROG) | Nitrogen Oxide ($NO_X$) | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) | Carbon Monoxide (CO) | Sulfur Dioxide ($SO_2$) |
|---|---|---|---|---|---|---|
| Area Source | 6.02 | 0.07 | 0.06 | 0.06 | 6.47 | 0.00 |
| Energy Use | 0.07 | 0.67 | 0.05 | 0.05 | 0.33 | 0.00 |
| Mobile Source[a] | 14.21 | 41.65 | 18.85 | 5.64 | 183.20 | 0.38 |
| **Total** | **20.31** | **42.40** | **18.97** | **5.75** | **190.01** | **0.38** |
| SJVAPCD Potentially Significant Impact Threshold | 10 tons/year | 10 tons/year | 15 tons/year | 15 tons/year | 100 tons/year | 27 tons/year |
| **Exceed SJVAPCD Threshold?** | **Yes** | **Yes** | **Yes** | **No** | **Yes** | **No** |

*Source: CalEEMod version 2013.2.2. See **Appendix 4.3-A** for emissions model outputs*
*a. Based on trip generation rates identified in the traffic impact study prepared for the project, which estimates 23,370 average daily weekday trips and 29,116 average daily weekend trips.*

As indicated in **Table 4.3-9**, estimated operational emissions of the project would generate approximately 20 tons per year of ROG, 42 tons per year of $NO_x$, 190 tons per year of CO, less than 1 ton per year of $SO_2$, 19 tons per year of $PM_{10}$, and 6 tons per year of $PM_{2.5}$; thus, the project would exceed the significance thresholds for ROG, $NO_x$, $PM_{10}$, and CO. Therefore, operational air quality impacts would be considered significant.

SJVAPCD Rule 9510, Indirect Source Review, applies to all development projects within the air district's jurisdiction that are projected to generate more than 2 tons of $NO_X$ and/or 2 tons of $PM_{10}$. Therefore, the proposed project would be required to comply with this rule. In accordance with Rule 9510, the project applicant is required to prepare a detailed air impact assessment (AIA) for submittal to the SJVAPCD demonstrating reduction from the project's baseline of $NO_x$ emissions by 33.3 percent and $PM_{10}$ emissions by 50 percent. Therefore, the following mitigation is required.

Mitigation Measures

**MM 4.3.3** In accordance with SJVAPCD Rule 9510, a detailed air impact assessment (AIA) shall be prepared detailing the operational characteristics associated with the proposed project. In accordance with this rule, operational emissions of $NO_X$ and $PM_{10}$ shall be reduced by a minimum of 33.3 percent and 50 percent, respectively. Emissions reductions are in comparison to the project's operational baseline (unmitigated) emissions (see **Table 4.3-9**). The project will

demonstrate compliance with Rule 9510, including payment of all applicable fees, before issuance of the first building permit.

Based on the findings of the AIA, the applicant shall pay to the SJVAPCD a monetary sum necessary to offset the required operational emissions that are not reduced by the emission reduction measures contained in the AIA. The quantity of operational emissions that need to be offset will be calculated in accordance with the methodologies identified in Rule 9510, Indirect Source Review, and approved by the SJVAPCD. Operational emissions reduction methods will be selected under the direction of the SJVAPCD according to the AIA process detailed in and required by Rule 9510, Indirect Source Review (see Rule 9510, subsection 5). Methods for reducing operational emissions include, but are not limited to, a new bus or other public transit service provided every hour or within a quarter mile of the project, a project site connection with a Class I or Class II bike lane, and/or the provision of a pedestrian access network that internally links all project land uses and connects to existing external streets and pedestrian facilities.

*Timing/Implementation:* *Prior to the issuance of building permits*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measure **MM 4.3.3** would substantially reduce impacts resulting from $NO_X$ and $PM_{10}$ emissions associated with project operations. Annual $NO_X$ emissions would be reduced up to 33.3 percent and $PM_{10}$ emissions would be reduced 50 percent from baseline. As set forth in Rule 9510, subsection 6.3, mitigation required by the rule may be met through a "combination of on-site reduction measure or off-site fees." However, while the reduction of $PM_{10}$ emissions by 50 percent from unmitigated baseline (see **Table 4.3-9**) would reduce these emissions to a level below the SJVAPCD's $PM_{10}$ significance threshold, a 33.3 percent reduction of $NO_X$ would not reduce this pollutant to a level below the air district's $NO_X$ significance threshold. Furthermore, emissions of ROG and CO would also surpass SJVAPCD thresholds. Therefore, this impact is considered **significant and unavoidable**.

As identified in **Table 4.3-5**, the San Joaquin Valley Air Basin is nonattainment for state ozone, $PM_{10}$, and $PM_{2.5}$ standards as well as federal ozone and $PM_{2.5}$ standards. The proposed project would result in increased emissions of these pollutants. Ozone is a health threat to persons who already suffer from respiratory diseases, can cause severe ear, nose, and throat irritation, and increases susceptibility to respiratory infections. Particulate matter can adversely affect the human respiratory system. However, the correlation between resultant emissions and increases in the days in which state and federal ambient air quality standards are surpassed, or frequency or severity of related illnesses, cannot be accurately quantified.

The overall strategy for reducing air pollution for criteria pollutants in the San Joaquin Valley Air Basin is contained in the SJVAPCD 2004 Extreme Ozone Attainment Demonstration Plan and 2013 Plan for the Revoked 1-Hour Ozone Standard, 2007 Ozone Plan, 2009 Reasonably Available Control Technology Demonstration for Ozone State Implementation Plan, 2012 $PM_{2.5}$ Plan, and 2007 $PM_{10}$ Attainment Demonstration Plan (see Impact 4.3.7). These plans collectively address the air basin's nonattainment status with the national and state ozone standards as well as particulate matter by establishing a program of rules and regulations directed at reducing air pollutant emissions and achieving state (California) and national air quality standards. Pollutant

control strategies are based on the latest scientific and technical information and planning assumptions, updated emission inventory methodologies for various source categories, and the latest population growth projections and associated vehicle miles traveled projections for the region.

No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Projects that are considered to be consistent with the regional air quality plans would not interfere with attainment, because this growth is included in the projections used to formulate the plans. Therefore, projects, uses, and activities that are consistent with the applicable assumptions used in the development of the SJVAPCD's air quality plans would not jeopardize attainment of the air quality levels identified in these plans, even if they exceed the SJVAPCD's recommended emissions thresholds. As described under Impact 4.3.7 below, the proposed project would not conflict with or obstruct implementation of the 2004 Extreme Ozone Attainment Demonstration Plan and 2013 Plan for the Revoked 1-Hour Ozone Standard, 2007 Ozone Plan, 2009 Reasonably Available Control Technology Demonstration for Ozone State Implementation Plan, 2012 $PM_{2.5}$ Plan, or 2007 $PM_{10}$ Attainment Demonstration Plan. This is because the proposed project is consistent with the land use designation and development density presented in the City of Delano's General Plan. In addition, as demonstrated in Section 4.12, Population and Housing, the increase in population resulting from the proposed project is consistent with not only the City General Plan population forecast but also the population forecast developed by the Kern Council of Governments (Kern COG). Therefore, the project would not exceed the population or job growth projections used by the SJVAPCD to develop its air quality attainment plans

Refer to Impact 4.3.5 for an expanded analysis of the proposed project's potential to expose sensitive receptors to substantial pollutant concentrations.

### Exposure of Sensitive Receptors to Near-Term Local Mobile-Source CO Pollutant Concentrations (Standard of Significance 2)

**Impact 4.3.4** Implementation of the project would not contribute to localized concentrations of mobile-source carbon monoxide (CO) that would exceed applicable ambient air quality standards. This is considered a **less than significant** impact.

The primary mobile-source criteria pollutant of local concern is CO. Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Transport of this criteria pollutant is extremely limited; CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Given the high traffic volume potential, areas of high CO concentrations, or "hotspots," are typically associated with traffic facilities that are projected to operate at unacceptable levels of service during the peak commute hours.[4] Modeling is therefore typically conducted for traffic facilities that are projected to operate at unacceptable levels of service during peak commute hours.

[4] Level of service (LOS) is a measure used by traffic engineers to determine the effectiveness of transportation infrastructure. LOS is most commonly used to analyze intersections by categorizing traffic flow with corresponding safe driving conditions. LOS A is considered the most efficient level of service and LOS F the least efficient.

Based on SJVAPCD guidance, projects meeting all of the following screening criteria would be considered to have a less than significant impact to localized CO concentrations:

- A traffic study for the project indicates that the level of service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or

- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity.

A traffic impact study (TIS) prepared for the proposed project by Arch Beach Consulting (2015; **Appendix 4.14-A**) estimates the generation of approximately 23,370 daily vehicle trips on a weekday and 29,116 average vehicle trips on a weekend day. The TIS included 17 local intersections, 11 roadway segments, 4 highway segments, and 4 highway ramps. Based on the traffic analysis prepared for this project, the proposed project would increase the number of vehicles on the following facilities over existing conditions, causing these facilities to degrade to an unacceptable level of service. All other traffic facilities in the vicinity of the project are projected to continue to operate acceptably with project implementation.

### Intersections

- Garces Highway/Albany Street (weekday and weekend)
- Garces Highway/Dover Place (weekday and weekend)
- 1st Avenue/Dover Place (weekday and weekend)
- Woollomes Avenue/Albany Street-Stradley Avenue (weekday and weekend)
- Woollomes Avenue/Belmont Street (weekend)
- Woollomes Avenue/Grapevine Driveway (weekday and weekend)
- Woollomes Avenue/Dover Parkway (weekday and weekend)
- Woollomes Avenue/State Route 99 Southbound Ramps (weekday and weekend)

### Roadway Segments

- Woollomes Avenue, Stradley to Belmont (weekday)
- Woollomes Avenue, Belmont to Grapevine (weekday)
- Woollomes Avenue, Grapevine Driveway to Dover Place (weekday)
- Woollomes Avenue, Dover Place to Home Depot Entrance (weekday)
- Woollomes Avenue, Home Depot Entrance to State Route 99 (weekday)
- Woollomes Avenue, State Route 99 Southbound to State Route 99 Northbound (weekday)

Since the facilities listed above are projected to operate at an unacceptable level of service with project implementation, CO hotspot modeling was conducted based on PM peak-hour traffic volumes for operating conditions. To ensure a conservative analysis, predicted 1-hour and 8-hour CO concentrations were calculated assuming background CO concentrations of 2.9 and 2.1 parts per million (ppm), respectively, based on the most recent available data obtained from the nearest monitoring station that monitors CO.[5] A persistence factor of 0.7 was used to convert predicted hourly concentrations to 8-hour concentrations. A fleet average emission factor of 2.9 grams was obtained from CARB's EMFAC2011 emissions model. The predicted 1-hour and 8-hour CO concentrations for future cumulative conditions are summarized in **Table 4.3-10**.

**TABLE 4.3-10**
**PREDICTED LOCAL MOBILE SOURCE CARBON MONOXIDE CONCENTRATIONS – FUTURE CONDITIONS**

| Traffic Facility | Predicted CO Concentration (ppm) | |
|---|---|---|
| | 1-Hour | 8-Hour |
| **Intersections** | | |
| Garces Highway/Albany Street | | |
| • weekday | 3.2 | 2.3 |
| • weekend | 3.1 | 2.2 |
| Garces Highway/Dover Place | | |
| • weekday | 3.1 | 2.2 |
| • weekend | 3.1 | 2.2 |
| 1st Avenue/Dover Place | | |
| • weekday | 3.1 | 2.2 |
| • weekend | 3.1 | 2.2 |
| Woollomes Avenue/Albany Street-Stradley Avenue | | |
| • weekday | 3.4 | 2.4 |
| • weekend | 3.2 | 2.3 |
| Woollomes Avenue/Belmont Street | | |
| • weekend | 3.4 | 2.4 |
| Woollomes Avenue/Grapevine Driveway | | |
| • weekday | 3.8 | 2.7 |
| • weekend | 3.8 | 2.7 |
| Woollomes Avenue/Dover Parkway | | |
| • weekend | 4.0 | 2.8 |
| Woollomes Avenue/SR 99 Southbound Ramps | | |
| • weekday | 4.1 | 2.9 |
| • weekend | 4.6 | 3.2 |
| **Roadway Segments** | | |
| Woollomes Avenue, Stradley to Belmont (weekday) | 3.8 | 2.7 |
| Woollomes Avenue, Belmont to Grapevine (weekday) | 4.0 | 2.8 |

[5] 1-hour and 8-hour background concentrations are based on the most recent measurements (year 2014 and year 2012, respectively) at the Fresno-Garland monitoring station.

| Traffic Facility | Predicted CO Concentration (ppm) | |
|---|---|---|
| | 1-Hour | 8-Hour |
| Woollomes Avenue, Grapevine Driveway to Dover Place (weekday) | 4.3 | 3.0 |
| Woollomes Avenue, Dover Place to Home Depot Entrance (weekday) | 4.7 | 3.3 |
| Woollomes Avenue, Home Depot Entrance to State Route 99 (weekday) | 4.8 | 3.4 |
| Woollomes Avenue, SR 99 Southbound to SR 99 Northbound (weekday) | 4.2 | 3.0 |
| California Ambient Air Quality Standards (CAAQS) | 20 | 9 |
| **Predicted Concentrations Exceed CAAQS?** | **No** | **No** |

*Source: CALINE4 model. Note: Predicted CO concentrations are the sums of a background component, which includes the cumulative effects of CO sources in the project area vicinity and the proposed project's contribution. Results based on emissions modeling conducted using the CALINE4 computer program. CALINE4 outputs are included as* ***Appendix 4.3-B****.*

As noted in **Table 4.3-10**, under future conditions, predicted maximum 1-hour and 8-hour CO concentrations at the intersections and roadway segments projected to operate at unacceptable levels of service during peak commute hours would not exceed even the most stringent corresponding California ambient air quality standards (CAAQS) of 20 and 9 ppm, respectively. Therefore, the proposed project would not contribute to predicted localized concentrations of mobile-source carbon monoxide that would exceed applicable ambient air quality standards. As a result, this impact would be considered **less than significant**.

Mitigation Measures

None required.

**Exposure of Sensitive Receptors to Toxic Air Contaminant Pollutant Concentrations (Standard of Significance 2)**

**Impact 4.3.5** Implementation of the proposed project would not result in increased exposure of existing sensitive land uses to pollutant concentrations that would exceed applicable standards. As a result, this impact is considered **less than significant**.

Project Construction

Construction activities would involve the use of gasoline- or diesel-powered equipment that emits air contaminant exhaust fumes (DPM) and generates dust during soil disturbance. DPM is the most prevalent toxic air contaminant during construction activities. Construction activities associated with the proposed project would occur over an extended period (approximately 10 years) and activities would be spread over a large area. The use of diesel-powered construction equipment in any one area would be short term and episodic and would cease when construction activities are completed in that area of the project site. Although construction activities can produce TAC emissions, the emission of these pollutants is temporary and lasts only as long as construction.

A 70-year period is the exposure parameter recommended by the California Office of Environmental Health Hazard Assessment (OEHHA), and the construction of the proposed project would last only 10 years. Furthermore, the prevailing wind direction at the project site is in

a northwesterly direction (WRCC 2002); this wind pattern would direct construction-generated TACs away from the nearest sensitive receptors, located to the north. Also, as previously stated, mitigation measure **MM 4.3.1** requires the use of off-road construction equipment manufactured to Tier 3 standards for all construction completed through the year 2021 and the use of off-road construction equipment manufactured to Tier 4 standards after the year 2021. This mitigation has the effect of reducing $PM_{10}$ exhaust fumes (DPM) by a minimum of 17 percent and a maximum of 85 percent, depending on the construction phase (see **Appendix 4.3-A**). (Annual $NO_X$ emissions would be reduced by a minimum of 21 percent and a maximum of nearly 80 percent as a result of mitigation measure **MM 4.3.1**.)

For these reasons, the short-term generation of TACs associated with project construction would not contribute to a substantial concentration of air toxic emissions and construction impacts are less than significant.

Valley Fever

As discussed previously, valley fever (*Coccidioidomycosis*) is found in California, including Kern County. In about 50 to 75 percent of people, valley fever causes either no symptoms or mild symptoms and those infected never seek medical care; when symptoms are more pronounced, they usually present as lung problems (cough, shortness of breath, sputum production, fever, and chest pains). The disease can progress to chronic or progressive lung disease and may even become disseminated to the skin, lining tissue of the brain (meninges), skeleton, and other body areas.

The California Department of Public Health (2013, p. 2) considers Kern County a highly endemic area for valley fever. When soil containing this fungus is disturbed by construction activities such as digging or grading, by vehicles raising dust, or by the wind, the fungal spores get into the air. When people breathe the spores into their lungs, they may get valley fever. Fungal spores are small particles that can grow and reproduce in the body. The highest infection period for valley fever occurs during the dry months in California between June and November (CDPH 2013, p. 2). Infection from valley fever during construction can be partially mitigated through the control of construction-generated dust. As noted, construction-generated dust would be controlled by adhering to the mandatory requirements contained in SJVAPCD Regulation VIII, which include the preparation of a SJVAPCD-approved dust control plan describing all fugitive dust control measures that are to be implemented before, during, and after any dust-generating activity. In addition, the California Department of Public Health provides recommendations for reducing the potential for valley fever infection during construction activities. These recommendations are required as mitigation measures **MM 4.8.4a** and **MM 4.8.4b** for the project (see Section 4.8, Hazards and Hazardous Materials).

Project Location Near Existing Sources of TACs

Some land uses are considered more sensitive to air pollution than others because of the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. The proposed project could be considered sensitive due to the proposed residential land uses. According to CARB's (2004) Community Health Air Pollution Information System, there are no sources of air toxics in Delano. This search was augmented by the EPA's (2013) National Air Toxics Program Release Chemical Report, which similarly does not identify any sources of air toxics in the city.

In April 2005, CARB released the *Air Quality and Land Use Handbook: A Community Health Perspective*, which offers guidance on siting sensitive land uses in proximity to sources of air toxics. Sensitive land uses identified in the handbook include residential communities, schools and schoolyards, day-care centers, parks and playgrounds, and hospitals and medical facilities. A particular source of air toxics treated in the guidance is freeways and major roadways. These roadways are sources of diesel particulate matter (DPM), which CARB has listed as a toxic air contaminant.

The handbook recommends that sensitive land uses be sited no closer than 500 feet from a freeway or major roadway, a buffer area that was developed to protect sensitive receptors from exposure to DPM, which was based on traffic-related studies that showed a 70 percent drop in particulate matter concentrations at a distance of 500 feet from the roadway. Presumably, acute and chronic risks as well as lifetime cancer risk due to DPM exposure are lowered proportionately. Per Google Earth, State Route 99 is approximately 2,850 feet east of the project site at the nearest. Therefore, the site lies beyond the CARB-recommended buffer area, and future receptors would not be negatively affected by TACs generated on State Route 99.

Project Operations

Operational emissions of TACs attributable to the proposed project would result primarily from on-site mobile emissions associated with the delivery of materials via diesel trucks to the proposed 340,000 square feet of commercial land uses in the West Pavilion development. Potential stationary sources consist of the possibility of charbroiling at fast-food restaurants.

The TAC of primary concern that would be generated by mobile sources associated with operation of the proposed project is diesel particulate matter (DPM). Project sources of DPM are the diesel-powered delivery trucks associated with the proposed commercial land uses. Such uses require the need for delivery trucks on a regular basis. While the specific land use mix of the proposed 340,000 square feet of commercial land use is not known and therefore the number of delivery truck trips is also unknown, for the purposes of this air quality analysis, truck trip data is provided from the analysis of similar commercial land use proposals in the region (Delano 2007, 2014). For the purposes of this analysis, it is assumed that the proposed project would generate approximately 50 delivery truck trips per weekday. The SJVAPCD (2012b) has developed a spreadsheet tool ("Mall") to determine the health risk associated with diesel truck travel, which identifies the health risk resulting from project truck travel at 0.0000002 in 1 million and the health risk resulting from project truck idling at 0.00005 in 1 million (see **Appendix 4.3-C**). These values do not exceed the 10 in 1 million significance threshold established by the SJVAPCD.

Potential stationary sources of TACs consist of the possibility of charbroiling at fast-food restaurants, which according to the SJVAPCD have the potential to emit TACs. The particular TAC of concern from charbroiling at fast-food restaurants is polycyclic aromatic hydrocarbon (PAH), both with and without naphelene. While the specific land use mix of the proposed 340,000 square feet of commercial land use is not known and therefore the number of charbroiling fast-food restaurants is also unknown, for the purposes of this air quality analysis, the potential number of fast-food restaurants is provided from the analysis of similar proposals in the region (Delano 2014). For the purposes of this analysis, it is assumed that the proposed project would include approximately 13 fast-food restaurants. The SJVAPCD "Mall" spreadsheet tool was also used to estimate the health risk associated with the possibility of charbroiling at restaurants and identified a health risk of 0.000006 in 1 million, which is also under the 10 in 1 million significance threshold established by the SJVAPCD.

The combined health risk of all project TAC sources would be 0.00005 in 1 million (0.00005 + 0.0000002 + 0.000006 = 0.00006), which is under the significance threshold established by the SJVAPCD.

For the reasons listed above, potential project impacts associated with toxic air contaminants would be **less than significant**.

Mitigation Measures

None required.

### Create Objectionable Odors Affecting a Substantial Number of People (Standard of Significance 3)

**Impact 4.3.6** The proposed project would not include sources that could create objectionable odors affecting a substantial number of people or expose new residents to existing sources of odor. Thus, this impact is considered to have a **less than significant** impact.

The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to distress among the public and often generating citizen complaints to local governments and regulatory agencies.

The SJVAPCD's (2014) Draft Guidance for Assessing and Mitigating Air Quality Impacts identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, transfer stations, and fiberglass molding. The proposed project is residential and commercial in nature and will not include any of the land uses that have been identified by the SJVAPCD as odor sources. However, uses considered to be minor sources of odors will be developed, such as restaurants. Odors from such sources are typically intermittent and disperse rapidly with distance from the source.

The lands to the immediate west of the West Pavilion site are designated in the Delano General Plan as Community Facility and are the location of the Kern County Dump-McFarland-Delano Sanitary Landfill (MDSL), which was closed in 1992, and the McFarland-Delano Transfer Station. Transfer stations are categorized by the SJVAPCD as a potential odor source. According to the SJVAPCD (2002), increases in odorous emissions would be considered significant if more than one confirmed complaint per year regarding odors has been received, averaged over a three-year period. The SJVAPCD has not received any odor-related complaints associated with the existing transfer station over the last three years (Sargenti 2014). This impact is **less than significant**.

Mitigation Measures

None required.

### Conflict with SJVAPCD Air Quality Attainment Plans (Standard of Significance 4)

**Impact 4.3.7** The proposed project would not conflict with the population growth assumptions used to develop the emissions inventories of SJVAPCD air quality attainment plans. There is a **no impact**.

As part of its enforcement responsibilities, the EPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the California Clean Air Act requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to the federal and state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

As previously stated, the SJVAPCD prepared the 2004 Extreme Ozone Attainment Demonstration Plan and 2013 Plan for the Revoked 1-Hour Ozone Standard, 2007 Ozone Plan, 2009 Reasonably Available Control Technology Demonstration for Ozone State Implementation Plan, 2012 $PM_{2.5}$ Plan, and 2007 $PM_{10}$ Attainment Demonstration Plan. These plans collectively address the air basin's nonattainment status with the national and state ozone standards as well as particulate matter by establishing a program of rules and regulations directed at reducing air pollutant emissions and achieving state (California) and national air quality standards. Pollutant control strategies are based on the latest scientific and technical information and planning assumptions, updated emission inventory methodologies for various source categories, and the latest population growth projections and associated vehicle miles traveled projections for the region.

Population growth projections for Delano are identified in the City's General Plan as well as by the Kern Council of Governments (Kern COG). The proposed project is consistent with the land use designation and development density presented in the City of Delano's General Plan. In addition, as demonstrated in Section 4.12, Population and Housing, the increase in population resulting from the proposed project is consistent with not only the City General Plan population forecast but also the population forecast developed by Kern COG. Therefore, the project would not exceed the population or job growth projections used by the SJVAPCD to develop its air quality attainment plans. **No impact** would occur.

Mitigation Measure

None required.

### 4.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

#### CUMULATIVE SETTING

The cumulative setting for air quality includes Delano and the San Joaquin Valley Air Basin. The SJVAB is designated nonattainment for federal ozone and $PM_{2.5}$ standards and is nonattainment for state ozone, $PM_{10}$ and $PM_{2.5}$ standards (CARB 2013b, 2014b). Cumulative growth in population, vehicle use, and industrial activity could inhibit efforts to improve regional air quality and attain the ambient air quality standards. Thus, the setting for this cumulative analysis consists of the SJVAB and associated growth and development anticipated in the air basin.

## CUMULATIVE IMPACTS AND MITIGATION MEASURES

### Result in a Cumulatively Considerable Net Increase in Nonattainment Criteria Pollutant (Standard of Significance 5)

**Impact 4.3.8** The proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter. This impact is **cumulatively considerable**.

The SJVAPCD's approach to assessing cumulative impacts is based, in part, on the projected increases in emissions attributable to the proposed project, as well as the project's consistency with the air district's air quality attainment plans. In other words, the SJVAPCD considers the impact of a project to be less than cumulatively considerable if it does not exceed significance thresholds under project-level conditions and does not conflict with the SJVAPCD's air quality plans. As identified under Impact 4.3.3, the project would exceed SJVAPCD operational significance thresholds, though as shown in Impact 4.3.7, the project would not conflict with any SJVAPCD air quality plans. Since the project would exceed SJVAPCD operational significance thresholds, this impact is **cumulatively considerable** and **significant and unavoidable**.

Mitigation Measures

See mitigation measure **MM 4.3.3**.

### Exposure of Sensitive Receptors to Cumulatively Considerable Toxic Air Contaminant Pollutant Concentrations During Operations (Standard of Significance 2)

**Impact 4.3.9** Implementation of the proposed project, in combination with cumulative development in the vicinity of the proposed project site, would result in a cumulatively considerable net increase of toxic air contaminants. This is considered a **less than cumulatively considerable** impact.

The SJVAPCD considers toxic air contaminant impacts to be cumulatively considerable when modeling shows that the combined emissions from the project and other existing and planned projects will exceed the significance threshold of 10 in 1 million. Therefore, the SJVAPCD "Mall" spreadsheet tool was used to determine the health risk associated with combined diesel truck travel resulting from the proposed project and the neighboring Marketplace development and Grapevine development. The SJVAPCD "Mall" spreadsheet tool was also used to determine the health risk associated with the potential stationary sources of these same neighboring developments, which include the possibility of charbroiling at restaurants.

The health risk resulting from cumulative project truck travel was identified at 0.0000008 in 1 million and the health risk resulting from cumulative project truck idling was identified at 0.0002 in 1 million (see **Appendix 4.3-C**). The health risk resulting from the possibility of charbroiling at restaurants was identified at 0.000008 in 1 million. The combined health risk for all these factors is 0.00021 in 1 million, which is also under the 10 in 1 million significance threshold established by the SJVAPCD. Therefore, this impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

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This section describes the existing biological resources including special-status species and sensitive habitat known to occur and/or have the potential to occur on and adjacent to the project site. A summary of the regulations and programs that provide protective measures to special-status species, an analysis of impacts to biological resources that could result from project implementation, and a discussion of mitigation measures necessary to reduce impacts to a less than significant level, where feasible, are provided in this section.

## 4.4.1 ENVIRONMENTAL SETTING

Several steps were taken to characterize the environmental setting in the project vicinity. A reconnaissance-level field survey was conducted on August 2, 2014, to collect site-specific data regarding habitat suitability for special-status species and to identify potential jurisdictional waters. Additional information was obtained from a variety of outside data sources and can be found in the reference list. Preliminary database searches were performed on the following websites to identify special-status species with the potential to occur in the area.

- US Fish and Wildlife Service's (USFWS) Sacramento Office Species List (2014a)
- USFWS's Information, Planning and Conservation System (IPaC) (2014b)
- USFWS's Critical Habitat Portal (2014c)
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (2014a)
- California Native Plant Society's (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (2014)

The project site is split between the jurisdictions of the Sacramento and Ventura USFWS offices. A search of the USFWS Sacramento Office's database was performed for the Pond, McFarland, Famoso, Wasco NW, Wasco SW, Wasco, Delano East, Allensworth, and Delano West, California, US Geological Survey (USGS) 7.5-minute quadrangles to identify special-status species within their jurisdiction that may be affected by project components. An accompanying search of the USFWS's IPaC system was conducted to capture species under the jurisdiction of the Ventura Field Office.

In addition, the USFWS Critical Habitat Portal was queried to identify designated critical habitat within 1 mile of the project site. A query of the CNDDB provided a list of processed and unprocessed occurrences for special-status species within the Pond, California, USGS quadrangle and the eight surrounding quads (listed above). The CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned quadrangles. Raw data from the database queries is provided in **Appendix 4.4-A**. Please see the Special-Status Species subsection below for a summary of the database search results, as well as conclusions regarding the potential for each species to be impacted by project-related activities.

### REGIONAL SETTING

The project site is located within the Great Valley ecological section of the California Dry Steppe ecological province (McNab et al. 2007). This province is characterized by dry, hot summers and mild, foggy winters. The regional landscape around the project site consists of broad, nearly level alluvial plains bordered by gently sloping alluvial fans with elevations ranging from sea level to 500 feet (150 meters) above mean sea level (McNab et al. 2007). Rock formations are derived

from nonmarine sedimentary rocks and alluvial deposits. Historically, this region was dominated by bunchgrass prairies. Today, agricultural crops and introduced annual grasses occupy the majority of the remaining grassland areas. Other common natural communities include oak woodland, and alkali scrub, as well as vernal pool and wetland communities (McNab et al. 2007). The Great Valley section is subdivided into 26 subsections, including the South Valley Alluvium and Basins subsection.

The project site is located in the South Valley Alluvium and Basins ecological subsection, comprising alluvial fans and lake basins of the southern San Joaquin Valley. Soils are predominantly well drained. Natural vegetation has been largely converted to agriculture, but remaining vegetation is characterized by allscale series on the basin floors and needlegrass grasslands on alluvial fans. Less common natural communities include mesquite series and iodine bush series. The climate is hot and arid, characterized by mean annual temperatures between 59° and 62° Fahrenheit and 5–6 inches of precipitation annually that falls as rain. Water drains into either the Tulare Basin or the Buena Vista-Kern Lake Basin. Streams in the region are dry most of the year, and historical lakes are now dry year-round (Goudey and Miles 1998).

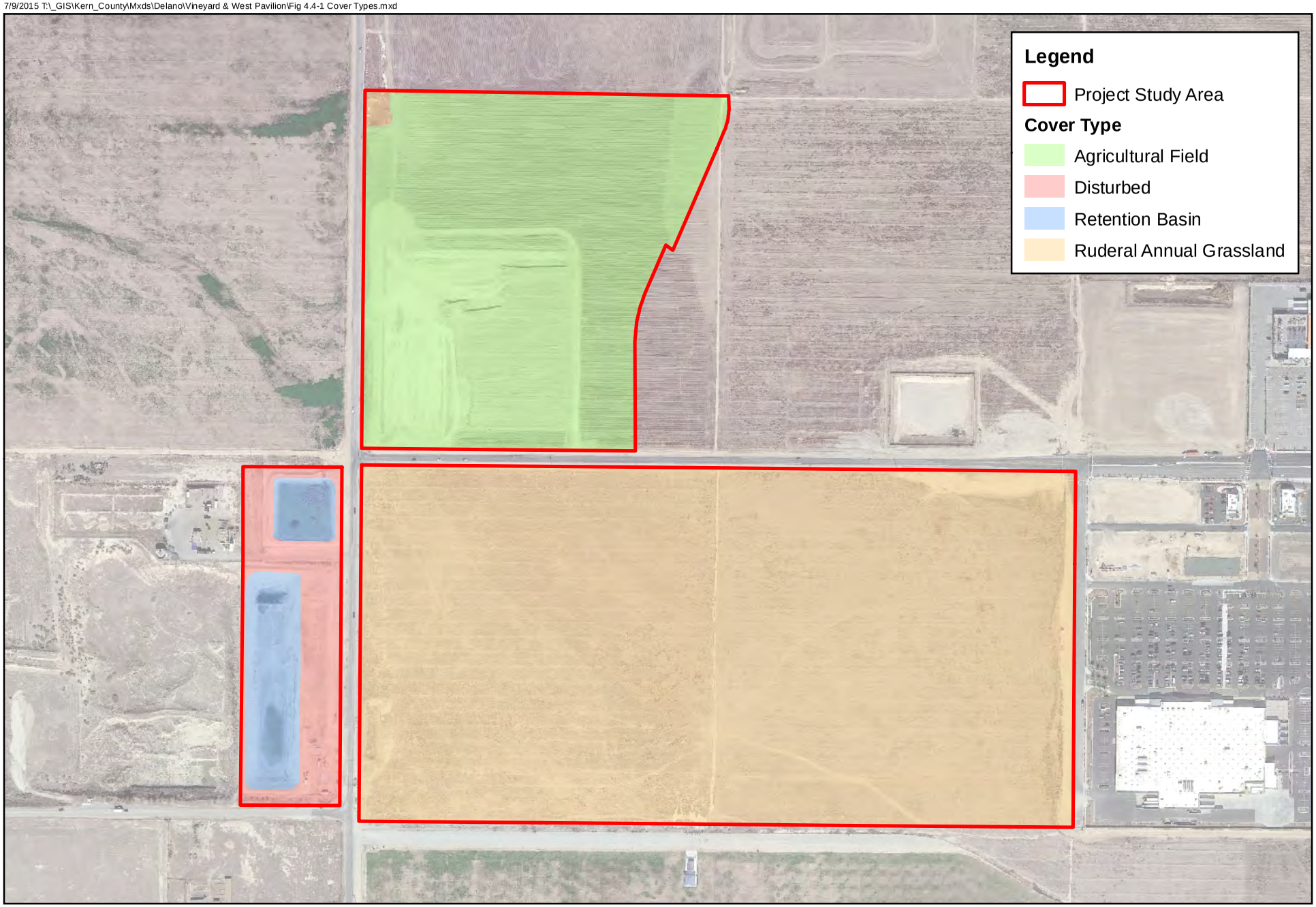
### PHYSICAL SETTING

The project site is located in the southern San Joaquin Valley. The valley floor is composed of primarily agricultural and urban land uses. Lands surrounding the project site support isolated pockets of natural vegetation such as grasslands, salt scrub, marsh, and woodland. The project site consists of two undeveloped fields, one of which contains a small retention basin. In addition, two retention basins west of the main fields are included in the project area. The topography on the project site consists of flat terrain at an elevation of approximately 300 feet above mean sea level (amsl). The soils within the project site are a combination of well-drained soils, including Garces silt loam, Kimberlina fine sandy loam, and Wasco sandy loam.

### BIOLOGICAL SETTING

Vegetative communities are assemblages of plant species that occur in the same area and are defined by species composition and relative abundance. The project site contains four cover types or vegetative communities: ruderal annual grassland, fallow agricultural fields, disturbed lands, and retention basins. Based on a review of aerial images, it appears the majority of the project site has a history of agricultural uses. The difference between the two main fields is that one is regularly tilled (fallow agricultural field); the other is less disturbed and supports significantly more vegetation (ruderal annual grassland). Each cover type is described below and shown in **Figure 4.4-1**. The cover type layer was created using the geographic information system (GIS) ArcView program based on aerial photograph interpretation and data collected during from the reconnaissance-level survey.

7/9/2015 T:_GIS\Kern_County\Mxds\Delano\Vineyard & West Pavilion\Fig 4.4-1 Cover Types.mxd




Michael Baker INTERNATIONAL

0 125 250 500 Feet

Source: PMC, 2014; Kern County, 2014; Microsoft Aerial, 2010

# Cover Types

Figure 4.4-1

*Ruderal Annual Grassland*

The large southern field (Delano West Pavilion) is characterized as ruderal annual grassland. Based on a review of aerial imagery, the field appears to have an agricultural history; however, there is no evidence of recent agricultural activity. The northwestern corner of the north field appears to be an old retention basin, a remnant from when the field was used for agriculture. This depression supports upland plant species similar to those in the southern field. The annual grassland community supports non-native weedy species including bromes (*Bromus* spp.), tumbleweed (*Salsola* sp.), wood-sorrel (*Oxalis* sp.), filaree (*Erodium* sp.), and mallow (*Malva* sp.). Vegetation is low growing and relatively sparse. Annual grasslands provide foraging habitat for a wide variety of wildlife species including raptors, seed-eating birds, small mammals, amphibians, and reptiles.

*Fallow Agricultural Field*

The northern field (Vineyard at Delano) is characterized as agriculture. The field had been recently disked at the time of the site visit on August 2, 2014. The freshly turned soil supported little to no plant life. A review of aerial images indicates the field is regularly disked, preventing the establishment of vegetation. Aerial imagery indicates the field has not been actively used for agriculture in many years. The barren, disturbed nature of the field makes it poor habitat for local wildlife; however, small mammals and raptors may utilize this area for foraging.

*Disturbed Lands*

Disturbed lands surround the retention basins west of Stradley Avenue. These lands appear to be severely and routinely disturbed. These lands are almost completely barren, providing very little habitat value to local wildlife.

*Retention Basins*

The two on-site retention basins hold water year-round. The northern basin currently supports stands of emergent vegetation such as cattails (*Typha* sp.). A review of historic aerials suggests that emergent vegetation management within both basins occurs with some regularity. Birds may use emergent vegetation in the northern basin for nesting. The southern basin does not support any emergent vegetation. The banks of both basins are severely disturbed and are mostly barren.

### SENSITIVE HABITATS

Sensitive habitats evaluated in this Environmental Impact Report (EIR) include those that are of special concern to resource agencies or those that are protected under the California Environmental Quality Act (CEQA), Section 1600 of the California Fish and Game Code (FGC), and/or Sections 401 and 404 of the Clean Water Act, as described more fully below.

#### Waters of the State and/or United States

Jurisdictional waters of the State and United States (WoUS), along with isolated wetlands, provide a variety of functions for plants and wildlife. Wetlands and other water features provide habitat, foraging, cover, and migration and movement corridors for both special-status and common species. In addition to habitat functions, these features provide physical conveyance of surface water flows capable of handling large stormwater events. Large storms can produce extreme flows that cause bank cutting and sedimentation of open waters and streams.

Jurisdictional waters can slow these flows and lessen the effects of these large storm events, protecting habitat and other resources.

There is a small retention basin in the northwestern corner of the project site. It is an isolated, man-made feature that supports upland vegetation. Two large retention basins west of Stradley Avenue appear to hold water year-round. Both of these basins are man-made and isolated with no apparent outfall and/or connection to off-site aquatic feature; therefore, all of the on-site basins do not appear to meet the criteria for WoUS. The basins may be considered waters of the State by the Regional Water Quality Control Board (RWQCB).

### WILDLIFE MOVEMENT CORRIDORS

Wildlife corridors are established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link otherwise fragmented acres of undisturbed area. Maintaining the continuity of established wildlife corridors is important to sustain species with specific foraging requirements, preserve a species' distribution potential, and retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

The majority of the project site has been disturbed by previous and ongoing disking or some other form of disturbance and could occasionally provide opportunity for local wildlife movement, though adjacent lands are farther removed from anthropogenic activities and offer more optimal movement opportunities. The CDFW BIOS 5 Viewer (2014c) provided the data on movement corridors and linkages. Data reviewed included the Essential Connectivity Areas [ds623] layer and the Missing Linkages in California [ds420] layer. The project site is not within or adjacent to any Essential Connectivity Areas or Missing Linkages.

### SPECIAL-STATUS SPECIES

Candidate, sensitive, or special-status species are commonly characterized as species that are at potential risk or actual risk to their persistence in a given area or across their native habitat. These species have been identified and assigned a status ranking by governmental agencies such as the CDFW and the USFWS and by private organizations such as the CNPS. The degree to which a species is at risk of extinction is the determining factor in the assignment of a status ranking. Some common threats to a species' or population's persistence include habitat loss, degradation, and fragmentation, as well as human conflict and intrusion. For the purposes of this biological review, special-status species are defined by the following codes:

- Listed, proposed, or candidates for listing under the federal Endangered Species Act (ESA) (50 Code of Federal Regulations [CFR] 17.11 – listed; 61 Federal Register [FR] 7591, February 28, 1996, candidates)

- Listed or proposed for listing under the California Endangered Species Act (CESA) (FGC 1992 Section 2050 et seq.; 14 California Code of Regulations [CCR] Section 670.1 et seq.)

- Designated as Species of Special Concern by the CDFW

- Designated as Fully Protected by the CDFW (FGC Sections 3511, 4700, 5050, and 5515)

- Species that meet the definition of rare or endangered under CEQA (14 CCR Section 15380) including CNPS List Rank 1b and 2

The results of the USFWS, CDFW, and CNPS database queries identified six special-status species with the potential to be impacted by project-related activities. **Table 4.4-1** summarizes all special-status species identified in the database results, describes the habitat requirements for each species, and provides conclusions regarding the potential for each species to be impacted by project-related activities. The CNDDB results within 1 mile of the project are depicted on **Figure 4.4-2**. In addition, the query of the USFWS Critical Habitat Portal revealed that the project site is not within or adjacent to any designated critical habitat.

**TABLE 4.4-1**
**SPECIAL-STATUS SPECIES OCCURRENCE SUMMARY**

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| **Plants** | | | | | | | |
| *Atriplex cordulata* var.*cordulata* | heartscale | — | — | 1B.2 | Saline or alkaline soils in chenopod scrub, meadows and seeps, and valley and foothill grassland. Elev: 0–1,837 feet (0–560 m). Blooms: Apr–Oct. (CNPS 2014) | A | **No effect.** Due to the highly disturbed nature of the project site and its isolation from any natural communities, it is highly unlikely any special-status plant species are present. |
| *Atriplex cordulata* var. *erecticaulis* | Earlimart orache | — | — | 1B.2 | Valley and foothill grassland. Elev: 131–328 feet (40–100 m). Blooms: Aug–Nov. (CNPS 2014) | A | |
| *Atriplex coronata* var. *vallicola* | Lost Hills crownscale | — | — | 1B.2 | Alkaline soils in chenopod scrub, vernal pools, and valley and foothill grassland. Elev: 164–2,083 feet (50–635 m). Blooms: Apr–Aug. (CNPS 2014) | A | |
| *Atriplex depressa* | brittle saltscale | — | — | 1B.2 | Alkaline and clay areas in chenopod scrub, meadows, seeps, playas, vernal pools, and valley and foothill grasslands. Elev: 3–1,049 feet (1–320 m). Blooms: Apr–Oct. (CNPS 2014) | A | |
| *Atriplex minuscula* | lesser saltscale | — | — | 1B.1 | Alkaline, sandy soils in chenopod scrub, playas, and valley and foothill grassland. Elev: 49–656 feet (15–200 m). Blooms: May–Oct. (CNPS 2014) | A | |
| *Atriplex subtilis* | subtle orache | — | — | 1B.2 | Valley and foothill grasslands. Elev: 131–328 feet (40–100 m). Blooms: June–Oct. (CNPS 2014) | A | |
| *Calochortus striatus* | alkali mariposa lily | — | — | 1B.2 | Alkaline, mesic areas in chaparral, chenopod scrub, Mojavean desert scrub, and meadows and seeps. Elev: 230–5,233 feet (70–1,595 m). Blooms: Apr–June. (CNPS 2014) | A | |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| *Caulanthus californicus* | California jewel-flower | FE | CE | 1B.1 | Sandy soils in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland. Elev: 200–3,281 feet (61–1,000 m). Blooms: Feb–May. (CNPS 2014) | A | **No effect.** Due to the highly disturbed nature of the project site and its isolation from any natural communities, it is highly unlikely any special-status plant species are present. |
| *Cirsium crassicaule* | slough thistle | — | — | 1B.1 | Chenopod scrub, slough marshes and swamps, and riparian scrub. Elev: 10–328 feet (3–100 m). Blooms: May–Aug. (CNPS 2014) | A | |
| *Delphinium recurvatum* | recurved larkspur | — | — | 1B.2 | Alkaline soils in chenopod scrub, cismontane woodland, and valley and foothill grassland. Elev: 10–2,592 feet (3–790 m). Blooms: Mar–Jun. (CNPS 2014) | A | |
| *Eremalche kernensis* | Kern mallow | FE | — | 1B.1 | On dry, open sandy to clay soils; often at edge of bald areas in chenopod scrub, and valley and foothill grassland. Elev: 230–4,232 feet (70–1,290 m). Blooms: Mar–May. (CNPS 2014) | A | |
| *Eryngium spinosepalum* | spiny-sepaled button-celery | — | — | 1B.2 | Vernal pools, and valley and foothill grassland. Elev: 26—837 feet (80–255 m). Blooms: Apr–May. (CNPS 2014) | A | |
| *Layia munzii* | Munz's tidy-tips | — | — | 1B.2 | Chenopod scrub and alkaline clay in valley and foothill grasslands. Elev: 492–2,297 feet (150–700 m). Blooms: Mar–Apr. (CNPS 2014) | A | |
| *Monolopia congdonii* | San Joaquin woollythreads | FE | — | 1B.2 | Chenopod scrub and sandy soils in valley and foothill grasslands. Elev: 197–2,625 feet (60–800 m). Blooms: Feb–May. (CNPS 2014) | A | |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| **Invertebrates** | | | | | | | |
| *Branchinecta conservatio* | conservancy fairy shrimp | FE | — | | Vernal pools, often large and turbid pools (USFWS 2005). | A | **No effect.** Suitable habitat not present. |
| *Branchinecta lynchi* | vernal pool fairy shrimp | FT | — | | Found only in vernal pools and vernal pool-like habitats. Distributed throughout the Central Valley (USFWS 2005). | A | **No effect.** Suitable habitat not present. |
| | Critical habitat, vernal pool fairy shrimp | X | — | | | A | **No effect.** Designated critical habitat not present. |
| *Desmocerus californicus dimorphus* | valley elderberry longhorn beetle | FT | — | | Dependent on host plant, elderberry (*Sambucus* spp.), which generally grows in riparian woodlands and upland habitats of the Central Valley. Current beetle distribution in Central Valley ranges from Shasta County to Fresno County (USFWS 1999). | A | **No effect.** Suitable habitat and host plant not present. |
| **Fish** | | | | | | | |
| *Entostephenus hubbsi* | Kern brook lamprey | — | SSC | | Silty backwaters of large rivers in the foothill regions (Moyle et al. 1995). | A | **No effect.** Suitable habitat not present. |
| *Hypomesus transpacificus* | delta smelt | FT | SE | | Distribution includes the Sacramento River below Isleton, San Joaquin River below Mossdale, and Suisun Bay. Spawning areas include the Sacramento River below Sacramento, Mokelumne River system, Cache Slough, the delta, and Montezuma Slough (USFWS 1995). | A | **No effect.** Suitable habitat not present and outside species range. |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| **Amphibians** | | | | | | | |
| *Rana draytonii* | California red-legged frog | FT | SSC | | Found mainly near ponds in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover. Most common in lowlands or foothills. Frequently found in woods adjacent to streams. Breeding habitat is in permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 feet (1,525 m) (Nafis 2014). | A | **No effect.** This species is mostly extirpated from the Central Valley floor. Retention basins are isolated, disturbed, and support little bankside vegetation. |
| *Spea hammondii* | western spadefoot | — | SSC | | Open areas with sandy/gravelly soils. Variable habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding (Nafis 2014). | A | **No effect.** Suitable habitat/soils not present. Severe disturbance of project site precludes the presence of this species. |
| **Reptiles** | | | | | | | |
| *Gambelia sila* | blunt-nosed leopard lizard | FE | SE/FP | | Semiarid grasslands, alkali flats, and washes. Flat areas with open space for running, avoids densely vegetated areas. Uses mammal dens and burrows for cover and shelter. The number of available burrows will determine the size of this lizard's population in an area (Nafis 2014). | P | **May affect.** Suitable habitat present. |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| *Mastichophis flagellum ruddocki* | San Joaquin whipsnake | — | SSC | | Occurs in open, dry, treeless areas, including grassland and saltbush scrub. Takes refuge in rodent burrows, under shaded vegetation, and under surface objects. Ranges from Colusa County to Kern County and westward into the inner South Coast Range; also an isolated occurrence in Sutter Buttes (Nafis 2014). | A | **No effect.** Outside species range. The project site does not overlap with the CDFW Range Map (1997 update) for this species (CDFW 2014d). |
| *Phynosoma blanvillii* | coast horned lizard | — | SSC | | Occurs in valley-foothill hardwood, conifer, and riparian habitats, as well as in pine-cypress, juniper, and annual grassland habitats. Ranges up to 4,000 feet (1,219 m) in the Sierra Nevada foothills, and up to 6,000 feet (1,800 m) in the mountains of Southern California (CDFW 2014d). | A | **No effect.** Outside species range. The project site does not overlap with the CDFW Range Map (1997 update) for this species (CDFW 2014d). |
| *Thamnophis gigas* | giant garter snake | FT | ST | | Marshes, sloughs, ponds, small lakes, low-gradient streams, irrigation and drainage canals, rice fields and their associated uplands. Upland habitat should have burrows or other soil crevices suitable for snakes to reside during their dormancy period (November–mid March). Ranges in the Central Valley from Butte County to Buena Vista Lake in Kern County (USFWS 2012). | A | **No effect.** Suitable habitat not present. Retention basins are isolated, disturbed, and support little bankside vegetation. |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| **Birds** | | | | | | | |
| *Agelaius tricolor* | tricolored blackbird | — | SSC | | Nests in wetlands or in dense vegetation near open water. Dominant nesting substrates: cattails, bulrushes, blackberry, agricultural silage. Nesting substrate must either be flooded, spinous, or in some way defended against predators (Hamilton 2004). Tricolored blackbirds are colonial, so nesting sites must be relatively large (CDFW 2014d). | A | **No effect.** Northern retention basin supports cattail stands, which may provide suitable nesting habitat for this species; however, this species is colonial and needs large stands of nesting substrate to be supported. The cattail stands on-site are too small to support a colony. |
| *Aquila chrysaetos* | golden eagle | — | FP | | Uncommon resident and migrant throughout California, except center of Central Valley. Habitat typically rolling foothills, mountain areas, sage-juniper flats, desert (CDFW 2014d). | A | **No effect.** Suitable nesting trees absent. |
| *Athene cunicularia* | burrowing owl | — | SSC | | Open, flat expanses with short, sparse vegetation and few shrubs, level to gentle topography and well-drained soils. Requires underground burrows or cavities for nesting and roosting. Can use rock cavities, debris piles, pipes, and culverts if burrows unavailable. Habitats include grassland, shrub steppe, desert, agricultural land, vacant lots, and pastures (CDFW 2014d). | P | **May affect.** Ruderal grassland in southern field and old retention basin provide suitable habitat. |
| *Buteo swainsoni* | Swainson's hawk | — | ST | | Nests in stands with few trees in riparian areas, juniper-sage flats, and oak savannah in the Central Valley. Forages in adjacent grasslands, agricultural fields and pastures (CDFW 2014d). | A | **No effect.** Nesting trees absent and ruderal grassland provides low quality foraging habitat. Surrounding agricultural lands are preferable foraging habitat. |
| *Charadrius montanus* | mountain plover | — | SSC | | Frequents open plains with low, herbaceous or scattered shrub vegetation below 3,200 feet (1,000 m) (CDFW 2014d). | A | **No effect.** Outside species range. The project site does not overlap with the CDFW Range Map (2008 update) for this species (CDFW 2014d). |

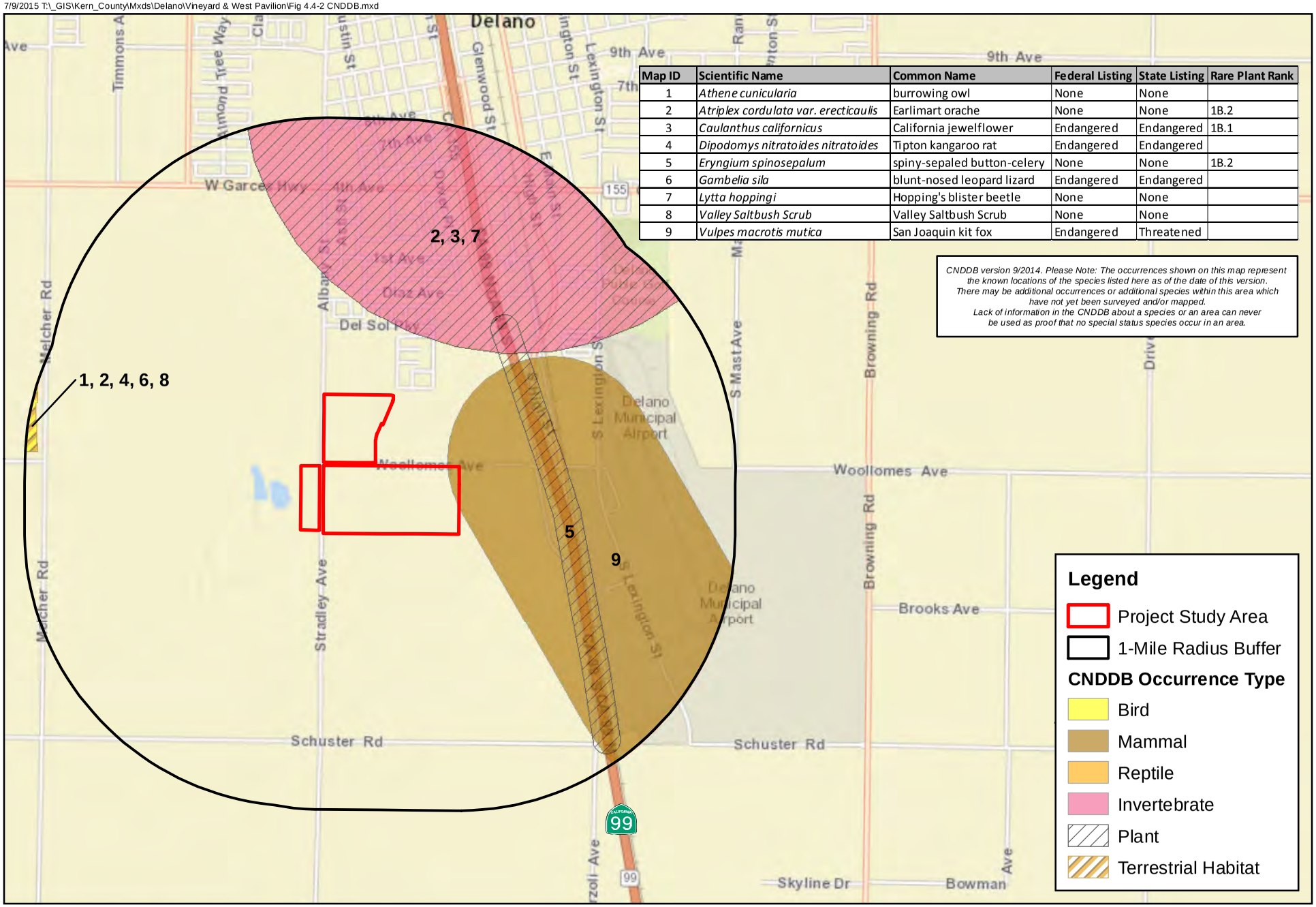
| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| *Empidonax traillii extimus* | southwestern willow flycatcher | — | SE | | Dense riparian forest and scrub habitats associated with rivers, swamps, wetlands, lakes, and reservoirs (USFWS 2002). | A | **No effect.** Suitable habitat not present. |
| *Lanius ludovicianus* | loggerhead shrike | — | SSC | | Breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground (Shuford and Gardali 2008). | A | **No effect.** Suitable habitat not present. |
| *Toxostoma lecontei* | Le Conte's thrasher | — | SSC | | Occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats (CDFW 2014b). Found primarily in habitats dominated by saltbush (*Atriplex*). Nests mostly in taller, bushier shrubs (USFWS 1998). | A | **No effect.** Suitable habitat not present. |
| *Vireo bellii pusillus* | least Bell's vireo | FE | SE | | Willows and other low, dense valley foothill riparian habitat and lower portions of canyons. Usually found near water, but also inhabits thickets along dry, intermittent streams. Ranges 0–2,000 feet (CDFW 2014d). | A | **No effect.** Suitable habitat not present. |
| **Mammals** | | | | | | | |
| *Ammospermophilus nelsoni* | San Joaquin antelope squirrel | — | ST | | Resident of the western San Joaquin Valley from 200 to 1,200 feet (60–360 m) on dry, sparsely vegetated, loam soils. Dwells in burrows, often associated with widely spaced alkali scrub vegetation (*Atriplex, Ephedra*), and dry washes (CDFW 2014d). | P | **May affect.** Ruderal grassland in southern field and old retention basin provide suitable habitat. |
| *Chaetodipus californicus femoralis* | Dulzura pocket mouse | — | SSC | | Variety of habitats including chaparral, grassland, and coastal sage scrub (CDFW 2014d). | A | **No effect.** Outside species range. The project site does not overlap with the CDFW Range Map (2007 update) for this species (CDFW 2014d). |

| Scientific Name | Common Name | Federal Status | State Status | CNPS Rare Plant Rank | General Habitat Characteristics | Habitat Present/ Absent | Rationale |
|---|---|---|---|---|---|---|---|
| *Dipodomys ingens* | giant kangaroo rat | FE | SE | | Found on sandy loam soils supporting sparse annual vegetation, and marginally found in low-density alkali desert scrub. Prefers large areas of gently sloping, homogenous terrain, with scattered shrubs and herbacous cover (CDFW 2014d). | A | **No effect.** Outside species range. The project site does not overlap with the CDFW Range Map (2007 update) for this species (CDFW 2014d). |
| *Dipodomys nitratoides nitratoides* | Tipton kangaroo rat | FE | SE | | Limited to arid-land communities on nearly level terrain. Typically found in areas with sparsely scattered woody shrubs and annual groundcover (USFWS 1998). | P | **May affect.** Ruderal grassland in southern field and old retention basin provide suitable habitat. |
| *Sorex ornatus relictus* | Buena Vista Lake shrew | FE | SSC | | Associated with freshwater emergent marsh and dense understory riparian vegetation. Known only to occur in Kern Lake preserve and Kern National Wildlife Refuge (Bolster 1998). | A | **No effect.** Suitable habitat not present. |
| *Taxidea taxus* | American badger | — | SSC | | Open shrub, forest, and herbaceous habitats with friable soils. Associated with treeless regions, prairies, parklands, and cold desert areas. Range includes most of California, except the North Coast (CDFW 2014d). | P | **May affect.** Suitable habitat present. |
| *Vulpes macrotis mutica* | San Joaquin kit fox | FE | ST | | Occurs in desert-like habitats characterized by sparse or absent shrub cover, sparse ground cover, and short vegetative structure. Areas having open, level, sandy ground (USFWS 2010). | P | **May affect.** Ruderal grassland in southern field and old retention basin provide suitable habitat. |

| Key | |
|---|---|
| Federal & State Status | CNPS Rare Plant Rank |
| (FE) Federal Endangered | *Rareness Ranks* |
| (FT) Federal Threatened | (1A) Presumed Extinct in California |

| | |
|---|---|
| (FC) Federal Candidate | (1B) Rare, Threatened, or Endangered in California and Elsewhere |
| (FD) Federally Delisted | (2B) Rare, Threatened, or Endangered in California, But More Common Elsewhere |
| (SE) State Endangered | (3) More Species Information Needed |
| (ST) State Threatened | (4) Limited Distribution |
| (SSC) State Species of Special Concern | *Threat Ranks* |
| (SCT) State Candidate Threatened | (0.1) Seriously threatened in California |
| (FP) Fully Protected | (0.2) Fairly threatened in California |
| (X) Federal Designated Critical Habitat | (0.3) Not very threatened in California |

7/9/2015 T:_GIS\Kern_County\Mxds\Delano\Vineyard & West Pavilion\Fig 4.4-2 CNDDB.mxd




| Map ID | Scientific Name | Common Name | Federal Listing | State Listing | Rare Plant Rank |
|---|---|---|---|---|---|
| 1 | *Athene cunicularia* | burrowing owl | None | None | |
| 2 | *Atriplex cordulata var. erecticaulis* | Earlimart orache | None | None | 1B.2 |
| 3 | *Caulanthus californicus* | California jewelflower | Endangered | Endangered | 1B.1 |
| 4 | *Dipodomys nitratoides nitratoides* | Tipton kangaroo rat | Endangered | Endangered | |
| 5 | *Eryngium spinosepalum* | spiny-sepaled button-celery | None | None | 1B.2 |
| 6 | *Gambelia sila* | blunt-nosed leopard lizard | Endangered | Endangered | |
| 7 | *Lytta hoppingi* | Hopping's blister beetle | None | None | |
| 8 | *Valley Saltbush Scrub* | Valley Saltbush Scrub | None | None | |
| 9 | *Vulpes macrotis mutica* | San Joaquin kit fox | Endangered | Threatened | |

*CNDDB version 9/2014. Please Note: The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.*

Michael Baker INTERNATIONAL

0 0.125 0.25 0.5 Miles

Source: ESRI Streetmap, 2015; CA Department of Fish and Wildlife, 2014

# Previously Recorded Occurrences of Special-Status Species Within 1 MIle of Project Study Area

Figure 4.4-2

### Special-Status Plant Species

Based on the database search results, no special-status plant species have the potential to occur on the project site. In addition, based on site reconnaissance, the previous and ongoing disturbance within the project site precludes the presence of special-status plants, as does a lack of suitable habitat.

### Special-Status Wildlife Species

Based on database search results, six special-status wildlife species have the potential to occur on the project site. Each species considered in the impact analysis is described below based on the data obtained from the CDFW's (2014d) California Wildlife Habitat Relationships System Life History Accounts and Range Maps as well as other published data sources, as cited.

#### Blunt-Nosed Leopard Lizard (*Gambelia sila*)

The blunt-nosed leopard lizard is a federal and state listed endangered species, as well as a state fully protected species. Blunt-nosed leopard lizards inhabit the San Joaquin Valley floor and the surrounding foothills, in open, sparsely vegetated areas. This species is found on alkali flats, large washes, arroyos, canyons, and low foothills at elevations ranging from 100 to 2,400 feet (30–730 meters) amsl. On the valley floor, they are most often found in grasslands and chenopod scrub communities. This species uses small rodent burrows for cover and nesting (USFWS 1998).

No blunt-nosed leopard lizards were observed during the reconnaissance-level survey. The sparsely vegetated grasslands on the project site provide potentially suitable habitat for this species. Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of six CNDDB records within 5 miles of the project site result in the potential for this species to be impacted by project-related activities.

#### Burrowing Owl (*Athene cunicularia*)

The burrowing owl is a California species of special concern. It is federally protected under the Migratory Bird Treaty Act and as a bird of prey under the Raptor Recovery Act. Burrowing owls prefer nesting in mammal burrows in open areas of dry, open, rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub with gullies, washes, arroyos, and along the edges of human disturbed lands. This species can also be found inhabiting golf courses, airports, cemeteries, vacant lots, and road embankments with friable soils for nesting. The elevation range for this species extends from 200 feet (60 meters) below mean sea level to 12,000 feet (3,636 meters) amsl at the Dana Plateau in Yosemite (Bates 2006).

No burrowing owls or their sign were observed during the reconnaissance-level site survey; however, several burrows were observed on and adjacent to the project site. The combination of sparse vegetation, friable soils, and existing burrows makes the project site suitable habitat for this species. Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of two CNDDB records within 5 miles of the project site result in the potential for this species to be impacted by project-related activities.

#### San Joaquin Antelope Squirrel (*Ammospermophilus nelson*)

The San Joaquin antelope squirrel (formerly Nelson's antelope squirrel) is state listed as threatened. It is associated with dry, sparsely vegetated loam soils in the western San Joaquin Valley at elevations ranging from 200 to 1,200 feet (60–360 meters) amsl. This species can be

found in a variety of relatively level arid grassland and shrubland habitats; however, they prefer areas with widely scattered shrubs, annual ground cover, and terrain cut by small gullies and washes. Antelope squirrels require friable soils in order to dig burrows for cover and nesting.

No San Joaquin antelope squirrels were observed during the reconnaissance-level survey. The sparsely vegetated grasslands in the project site provide potentially suitable habitat for this species. There are no CNDDB records of this species occurring within 5 miles of the project site; however, there are two records approximately 7.5 miles west of the project site (CDFW 2014c). Furthermore, the project site overlaps with the known range of this species (CDFW 2014d). Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of two CNDDB records approximately 7.5 miles west of the project site result in the potential for this species to be impacted by project-related activities.

Tipton Kangaroo Rat (*Dipdomys nitratoides nitratoides*)

The Tipton kangaroo rat is a federal and state listed endangered species. This species is associated with nearly level arid communities on the floor of the Tulare Basin. They are typically found in areas with sparsely scattered woody shrubs and a groundcover composed of annual grasses and forbs. Burrows of Tipton kangaroo rats are often located in elevated mounds, road berms, canal embankments, railroad beds, and at the base of shrubs. They are generally associated with sandy, friable soils (USFWS 1998).

No Tipton kangaroo rats were observed during the reconnaissance-level survey; however, several burrows were observed on and adjacent to the project site. The combination of sparse vegetation, friable soils, and existing burrows make the project site suitable habitat for this species. Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of four CNDDB records within 5 miles of the project site result in the potential for this species to be impacted by project-related activities.

American Badger (*Taxidea taxus*)

The American badger is a California species of special concern. It is an uncommon, permanent resident found throughout the state in open stages of herbaceous, shrub, and forest habitats. American badgers dig burrows and are associated with areas that have dry, friable, often sandy soils. American badgers are somewhat tolerant of human activities.

No badgers or large burrows were observed during the reconnaissance-level site survey. The entire project site provides potentially suitable habitat for this species. There are no CNDDB records of this species occurring within 5 miles of the project site; however, there is one record approximately 8 miles north of the project site in Earlimart (CDFW 2014c). Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of a CNDDB record approximately 8 miles north of the project site result in the potential for this species to be impacted by project-related activities.

San Joaquin Kit Fox (*Vulpes macrotis mutica*)

The San Joaquin kit fox is federally endangered and a state listed as threatened species. This species is found in a wide variety of scrub and grassland habitats, including areas that have been heavily modified by humans. For example, kit foxes have been known to inhabit active oil fields, wind turbine farms, croplands, pastures, orchards, vineyards, and other agricultural lands. They have been known to forage in disturbed areas such as tilled fields and row crop fields. Kit foxes prefer friable soils; however, they have been found on virtually every soil type (USFWS 1998).

No San Joaquin kit foxes or large burrows were observed during the reconnaissance-level site survey; however, the friable soils and sparse vegetation of the project site create suitable habitat for this species. Focused surveys for this species have not been conducted to date; however, the presence of suitable habitat and the presence of six CNDDB records within 5 miles of the project site result in the potential for this species to be impacted by project-related activities.

## 4.4.2 REGULATORY SETTING

### FEDERAL

#### Endangered Species Act

The Endangered Species Act of 1973 (ESA), as amended, provides protective measures for federally listed threatened and endangered species, including their habitats, from unlawful take (16 United States Code (USC) Sections 1531–1544). The ESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Title 50, Part 222, of the Code of Federal Regulations (50 CFR Section 222) further defined "harm" to include "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including feeding, spawning, rearing, migrating, feeding, or sheltering."

ESA Section 7(a)(1) requires federal agencies to utilize their authority to further the conservation of listed species. ESA Section 7(a)(2) requires consultation with the USFWS or the National Marine Fisheries Service (NMFS) if a federal agency undertakes, funds, permits, or authorizes (termed the federal nexus) any action that may affect endangered or threatened species, or designated critical habitat. For projects that may result in the incidental "take" of threatened or endangered species, or critical habitat, and that lack a federal nexus; a Section 10(a)(1)(b) incidental take permit can be obtained from the USFWS and/or the NMFS.

#### Clean Water Act

The basis of the Clean Water Act (CWA) was established in 1948; however, it was referred to as the Federal Water Pollution Control Act. The act was reorganized and expanded in 1972 (33 USC Section 1251), and at that time the Clean Water Act became the act's commonly used name. The basis of the CWA is the regulation of pollutant discharges into waters of the United States (WoUS), as well as the establishment of surface water quality standards.

##### Section 404

CWA Section 404 (33 USC Section 1344) established the program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Under this regulation, certain activities proposed within WoUS require the obtainment of a permit prior to initiation. These activities include, but are not limited to, placement of fill for the purposes of development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and bridges), and mining operations.

The primary objective of this program is to ensure that the discharge of dredged or fill material is not permitted if a practicable alternative to the proposed activities exists that results in less impact to WoUS, or the proposed activity would result in significant adverse impacts to WoUS. To comply with these objectives a permittee must document the measures taken to avoid and minimize impacts to WoUS and provide compensatory mitigation for any unavoidable impacts.

The US Environmental Protection Agency (EPA) and the USFWS are assigned roles and responsibilities in the administration of this program; however, the US Army Corps of Engineers (USACE) is the lead agency in the administration of day-to-day activities, including issuance of permits. The agencies will typically assert jurisdiction over the following waters (1) traditional navigable waters (TNW); (2) wetlands adjacent to TNWs; (3) relatively permanent waters (RPW) that are non-navigable tributaries to TNWs and have relatively permanent flow or seasonally continuous flow (typically three months); and (4) wetlands that directly abut RPWs. Case-by-case investigations are usually conducted by the agencies to ascertain their jurisdiction over waters that are non-navigable tributaries and do not contain relatively permanent or seasonal flow, wetlands adjacent to the aforementioned features, and wetlands adjacent to but not directly abutting RPWs (USACE 2007). Jurisdiction is not generally asserted over swales or erosional features (e.g., gullies or small washes characterized by low volume/short duration flow events) or ditches constructed wholly within and draining only uplands that do not have relatively permanent flows.

The extent of jurisdiction within WoUS which lack adjacent wetlands is determined by the Ordinary High Water Mark (OHWM). The OHWM is defined in 33 CFR Section 328.3(e) as the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." Wetlands are further defined under 33 CFR Section 328.3 and 40 CFR Section 230.3 as "those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" and typically include "swamps, marshes, bogs, and similar areas." The 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Manual) sets forth a standardized methodology for delineating the extent of wetlands under federal jurisdiction (USACE 1987).

The 1987 Manual outlines three parameters that all wetlands, under normal circumstances, must contain positive indicators to be considered jurisdictional. These parameters include (1) wetland hydrology, (2) hydrophytic vegetation, and (3) hydric soils (USACE 1987). In 2006, the USACE issued a series of regional supplements to address regional differences that are important to the functioning and identification of wetlands. The supplements present "wetland indicators, delineation guidance, and other information" that is specific to the region. The USACE requires that wetland delineations submitted after June 5, 2007, be conducted in accordance with both the 1987 Manual and the applicable supplement.

### Section 401

Under CWA Section 401 (33 USC Section 1341), federal agencies are not authorized to issue a permit and/or license for any activity that may result in discharges to waters of the United States, unless a state or tribe where the discharge originates either grants or waives CWA Section 401 certification. CWA Section 401 provides states or tribes with the ability to grant, grant with conditions, deny, or waive certification. Granting certification, with or without conditions, allows the federal permit/license to be issued and remain consistent with any conditions set forth in the CWA Section 401 Certification. Denial of the certification prohibits the issuance of the federal license or permit, and waiver allows the permit/license to be issued without state or tribal comment. Decisions made by states or tribes are based on the proposed project's compliance with EPA water quality standards as well as applicable effluent limitations guidelines, new source performance standards, toxic pollutant restrictions, and any other appropriate requirements of

state or tribal law. In California, the State Water Resources Control Board is the primary regulatory authority for CWA Section 401 requirements (additional details below).

### Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Section 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR Section 21). The majority of birds found in the project vicinity would be protected under the MBTA.

### Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with the USFWS, the state agency responsible for fish and wildlife management, and the National Marine Fisheries Service. Section 662(b) of the act requires the lead federal agency to consider the recommendations of the USFWS and other agencies. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

### Executive Order 11990 Protection of Wetlands (42 FR 26961, 25 May 1977)

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless (1) no practicable alternative exists, and (2) all practical measures have been taken to minimize harm to wetlands.

## STATE

### California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has the responsibility for maintaining a list of endangered and threatened species (FGC Section 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for potential addition to the list of endangered or threatened species, and a list of "species of special concern," which serve as species "watch lists."

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species.

Project-related impacts to species on the CESA endangered or threatened list would be considered significant. State-listed species are fully protected under the mandates of the CESA. "Take" of protected species incidental to otherwise lawful management activities may be authorized under FGC Section 206.591. Authorization from the CDFW would be in the form of an incidental take permit.

## California Fish and Game Code

### Native Plant Protection Act

The Native Plant Protection Act (FGC Sections 1900–1913) prohibits the taking, possessing, or sale within the state of any plants with a state designation of rare, threatened, or endangered (as defined by the CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify the CDFW and give that state agency at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed (FGC Section 1913). Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed project.

### Birds of Prey

Under FGC Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

### "Fully Protected" Species

California statutes also afford "fully protected" status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. FGC Section 3505 makes it unlawful to take "any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird." FGC Section 3511 protects from take the following fully protected birds: (a) American peregrine falcon (*Falco peregrinus anatum*); (b) brown pelican (*Pelecanus occidentalis*); (c) California black rail (*Laterallus jamaicensis coturniculus*); (d) California clapper rail (*Rallus longirostris obsoletus*); (e) California condor (*Gymnogyps californianus*); (f) California least tern (*Sterna albifrons browni*); (g) golden eagle (*Aquila chrysaetos*); (h) greater sandhill crane (*Grus canadensis tabida*); (i) light-footed clapper rail (*Rallus longirostris levipes*); (j) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (k) trumpeter swan (*Cygnus buccinator*); (l) white-tailed kite (*Elanus leucurus*); and (m) Yuma clapper rail (*Rallus longirostris yumanensis*).

FGC Section 4700 identifies the following fully protected mammals that cannot be taken: (a) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (b) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (c) Northern elephant seal (Mirounga angustirostri); (d) Guadalupe fur seal (*Arctocephalus townsendi*); (e) ring-tailed cat (genus *Bassariscus*); (f) Pacific right whale (*Eubalaena sieboldi*); (g) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (h) southern sea otter (*Enhydra lutris nereis*); and (i) wolverine (*Gulo gulo*).

FGC Section 5050 protects from take the following fully protected reptiles and amphibians: (a) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*); (b) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); (c) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*); (d) limestone salamander (*Hydromantes brunus*); and (e) black toad (*Bufo boreas exsul*).

FGC Section 5515 also identifies certain fully protected fish that cannot lawfully be taken even with an incidental take permit. The following species are protected in this fashion: (a) Colorado River squawfish (*Ptychocheilus lucius*); (b) thicktail chub (*Gila crassicauda*); (c) Mohave chub

(*Gila mohavensis*); (d) Lost River sucker (*Catostomus luxatus*); (e) Modoc sucker (*Catostomus microps*); (f) shortnose sucker (*Chasmistes brevirostris*); (g) humpback sucker (*Xyrauchen texanus*); (h) Owens River pupfish (*Cyprinoden radiosus*); (i) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*); and (j) rough sculpin (*Cottus asperrimus*).

None of these species will be affected by the proposed project.

### Policies Related to California Wetlands and Other Waters

The California Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all of the following conditions are met:

- The project is water-dependent.
- No other feasible alternative is available.
- The public trust is not adversely affected.
- Adequate compensation is proposed as part of the project.

#### Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1966 (California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15) is the primary state regulation that addresses water quality. The requirements of the act are implemented by the State Water Resources Control Board at the state level and at the local level by the Regional Water Quality Control Board (RWQCB). The RWQCB carries out planning, permitting, and enforcement activities related to water quality in California. The act provides for waste discharge requirements and a permitting system for discharges to land or water. Certification is required by the RWQCB for activities that can affect water quality.

#### Clean Water Act, Section 401 Water Quality Certification

CWA Section 401 (33 USC Section 1341) requires that any applicant for a federal license or permit that may result in a pollutant discharge to WoUS obtain a certification that the discharge will comply with EPA water quality standards. The state or tribal agency responsible for issuance of the Section 401 certification may also require compliance with additional effluent limitations and water quality standards set forth in state/tribal laws. In California, the RWQCB is the primary regulatory authority for CWA Section 401 requirements.

The Central Valley RWQCB is responsible for enforcing water quality criteria and protecting water resources in the project area. In addition, the RWQCB is responsible for controlling discharges to surface waters of the state by issuing waste discharge requirements (WDR) or commonly by issuing conditional waivers to WDRs. The RWQCB requires that a project proponent obtain a CWA Section 401 water quality certification for CWA Section 404 permits issued by the USACE.

#### Delegated Permit Authority

California has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES) permit program including stormwater permits for all areas except tribal lands.

Issuance of CWA Section 404 dredge and fill permits remains the responsibility of the USACE; however, the state actively uses its CWA Section 401 certification authority to ensure CWA Section 404 permits are in compliance with state water quality standards.

State Definition of Covered Waters

Under California state law, "waters of the State" means "any surface water or groundwater, including saline waters, within the boundaries of the state." Therefore, water quality laws apply to both surface water and groundwater. After the US Supreme Court decision in *Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers*, the Office of Chief Counsel of the State Water Resources Control Board released a legal memorandum confirming the state's jurisdiction over isolated wetlands. The memorandum stated that under the California Porter-Cologne Water Quality Control Act (Porter-Cologne), discharges to wetlands and other waters of the State are subject to state regulation, and this includes isolated wetlands. In general, the State Water Resources Control Board regulates discharges to isolated waters in much the same way as it does for WoUS, using Porter-Cologne rather than Clean Water Act authority.

### LOCAL

#### Kern County Valley Floor Habitat Conservation Plan

Kern County is in the final stages of developing a multi-species habitat conservation plan for an approximately two-million-acre area of the southern San Joaquin Valley. This is one of the largest and most diverse endangered species conservation plans under development in the nation. The plan is a collaborative effort by several local, state, and federal agencies with land use and natural resource regulatory authority, plus major private sector and nongovernmental interests. The plan encompasses several natural vegetation types that provide habitat for many threatened, endangered, and sensitive plant and animal species. The plan will cover saltbush scrub, valley sink scrub, and grassland habitats, as well as 25 species of concern. All the special-status species, except burrowing owl, that are considered in the impact analysis for the proposed project will be covered under the Valley Floor Habitat Conservation Plan.

#### City of Delano General Plan

The following objectives and related policies from the Natural Resources section of the Open Space and Conservation Element of the Delano General Plan (2005) are relevant to biological impacts:

Objective: To protect natural resources including groundwater, soils, and air quality, to meet the needs of present and future generations.

Policy 6. Promote biological diversity and the use of plant species compatible with the bio-region.

Policy 10. Properties which may have listed plant and animal species will be required to have biological investigation if such species may be present. Federal and state protocols and requirements shall be used for such surveys and needed mitigation.

### NONGOVERNMENTAL AGENCY

**California Native Plant Society**

The CNPS is a nongovernmental agency that classifies native plant species according to current population distribution and threat level in regard to extinction. The CNPS utilizes the data to create/maintain a list of native California plants that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2014). Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review.

The following identifies the definitions of the CNPS listings:

List 1A: Plants believed to be extinct

List 1B: Plants that are rare, threatened, or endangered in California and elsewhere

List 2B: Plants that are rare, threatened, or endangered in California, but are more numerous elsewhere

All of the plant species on List 1 and 2 meet the requirements of the Native Plant Protection Act, Section 1901, Chapter 10, or FGC Sections 2062 and 2067, and are eligible for state listing. Plants appearing on List 1 or 2 are considered to meet the criteria of CEQA Section 15380, and effects on these species are considered "significant." Classifications for plants on List 3 (plants about which we need more information) and/or List 4 (plants of limited distribution), as defined by the CNPS, are not currently protected under state or federal law. Therefore, no detailed descriptions are provided or impact analysis was performed on species with these classifications.

## 4.4.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the application of the State CEQA Guidelines Appendix G thresholds of significance. A project is considered to have significant impacts on biological resources if it would:

1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations, or by the CDFW or the USFWS.

2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or the USFWS.

3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

6) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

7) Reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels.

## METHODOLOGY

The impact assessment below discusses impacts from implementation of project activities. The impact assessment was based on the project description (Section 3.0), information described in the environmental setting, and the standards of significance listed above. In addition, the impact analysis is organized by the significance criteria noted above: special-status plant and wildlife species, sensitive vegetation communities, federally protected wetlands, wildlife movement corridors, and compliance with local plans and policies or existing habitat conservation plans. Each impact category includes a description of the specific potential impacts as well as avoidance, minimization, and mitigation measures that can potentially reduce and mitigate potentially significant impacts. The reader is referred to Section 3.0, Project Description, for specific details on the proposed project.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Impacts to Candidate, Sensitive, or Special-Status Species (Standard of Significance 1)

**Impact 4.4.1** Implementation of project-related activities could result in substantial adverse effects, either directly or through habitat modifications, to species identified as candidate, sensitive, or special-status species in local or regional plans, policies, regulations, or by CDFW or USFWS. These effects would be considered a **potentially significant** impact.

Project-related activities have the potential to adversely affect several special-status species, either directly or through habitat modifications. Species include blunt-nosed leopard lizard, San Joaquin antelope squirrel, Tipton kangaroo rat, San Joaquin kit fox, American badger, and burrowing owl, as well as other raptors and migratory birds not identified in **Table 4.4-1**. No sign of any of these species was observed during the reconnaissance-level survey; however, the presence of suitable habitat and the presence of nearby occurrences result in the potential for these species to occupy the project site. Impacts to these species would be considered **potentially significant**. However, mitigation measures **MM 4.4.1a** through **MM 4.4.1d** are presented below to reduce the potential impacts to a **less than significant** level**.**

#### Mitigation Measures

**MM 4.4.1a** **Preconstruction Surveys.** Preconstruction surveys for special-status wildlife species (i.e., blunt-nosed leopard lizard, burrowing owl, San Joaquin antelope squirrel, Tipton kangaroo rat, San Joaquin kit fox, and American badger) shall be conducted by a qualified biologist no more than 14 days prior to ground disturbance. If any evidence of occupation of the project site by special-status animal species is observed, a buffer shall be established by a qualified biologist that results in sufficient avoidance to comply with applicable

regulations. If sufficient avoidance cannot be established, the CDFW and the USFWS shall be contacted for further guidance and consultation on additional measures. The project proponent shall obtain any required permits from the appropriate wildlife agency. Copies of the preconstruction survey and results, as well as required permits and evidence of compliance with applicable regulations, shall be submitted to the City of Delano.

The following buffer distances shall be established prior to construction activities:

- San Joaquin kit fox or American badger potential den: 50 feet
- San Joaquin kit fox known den: 100 feet
- San Joaquin kit fox or American badger pupping den: contact the CDFW and the SFWS
- Burrowing owl burrows outside of breeding season (February 1–August 31): as recommended by the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012)
- Burrowing owl burrows during breeding season: as recommended by the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012)
- Other protected raptor/migratory bird nests during breeding season (March 15–August 15): as recommended by qualified biologist
- Other special-status wildlife species: as recommended by qualified biologist

*Timing/Implementation:* *Prior to the start of project grading*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

**MM 4.4.1b** **Worker Environmental Awareness Training.** If any evidence of occupation of the project site by special-status species is observed during the preconstruction survey, the project proponent shall retain a qualified biologist to conduct mandatory contractor/worker awareness training for project personnel. The awareness training will be provided to all personnel to brief them on the identified location of sensitive biological resources, including how to identify species (visual and auditory) most likely to be present and the need to avoid impacts to biological resources (e.g., plants, wildlife, and jurisdictional waters), and to brief them on the penalties for not complying with biological mitigation requirements. If new personnel are added to the project, the project proponent will ensure that they receive the mandatory training before starting work.

*Timing/Implementation:* *Prior to the start of project grading*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

**MM 4.4.1c** **Avoidance and Minimization Measures.** The following measures shall be implemented throughout project implementation:

a) If any San Joaquin kit fox dens are found during preconstruction surveys, the status of dens shall be evaluated no more than 14 days prior to project ground disturbance. Provided that no evidence of kit fox occupation is observed, potential dens shall be marked and a 50-foot avoidance buffer delineated using stakes and flagging or other similar material to prevent inadvertent damage to the potential den. If a potential den cannot be avoided, it may be hand excavated following USFWS standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance. If kit fox activity is observed at a den, the den status shall be changed to "known" per USFWS (2011) guidelines, and the buffer distance shall be increased to 100 feet. Absolutely no excavation of San Joaquin kit fox known or pupping dens shall occur without prior authorization from the USFWS and the CDFW.

b) To enable kit foxes and other wildlife to pass through the project site during construction, the perimeter security fence shall leave a 4- to 5-inch opening between the fence mesh and the ground or the fence shall be raised 4 inches above the ground. The bottom of the fence fabric shall be knuckled (wrapped back to form a smooth edge) to protect wildlife that passes under the fence.

c) All pipes, culverts, or similar structures with a diameter of 4 inches or more that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS has been consulted. If necessary, under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity until the fox has escaped.

d) To prevent inadvertent entrapment of San Joaquin kit foxes, badgers, or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or provided with escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape. If listed species are trapped, the USFWS and the CDFW shall be contacted.

e) If San Joaquin kit fox known or pupping dens are observed in project areas, the project proponent shall contact the USFWS and the CDFW to discuss appropriate actions.

f) All vertical tubes used in project construction, such as chain-link fencing poles, shall be temporarily or permanently capped at the time they are installed to avoid the entrapment and death of special-status birds.

g) Project-related vehicles shall observe a 15 mile per hour (mph) speed limit in all project areas, except on county roads and state and federal highways. Construction after sundown shall be prohibited. Off-road traffic outside of designated project areas shall be prohibited.

h) All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and removed at least once a week from the construction or project site.

i) No pets shall be allowed in project areas.

j) The use of herbicides for vegetation control in project areas shall be restricted. No rodenticides shall be used on the project. All uses of such herbicidal compounds shall observe label and other restrictions mandated by the US Environmental Protection Agency, California Department of Food and Agriculture, and federal and state legislation as well as additional project-related restrictions deemed necessary by the CDFW and/or the USFWS.

k) No plants or wildlife shall be collected, taken, or removed from the construction areas except as necessary for project-related vegetation removal or wildlife relocation. Salvage of native vegetation to be removed from construction areas is encouraged, but shall only be performed by qualified biologists and with written approval from the CDFW.

*Timing/Implementation:* *Prior to the start of project grading and through out project construction*

*Monitoring/Enforcement:* *City of Delano to Community Development Department and Public Works Department, Engineering Division*

**MM 4.4.1d** **Agency Notification for Presence of Listed Species.** During project construction, if Tipton kangaroo rats, San Joaquin kit foxes, San Joaquin antelope squirrels, or blunt-nosed leopard lizards are found within the project area, temporary fencing shall be installed around the perimeter of the ground disturbance zone to prevent individuals from entering the construction zone. If the above species are found within the disturbance zone, work in the vicinity of the animal shall cease until a qualified biologist is on-site to determine the appropriate measures to be taken. Concurrent with this effort, the USFWS and the CDFW shall be consulted regarding any additional avoidance, minimization, or mitigation measures that may be necessary. Once the sensitive species is observed leaving the site, work in the area can resume. A report shall be prepared by the biologist to document the activities, and a copy of the report shall be submitted to wildlife and resource agency representatives and the City of Delano.

*Timing/Implementation:* *Throughout project construction*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

### Impacts to Riparian Habitat or Sensitive Natural Communities (Standard of Significance 2)

**Impact 4.4.2** Implementation of project-related activities will not result in the disturbance, degradation, and/or removal of riparian habitat or sensitive natural communities. The impact would be **less than significant**.

Sensitive habitats include those that are of special concern to resource agencies and those that are protected under CEQA, Section 1600 of the Fish and Game Code, and Section 404 of the Clean Water Act. There are no sensitive habitats within the project area. Project-related activities are not anticipated to adversely affect riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFW or the USFWS.

No drainages, stream courses, or other natural water features were observed during the reconnaissance-level survey of the project site. Implementation of project activities would result in the loss of the small retention basin in the northwest corner of the project site; however, this feature is man-made, isolated, and supports ruderal annual grassland vegetation similar to that found in the surrounding uplands. The two larger retention basins west of Stradley Avenue may be impacted by project-related activities. These basins are also man-made, but they hold water year-round and are able to support emergent vegetation such as cattails. These basins may be considered waters of the State. It is recommended that the project proponent consult with the RWQCB before expanding these basins to determine jurisdiction and whether any permits need to be acquired. The project is anticipated to have a **less than significant** impact on riparian habitat and sensitive natural communities.

Mitigation Measures

None required.

### Impacts to Federally Protected Wetlands (Standard of Significance 3)

**Impact 4.4.3** Implementation of project-related activities will not result in the disturbance, degradation, and/or removal of federally protected wetlands. There is **no impact.**

The project area contains three potentially jurisdictional features: the small retention basin located in the northwest corner of the project site, and the two retention basins west of Stradley Avenue. During the field survey, it was determined that these features were isolated and man-made. The small retention basin supported ruderal annual grassland vegetation similar to that found in the surrounding uplands. Although no formal wetland delineation has been conducted for this feature to date, there is no evidence that these retention basins would be treated as jurisdictional in the professional opinion of the project biologist. As a result, the project is anticipated to have **no impact** on federally protected wetlands.

Mitigation Measures

None required.

### Impacts to Wildlife Movement (Standards of Significance 4)

**Impact 4.4.4** Implementation of project-related activities will not adversely affect the movement of native resident or migratory fish or wildlife species or established migratory corridors. This is a **less than significant** impact.

The project site provides wildlife movement opportunities, as it is generally undeveloped open land; however, it does not support habitat or act as a major wildlife movement corridor that would require protection to preserve connection between habitat areas. The majority of the site has been disturbed by previous and ongoing disking or some other form of disturbance. While it could occasionally provide opportunity for local wildlife movement, adjacent lands are farther removed from anthropogenic activities and therefore offer more optimal movement opportunities. In addition, the site is surrounded by fairly dense urban and agricultural uses, which further impairs any corridor function.

As a result, no impact to the movements of any native resident or migratory wildlife corridors or the use of native wildlife nursery sites will occur as a result of the proposed project. Therefore, no mitigation measures are proposed. Implementation of project-related activities is not expected to result in impacts to the movement of native resident or migratory fish or wildlife species or established migratory corridors. As such, there would be a **less than significant** impact.

Mitigation Measures

None required.

### Conflict with Local Policies and Ordinances (Standard of Significance 5)

**Impact 4.4.5** Implementation of project-related activities will not conflict with any local policies or ordinances protecting biological resources. There is **no impact.**

The proposed project would not conflict with any local policies or ordinances protecting biological resources, including the Delano General Plan. As such, **no impact** would occur.

Mitigation Measures

None required.

### Conflict with Conservation Plans (Standard of Significance 6)

**Impact 4.4.6** Implementation of project-related activities will not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. There is **no impact.**

The project site is located within the Kern County Valley Floor Habitat Conservation Plan planning area; however, this plan has not been adopted to date. As a result, no conflict with an adopted habitat conservation plan will occur, and **no impact** would result.

Mitigation Measures

None required.

**Special-Status Species Population Impacts (Standard of Significance 7)**

**Impact 4.4.7** Implementation of project-related activities will not reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels. The impact would be **less than significant**.

Implementation of project-related activities would not reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or a biotic community, thereby causing the species or community to drop below self-sustaining levels. In addition, implementation of mitigation measures **MM 4.4.1a** through **MM 4.4.1d** will ensure that the proposed project does not reduce sensitive wildlife, habitats, and/or other biological resources below self-sustaining levels. As such, there would be a **less than significant** impact.

Mitigation Measures

No additional mitigation measures are necessary.

## 4.4.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

The project site and the surrounding area of Kern County as a whole must be considered for the purpose of evaluating land use conversion issues associated with biological resources on a cumulative level. In particular, this cumulative setting condition includes planned development under the current Land Use Element of the Delano General Plan, existing land use conditions, and planned and proposed land uses in the vicinity of the project site, as well as consideration of development patterns in the rest of Kern County. These land uses and cumulative development projects have the potential to adversely affect the biological resources in the region and could contribute to the loss of potential habitat.

### CUMULATIVE IMPACTS AND MITIGATION MEASURES

**Cumulative Impacts to Special-Status Species**

**Impact 4.4.8** The proposed project, in combination with other reasonably foreseeable projects, could result in mortality and loss of habitat for special-status species. This impact is **potentially cumulatively considerable**.

The vegetation communities/habitats within the project site represent only a small portion of the communities and habitats available for special-status species in the project vicinity. However, implementation of the proposed project may result in degradation of habitat through a variety of actions that, when combined with other habitat impacts occurring from development in surrounding areas, could conceivably result in significant cumulative impacts.

The project will result in the loss of ruderal annual grassland and agricultural land cover types. These land cover types have minimal habitat value for special-status species.

Project-related construction may result in disturbance to blunt-nosed leopard lizards, San Joaquin antelope squirrels, Tipton kangaroo rats, American badgers, San Joaquin kit foxes, burrowing owls, and/or other nesting migratory birds. Project-specific minimization measures would result in avoidance of these effects, and the project will not combine with other

reasonably foreseeable development to create a significant cumulative effect. Implementation of mitigation measures **MM 4.4.1a** through **MM 4.4.1d** will reduce the proposed project's impact and therefore result in a **less than cumulatively considerable** impact.

Mitigation Measures

No additional mitigation measures are necessary.

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This section provides background information on the cultural and historical background of the project area and evaluates the potential impacts of the proposed project on cultural and paleontological resources. Cultural resources include historic buildings and structures, historic districts, historic resource sites, prehistoric and historic archaeological sites, and other prehistoric and historic objects and artifacts. Paleontological resources include vertebrate, invertebrate, and plant fossils. This section is based primarily on the Cultural Resources Survey Report and Paleontology Assessment for the Vineyard at Delano & West Pavilion Projects prepared for the proposed project by ECORP Consulting, Inc., in August 2014. Due to the confidential and sensitive nature of cultural resources, the report is not included in the EIR appendices, but all information needed to provide factual evidence for impact determinations is reproduced in this section.

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

- *Cultural resources* is the term used to describe several different types of properties: prehistoric and historical archaeological sites; architectural properties such as buildings, bridges, and infrastructure; and resources of importance to Native Americans.

- *Historic properties* is a term defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such property.

- *Historical resource* is a California Environmental Quality Act (CEQA) term that includes buildings, sites, structures, objects, or districts, each of which may have historical, prehistoric, architectural, archaeological, cultural, or scientific importance and is eligible for listing or is listed in the California Register of Historical Resources (CRHR).

- *Paleontological resource* is defined as including fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. A unique paleontological site would include a known area of fossil-bearing rock strata.

## 4.5.1 ENVIRONMENTAL SETTING

### PREHISTORY

It is generally believed that human occupation of California began at least 10,000 years before present (BP). The archaeological record indicates that between approximately 10,000 and 8,000 years BP, a predominantly hunting economy existed, characterized by archaeological sites containing numerous projectile points and the bones of butchered large animals. Animals that were hunted probably consisted mostly of large species still alive today. Bones of extinct species have been found, but cannot definitely be associated with human artifacts. Although small animal bones and plant grinding tools are rarely found within archaeological sites of this period, small game and floral foods were probably exploited on a limited basis. A lack of deep cultural deposits from this period suggests that groups included only small numbers of individuals who did not often stay in one place for extended periods (ECORP 2014, p. 6).

Around 8,000 years BP, there was a shift in focus from hunting toward a greater reliance on plant resources. Archaeological evidence of this trend consists of a much greater number of milling tools (e.g., metates and manos) for processing seeds and other vegetable matter. This period, which extended to around 5,000 years BP, is sometimes referred to as the Millingstone Horizon (ECORP 2014, p. 6). Projectile points are found in archaeological sites from this period, but they are far fewer in number than from sites dating before 8,000 years BP. An increase in the size of groups and the stability of settlements is indicated by deep, extensive middens at some sites from this period (ECORP 2014, p. 6).

In sites dating after about 5,000 years BP, archaeological evidence indicates that reliance on both hunting and plant gathering continued as in the previous period, with more specialized adaptation to particular environments. Mortars and pestles were added to metates and manos for grinding seeds and other vegetable material. Flaked-stone tools became more refined and specialized, and bone tools were more common. During this period, new peoples from the Great Basin began entering Southern California. These immigrants, who spoke a language of the Uto-Aztecan linguistic stock, seem to have displaced or absorbed the earlier population of Hokan-speaking peoples. During this period, known as the Late Horizon, population densities were higher than before and settlement became concentrated in villages and communities along the coast and in interior valleys (ECORP 2014, p. 6). Regional subcultures also started to develop, each with its own geographical territory and language or dialect (ECORP 2014, p. 6). These were most likely the basis for the groups encountered by the first Europeans during the eighteenth century (ECORP 2014, p. 6). Despite the regional differences, many material culture traits were shared among groups, indicating a great deal of interaction (ECORP 2014, p. 6). The introduction of the bow and arrow into the region sometime around 2,000 BP is indicated by the presence of small projectile points (ECORP 2014, p. 6).

### LOCAL PREHISTORY

The earliest human use of the southern San Joaquin Valley is indicated by a few projectile points similar to Clovis spear points. Elsewhere in North America, Clovis points are dated 11,550 to 9,550 BP. In addition, hundreds of early concave base points were found along a past shoreline of Tulare Lake in association with human bone that has been dated to 13,800 to 9,400 BP. This indicates that small bands of hunters were present around Tulare Lake at this early time period (ECORP 2014, p. 6). The Lower Archaic Period (10,000 to 7,550 BP) is also represented archaeologically by individual flaked stone tools, including stemmed points, concave base points, and crescents, around Tulare Lake. No evidence of camp sites or other residential sites has been found. A site near Buena Vista Lake yielded three crescents, a stemmed projectile point, and several small flaked stone tools. Animal bones indicated use of fish, waterfowl, freshwater mussels, and artiodactyls (probably deer and pronghorn antelope) (ECORP 2014, p. 6).

During the Middle Archaic (7,550 to 2,550 BP), warmer, drier conditions prevailed. Tulare Lake decreased in size and eventually dried completely. Toward the end of this period in the northern San Joaquin Valley, residential sites are found along the rivers in the valley, with temporary camps elsewhere. Specialized fishing technology, including gorge hooks, composite bone hooks, and spears, is found in these sites, along with abundant fish bone. Few sites dating to this period have been found in the southern San Joaquin Valley, possibly due to the desiccation of Tulare Lake (ECORP 2014, p. 7).

Cooler, wetter conditions returned at the beginning of the Upper Archaic Period (2,550 BP to A.D. 1000), and Tulare, Buena Vista, and Kern lakes filled with water. However, few sites dating to this period are known from the southern San Joaquin Valley, possibly because they were buried by later deposition. Two sites excavated at Buena Vista Lake in the 1930s date to the Upper Archaic Period and have house floors and subsistence waste, indicating exploitation of both aquatic and terrestrial environments (ECORP 2014, p. 7). These sites have roasting pits, charmstones, bone strigils and bipoints, limpet shell ornaments, and Olivella half-shell and saucer beads (ECORP 2014, p. 7).

The cultures in place at the time of European contact developed during the Emergent Period (AD 1000 to the Historic Period). Sites at Buena Vista Lake from this period are villages with numerous house pits, triangular arrow points, an elaborate steatite industry, and pottery (ECORP 2014, p. 7).

### ETHNOGRAPHY

The predominant Native American group occupying the region encompassing the project area at the time of European contact in the late eighteenth century was the Southern Valley Yokuts. The southern San Joaquin Valley was originally covered by sloughs and marshes surrounding three shallow lakes: Tulare Lake, Buena Vista Lake, and Kern Lake. The lakes were fed by rivers coming from the Sierras such as the Kern River. Areas away from the lakes, rivers, and sloughs were dry since the valley receives less than 10 inches of rain per year. The Southern Valley Yokuts obtained fish, freshwater mussels, turtles, and waterfowl from the lakes and marshes. Fishing was carried out year-round. Elk and pronghorn antelope were hunted from blinds when they came to the lakes to drink. Grass and tule seeds were important plant foods. Since there were no oak trees on the valley floor, acorns were not an important food (ECORP 2014, p. 7).

The Yokuts lived in villages occupied year-round near lakes, sloughs, and rivers. However, groups of people left the village and lived in temporary camps while collecting seeds in the spring. Single-family houses consisted of wood frames covered with tule mats. There were also large multi-family communal residences that were long mat-covered rectangular structures with steep pitched roofs. These structures were divided into sections so that each family had its own fireplace and door. A shade porch, where cooking took place, ran along the front of the building. Seeds, roots, and dried fish were stored in mat-covered granaries raised off the ground. Each village also had an earth-covered sweathouse for use by men. Tule was used to make baskets and cradles. Wood and stone were obtained through trade with groups outside the valley. Marine shells obtained from coastal people were made into beads by the Yokuts. Clamshell disks circulated as primitive money, and Olivella beads and abalone pendants were strung for necklaces. Canoes and rafts made of tule were used for water transport (ECORP 2014, p. 7).

The Southern Valley Yokuts were organized in territorial tribelets with an average population of 350. Each tribelet spoke a different dialect and claimed the resources within its territory. Each tribelet had a chief who belonged to the Eagle lineage. Usually there was more than one village in a tribelet territory. The project area was probably in the territory of the Wowol tribelet, which had two villages south of Tulare Lake (ECORP 2014, p. 8).

### REGIONAL HISTORY

The first European to visit California was Spanish maritime explorer Juan Rodriguez Cabrillo in 1542. Cabrillo was sent north by the Viceroy of New Spain (Mexico) to look for the Northwest Passage.

Cabrillo visited San Diego Bay, Catalina Island, San Pedro Bay, and the northern Channel Islands. The English adventurer Francis Drake visited the Miwok Native American group at Drake's Bay or Bodega Bay in 1579. Sebastian Vizcaíno explored the coast as far north as Monterey in 1602. He reported that Monterey was an excellent location for a port (ECORP 2014, p. 8).

Colonization of California began with the Spanish Portolá land expedition. The expedition, led by Captain Gaspar de Portolá of the Spanish army and Father Junipero Serra, a Franciscan missionary, explored the California coast from San Diego to the Monterey Bay area in 1769. As a result of this expedition, Spanish missions to convert the native population, presidios (forts), and pueblos (towns) were established. The Franciscan missionary friars established 21 missions in Alta California (the area north of Baja California) beginning with Mission San Diego in 1769 and ending with the mission in Sonoma established in 1823. The purpose of the missions and presidios was to establish Spanish economic, military, political, and religious control over the Alta California territory. The Spanish took little interest in the project area and did not establish any missions or settlements in the Central Valley. After Mexico became independent from Spain in 1821, what is now California became the Mexican province of Alta California with its capital at Monterey. In 1827, American trapper Jedediah Smith traveled along the Sacramento River and into the San Joaquin Valley to meet other trappers of his company who were camped there, but no permanent settlements were established by the fur trappers (ECORP 2014, p. 8).

The Mexican government closed the missions in the 1830s and former mission lands, as well as previously unoccupied areas, were granted to retired soldiers and other Mexican citizens for use as cattle ranches. Much of the land along the coast and in the interior valleys became part of Mexican land grants or "ranchos" (ECORP 2014, p. 8). During the Mexican period, there were small towns at San Francisco (then known as Yerba Buena) and Monterey. The rancho owners lived in one of the towns or in an adobe house on the rancho. The Mexican Period includes the years 1821 to 1848.

John Sutter, a European immigrant, built a fort at the confluence of the Sacramento and American rivers in 1839 and petitioned the Mexican governor of Alta California for a land grant, which he received in 1841. Sutter built a flour mill and grew wheat near the fort (ECORP 2014, p. 9). Gold was discovered in the flume of Sutter's lumber mill at Coloma on the South Fork of the American River in January 1848 (ECORP 2014, p. 9). The discovery of gold initiated the 1849 California Gold Rush, which brought thousands of miners and settlers to the Sierra foothills east and southeast of Sacramento.

The American period began when the Treaty of Guadalupe Hidalgo was signed between Mexico and the United States in 1848. As a result of the treaty, Alta California became part of the United States as the territory of California. Rapid population increase occasioned by the Gold Rush of 1849 allowed California to become a state in 1850. Most Mexican land grants were confirmed to the grantees by US courts, but usually with more restricted boundaries, which were surveyed by the US Surveyor General's office. Land outside the land grants became federal public land, which was surveyed into sections, quarter sections, and quarter-quarter sections. The federal public land could be purchased at a low fixed price per acre or could be obtained through homesteading (after 1862) (ECORP 2014, p. 9).

## PROJECT AREA HISTORY

Kern County was formed in 1866 from the southern part of Tulare County, and Havilah was made the county seat. Bakersfield began as Baker's field, a fenced property with a corral owned by Colonel Thomas Baker at Kern Island on the Kern River (ECORP 2014, p. 9). Baker was responsible for draining thousands of acres of "swampland" in the valley around Kern River. Baker's field developed into the town of Bakersfield where a school and store opened in 1865. Baker built a grist mill in Bakersfield in 1868 and opened a land office to sell the land he had drained. The former Kern Island post office was renamed as the Bakersfield post office in 1869. A weekly newspaper began publication and a brick schoolhouse opened the same year. The town plat (showing streets and lots for sale) was filed in 1870, and the Bakersfield town hall was completed in 1871 (ECORP 2014, p. 9).

The county seat of Kern County was moved from Havilah to Bakersfield in 1874, and a bank opened in Bakersfield that year. The county courthouse in the new county seat was completed in 1876 (ECORP 2014, p. 9). The Southern Pacific Railroad line from San Francisco was completed via Fresno and Delano to Bakersfield in 1874. Bakersfield was connected by rail to Los Angeles when the Southern Pacific's route was completed in 1876 (ECORP 2014, p. 9). The railroad stimulated agricultural development in the southern San Joaquin Valley because the harvest could be transported and sold outside the area.

Delano was founded in 1873 when the Southern Pacific Railroad was constructed through the area. The town was named by the Southern Pacific Railroad in honor of Columbus Delano, at the time the Secretary of the Interior for the United States (ECORP 2014, p. 9). The first post office and a store opened in 1874. Large tracts of land around Delano were purchased for agricultural development in 1880. The Delano town site was platted in 1888, and the first commercial vineyard in the Delano area began production in 1892. A bank and a newspaper began operation in 1908 followed by the incorporation of Delano in 1915. DiGiorgio Farms acquired 69,000 acres of land near Arvin and Delano in 1919, and the San Joaquin Cottongrowers Association formed at Delano in 1927. The Voice of America began broadcasting from transmitters 2 miles west of Delano in 1944 (ECORP 2014, p. 10).

Delano was a major center for Chicano and Filipino farmworker organization efforts during the 1950s and 1960s. Filipino immigrants Philip Vera Cruz and Larry Dulay Itliong helped organize the farmworkers around Delano in the 1950s. Filipino leaders led the Agricultural Workers Organizing Committee (AWOC) in a "walk off" from table grape farms. This became known as the Delano grape strike. The strikers' goal was to improve farmworkers' wages and working conditions. The National Farm Workers Association (NFWA), a largely Hispanic union led by Cesar Chavez, joined the strike within a week. During the strike, the two groups joined forces and formed the United Farm Workers of America (UFW). By 1970, the UFW won a contract with major grape growers across California (ECORP 2014, p. 10).

## PROJECT AREA PALEONTOLOGY

Paleontological resources include mineralized (fossilized) or unmineralized bones, teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains.

The geologic features identified on the project site are from the Pliocene, Pleistocene and Holocene Epochs. The Pliocene Epoch, approximately 5.3 to 2.6 million years ago, was a time

when the global climate became cooler and more arid (ECORP 2014, p. 19). The beginning of this epoch saw numerous fluctuations in temperature, which gave way to a general cooling trend near the end of the Pliocene. The cooling and drying of the global environment may have contributed to the enormous spread of grasslands and savannas during this time. Additionally, the Panamanian land bridge between North and South America appeared during the Pliocene, allowing migrations of plants and animals into new habitats. The Pleistocene epoch, beginning after the end of the Pliocene, approximately 2.6 million to 11,700 years ago, included the most recent episodes of global cooling (ECORP 2014, p. 20). Much of the world's temperate zones were alternately covered by glaciers during cool periods and uncovered during the warmer interglacial periods when the glaciers retreated. The Pleistocene epoch was characterized by the presence of distinctive large land mammals and birds, including the mammoth, mastodons, long-horned bison, saber-toothed cats, and giant ground sloths. The Holocene is the name given to the last 11,700 years of the earth's history—the time since the end of the last major glacial epoch, or ice age. Since then, there have been small-scale climate shifts—notably the Little Ice Age between about 1200 and 1700 AD, but in general, the Holocene has been a relatively warm period in between ice ages (ECORP 2014, p. 20).

## 4.5.2 REGULATORY SETTING

### FEDERAL

#### National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966 requires that the federal government list significant historic resources on the National Register of Historic Places (NRHP). Federal agencies must consult the NRHP when planning to undertake or grant approval through permits for a project. Prior to the issuance of any license or implementation of any project, the federal agency must consider the effects of a project or license on any historical buildings, sites, structures, or objects that are included on, or eligible for inclusion on, the NRHP (16 USC Section 470(f)). This typically includes consultation with the federal agency responsible for the undertaking, the state historic preservation officer, local Native American groups and individuals, local and state historical societies and organizations, and relevant archival sources, including the appropriate facility of the California Historical Resources Information System.

### STATE

#### California Environmental Quality Act

The California Environmental Quality Act (CEQA) states that "[a] project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Public Resources Code Section 21084.1; 14 California Code of Regulations Section 15064.5). A significant historical resource (including both a prehistoric and historic resource) is one that is found eligible for listing in the California Register of Historical Resources. Per the CEQA Guidelines, historical resources are those that are:

- Listed in, or eligible for listing in, the California Register of Historic Resources (Public Resources Code (PRC) 5024.1, Title 14 California Code of Regulations, Section 4850 et seq.);
- Listed in, or eligible for listing in, the National Register of Historic Places;

- Included in a local register of historical resources, as defined in an historical resource survey meeting the requirements of Public Resources Code Section 5024.1(g); or

- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

Additionally, historical resources and historic districts designated or listed as city or county landmarks or historic properties or districts pursuant to any city or county ordinance can also be listed in the California Register of Historical Resources (CRHR), if the criteria for listing under the ordinance have been determined by the Office of Historic Preservation to be consistent with CRHR criteria adopted by the State Historical Resources Commission (pursuant to PRC Section 5024.1(e)).

A resource may be listed as a historical resource in the California Register if it has integrity and meets any of the following four criteria:

1) Associated with events that has made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;

2) Associated with the lives of persons important to local, California, or national history;

3) Embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values; or

4) Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

CEQA (PRC Section 21083.2) also distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as outlined above, and unique archaeological resources. A unique archaeological resource is defined in CEQA as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; or

3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Buildings, sites, structures, objects, and districts representative of California and United States history, architecture, archaeology, engineering, and culture convey significance when they also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A resource has integrity if it retains the characteristics that were present during the resource's

period of significance. Enough of these characteristics must remain to convey the reasons for its significance.

Paleontological resources are classified as nonrenewable scientific resources and are protected by state statute (PRC Chapter 1.7, Section 5097.5, Archeological, Paleontological, and Historical Sites, and Appendix G). No state or local agencies have specific jurisdiction over paleontological resources. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth-moving on state or private land on a project site.

#### LOCAL

### City of Delano General Plan

The Delano General Plan (2005) includes a discussion of cultural resources in the city identifying the Weaver House as eligible for the National Register of Historic Places and a mortuary designed by Frank Lloyd Wright. General Plan policies are intended to preserve, protect, enhance, and commemorate significant historical, archeological, and paleontological resources as well as the city's overall historic character.

## 4.5.3 IMPACTS AND MITIGATION MEASURES

#### STANDARDS OF SIGNIFICANCE

CEQA Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.

2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4) Disturb any human remains, including those interred outside of formal cemeteries.

#### METHODOLOGY

The following impact analysis is based primarily on the Cultural Resources Survey Report and Paleontology Assessment for the Vineyard at Delano & West Pavilion Projects prepared for the proposed project by ECORP (2014). Following is a summary of the methodology used in preparation of that report.

### Research Sources

A records search for the property was completed by the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System at

California State University-Bakersfield on June 4, 2014 (SSJVIC search #14-207). The purpose of the records search was to determine the extent of previous surveys within a 1-mile (1,600-meter) radius of the proposed project location, and whether previously documented prehistoric or historic archaeological sites, architectural resources, or traditional cultural properties exist within this area.

ECORP requested a paleontological records search from the Natural History Museum of Los Angeles County on May 27, 2014. Conducted by museum scientist (vertebrate paleontology) Samuel A. McLeod, PhD, the results included a search of the paleontology specimen collection records for the project site and vicinity. The purpose of the paleontological records search was to determine the sensitivity of the project site, whether known occurrences of paleontological resources are present within or immediately adjacent to the project site, and whether implementation of the project could result in significant impacts to paleontological resources.

### Native American Consultation

ECORP contacted the California Native American Heritage Commission (NAHC) to request a search of the Sacred Lands File for the project site. In a letter dated May 23, 2014, the NAHC stated that the search failed to indicate the presence of Native American cultural resources located within the project site. The NAHC also provided a list of individuals and organizations in the Native American community that may be able to provide information about unrecorded sites in the project vicinity.

ECORP contacted all persons or organizations on the NAHC contact list by letter on May 29, 2014, to request information on unrecorded cultural resources that may exist within the current project site or to inquire about any concerns regarding sacred sites or traditional cultural properties in the vicinity that might be affected by the proposed project. No correspondence has been received in response at the time of publication of this EIR.

### Field Inventory

Field work was conducted by ECORP archaeologists Kristina Lindgren and Andrew Myers on June 10, 2014, during which the project site were subjected to an intensive systematic pedestrian survey.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Historic Resources (Standard of Significance 1)

**Impact 4.5.1** The project site is located in an area containing existing historic resources. This impact would be **potentially significant**.

The records search results indicated that 23 previous cultural resources studies were conducted within 1 mile of the project site, and two sites containing cultural resources (P-15-02989 and P-15-11697) have previously been recorded, both within 1 mile of the project site and on the project site itself. The previous studies were conducted between 1978 and 2010. The records search determined that the one previously recorded historic-era cultural resource located within 1 mile of the project site consists of a small domestic refuse scatter of glass, crockery, and stoneware fragments (ECORP 2014, p. 18). The records search also determined that the one previously

recorded historic-era cultural resource located within the project site itself consists of a small domestic refuse scatter of ceramic, glass, crockery, and stoneware fragments (ECORP 2014, p. 18). These two sites containing cultural resources are shown in **Table 4.5-1**. In addition, this assessment identified that the Woollomes Avenue overcrossing (Bridge Number 50 0210, Location 06-KER-099-54.48-DLN), which was built in 1955 and widened in 2002, is listed as a historic bridge yet was determined not to be eligible for the NRHP by the California Department of Transportation (Caltrans) (ECORP 2014, p. 18). The cultural resources survey report and paleontology assessment (2014) prepared for the project indicates that there are no inventoried properties within the project site or in the vicinity of the project site (ECORP 2014, p. 18).

**TABLE 4.5-1**
**PREVIOUSLY RECORDED SITES CONTAINING CULTURAL RESOURCES IN OR WITHIN 1 MILE OF THE PROJECT SITE**

| Site # CA-KER- | Primary # P-15- | Recorder & Year | Age/Period | Site Description |
|---|---|---|---|---|
| 6770H | 011697 | Dorothy Fleagle, Three Girls and a Shovel LLC.; 2005 | Historic | Small Historic-Era Domestic Refuse Scatter |
| 2989H | 002989 | Robert Yohe; 1991 | Historic | Small Historic-Era Domestic Refuse Scatter |

*Source: ECORP 2014, p. 18*

The previously recorded historic-era cultural resource located on the project site, originally discovered in 2005, was described as a small scatter of domestic refuse in a 5.5-meter north–south by 15-meter east–west area. This resource was located again on June 10, 2014, although it is highly disturbed and currently much more widely scattered than originally described in 2005 (ECORP 2014, p. 21). It currently contains three earthenware ceramic fragments with a white glaze and one sun-colored amethyst glass bottle body fragment. Other items described in the original record (two brown glass shards, one green glass shard, one green crockery shard, and four pieces of colorless glass) were not found. This resource is located near the southern boundary line of the southern parcel, and there was evidence that a bulldozer had pushed up dirt near the glass fragment (ECORP 2014, p. 21).

One new resource area, DEL-001, was recorded by ECORP on the eastern side of the southern parcel (ECORP 2014, p. 21). This resource is a historic-period refuse deposit containing one colorless glass jar base fragment with “8” embossed on the base, three colorless glass bottle body fragments, one amber glass bottle body fragment, one porcelain teacup fragment with an orange line and circle abstract transferred pattern, and one earthenware ceramic fragment with a brown glaze. It is located approximately 220 feet northeast from the resource area described above. There is a possibility that site DEL-001 could have been a part of P15-11697 and was displaced by disking and plowing activity, yet nonetheless it was recorded as a new site.

The previously recorded historic-period resource (P-15-11697) and one potentially new historic-period cultural resource (DEL-001) have not been evaluated for significance or eligibility, and their status as a historical resource, as defined by CEQA, has not been determined. In an abundance of caution, this is considered a **potentially significant** impact, and mitigation measure **MM 4.5.1** is required. Furthermore, there is a possibility of unanticipated and accidental cultural resource discoveries during ground-disturbing project-related activities. Unanticipated and accidental cultural resource discoveries during project implementation have the potential to negatively affect significant cultural resources. These “inadvertent discoveries” can appear

unexpectedly in construction trenches or in back dirt piles, and once discovered, they require special treatment. Mitigation measure **MM 4.5.1** would also address these potential impacts.

Mitigation Measures

**MM 4.5.1** If any subsurface deposits believed to be cultural or human in origin are discovered during construction, all work must halt within a 50-foot radius of the discovery. An on-site archaeological monitor or principal investigator, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology, shall be afforded a reasonable amount of time to evaluate the significance of the find. Work shall continue within a 50-foot radius of the discovery site until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either (1) not cultural in origin or (2) not potentially significant or eligible for listing on the National Register of Historic Places or California Register of Historical Resources. If a potentially eligible resource is encountered, the archaeologist, lead agency, and project proponent shall arrange for either (1) total avoidance of the resource, if possible, or (2) test excavations to evaluate eligibility and, if eligible, total data recovery as mitigation. The determination shall be formally documented in writing and submitted to the City as verification that the provisions in CEQA for managing unanticipated discoveries have been met.

*Timing/Implementation:* *During the construction period*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measure **MM 4.5.1** would reduce impacts to known and undiscovered historic resources to a **less than significant** level.

### Prehistoric Resources and Human Remains (Standards of Significance 2 and 4)

**Impact 4.5.2** Implementation of the proposed project could indirectly result in the potential disturbance of undiscovered cultural resources (i.e., prehistoric sites and isolated artifacts and features) and unrecorded human remains. This impact would be **potentially significant**.

As previously stated, ECORP contacted the California NAHC to request a search of the Sacred Lands File for the project site and further contacted all persons or organizations on the NAHC contact list by letter to request information on unrecorded cultural resources that may exist within the current project site or to inquire about any concerns regarding sacred sites or traditional cultural properties in the vicinity that might be affected by the proposed action. This outreach failed to indicate the presence of Native American cultural resources located within the project site. In addition, the intensive systematic pedestrian survey conducted on the project site determined that given the level of previous disturbance, the potential for subsurface historic-period cultural resources is considered low (ECORP 2014, p. 22).

Regardless, the potential exists for the proposed construction activities to disturb previously unknown prehistoric resources and unrecorded human remains on the site. Prehistoric materials might include flaked stone tools, tool-making debris, bedrock mortars and other stone milling tools, fire-affected rock, basketry, shell or bone artifacts, or soil darkened by cultural activities (midden). These inadvertent discoveries can appear unexpectedly in construction trenches or in back dirt piles and once discovered, they require special treatment. In addition, Health and Safety Code Section 7050.5(b) specifies protocol when human remains are discovered. The following mitigation measure provides more specific requirements to be implemented in the event a prehistoric resource and/or human remains are discovered. This is considered a **potentially significant** impact before implementation of mitigation.

Mitigation Measures

**MM 4.5.2** In the event that evidence of human remains is discovered, construction activities within 50 feet of the discovery will be halted or diverted and the requirements above will be implemented. Depending on the occurrence, a larger radius may be necessary and will be required at the discretion of the on-site archaeologist. In addition, the provisions of California Health and Safety Code Section 7050.5, California Public Resources Code Section 5097.98, and Assembly Bill (AB) 2641 will be implemented. When human remains are discovered, state law requires that the discovery be reported to the county coroner (Health and Safety Code Section 7050.5) and that reasonable protection measures be taken during construction to protect the discovery from disturbance (AB 2641). If the coroner determines the remains are Native American, the coroner notifies the Native American Heritage Commission, which then designates a Native American Most Likely Descendant (MLD) for the project (Public Resources Code Section 5097.98). The MLD may not be the same person as the tribal monitor. The designated MLD then has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains (AB 2641). If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Public Resources Code Section 5097.94). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Public Resources Code Section 5097.98). This will also include either recording the site with the NAHC or the appropriate Information center, using an open space or conservation zoning designation or easement, or recording a document with the county in which the property is located (AB 2641).

*Timing/Implementation:* *During the construction period*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measure **MM 4.5.2** would reduce impacts to a **less than significant** level.

### Paleontological Resources (Standard of Significance 3)

**Impact 4.5.3** Implementation of the proposed project could inadvertently result in the potential disturbance of paleontological resources (i.e., fossils and fossil formations) on the project site. This impact would be **potentially significant**.

The paleontological records search by the Natural History Museum of Los Angeles County (LANHM) determined that no vertebrate fossil localities lie within the project site, but there are localities nearby from sedimentary deposits similar to those that occur in the project vicinity (ECORP 2014, p. 19). Surface deposits in the entire project site consist of younger Quaternary Period Alluvium to present), derived as alluvial basin deposits that typically do not contain significant vertebrate fossils, at least in the uppermost layers. The LANHM's closest vertebrate fossil locality from these deposits is LACM 1156, located just north of Delano and east of Radnor, which produced a fossil specimen of horse (*Equus*) at a depth of 45 feet (ECORP 2014, p. 19). The LANHM has two other vertebrate fossil localities somewhat nearby to the project site from Quaternary Period Alluvial deposits in areas otherwise mapped as the Kern River Formation (ECORP 2014, p. 19). These include LACM 6701, which is northeast of the proposed project site between Fountain Springs and the White River, and LACM 4087, which is located northeast of the proposed project site and due east of Terra Bella. Both of these localities produced specimens of fossil mammoth (*Mammuthus*) (ECORP 2014, p. 19).

While no paleontological resources were identified in the records search results within the project site, and shallow excavations in the younger Quaternary Period alluvial fan and basin deposits of the site are unlikely to encounter significant vertebrate fossil remains, deeper excavations that extend down into older sedimentary deposits may well uncover significant vertebrate fossils. Therefore, this is considered a **potentially significant** impact, and mitigation measure **MM 4.5.3** is required.

Mitigation Measures

**MM 4.5.3** If subsurface deposits believed to be of paleontological significance are discovered during construction, all work must halt within a 50-foot radius of the discovery. An on-site paleontological monitor, meeting the Secretary of the Interior's Professional Qualification Standards for paleontology shall be retained by the project applicant, and shall be afforded a reasonable amount of time to evaluate the significance of the find. Work cannot continue at the discovery site until the paleontologist conducts sufficient research and data collection to make a determination that the resource is either (1) not a paleontological resource or (2) not potentially significant. If a potentially eligible resource is encountered, the paleontologist, lead agency, and project proponent shall arrange for either (1) total avoidance of the resource, if possible, or (2) test excavations to evaluate eligibility and, if eligible, total data recovery as mitigation. The determination shall be formally documented in writing and submitted to the City as well as the Los Angeles Museum of Natural History, as verification that the provisions in CEQA for managing unanticipated discoveries have been met.

| | |
|---|---|
| *Timing/Implementation:* | *During the construction period* |
| *Monitoring/Enforcement:* | City of Delano Community Development Department and Public Works Department, Engineering Division |

Implementation of this mitigation would reduce impacts to a **less than significant** level.

## 4.5.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

The cumulative setting condition includes existing land use conditions and planned development in Delano and the surrounding area of Kern County. The cumulative effect of development projects will result in a net loss of rural historic landscapes and their associated sites and features. Similarly, proposed projects in the vicinity of Delano and Kern County could damage undiscovered paleontological resources in these areas.

### CUMULATIVE IMPACTS AND MITIGATION MEASURES

**Prehistoric and Historic Resources/Human Remains (Standards of Significance 1, 2, and 4)**

**Impact 4.5.4** Implementation of the project, along with any foreseeable development in the project vicinity, could contribute to cumulative impacts to historic, prehistoric, and previously undiscovered human remains. This is considered a **potentially cumulatively considerable** impact.

Implementation of the project, in combination with cumulative development in Delano and Kern County, would increase the potential to reduce historic and prehistoric resources in the area and would increase the potential to encounter previously undiscovered human remains. As noted above, the project itself is expected to result in less than significant impacts with mitigation incorporated.

Mitigation Measures

Implementation of mitigation measures **MM 4.5.1,** and **MM 4.5.2** would reduce the project's contribution to cumulative impacts to historic and prehistoric resources (see impact discussions above). These impacts are considered to be **less than cumulatively considerable**.

**Paleontological Resources (Standard of Significance 3)**

**Impact 4.5.5** Implementation of the project, along with any foreseeable development in the project vicinity, could result in cumulative impacts to undiscovered paleontological resources in areas surrounding the project site, both in Delano and in Kern County. This is considered a **potentially cumulatively considerable** impact.

Implementation of the project, in combination with other development in the region, could result in the loss of paleontological resources in the region if mitigation were not required.

Mitigation Measures

Implementation of mitigation measure **MM 4.5.3** would reduce the project's contribution to cumulative impacts to paleontological resources to a **less than cumulatively considerable** level.

## REFERENCES

Delano, City of. 2005. *Delano General Plan*. Adopted December 2005. http://www.cityofdelano.org/index.aspx?nid=113.

ECORP (ECORP Consulting, Inc.). 2014. *Cultural Resources Survey Report and Paleontology Assessment for the Vineyard at Delano & West Pavilion Projects.*

This section provides a discussion of the proposed project's effect on greenhouse gas emissions and the associated effects of climate change. The California Environmental Quality Act (CEQA) requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval.

## 4.6.1 ENVIRONMENTAL SETTING

### EXISTING CLIMATE SETTING

Since the early 1990s, scientific consensus holds that the world's population is releasing greenhouse gases (GHGs) faster than the earth's natural systems can absorb them. These gases are released as byproducts of fossil fuel combustion, waste disposal, energy use, land use changes, and other human activities. This release of gases, such as carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$), creates a blanket around the earth that allows light to pass through but traps heat at the surface, preventing its escape into space. While this is a naturally occurring process known as "the greenhouse effect," human activities have accelerated the generation of GHGs beyond natural levels. The overabundance of GHGs in the atmosphere has led to a warming of the earth and has the potential to severely impact the earth's climate system.

While often used interchangeably, there is a difference between the terms *climate change* and *global warming.* According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period of time that can be caused by both natural factors and human activities. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased GHG emissions. The use of the term *climate change* is becoming more prevalent because it encompasses all changes to the climate, not just temperature.

To fully understand global climate change, it is important to recognize the naturally occurring greenhouse effect and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are $CO_2$, $CH_4$, $N_2O$, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).

**Table 4.6-1** provides descriptions of the primary GHGs attributed to global climate change, including a description of their physical properties, primary sources, and contribution to the greenhouse effect.

**TABLE 4.6-1**
**GREENHOUSE GASES**

| Greenhouse Gas | Description |
|---|---|
| Carbon Dioxide ($CO_2$) | Carbon dioxide is a colorless, odorless gas. $CO_2$ is emitted in a number of ways, both naturally and through human activities. The largest source of $CO_2$ emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to $CO_2$ emissions. The atmospheric lifetime of $CO_2$ is variable because it is so readily exchanged in the atmosphere.[1] |
| Methane ($CH_4$) | Methane is a colorless, odorless gas that is not flammable under most circumstances. Methane is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (intestinal fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of $CH_4$ to the atmosphere. Natural sources of $CH_4$ include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. The atmospheric lifetime of $CH_4$ is about12 years.[2] |
| Nitrous Oxide ($N_2O$) | Nitrous oxide is a clear, colorless gas with a slightly sweet odor. Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources of $N_2O$ are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. Nitrous oxide is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of $N_2O$ is approximately 120 years.[3] |

*Sources: [1] EPA 2011a, [2] EPA 2011b, [3] EPA 2010*

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Methane traps over 21 times more heat per molecule than $CO_2$, and $N_2O$ absorbs 310 times more heat per molecule than $CO_2$. Often, estimates of GHG emissions are presented in carbon dioxide equivalents ($CO_2e$), which weigh each gas by its global warming potential (GWP). Expressing GHG emissions in $CO_2e$ takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only $CO_2$ were being emitted. **Table 3.6-2** shows the GWPs for different greenhouse gases for a 100-year time horizon.

**TABLE 4.6-2**
**GLOBAL WARMING POTENTIAL FOR GREENHOUSE GASES**

| Greenhouse Gas | Global Warming Potential |
|---|---|
| Carbon Dioxide ($CO_2$) | 1 |
| Methane ($CH_4$) | 21 |
| Nitrous Oxide ($N_2O$) | 310 |

*Source: California Climate Action Registry 2009*

As the name implies, global climate change is a global problem. Greenhouse gases are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California is a significant emitter of $CO_2e$ in the world

and produced 452 million gross metric tons of $CO_2e$ in 2010 (CARB 2013). Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2010, accounting for 38.3 percent of total GHG emissions in the state (CARB 2013). This category was followed by the electric power sector (including both in-state and out-of-state sources) (20.7 percent) and the industrial sector (19.0 percent) (CARB 2013).

### EFFECTS OF GLOBAL CLIMATE CHANGE

California can draw on substantial scientific research conducted by experts at various universities and research institutions. With more than a decade of concerted research, scientists have established that the early signs of climate change are already evident in the state—as shown, for example, in increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea level rise, and ecological shifts.

Many of these changes are accelerating locally, across the country, and around the globe. As a result of emissions already released into the atmosphere, California will face intensifying climate change in coming decades (CNRA 2009a). Generally, research indicates that California should expect overall hotter and drier conditions, with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea-level rise. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing (CNRA 2009a).

Climate change temperature projections identified in the 2009 California Climate Adaptation Strategy suggest the following:

- Average temperature increase is expected to be more pronounced in the summer than in the winter season.
- Inland areas are likely to experience more pronounced warming than coastal regions.
- Heat waves are expected to increase in frequency, with individual heat waves also showing a tendency toward becoming longer and extending over a larger area, thus more likely to encompass multiple population centers in California at the same time.
- As GHGs remain in the atmosphere for decades, temperature changes over the next 30 to 40 years are already largely determined by past emissions. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4°F (an increase one to three times as large as that which occurred over the entire twentieth century).
- By 2100, the models project temperature increases between 3.6 and 9°F. (CNRA 2009a)

According to the 2009 California Climate Adaptation Strategy, the impacts of climate change in California have the potential to include, but are not limited to, the areas discussed in **Table 4.6-3**.

**TABLE 4.6-3**
**POTENTIAL STATEWIDE IMPACTS FROM CLIMATE CHANGE**

| Potential Statewide Impact | Description |
|---|---|
| Public Health | Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer. Larger temperature increases are anticipated in inland communities as compared to the California coast. The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures. The elderly, infants, and socially isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves. |
| Floods and Droughts | The impacts of flooding may include population displacement, severe psychosocial stress with resulting mental health impacts, exacerbation of pre-existing chronic conditions, and infectious disease. Additionally, impacts can range from a loss of personal belongings, and the emotional ramifications from such loss, to direct injury and/or mortality.<br>Drinking water contamination outbreaks in the United States are associated with extreme precipitation events. Runoff from rainfall is also associated with coastal contamination that can lead to contamination of shellfish and contribute to food-borne illness. Floodwaters may contain household, industrial, and agricultural chemicals, as well as sewage and animal waste. Flooding and heavy rainfall events can wash pathogens and chemicals from contaminated soils, farms, and streets into drinking water supplies. Flooding may also overload storm and wastewater systems, or flood septic systems, also leading to possible contamination of drinking water systems.<br>Drought impacts develop more slowly over time. Risks to public health that Californians may face from drought include impacts on water supply and quality, food production (both agricultural and commercial fisheries), and risks of waterborne illness. As surface water supplies are reduced as a result of drought conditions, the amount of groundwater pumping is expected to increase to make up for the water shortfall. The increase in groundwater pumping has the potential to lower the water tables and cause land subsidence. Communities that utilize well water will be adversely affected by drops in water tables or through changes in water quality. Groundwater supplies have higher levels of total dissolved solids compared to surface waters. This introduces a set of effects for consumers, such as repair and maintenance costs associated with mineral deposits in water heaters and other plumbing fixtures, and on public water system infrastructure designed for lower salinity surface water supplies. Drought may also lead to increased concentration of contaminants in drinking water supplies. |
| Water Resources | The state's water supply system already faces challenges to provide water for California's growing population. Climate change is expected to exacerbate these challenges through increased temperatures and possible changes in precipitation patterns. The trends of the last century, especially increases in hydrologic variability, will likely intensify in this century. The state can expect to experience more frequent and larger floods and deeper droughts. Rising sea level will threaten the Delta water conveyance system and increase salinity in near-coastal groundwater supplies. |
| Forests and Landscapes | Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, wildfire occurrence statewide could increase from 57% to 169% by 2085. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. |

*Source: CNRA 2009a*

## 4.6.2 REGULATORY SETTING

The adoption of recent legislation has provided a clear mandate that climate change must be included in an environmental review for a project subject to CEQA. Several GHG emission–related laws and regulations are provided below.

### STATE REGULATIONS

California has adopted various administrative initiatives and also enacted a variety of legislation relating to climate change, much of which sets aggressive goals for GHG emissions reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in environmental review documents prepared under CEQA. In particular, the CEQA Guidelines do not require or suggest specific methodologies for performing an assessment or specific thresholds of significance and do not specify GHG reduction mitigation measures. Instead, the guidelines allow lead agencies to choose methodologies and make significance determinations based on substantial evidence, as discussed in further detail below. In addition, no state agency has promulgated binding regulations for analyzing GHG emissions, determining their significance, or mitigating significant effects in CEQA documents. Thus, lead agencies exercise their discretion in determining how to analyze GHGs.

The discussion below provides a brief overview of the primary legislation relating to climate change that may affect the emissions associated with the proposed project. It begins with an overview of the primary regulatory acts that have driven GHG regulation and analysis in California.

#### Executive Order S-3-05 (Statewide GHG Targets)

California Executive Order S-03-05 (2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. Although the 2020 target has been incorporated into legislation (AB 32), the 2050 target remains only a goal of the Executive Order.

#### Assembly Bill 32, the California Global Warming Solutions Act of 2006

The California Global Warming Solutions Act of 2006 (AB 32) (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) instructs the California Air Resources Board (CARB) to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. The act directed CARB to set a greenhouse gas emissions limit based on 1990 levels, to be achieved by 2020. The bill set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (1990 levels have been estimated to equate to 15 percent below 2005 emission levels). Based on CARB's calculations of emissions levels, California must reduce GHG emissions by approximately 15 percent below 2005 levels to achieve this goal.

##### AB 32 Scoping Plan

CARB adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG

emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business as usual"). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. Additional development of these measures and adoption of the appropriate regulations occurred through the end of year 2013. The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs, as well as building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, heavy-duty truck measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation. (CARB 2008)

In 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relies on emissions projections updated in light of current economic forecasts that account for the economic downturn since 2008, reduction measures already approved and put in place relating to future fuel and energy demand, and other factors. This reduced the projected 2020 emissions from 596 million metric tons (MMT) $CO_2e$ to 545 $MMTCO_2e$. The reduction in projected 2020 emissions means that the revised business-as-usual (BAU) reduction necessary to achieve AB 32's goal of reaching 1990 levels by 2020 is now 21.7 percent. CARB also provided a lower 2020 inventory forecast that took credit for certain State-led GHG emissions reduction measures already in place. When this lower forecast is considered, the necessary reduction from BAU needed to achieve the goals of AB 32 is approximately 16 percent.

AB 32 requires CARB to update the Scoping Plan at least once every five years. CARB adopted the first major update to the Scoping Plan on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG reduction necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. The Scoping Plan update also looks beyond 2020 toward the 2050 goal established in Executive Order S-3-05, though not yet adopted as state law, and observes that "a mid-term statewide emission limit will ensure that the State stays on course to meet our long-term goal." The Scoping Plan update does not establish or propose any specific post-2020 goals, but identifies such goals adopted by other governments or recommended by various scientific and policy organizations.

### Assembly Bill 1493 and Advanced Clean Cars Program

Assembly Bill 1493 ("the Pavley Standard," or AB 1493, 2005) (Health and Safety Code Sections 42823 and 43018.5) aimed to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model years 2009–2016. The bill also required the California Climate Action Registry to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emissions reduction credits. The bill authorized CARB to grant emissions reduction credits for reductions in GHG emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2012, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and GHG emissions with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

### Low Carbon Fuel Standard

Executive Order S-01-07 (2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32. The regulation took effect in 2010 and is codified at Title 17, California Code of Regulations, Sections 95480–95490. The LCFS will reduce greenhouse gas emissions by reducing the carbon intensity of transportation fuels used in California by at least 10 percent by 2020. Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "life cycle" of a transportation fuel.

### Renewables Portfolio Standard (Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2)

Established in 2002 under Senate Bill (SB) 1078, and accelerated in 2006 under SB 107 and again in 2011 under SBX1-2, California's Renewables Portfolio Standard (RPS) requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. The 33 percent standard is consistent with the RPS goal established in the Scoping Plan. As an interim measure, the RPS requires 25 percent of retail sales to be sourced from renewable energy by 2016.

### Senate Bill 375

SB 375 (codified in the Government Code and the Public Resources Code[1]) took effect in 2008 and provides a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. SB 375 also requires metropolitan planning organizations (MPOs) to incorporate a Sustainable Communities Strategy (SCS) in their Regional Transportation Plans that will achieve GHG emissions reduction targets by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities. If the SCS cannot meet greenhouse gas reduction targets, the MPO must prepare an Alternative Planning Strategy identifying the additional regional land uses and transportation investments

[1] Senate Bill 375 is codified at Government Code Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, and 65080.01 as well as Public Resources Code Sections 21061.3 and 21159.28 and Chapter 4.2.

needed to attain the targets. The MPO with jurisdiction in the project area is the Kern Council of Governments (KCOG).

On September 23, 2010, CARB adopted regional targets for the reduction of GHGs applying to the years 2020 and 2035 (CARB 2011a). For the area under KCOG jurisdiction, CARB established placeholder regional targets for reduction of greenhouse gas emissions of 2 percent for 2020 and by 5 percent for 2035 (CARB 2010). CARB's executive officer approved the final targets on February 15, 2011 (CARB 2011b).

### California Building Energy Efficiency Standards

Energy conservation standards for new residential and nonresidential buildings were originally adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6, of the California Code of Regulations). In general, Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

In 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Title 24, Part 11) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations).

Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. Current mandatory standards include:

- Twenty (20) percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35, and 40 percent reductions.
- Separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects.
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects.
- Wastewater reduction measures including the requirement that each building reduce the generation of wastewater through the installation of water conservation fixtures or by using non-potable water systems.
- Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies.
- Low-pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard.

The California Energy Commission recently adopted changes to the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1 (collectively referred to here as the standards). The amended standards took effect in the summer of 2014. The 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The

standards offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses. Energy-efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions.

### California Green Building Standards

In January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (CALGreen [California Code of Regulations, Title 24, Part 11]). CALGreen applies to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure. CALGreen requires energy conservation measures for new buildings and structures. The City adopted the CALGreen standards by ordinance (Ordinance 11-01).

#### LOCAL

### San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (SJVAPCD) monitors air quality and regulates stationary emission sources in the San Joaquin Valley Air Basin. As a responsible agency under CEQA, the air district reviews and approves environmental documents prepared by other lead agencies or jurisdictions to reduce or avoid impacts on air quality and to ensure that the lead agency's environmental document is adequate to fulfill CEQA requirements. As a concerned agency, the SJVAPCD comments on environmental documents and suggests mitigation measures to reduce air quality impacts.

On December 17, 2009, the SJVAPCD's Governing Board adopted the first comprehensive regional policy and guidance on addressing and mitigating GHG emission impacts caused by industrial, commercial, and residential development in the San Joaquin Valley. SJVAPCD guidance recommends that proposed development projects be evaluated for GHG-related impacts through emissions quantification and disclosure. Development projects that implement best performance standards (BPS) or that achieve at least a 29 percent reduction of GHGs below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business as usual" or BAU) are considered to have a less than significant individual and cumulative impact from GHG emissions.[2] (The SJVAPCD's best performance standards have not yet been fully established.)

## 4.6.3 IMPACTS AND MITIGATION MEASURES

#### STANDARDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines, impacts related to climate change are normally considered significant if implementation of the proposed project would result in the following:

1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

[2] Business as usual (BAU) is the project's projected GHG emissions level in 2020 under the assumption that consumption patterns and efficiencies are maintained at their 2009 levels. Under a BAU scenario, state, regional, and project-level efforts to reduce GHG emissions are not taken into consideration; rather, the BAU assumes the Year 2009 status quo.

2) Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

As noted earlier, AB 32 is a legal mandate requiring that statewide GHG emissions be reduced to 1990 levels by 2020. In adopting AB 32, the California Legislature determined the necessary GHG reductions for the state to make in order to sufficiently offset its contribution to the cumulative climate change problem to reach 1990 levels. AB 32 is the only legally mandated requirement for the reduction of greenhouse gases. As such, compliance with AB 32 is the current adopted basis upon which the agency can base its significance threshold for evaluating the project's GHG impacts.

As previously stated, the SJVAPCD has developed guidance on assessing GHG and climate change impacts and has established thresholds of significance for impacts related to GHG emissions. The City has determined, in its discretion, that the SJVAPCD greenhouse gas significance thresholds are based on substantial evidence to attribute an appropriate share of GHG emissions reductions necessary to reach AB 32 goals to new land use development projects in the air district's jurisdiction which are evaluated pursuant to CEQA. Therefore, for the purposes of evaluating the proposed project's GHG contribution and the potential to conflict with the implementation of an applicable GHG-reducing regulation, the proposed project is compared to the SJVAPCD significance threshold, which states that projects reducing project-specific GHG emissions by at least 29 percent compared to business as usual would be determined to have a less than significant individual and cumulative impact on global climate change. The City has determined that this reduction is consistent with the GHG emissions reduction targets established in CARB's AB 32 Scoping Plan.

In order to ascertain the achievement of a 29 percent reduction compared to BAU, quantification of project-specific GHG emissions is required. Projects demonstrated to have reduced or mitigated project-specific GHG emissions by at least 29 percent compared to BAU, consistent with GHG emissions reduction targets established by the SJVAPCD, would be determined to have a less than significant individual and cumulative impact on global climate change. To be conservative, total construction-generated GHG emissions were amortized over the estimated life of the project and included with operational emissions for comparison to the significance thresholds. A project life of 30 years was assumed for the proposed project.

### METHODOLOGY

The resultant GHG emissions of the proposed project were calculated using the California Emissions Estimator Model (CalEEMod), version 2013.2.2, computer program (see **Appendix 4.3-A**). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for the use of government agencies, land use planners, and environmental professionals.

The California Natural Resources Agency has noted that impacts of GHG emissions should focus on the cumulative impact on climate change. The public notice states:

> *While the Proposed Amendments do not foreclose the possibility that a single project may result in greenhouse gas emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of greenhouse gas emissions should center on whether a project's incremental contribution of greenhouse gas emissions is cumulatively considerable.* (CNRA 2009b)

Thus, the CEQA Amendments continue to make clear that the significance of GHG emissions is most appropriately considered on a cumulative level.

## IMPACTS AND MITIGATION MEASURES

### Generate Greenhouse Gas Emissions That May Have a Significant Impact on the Environment (Standard of Significance 1)

**Impact 4.6.1** The proposed project could generate greenhouse gas emissions. This is considered a **less than cumulatively considerable** impact.

GHG emissions associated with the proposed project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with new vehicular trips and indirect source emissions, such as electricity usage for lighting. As shown in **Table 4.6-4**, the project could produce 45,449 metric tons of $CO_2e$ annually under BAU conditions, primarily from motor vehicles that travel to and from the site. For purposes of this assessment, the total emissions of 45,449 metric tons of $CO_2e$ per year are considered the BAU figure.

**TABLE 4.6-4**
**ESTIMATED GREENHOUSE GAS EMISSIONS UNDER BAU OPERATIONS (METRIC TONS PER YEAR)**

| Emissions Source | $CO_2e$ |
|---|---|
| Construction Amortized over 30 Years | 232 |
| Area Source (landscaping, hearth) | 391 |
| Energy | 2,939 |
| Mobile | 41,255 |
| Waste | 345 |
| Water | 287 |
| **Total** | **45,449** |

*Source: CalEEMod version 2013.2.2. See **Appendix 4.3-A** for emission model outputs.*

*Notes: BAU emissions projections account for development-generated emissions without any greenhouse gas reduction measures; i.e., emissions presented are not adjusted for future improved CAFÉ standards (Pavley I) and Low Carbon Fuel Standards, or the 2011 Renewables Portfolio Standard. The Southern California Edison Year 2005 emissions factors of 654.19 pounds of $CO_2$ per megawatt, 0.028 pounds of $CH_4$ per megawatt, and 0.0062 pounds of $N_2O$ per megawatt of energy generated was used to account for energy-related BAU GHG emissions. Traffic generation (23,370 average daily weekday trips and 29,116 average daily weekend trips) is derived from the traffic impact study prepared for the project.*

Several State-led GHG emissions–reducing regulations have recently taken effect, and changes to regulations will continue to take effect in the near future that will substantially reduce GHG emissions. For instance, implementation of Assembly Bill 1493 (the Pavley Standard) (Health and Safety Code Sections 42823 and 43018.5) will significantly reduce the amount of GHGs emitted from passenger vehicles. The Pavley Standard is aimed at reducing GHG emissions from noncommercial passenger vehicles and light-duty trucks of model years 2009–2016 by requiring increased fuel efficiency standards of automobile manufacturers. The program combines the control of smog, soot, and GHG emissions with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions. Because passenger vehicles represent the single largest source of GHGs associated with the proposed project, the

anticipated reduction associated with State-led GHG emissions–reducing regulations represents 13,146 fewer metric tons per year of GHGs attributed to the project (see **Table 4.6-5**).

The electricity provider for Delano, Southern California Edison (SCE), is subject to California's Renewables Portfolio Standard (RPS). The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020, which will have the effect of reducing GHG emissions generated during energy production. For example, from 2005 to 2012, SCE increased its purchase of renewable source-generated electricity levels from 5 percent to 20 percent (CEC 2014; SCE 2006). Largely due to this strategy, SCE's reduction of its GHG emission intensity factor between business as usual and the development of the proposed project would result in 584 fewer metric tons per year of GHGs (46 fewer metric tons per year attributed to water conveyance) as shown in **Table 4.6-5**.

As previously stated, in 2008 the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Title 24, Part 11) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Current mandatory standards include a 20 percent mandatory reduction in indoor water use. As a result of the mandatory reduction in water use required by the Green Building Standards Code, the proposed project would result in 40 fewer metric tons per year of GHG emissions as shown in **Table 4.6-5**.

**TABLE 4.6-5**
**GHG REDUCTIONS FROM APPLICATION OF RECENT REGULATIONS**

| Reduction Source | $CO_2e$ Emissions Reductions (metric tons/year) |
|---|---|
| **State-Led GHG-Reducing Regulations** | |
| AB 1493 (Pavley) and Low Carbon Fuel Standard[1] | -13,146 |
| 2011 Renewables Portfolio Standard[2] | -584 |
| CALGreen Regulations | -40 |
| **Total** | **-13,770** |

*Notes:*

*[1] Emissions reductions from AB 1493 and Low Carbon Fuel Standard are derived from the difference between 2005 automobile emissions factors and 2025 automobile emissions factors contained in CalEEMod version 2013.2.2.*

*[2] Emissions reductions from the RPS are derived from the difference between SCE's BAU emissions intensity factor of 654.19 pounds of $CO_2$ per megawatt, 0.028 pounds of $CH_4$ per megawatt, and 0.0062 pounds of $N_2O$ per megawatt of energy generated and SCE's most current (2012) $CO_2$ emission intensity factor of 490.64 pounds of $CO_2$ per megawatt, 0.021 pounds of $CH_4$ per megawatt, and 0.0046 pounds of $N_2O$ per megawatt of energy generated (UCSB Utility & Energy Services 2012).*

*Data output is included as **Appendix 4.3-A.***

State-led GHG reduction measures such as Pavley, the Low Carbon Fuel Standard, the RPS, and the California Green Building Standards would reduce project GHG emissions by 30.3 percent compared with BAU, which is beyond the 29 percent reduction threshold. **Table 4.6-6** provides a summary of project GHG reductions attributable to state regulations determining the 29 percent reduction needed to achieve compliance with AB 32.

**TABLE 4.6-6**
**SUMMARY OF GHG REDUCTIONS**

| Emissions Reduction Summary | $CO_2$ Emissions (Metric Tons/Year) |
|---|---|
| **Total Business-as-Usual (BAU) Emissions** | **45,449** |
| State-Led Regulatory Reduction | -13,770 |
| **Project Emissions After Reductions** | **31,679** |
| Percentage Reduction from Business as Usual | 30.3 |
| Percentage Reduction Threshold for Less than Significant Determination | 29 |

The GHG emissions from implementation of the project are projected to result in 31,679 metric tons of $CO_2e$ per year (**Table 4.6-6**). As projected, BAU emissions would be reduced by 30.3 percent from BAU, which is greater than the 29 percent threshold, so the development is considered consistent with the State of California's ability to meet its GHG reduction goals. This impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

### Conflict with Applicable Greenhouse Gas Reduction Plan (Standard of Significance 2)

**Impact 4.6.2** The proposed project would be consistent with the goals of AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, etc.), as the project would achieve the GHG reduction targets established in the SJVAPCD threshold. This impact is considered **less than cumulatively considerable**.

The core mandate of AB 32 is that statewide GHG emissions in 2020 equal 1990 levels. AB 32 is anticipated to secure emissions reductions through a variety of mechanisms, such as increasing energy efficiency and introducing more renewable energy sources. CARB has already begun to adopt strategies to reduce greenhouse gas emissions under AB 32. Strategies included in the Climate Change Scoping Plan, described in detail above, such as the California Light-Duty Vehicle GHG Standard, Renewables Portfolio Standard, and Low Carbon Fuel Standard, while applicable to land use projects, are generally not under the control of local agencies like the City of Delano. Nonetheless, emission reductions from these strategies are anticipated to occur as the State of California adopts and implements regulations under AB 32. For instance, reductions are already taking place due to the newly adopted vehicle emission standards and the Low Carbon Fuel Standard.

It is the intent of AB 32 to reduce statewide GHG emissions to 1990 levels by the year 2020. As noted under Impact 4.6.1, the proposed project would achieve the SJVAPCD greenhouse gas reduction target consistent with the air district's significance thresholds, which were prepared with the purpose of complying with the requirements of and achieving the goals of AB 32. Compliance with SJVAPCD thresholds will be part of the solution to the cumulative GHG emissions problem, rather than hinder the State's ability to meet its goals of reduced statewide GHG emissions under AB 32.

The proposed project would achieve the SJVAPCD greenhouse gas reduction target consistent with the air district's significance thresholds and therefore is consistent with AB 32. Because the

contribution of GHG emissions is considered only as a cumulative impact, the project's contribution would be **less than cumulatively considerable.**

Mitigation Measures

None required.

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# 4.7 GEOLOGY, SOILS, AND MINERAL RESOURCES

This section discusses the current geologic and soil conditions of the project site and in the general vicinity and evaluates potential impacts related to geology and soils with implementation of the proposed project. The impact analysis focuses on seismic hazards, soil stability, and soil erosion. Section 4.9, Hydrology and Water Quality, provides further discussion of soil erosion as it relates to surface water quality. This section is based in part on the geotechnical engineering services report prepared for the proposed project by Krazan & Associates Inc., and Twining Laboratories, Inc., as well as on soils data obtained from the Natural Resources Conservation Service Web Soil Survey, the Delano General Plan, and the General Plan EIR.

## 4.7.1 ENVIRONMENTAL SETTING

### REGIONAL AND SITE GEOLOGY

California's geomorphic provinces are naturally defined geologic regions that display a distinct landscape or landform. Earth scientists recognize eleven provinces in California. Each region displays unique, defining features based on geology, faults, topographic relief, and climate.

The project site is located on the eastern flank, near the south end of the Great Valley geomorphic province. The Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern part is the Sacramento Valley, drained by the Sacramento River, and its southern part is the San Joaquin Valley, drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago) (CGS 2002a). The province is a large northwesterly-trending geosyncline structural trough between the Coastal Range and the Sierra Nevada.

#### Surface Conditions

Heavily laden streams forming the Sierra Nevada have built very prominent alluvial fans along the margins of the San Joaquin Valley. This has resulted in a rather flat topography in the vicinity of the project site. The site is composed of alluvial deposits, which are mostly cohesionless sands and silts (Krazan 2006, p. 3). The Vineyard at Delano project site is relatively flat, with an elevation range from 295 to 291 feet above mean sea level (amsl). Similarly, the West Pavilion site is also relatively flat, with an elevation ranging from 298 to 292 feet amsl. The site is currently vacant undeveloped land. Previously, the project site was in agricultural use, primarily for row crops.

#### Project Site Soils

The US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) provides soil information for areas throughout the United States. The NRCS's online soils mapping tool, called the Web Soil Survey, is an interactive tool that can provide a variety of soil-related information for a user-defined specific site. This tool was used to determine the specific soil for the project site, and this information is provided in **Appendix 4.7-A** of this DEIR as well as defined below.

According to the Web Soil Survey, the project site soils consist of Garces silt loam, Kimberlina fine sandy loam, 0 to 2 percent slopes, and Wasco sandy loam (NRCS 2014). See **Figure 4.2-1** in Section 4.2, Agriculture and Forestry Resources, of this EIR for project soils locations. **Table 4.7-1** summarizes the characteristics of the soil types present in the project area.

The project soils are all considered to be well drained. The Web Soil Survey also identifies the runoff potential for the soils on the project site. According to this survey, the soils have a high to low runoff potential, as shown in **Table 4.7-1**. These soils have rare frequency of flooding and linear extensibility (shrink/swell) ranges from low to moderate (NRCS 2014). According to the NRCS (2014), the project site's soils have a slight erosion potential.

**TABLE 4.7-1**
**PROJECT AREA SOIL CHARACTERISTICS**

| Soil | Percentage of Site | Drainage | Flooding Frequency Class | Erosion Hazard | Runoff Potential | Linear Extensibility[a] |
|---|---|---|---|---|---|---|
| Garces silt loam | 53.9% | Well drained | Rare | Slight | High | 4.5% |
| Kimberlina fine sandy loam, 0 to 2 percent slopes | 38.0% | Well drained | Rare | Slight | Low | 1.2% |
| Wasco sandy loam | 8.1% | Well drained | Rare | Slight | Low | 1.5% |

*Source: NRCS 2014*

*a. Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.*

## Subsurface Soils

Further analysis of the project site soils were provided by the geotechnical report completed for the project site. Geotechnical field investigations for both the Vineyard and West Pavilion (called Delano Market Place II and III at the time of the geotechnical report) sites were completed by Krazan & Associates in 2006. The field investigation drilled 50 soil borings for the entire project site.[1] The borings ranged from 10 to 25 feet in depth. In general, the upper soils, approximately 6 to 12 inches in depth, consisted of very loose sand, a mixture of silty sand/sandy silt, and sandy silt. Below the upper soils is 2 to 4 feet of loose to dense silty sand, silty sand/sandy silt, or sandy silt. Below 3 to 5 feet, loose to very dense silty sand, silty sand/sandy slit, sandy slit, silty sand/sand and sand was encountered (Krazan 2006, p. 4). In some borings, lenses of very dense, weakly cemented silty sands or silty sands/sandy silts were found. These cemented soils can be generally characterized as relatively strong and slightly compressible and have a low permeability (Krazan 2006, p. 4).

### FAULTING AND SEISMICITY

Earthquakes can cause strong ground shaking that may damage property and infrastructure. The strength of an earthquake is generally expressed in two ways: magnitude and intensity. The magnitude is a measure that depends on the seismic energy radiated by the earthquake as recorded on seismographs. The intensity at a specific location is a measure that depends on the

[1] A total of 75 borings were completed as part of the geotechnical investigation. The 25 borings associated with the Grapevine project site were not included in this EIR analysis, as this area is not a part of the proposed project.

effects of the earthquake on people or buildings and is used to express the severity of ground shaking.

The most commonly used magnitude scale today is the moment magnitude (Mw) scale. Moment magnitude is related to the physical size of fault rupture and the movement (displacement) across the fault, and it is therefore a more uniform measure of the strength of an earthquake. The seismic moment of an earthquake is determined by the resistance of rocks to faulting multiplied by the area of the fault that ruptures and by the average displacement that occurs across the fault during the earthquake. The seismic moment determines the energy that can be radiated by an earthquake and hence the seismogram recorded by a modern seismograph (CGS 2002b).

The most commonly used scale to measure earthquake intensities (ground shaking and damage) is the Modified Mercalli Intensity (MMI) Scale, which measures the intensity of an earthquake's effects in a given locality and is based on observations of earthquake effects at specific places. On the MMI Scale, values range from I to XII (see **Table 4.7-2**). While an earthquake has only one magnitude, it can have various intensities, which decrease with distance from the epicenter (CGS 2002b).

**Table 4.7-2** provides descriptions of the effects of ground shaking intensities, along with a general range of moment magnitudes that are often associated with those intensities.

**TABLE 4.7-2**
**EFFECTS OF RICHTER MAGNITUDE AND MODIFIED MERCALLI INTENSITY**

| Mw | Modified Mercalli Scale | Effects of Intensity |
|---|---|---|
| 1.0–3.0 | I | I. Not felt except by a very few under especially favorable conditions. |
| 3.0–3.9 | II–III | II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.<br>III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated. |
| 4.0–4.9 | IV–V | IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.<br>V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. |
| 5.0–5.9 | VI–VII | VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.<br>VII. Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars. |

| Mw | Modified Mercalli Scale | Effects of Intensity |
|---|---|---|
| 6.0–6.9 | VIII–IX | VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.<br>IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. |
| 7.0 and higher | X or higher | X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.<br>XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.<br>XII. Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air. |

*Source: CGS 2002b*

Faults are classified as active and potentially active. An active fault is one that has had surface displacement within Holocene time (about the last 11,000 years), while a potentially active fault is one that has been active during Quaternary time (last 1,600,000 years). These definitions are used in delineating Special Studies Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act. The intent of this act is to ensure that development does not occur across the traces of active faults (CGS 2013).

### Area Seismic Activity

The south end of the San Joaquin Valley is surrounded on three sides by active fault systems, the San Andreas, White Wolf-Breckenridge-Kern Canyon, and Garlock faults. A number of smaller faults exist on the San Joaquin Valley floor. The nearest active fault is the Pond fault approximately 3.6 miles southwest of the project site (BSK 2013, p. 4). The most notable earthquake in the Kern County area was the Kern County earthquake on July 21, 1952. The initial shock was 7.7 magnitude, with the epicenter near Wheeler Ridge, about 60 miles from Delano.

According to the geotechnical survey, there were no observed indications of surface faulting on the project site (Krazan 2006, p. 3).

## MINERAL RESOURCES

The California State Mining and Geology Board (SMGB) has the responsibility to inventory and classify mineral resources and can designate such mineral resources as having a statewide or regional significance. If this is done, the local agency must adopt a management plan for such identified resources. The SMGB has not identified any mineral resources areas in Delano.

According to the Delano General Plan, there are no significant mineral resources or mining operations within the Delano sphere of influence (Delano 2005, p. 4-4).

## 4.7.2 REGULATORY SETTING

### FEDERAL AND STATE

#### Uniform Building Code

The purpose of the Uniform Building Code (UBC) is to provide minimum standards to preserve the public peace, health, and safety by regulating the design, construction, quality of materials, certain equipment, location, grading, use, occupancy, and maintenance of all buildings and structures. UBC standards address foundation design, shear wall strength, and other structural-related conditions.

#### Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface of active faults. The act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Seismic Hazards Mapping Act (discussed below) addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides.

#### Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 directs the California Geological Survey to identify and map areas prone to liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of the act is to minimize loss of life and property through the identification, evaluation, and mitigation of seismic hazards.

Staff geologists in the Seismic Hazard Zonation Program gather existing geological, geophysical, and geotechnical data from numerous sources to produce the Seismic Hazard Zone Maps. They integrate and interpret these data regionally in order to evaluate the severity of the seismic hazards and designate as Zones of Required Investigation those areas prone to liquefaction and earthquake-induced landslides.

#### California Building Code

The State of California provides minimum standards for building design through the California Code of Regulations, Title 24, also known as the California Building Standards Code or the California Building Code (CBC). The CBC is based on the Uniform Building Code but modifies UBC regulations for specific conditions found in California and includes a large number of more detailed and/or more restrictive regulations.

For example, the CBC includes common engineering practices requiring special design and construction methods that reduce or eliminate potential expansive soil-related impacts. The CBC requires structures to be built to withstand ground shaking in areas of high earthquake hazards and the placement of strong motion instruments in larger buildings to monitor and

record the response of the structure and the site of seismic activity. Compliance with CBC regulations ensures the adequate design and construction of building foundations to resist soil movement. In addition, the CBC contains drainage requirements in order to control surface drainage and to reduce seasonal fluctuations in soil moisture content.

### LOCAL

#### City of Delano General Plan

The Delano General Plan (2005) includes policies and action programs intended to minimize public risk associated with seismic hazards and unstable soils. The Safety Element contains policies and programs that reduce the potential impacts of seismic and geologic hazards in the city, which include the following:

*Safety Policies*

Policy 1. Reduce the loss potential of life and property caused by earthquakes and resultant effects.

a. Require that seismic considerations be included in all areas identified as having significant earthquake potential.

b. Retain geologically hazardous areas, which are unsuitable for human occupancy, as open space. (Note: See Safety Hazard Action Programs)

c. Insure that future structures built in high seismic-potential areas conform to the guidelines established in the Uniform Building Code: Earthquake Regulations.

*Safety Hazard Action Programs*

Policy 1. The City should utilize those lands that have been identified as being hazardous for human occupancy and designated as "open space areas" for agriculture, natural wildlife habitats, and limited recreation purposes.

Policy 2. The City Engineer shall conduct, or cause to be conducted, appropriate soils tests for all projected new public buildings to determine the suitability for the proposed construction.

Policy 3. The Building Department shall continue to enforce the earthquake requirements of the Uniform Building Code for future buildings and structures.

Policy 4. Identified geologic hazards in a proposed subdivision should be referenced on the submitted final subdivision map.

Policy 5. The Public Works/Engineering Department shall enforce the Uniform Building Code requiring geological and soils engineering investigations in identified significant geologic hazard areas.

Policy 23. The City shall continue to enforce the regulations established in the Uniform Building Code, Uniform Mechanical Code, Uniform Plumbing Code, Uniform Fire Code, Uniform Dangerous Building Abatement Code, and other model codes adopted by the City to guarantee sound development.

Policy 24. The City shall work with county, regional and state agencies to explore new and innovative techniques and programs to reduce land subsidence in the area.

Policy 25. To prevent future problems associated with land subsidence, the City shall continue to enforce Title 14 - Section 2907 of the Municipal Code pertaining to foundation requirements. All concrete and masonry foundations for residential occupancy must be reinforced by a minimum of two continuous deformed bars.

### City of Delano Municipal Code

Section 16.36.020 Preliminary Soils Reports

Sections 16.36.020 and 20.10.320 of the Delano Municipal Code require that the subdivider fill a preliminary soil report with the Director of Public Works prior to the submission of the final subdivision map. If the preliminary soil report indicates the presence of critically expansive soils or other soil problems that, if not corrected, would lead to structural defects, a soil investigation of each lot in the subdivision must be prepared by a civil engineer registered by the State of California.

## 4.7.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

   i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

   ii) Strong seismic ground shaking.

   iii) Seismic-related ground failure, including liquefaction.

   iv) Landslides.

2) Result in substantial soil erosion or the loss of topsoil.

3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

4) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

6) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.

7) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

## METHODOLOGY

The following impact analysis is based on the preliminary geotechnical engineering investigation prepared for the proposed project site by Krazan & Associates in February 2006 and on the draft geotechnical engineering feasibility investigation by Twining Laboratories in November 2005, as well as on soils data obtained from the NRCS (2014) Web Soil Survey and other relevant materials, as appropriate.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Strong Seismic Ground Shaking and Seismic-Related Ground Failure (Standards of Significance 1 and 3)

**Impact 4.7.1** Because of the seismically active nature of the region, subsequent development associated with implementation of the proposed project would inherently result in the exposure of people, structures, and infrastructure to adverse effects associated with seismic ground shaking and seismic-related ground failure. This impact would be **potentially significant**.

#### Fault Rupture

The San Joaquin Valley, including the project area, is subject to the effects of seismic activity due to the active faults traversing the area. Active faults are defined as those that have experienced surface displacement within Holocene time (approximately the last 11,000 years) and/or are in a State-designated Alquist-Priolo Earthquake Fault Zone. According to the geotechnical report completed for the project, the site is not located in an Alquist-Priolo Special Studies Zone (Krazan 2006, p. 3). Therefore, the potential for damage due to direct fault rupture is considered unlikely. Thus, impacts would be **less than significant**.

### Seismic Ground Shaking

The project site is not located within an Alquist-Priolo Fault Zone as identified by the California Geological Survey (CGS). No known or potentially active faults are located within or adjacent to the project site (Krazen 2006, p. 3). However, active faults do exist near the project site and may affect the site. The nearest active fault system is the Pond fault 3.6 miles southwest of the project site.

Given its location in an active seismic region, it is assumed that the project site will be affected by seismic shaking as a result of earthquakes on major active faults and could therefore be at risk of seismic-induced ground failure (i.e., liquefaction, settlement, lurching, landsliding). However, according to the Earthquake Shaking Potential for California map produced by the CGS (2008), the project site is located in the area described as follows: "these regions are distant from known, active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking here."

The City of Delano adopted the California Building Code (CBC) in Chapter 14 of the Delano Municipal Code. Development of the project site would be required to comply with the current adopted CBC, which includes design criteria for seismic loading and other geologic hazards, including design criteria for geologically induced loading that govern sizing of structural members and provide calculation methods to assist in the design process. While shaking impacts could be potentially damaging, they would also tend to be reduced in their structural effects due to compliance with applicable CBC criteria that recognize this potential. The CBC includes provisions for buildings to be constructed in a manner to structurally survive an earthquake without collapsing and includes measures such as anchoring to the foundation and structural frame design.

Compliance with the structural standards contained in the CBC would minimize risks to the public from strong seismic ground shaking and would ensure that impacts are **less than significant.**

### Liquefaction

Liquefaction and seismically induced settlement typically occur in loose granular soils and low-cohesive silts and clays with relatively shallow groundwater. During an earthquake, ground shaking causes a rapid increase in the pore water pressure within the soil mass and a corresponding decrease in the soil's effective stress, which can result in a sudden loss of soil-bearing strength. Liquefaction potential has been found to be the greatest where the groundwater level is within a depth of 50 feet and loose fine sands or low plastic silts and clays occur within that depth. According to the Twining (2006, p. 11) geotechnical report competed for the project site, groundwater was not encountered at 51.5 feet below site grade and liquefaction is not expected to impact the site. This information is further supported by the 2013 geotechnical report completed for the adjacent Grapevine commercial project where groundwater was not encountered in borings up to 51.5 feet (BSK 2013, p. 3). While the 2006 Krazan geotechnical engineering investigation completed for the project site only drilled to a depth of 25 feet below site grade, these drillings also did not encounter groundwater. Based on this information, the potential for liquefaction is considered low. This, in concert with the seismic

building requirements of the CBC, would reduce the potential for liquefaction at the project site to **less than significant**.

Seismic Settlement

One of the most common phenomena that occurs during a seismic event is the induced settlement of loose, unconsolidated sediments, which can occur in unsaturated and saturated granular soils. A seismic settlement analysis was preformed as a part of the 2005 Twining geotechnical investigation. According to this report, a total dry seismic settlement of about one-eighth of an inch over a horizontal distance of 40 feet should be anticipated at the site (Twining 2005, p. 11). This analysis result is further confirmed by the 2013 geotechnical report completed for the adjacent property, which states that the total dry settlement would be approximately 0.2 to 0.3 inches (BSK 2013, p. 9). This amount of settlement does not require special building designs. Compliance with the CBC seismic building standards, as required by the City of Delano, would reduce this impact to a **less than significant** level.

Landslides

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves the surface soil and an upper portion of the underlying bedrock. Expansive soil on slopes tends to shrink and swell in response to moisture content changes. During this shrinking and swelling process, gravity tends to work the soil down slope. Movement may be very rapid or so slow that a change of position can be noted only over a period of weeks or years (creep). The size of a landslide can range from several square feet to several square miles.

The project site is located on flat and level ground. There are no slopes in the immediate vicinity of the project that would affect the project site. There would be **no impact** from landslides at the project site.

Subsidence, Collapse, and Lateral Spreading

Land surface subsidence can be induced by both natural and human phenomena. Natural phenomena include subsidence resulting from tectonic deformations and seismically induced settlements, soil subsidence from consolidation, hydro compaction, rapid sedimentation subsidence from oxidation or dewatering of organic-rich soils, and subsidence related to subsurface cavities. Subsidence related to human activity includes subsurface fluid or sediment withdrawal. Pumping of water for residential, commercial, and agricultural uses from subsurface water tables causes the majority of the identified subsidence in the United States. Site-specific subsidence was not discussed in the either of the geotechnical reports completed for the project site. However, the geotechnical report completed for the adjacent property determined that the area is not susceptible to significant subsidence due to petroleum or groundwater withdrawal (BSK 2013, p. 4). As such, this is considered a **less than significant** impact.

Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where there is a high groundwater table, where there are relatively soft and recent alluvial deposits, and where creek banks are

relatively high. None of these conditions occur on the project site. Additionally, since the project site is relatively flat, the potential for lateral spreading is nominal. As such, the project would have a **less than significant** impact related to lateral spreading.

According to the geotechnical reports completed for the project site, the site soils have a low to high collapse potential (Twining 2005, p. 13; Krazan 2006, p. 8). Structures in the general vicinity have experienced excessive post-construction settlement when the foundation soils become near-saturated (Krazan 2006, p. 8). These geotechnical reports recommend further investigation. As such, this is considered a **potentially significant** impact.

Conclusions

The geotechnical reports completed for the project site were draft/preliminary and recommended further investigation once actual building foundations were determined. The potential for collapse has been identified for the project site. Additionally, existing soils were determined to not provide adequate support for anticipated foundations and slabs on grade, exterior slabs, pavement walkways, and asphalt concrete pavement (Twining 2005, p. 12). Because actual foundation and building structures have not been determined for the West Pavilion project, final geotechnical engineering cannot be completed. The geotechnical reports concluded that the project site is suitable for development; however as stated previously, the final design of the project has not been determined at this point. As such, further geotechnical engineering investigation is necessary. Therefore, the project would have a **potentially significant** impact.

Mitigation Measures

**MM 4.7.1** Prior to the issuance of grading permits, a final geotechnical engineering investigation by a qualified engineer shall be prepared for review and approval by the City. All recommend geotechnical mitigation measures shall be incorporated into the design plans to the satisfaction of the City Engineer.

*Timing/Implementation:* *Prior to the issuance of building permits*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measure **MM 4.7.1** would ensure the project is appropriately designed to minimize risks associated with potential seismic ground shaking as well as the existing soil characteristics of the site by requiring incorporation of project-specific recommendations into construction drawings, which would then need to be adhered to during project construction. Therefore, with implementation of the above mitigation measure, this impact would be **less than significant**. Conformance with the CBC and the recommendations of a geotechnical analysis are standard measures required of any proposed development project.

### Erosion and Loss of Topsoil (Standard of Significance 2)

**Impact 4.7.2** Construction of the proposed project would require grading, excavating, and other ground-disturbing activities that would expose topsoil, resulting in soil

erosion. However, implementation of standard erosion control measures would ensure this impact is **less than significant**.

According to the NRCS (2014), the project site has a slight potential for erosion. However, construction of the proposed project would include land clearing, grading, excavating, and other soil-disturbing activities, potentially exposing site soils to wind and water erosion. In addition, construction activities may involve the use of water, which may further erode the topsoil as the water moves across the surface.

All construction activities would be required to comply with CBC Chapter 70 standards, which would ensure implementation of appropriate measures during grading activities to reduce soil erosion. In addition, the project applicant would be required to prepare and comply with a stormwater pollution prevention plan (SWPPP) that provides a schedule for the implementation and maintenance of erosion control measures and a description of erosion control practices, including appropriate design details and a time schedule. The SWPPP would consider the full range of erosion control best management practices (BMPs), including any additional site-specific and seasonal conditions. As further discussed further in Section 4.9, Hydrology and Water Quality, the State Water Resources Control Board adopted a Construction General Permit (CGP) (Order No. 2009-0009DWQ) and associated amendments that provide additional standards and requirements to avoid soil erosion.

Compliance with CBC Chapter 70 standards, as well as implementation of an approved SWPPP, would minimize the potential for soil erosion on the project site. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

### Expansive Soils (Standard of Significance 4)

**Impact 4.7.3** Project site soils were determined to have moderate expansion potential. This impact would be **potentially significant**.

Expansive soils can shrink and swell with drying and wetting. Soils with high clay content tend to be the most affected. The shrink-swell potential of expansive soils can result in differential movement beneath foundations. According to the Krazan geotechnical report, silty sands or sandy silts with clay were encountered on portions of the project site. These clayey soils have a moderate swell potential (Krazan 2006, p. 6). Additionally, as shown in **Table 4.7-1**, the Graces silt loam soils, which cover approximately 53.9 percent of the site, have a linear extensibility of 4.5 percent. A linear extensibility of 4.5 percent falls into the moderate shrink-swell potential level. A level of more than 3 percent can cause damage to buildings, roads, and other structures (NCRS 2014). As such, this is considered to be a **potentially significant** impact.

Mitigation Measures

Implementation of mitigation measure **MM 4.7.1** would require a final geotechnical report prior to the issuing of grading permits. Compliance with this mitigation would reduce the potential for expansive soil to a **less than significant** impact.

### Soils Incapable of Adequately Supporting the Use of Septic Tanks (Standard of Significance 5)

**Impact 4.7.4** Project wastewater systems have not been determined at this time. However, Delano General Plan policies require the connection to existing wastewater facilities. The project would have **no impact.**

The wastewater systems for the proposed project have not been determined at this time. However, General Plan Public Facilities Element Policy 18 requires the connection of new businesses, residences, and industries to the City's water and sewer system. The City establishes fees that enable it to recover the costs of such connection. As such, the proposed project would have **no impact** regarding inadequate soils for septic system use.

Mitigation Measures

None required.

### Result in the Loss of a Known Mineral Resource (Standards of Significance 6 and 7)

**Impact 4.7.5** The project is not located in an area identified as a mineral resource or on lands identified as a mineral resource by the City of Delano. The project would have **no impact.**

The California State Mining and Geology Board (SMGB) has the responsibility to inventory and classify mineral resources and can designate such mineral resources as having a statewide or regional significance. If this is done, the local agency must adopt a management plan for such identified resources. The SMGB has not identified any mineral resources areas in Delano. The Kern County GIS online mapping program identifies, among other things, parcels considered to have mineral resources. According to this mapping, the project site does not have mining resources (Kern County 2014). Finally, according to the Delano General Plan, there are no significant mineral resources or mining operations within the Delano sphere of influence (Delano 2005, p. 4-4). The project would have **no impact** related to mineral resources.

Mitigation Measures

None required.

## 4.7.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

Impacts associated with geology and soils generally are site-specific (determined by a particular site's soil characteristics, topography, and proposed land uses), rather than cumulative in nature. Individual development projects would be subject to, at a minimum, uniform site development and construction standards relative to seismic and other geologic conditions that are prevalent in the region. Impacts regarding surficial deposits, namely erosion and sediment deposition, can be cumulative in nature in a watershed. The reader is referred to Section 4.9, Hydrology and Water Quality, regarding cumulative water quality impacts from soil erosion.

## CUMULATIVE IMPACTS AND MITIGATION MEASURES

### Cumulative Geologic, Seismic, and Soil Hazards

**Impact 4.7.6** Development of the proposed project, in combination with other past, present, and reasonably foreseeable future development in the region as assumed under buildout of the General Plan, could result in the cumulative exposure of persons and structures to geologic hazards as well as cumulative soil erosion. However, compliance with applicable laws and regulations and common engineering practices would ensure that future development is not adversely impacted by significant geologic hazards and that soil erosion is minimized to the extent feasible. This impact would be **less than cumulatively considerable.**

All new development and redevelopment in the city would be required to comply with the CBC, Delano's Municipal Code, and General Plan policies, which mandate stringent earthquake-resistant design parameters and common engineering practices requiring special design and construction methods that reduce or eliminate potential expansive soil and soil settlement–related impacts. Furthermore, future development would be required to comply with the then-current CBC Chapter 70 standards to minimize soil erosion and to prepare a site plan detailing appropriate methods of erosion and deposition control, in addition to preparing a SWPPP to obtain coverage under the state's General Construction Permit. Compliance with these existing regulations would minimize the potential for soil erosion in the city. Therefore, these impacts will not combine to form a greater cumulative effect and are considered **less than cumulatively considerable**.

Mitigation Measures

None required.

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# 4.8 HAZARDS AND HAZARDOUS MATERIALS

This section provides information on hazardous materials and safety hazards potentially relevant to the project site and surrounding properties. The impact analysis focuses on the potential for the proposed project to create hazards to public health or the environment related to hazardous materials, airport operations, emergency access, and wildland fire. The discussion in this section is largely based on two reports, the Report of Phase I Environmental Site Assessment Update, Approximately 77.2 Acre Property, and the Phase I Environmental Site Assessment, Approximately 32 Acre Property. Both of these assessments were prepared by Moore Twining Associates, Inc. These reports are included as **Appendix 4.8-A** of this EIR.

## 4.8.1 ENVIRONMENTAL SETTING

### HAZARDOUS MATERIALS AND WASTE DEFINED

Under Title 22 of the California Code of Regulations (CCR), the term *hazardous substance* refers to both hazardous materials and hazardous wastes, and both are classified according to four properties: toxicity, ignitability, corrosiveness, and reactivity (CCR Title 22, Chapter 11, Article 3). A hazardous material is defined as a substance or combination of substances that may cause or significantly contribute to an increase in serious, irreversible, or incapacitating illness or may pose a substantial presence or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed.

Public health is potentially at risk whenever hazardous materials are or will be used. It is necessary to differentiate between the hazard of these materials and the acceptability of the risk they pose to human health and the environment. A hazard is any situation that has the potential to cause damage to human health and the environment. The risk to health and public safety is determined by the probability of exposure, in addition to the inherent toxicity of a material.

Factors that can influence the health effects when human beings are exposed to hazardous materials include the dose the person is exposed to, the frequency of exposure, the duration of exposure, the exposure pathway (route by which a chemical enters a person's body), and the individual's unique biological susceptibility.

Hazardous wastes are hazardous substances that no longer have practical use, such as materials that have been discarded, discharged, spilled, or contaminated or are being stored until they can be disposed of properly (CCR Title 22, Chapter 11, Article 2, Section 66261.10). Soil that is excavated from a site containing hazardous materials is a hazardous waste if it exceeds specific CCR Title 22 criteria. While hazardous substances are regulated by multiple agencies, as described in the Regulatory Setting subsection below, cleanup requirements of hazardous wastes are determined on a case-by-case basis according to the agency with lead jurisdiction over the project.

### PHASE I ENVIRONMENTAL SITE ASSESSMENT

The proposed project includes two different environmental assessments to evaluate potential hazards on the Vineyard site and the West Pavilion site. A Phase I Environmental Site Assessment (ESA) is a report prepared for a real estate holding that identifies existing and potential environmental contamination liabilities. The analysis contained in a Phase I ESA addresses both the underlying land and the physical improvements to the property, and includes examination of potential soil contamination, groundwater quality, surface water quality, and indoor air

quality. The assessment of a site typically includes a records review and personal interviews wit the land owner to determine past uses of the property, the age of any structures on the property, and hazardous substances that may have been used on the property. The assessment may also include a field inspection to look for signs of soil and/or water contamination, identify possible asbestos-containing building materials and lead paints, inventory hazardous substances currently stored or used on-site, and identify potential signs of mold and mildew.

A Phase I ESA is generally considered the first step in the process of environmental due diligence and does not include the actual sampling of soil, air, groundwater, and/or building materials. If the Phase I ESA determines that a site may be contaminated, a Phase II ESA may be conducted. This is a more detailed investigation involving chemical analysis for hazardous substances and/or petroleum hydrocarbons and may include recommendations for remediation of the site, if necessary.

The Phase I Environmental Site Assessment Approximately of the 32 Acre Property was completed for the Vineyard site by Moore Twining Associates, Inc. (MTA) on April 28, 2014. The Phase I Environmental Site Assessment Update Approximately 77.2 Acre Property was completed for the West Pavilion site by MTA on July 11, 2013. Both ESAs consist of the following: (1) review of records including physical setting sources, environmental regulatory database information, historic use information, and recorded land title records; (2) site reconnaissance; and (3) interviews. The findings of the Phase I ESAs are summarized below.

## EXISTING SITE CONDITIONS

### Vineyard at Delano

#### Past and Current Uses

A review of historic aerial photographs of the Vineyard at Delano site shows the site as vacant land in 1946. By 1956, aerial photographs indicate that all or a portion of the Vineyard site had been used for agricultural purposes. According to the ESA, the site would continue to be used for dry crop or row crop agriculture through 2012 (MTA 2014, p. 9). No structures exist on the property during this time.

From 1946 to 1971, aerial photography of the vicinity indicates that the adjacent property to the north, east, and west was vacant land and land to the south was used for row crop agriculture during this time period. From 1972 through 2012, aerial photography shows row crops to the south, east, and west of the Vineyard site and vacant land to the north (MTA 2014, p. 9).

#### Observed Site Features

MTA performed a systematic site reconnaissance of the project site as part of the Phase I ESA. MTA also viewed those portions of adjacent properties that were readily observable from the project site or from public access areas. The site reconnaissance revealed a retention basin, approximately 150 feet long by 95 feet wide by 4 feet deep, located at the northwest corner of the Vineyard site. This basin is used to store stormwater runoff for groundwater recharge purposes. Additionally, an agricultural pumping system was located on the northeastern corner of the basin. MTA did not observe any hazardous substances, petroleum products, aboveground or underground storage tanks, drums or suspect containers, stains or corrosion, septic or sewage

tanks, wells, odors, or other uses or conditions of concern on the project site. Miscellaneous debris was found in the retention basin, including mattresses, a broken coffee table, garbage bags of used clothing, and fast-food containers. There was no evidence of staining or leakage on or around the debris. No recognized environmental conditions (RECs) were identified during the site reconnaissance or during a review of historical information for the site or adjacent properties (MTA 2014, pp. 6–8).[1]

However, the project site and adjacent properties were in agricultural use from at least 1956 though 2012. While no structures indicative of agricultural chemical (i.e., pesticides, herbicides, and fertilizers) storage or mixing areas were noted in the aerial photographs, typically crops are maintained with chemicals applied as a normal agricultural process. And while no surficial evidence of misuse or misapplication of residual materials from agricultural chemicals was observed during the site reconnaissance, some such chemicals degrade slowly and/or have very low solubility and may still be present in low concentrations in the subsurface soils. As with any agricultural developed land, the possibility exists that pesticides, herbicides, and/or fertilizers have been applied which may have impacted the project site.

### Hazardous Material Records Review

A search of available environmental records was performed as part of the Phase I ESA to identify any known hazardous materials sites on or in the vicinity of the project site. The search included databases published by local, state, tribal, and federal agencies (MTA 2014, p. 12).

The project site and adjoining and surrounding properties were not identified as known hazardous materials sites and are therefore not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Other sites not immediately adjacent to but within 2,000 feet of the project site include the McFarland-Delano Sanitary Landfill (MDSL), which was closed in 1996 but is currently monitored by the Kern County Environmental Health Department, and the Sunset Waste Paper Transfer Station.. These sites were identified within the search area of the Phase I ESA, but were determined by MTA (2014, pp. 13–14) not to be relevant to the proposed project because they would be unlikely to impact the project site based primarily on the following factors:

- The relative distance between the hazardous materials sites and the Vineyard site.
- Flow of groundwater from the Vineyard site is cross-gradient to the MDSL site.
- No detection of constituents of concern at the closest monitoring well (MD1-26).
- No reported releases, spills, incidents, or violations for the Transfer Station.

[1] The term *recognized environmental condition* means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment (ASTM 2013).

## West Pavilion at Delano

### Past and Current Uses

A review of historic aerial photographs of the West Pavilion site shows the site as vacant land in 1946. By 1956, aerial photographs indicate that the site was vacant; however, several stormwater runoff channels were apparent in the western portion of the site. In the 1967 aerial, the site was developed for agricultural row crops, with a small pond in the southwest portion of the site. This site condition is similar in the 1972 and 1984 aerials. From 1994 though 2012, the site appears to have been fallow ground, and the small pond/retention basin was still located on the site. Additionally, a small dirt road traversed the central portion of the site in a north/south direction (MTA 2013, pp. 7–8). No structures existed on the property during this time.

From 1946 to 1967, aerial photography of the vicinity indicates that the surrounding adjacent property was vacant land during this time period. From 1967 to 2012, the aerial photography shows that the property north and south of the West Pavilion site was used for agricultural purposes. Rural residential is seen east of the site, and vacant land and a square-shaped pond feature are seen on the west. In 2012, aerial photography shows a small park (Delano Soccer Park) south of the site (MTA 2013, pp. 7–8).

### Observed Site Features

MTA performed a systematic site reconnaissance of the project site as part of the Phase I ESA. MTA also viewed those portions of adjacent properties that were readily observable from the project site or from public access areas. The site reconnaissance revealed that the site is currently vacant. One retention basin, approximately 20 feet wide by 75 feet long by 5 feet deep, is located on the western edge of the site. This basin is used for stormwater retention and excess irrigation water. Additionally, an agricultural well/pump unit is located near the basin. Two pole-mounted transformers owned and operated by Southern California Edison are located on the northern and western borders of the site. Miscellaneous debris, including concrete piping and paint cans, was observed on the site. There is no evidence of staining or leakage on or around the debris. No RECs were identified during the site reconnaissance or during a review of historical information for the site or adjacent properties (MTA 2013, pp. 15–16).

The project site was in agricultural use from 1967 though 1994. While no structures indicative of agricultural chemical (i.e., pesticides, herbicides, and fertilizers) storage or mixing areas were noted in the aerial photographs, typically crops are maintained with chemicals applied as a normal agricultural process. While no surficial evidence of misuse or misapplication of residual materials from agricultural chemicals was observed during the site reconnaissance, some of these chemicals degrade slowly and/or have very low solubility and may still be present in low concentrations in the subsurface soils. As with any agricultural developed land, the possibility exists that pesticides, herbicides, and/or fertilizers have been applied which may have impacted the project site.

### Hazardous Material Records Review

A search of available environmental records was performed as part of the Phase I ESA to identify any known hazardous materials sites on or in the vicinity of the project site. The search included databases published by local, state, tribal, and federal agencies (MTA 2013, p. 13).

The project site and adjoining and surrounding properties were not identified as known hazardous materials sites and are therefore not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Other sites not immediately adjacent but within 500 feet of the project site include the Delano Landfill #2, which was closed in 1996 but is currently monitored by the Kern County Environmental Health Department, and the Sunset Waste Paper Transfer Station.. These sites were identified within the search area of the Phase I ESA, but were determined by MTA (2013, pp. 14–15) not to be relevant to the proposed project because they would be unlikely to impact the project site based primarily on the following factors:

- The relative distance between the hazardous materials sites and the West Pavilion site.
- Flow of groundwater from the West Pavilion site is cross-gradient to the MDSL site.
- No detection of constituents of concern at the closest monitoring well (MD1-26).
- No reported releases, spills, incidents, or violations for the Transfer Station.

### HAZARDOUS MATERIALS TRANSPORT

The transportation of hazardous materials in California is subject to various federal, state, and local regulations. It is illegal to transport explosives or inhalation hazards on any public highway not designated for that purpose, unless the use of the highway is required to permit delivery or the loading of such materials (California Vehicle Code Sections 31602(b) and 32104(a)). The California Highway Patrol (CHP) designates through routes to be used for the transportation of hazardous materials. Transportation of hazardous materials is restricted to these routes except in cases where additional travel is required from the route to deliver or receive hazardous materials to and from users. The CHP (1997, pp. 2–10) has identified State Route (SR) 99, located approximately 0.4 miles east of the project site, as a route that may be used for the transportation of hazardous materials. Information on CHP requirements and regulatory authority is provided in the Regulatory Setting subsection below.

### REGIONAL POTENTIAL PUBLIC HEALTH HAZARDS

#### Valley Fever

Valley fever (*Coccidioidomycosis*) is caused by the fungus *Coccidioides immitis*. Valley fever is found in the southwestern United States including in Arizona, California, New Mexico, Nevada, and Utah, as well as in parts of Mexico. In about 50 to 75 percent of people, valley fever causes either no symptoms or mild symptoms and those infected never seek medical care; when symptoms are more pronounced, they usually present as lung problems (cough, shortness of breath, sputum production, fever, and chest pains). The disease can progress to chronic or progressive lung disease and may even become disseminated to the skin, lining tissue of the brain (meninges), skeleton, and other body areas. The disease can also infect many animal types (for example, dogs, cattle, otters, and monkeys).

From 1998 to 2011, the incidence in the United States increased about tenfold to about 22,000 diagnosed individuals per year, according to the Centers for Disease Control and Prevention (CDC). People are infected by inhaling dust contaminated with *Coccidioides*; the fungus is not transmitted from person to person. About 30–35 percent of people who develop valley fever

have flu-like symptoms (fever, cough, malaise, and chills) that dissipate over about two to six weeks without treatment. Some people may develop additional symptoms such as shortness of breath, night sweats, headaches, sputum production, and joint and muscle pains (symptoms resembling pneumonia). Women, more often than men, may develop erythema nodosum (reddish, painful, tender lumps, usually on the legs) or erythema multiforme (an allergic reaction similar to erythema nodosum in multiple body sites with rash). Usually these symptoms resolve in about two to six weeks (MedicineNet 2014). There are several antifungal drugs available to treat valley fever. However, in general, dosage (especially pediatric), length of time of drug administration, and the choice of drug are best decided in consultation with an infectious disease specialist (MedicineNet 2014).

### Mosquito-Borne Disease

Mosquitoes are vectors for diseases such as encephalitis, West Nile virus, dengue fever, malaria, Rift Valley fever, and yellow fever. Mosquito-borne viruses belong to a group of viruses commonly referred to as arboviruses (for arthropod-borne). Although 15 mosquito-borne viruses are known to occur in California, only WNV, western equine encephalomyelitis virus, and St. Louis encephalitis virus are significant causes of human disease. Since 2004, there have been 3,994 human cases of West Nile virus with 143 deaths and 1,201 horse cases (CDPH 2014, p. 3).

In the Delano area, the Delano Mosquito Abatement District (DMAD) provides surveillance and suppression of disease-carrying and pest mosquitoes. The DMAD currently serves an area of 477 square miles from Famoso in Kern County north almost to Pixley in Tulare County. DMAD boundaries cover McFarland, Delano, Earlimart, and Richgrove (DMAD 2014). The DMAD currently includes surveillance of West Nile virus, western equine encephalitis virus, and St. Louis encephalitis virus.

## OTHER HAZARDS

### Airport Operations

Airport-related hazards are generally associated with aircraft accidents, particularly during takeoffs and landings. Other airport operation hazards include incompatible land uses, power transmission lines, wildlife hazards (e.g., bird strikes), and tall structures that penetrate the imaginary surfaces surrounding an airport.

The closest public use airport to the project site is Delano Municipal Airport, located approximately 0.5 miles from the project site. The project site is located within Airport Land Use Capability Zone C and Safety Zone 6 (Traffic Pattern Zone) (Kern County 2011a, p. 4-23; Delano 2013, Section 20.3.30).

### Wildland Fire Hazards

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and causing destruction to life and property. Wildfires can occur in undeveloped areas and spread to urban areas where structures and other human development are more concentrated. According to the California Department of Forestry and Fire Protection (Cal Fire) (2007), the project site is not located in a Fire Hazard Severity Zone.

## 4.8.2 REGULATORY SETTING

### FEDERAL

Federal agencies that regulate hazardous substances include the US Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the US Department of Transportation (DOT), and the National Institute of Health. The following federal laws and guidelines govern hazardous materials.

- Federal Water Pollution Control Act
- Clean Air Act
- Occupational Safety and Health Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Resource Conservation and Recovery Act (RCRA)
- Safe Drinking Water Act
- Toxic Substances Control Act

#### Worker Safety

The Hazard Communication Standard (Title 29, Part 1910 of the Code of Federal Regulations [CFR]) requires that workers be informed of the hazards associated with the materials they handle. Workers must be trained in safe handling of hazardous materials, use of emergency response equipment, and the building emergency response plan and procedures. Containers must be appropriately labeled, and Material Safety Data Sheets must also be available in the workplace.

OSHA's Bloodborne Pathogens Standard is intended to protect workers, including lifeguards at aquatics facilities and water bodies, from exposure to blood and bodily fluids, which is the primary means of transmittal for the most harmful infectious agents known.

#### Hazardous Materials Transportation

The US Department of Transportation developed regulations pertaining to the transport of hazardous materials by all modes of transportation. DOT regulations specify packaging requirements for different types of materials. In addition to the DOT, the US Postal Service, the EPA, the CHP, Caltrans, and the California Department of Toxic Substances Control (DTSC) implement and enforce state and federal laws regarding hazardous materials transportation. The US Postal Service has regulations for the transport of hazardous materials by mail.

Transporters of hazardous materials are subject to both DOT and EPA enforcement of the regulations. Consequently, the DOT and the EPA coordinate their efforts, especially at the regional level, to obtain compliance with both the RCRA and Hazardous Materials Transportation Act (HMTA) regulations. Under the authority of the Resource Conservation and

Recovery Act, the EPA regulates the transportation of hazardous materials. The EPA coordinates its transportation ordinances with the requirements of the HMTA and any statutes promulgated by the US Department of Transportation pursuant to the HMTA. The EPA set forth these standards applicable to transporters of hazardous materials in 40 CFR 263. These EPA standards incorporate and require compliance with the DOT provisions on labeling, marking, placarding, using proper containers, and reporting discharges. The EPA's adoption of these DOT standards ensures consistency among the requirements and avoids establishing conflicting rules. The DOT's regulations are documented in 49 CFR 171-180 and implemented by the Research and Special Programs Administration within the DOT. In summary, the EPA is directed by the Resource Conservation and Recovery Act to establish certain standards for transporters of hazardous materials and to coordinate regulatory activities with the DOT.

EPA regulations require a transporter to:

- Comply with the manifest system (a system that ensures the integrity of the shipment from the point of origin to its destination).
- Maintain the appropriate records (signed manifests) for three years.
- Take immediate action to protect human health and the environment (e.g., notify local authorities or initiate interim measures) in the case of a discharge.
- Notify the National Response Center and submit a report to the DOT Office of Hazardous Materials Regulations in the event of a hazardous waste discharge.
- Clean up any discharges to the environment and take any actions required by the appropriate government officials for mitigating the discharge effects on human health and environment.

Transporters of hazardous materials must also adhere to all of the Federal Motor Carrier Safety Regulations that the DOT has adopted under the Motor Carrier Safety Act of 1984. This act specifies more requisites that apply to the transport vehicle and the driver. Among them are concise specifications for vehicle parts and accessories, such as lighting devices, brakes, glazing and windows, fuel systems, tires, and horns. Additional requirements concerning inspection, repair, and maintenance are enumerated. Special driving and parking rules that relate to hazardous materials transportation are also indicated. Standards for drivers identify minimum qualifications, including physical qualifications, background and character profiles, and pertinent examinations. Also included among these rules are testing requirements for alcohol and controlled substances such as marijuana, cocaine, opiates, amphetamines, and phencyclidine. Other regulations pertaining to drivers include standards for the driving of vehicles, stopping, fueling, the use of lamps, the reporting of accidents, and the monitoring of a driver's hours of service.

## STATE

### California Environmental Protection Agency

The California Environmental Protection Agency (CalEPA) and the State Water Resources Control Board establish rules governing the use of hazardous materials. Applicable state laws include the following:

- Public Safety/Fire Regulations/Building Codes
- Hazardous Substances Information and Training Act
- Air Toxics Hot Spots and Emissions Inventory Law
- Underground Storage of Hazardous Substances Act
- Porter-Cologne Water Quality Control Act

Within CalEPA, the DTSC has primary regulatory responsibility, with delegation of enforcement to local jurisdictions that enter into agreements with the state agency, for the management and transport of hazardous materials under the authority of the Hazardous Waste Control Law.

### Hazardous Materials Management

CalEPA has established regulations governing the use of hazardous materials in the state. Within CalEPA, the Department of Toxic Substances Control has primary hazardous materials regulatory responsibility, but can delegate enforcement responsibilities to local jurisdictions that enter into agreements with the DTSC, for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law. State regulations applicable to hazardous materials are contained primarily in Title 22 of the California Code of Regulations. CCR Title 26 is a compilation of those chapters or titles of the CCR that are applicable to hazardous materials management. California Division of Occupational Safety and Health (Cal/OSHA) standards are presented in CCR Title 8; these are more stringent than federal OSHA regulations and address workplace regulations involving the use, storage, and disposal of hazardous materials.

CalEPA adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The six elements of the Unified Program are hazardous waste generation and on-site treatment, underground storage tanks, aboveground storage tanks, hazardous material release response plans and inventories, risk management and prevention programs, and Uniform Fire Code hazardous materials management plans and inventories. The program is implemented at the local level by a local agency, referred to as the Certified Unified Program Agency (CUPA), which is responsible for consolidating the administration of the six program elements within its jurisdiction. The Kern County Environmental Health Services Department (KCEHSD) is the CUPA for Kern County.

Article 3 of the California Health and Safety Code, Division 2.5, Chapter 3, Section 1797.182, outlines hazardous materials management for the maintenance and operation of public swimming pools. The law sets forth requirements regarding clarity of water, disinfection, pH

control, cyanuric acid, bacteriological and chemical quality of pool water, and compressed chlorine gas, among provisions for worker safety. As required by Section 1797.182, pools must be disinfected continuously to maintain acceptable bacteria levels, but chemical quality must not cause objectionable physiological effects on bathers at the aquatics facility.

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, also called the Business Plan Act, is intended to minimize the potential for accidents involving hazardous materials and facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

### Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards and ensuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. As at the federal level, the Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. This is achieved through actions such as requiring manufacturers to appropriately label containers, make Material Safety Data Sheets available in the workplace, and require employers to properly train workers.

### Uniform Fire Code

The Uniform Fire Code contains regulations relating to construction and maintenance of buildings and the use of premises. The code includes specifications for fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and premises. Storage of corrosive materials and liquid and solid oxidizers, including pool chemicals, must be in compliance with Uniform Fire Code Sections 5404 and 6304, which include provisions for indoor storage, detached storage, liquid-tight floors, and smoke detection, among others.

### California Accidental Release Prevention Program

The California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5) covers certain businesses that store or handle more than a certain volume of specific regulated substances at their facilities. The list of regulated substances is found in Article 8, Section 2770.5, of the program regulations and includes common chemicals used in swimming pools such as chlorine and hydrochloric acid (also known as muriatic acid).

## LOCAL

### City of Delano General Plan

The Delano General Plan (2005) Safety Element includes policies and action programs intended to minimize risk to the public and the environment associated with hazardous materials, including:

*Safety Policies*

Policy 1. Promote and encourage adequate fire control within the Delano Planning Area.

a. Ensure that all sectors of the City maintain adequate water pressure and water supply for fire fighting purposes.

d. Continue and maintain weed abatement and brush clearance to reduce fire danger throughout the community.

e. Utilize proper mitigation measures to protect new development from areas with high brush fire potential.

*Safety Hazard Action Programs*

Policy 1. The City should utilize those lands that have been identified as being hazardous for human occupancy and designated as "open space areas" for agriculture, natural wildlife habitats, and limited recreation purposes.

Policy 2. The City Engineer shall conduct, or cause to be conducted, appropriate soils tests for all projected new public buildings to determine the suitability for the proposed construction.

Policy 10. The Fire Marshall and the Chief Building Official shall insure that all buildings are designed and equipped for an adequate level of fire protection.

Policy 12. The Fire Department should maintain an updated fire hazard potential map, indicating areas with high brush fire dangers and areas with limited access.

### City of Delano Municipal Code

Municipal Code Section 20.12.50 requires that any operation or activity involving the storage of flammable or explosive materials be provided with adequate safety devices against the hazard of fire and explosion and that it provide adequate firefighting and fire suppression equipment and devices in accordance with the requirements of the Uniform Fire Code and the Fire Department. Burning of waste materials in an open fire is prohibited. Municipal Code Section 20.12.60 prohibits the release or emission of hazardous materials and wastes into the atmosphere, ground, or sewage systems.

Municipal Code Section 20.3.30, Airport Height Combining (H) District, identifies permitted uses and building and site limitations for uses within the district. As previously stated, the project site is located within Zone 6: Traffic Pattern Zone. Zone 6 is considered to have a low likelihood of aircraft-related accident occurrence. Allowed uses in this zone include residential and nonresidential development with the exception of outdoor stadiums or similar very high intensity uses. Additionally, schools, large day-care centers, hospitals, and nursing homes are not allowed unless no feasible alternative is available.

### Kern County Airport Land Use Compatibility Plan/Delano Airport Master Plan

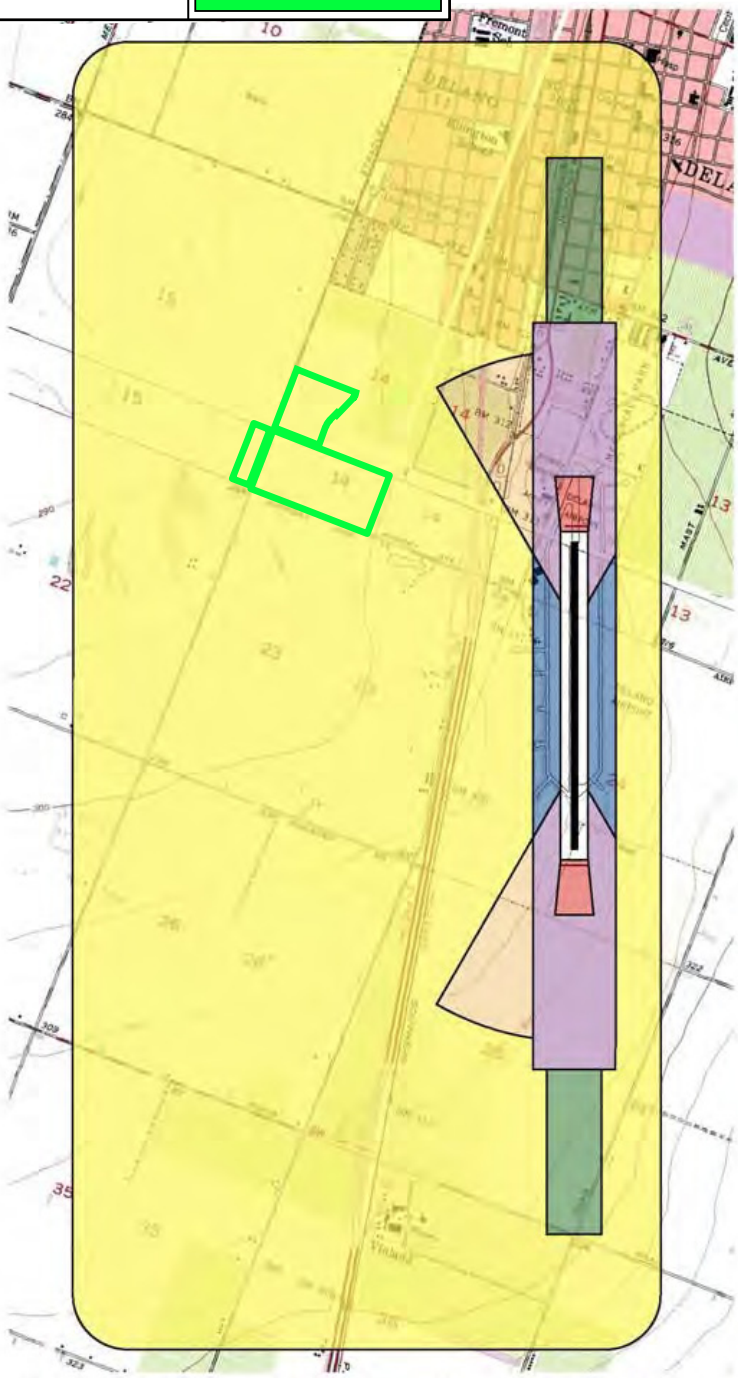
The Kern County Airport Land Use Compatibility Plan (ALUCP) outlines airport safety zones for airports in the county. Safety zones used in the ALUCP were based on information and regulations in the 1993 edition of the Caltrans Airport Land Use Planning Handbook. The ALUCP was used in part in preparing the Delano Airport Master Plan. However, the Airport Master Plan uses updated airport compatibility zones based on the 2002 edition of the Caltrans handbook, which are considered to be "much more definitive in the guidance it provides" (Delano 2011, p. 9-5). **Figure 4.8-1** illustrates the airport safety zones for Delano Municipal Airport based on the Caltrans safety zones. **Table 4.8-1** illustrates a comparison of the Caltrans handbook and the Kern County ALUCP zones.

**TABLE 4.8-1**
**COMPARISON OF STATE AND KERN COUNTY AIRPORT LAND USE COMPATIBILITY PLAN SAFETY ZONES**

| California Airport Land Use Planning Handbook | | Kern County Airport Land Use Compatibility Plan | Comments |
|---|---|---|---|
| **Zone** | **Description** | **Equivalent Zone(s)** | |
| 1 | Runway Protection Zone | A | Zone A includes the Runway Protection Zone and the Primary Surface. The handbook does not have a zone designation for the primary surface. |
| 2 | Inner Approach/Departure Zone | B1/B2 | Portions of B1 and B2 are now Zone 2. |
| 3 | Inner Turning Zone | B2 | |
| 4 | Outer Approach/Departure Zone | C | Portions of C (beyond runway ends). |
| 5 | Sideline Zone | A/B1 | Sides of the runway. |
| 6 | Traffic Pattern Zone | C/D | |

*Source: Delano 2011, Table 9-1*

| LEGEND | |
|---|---|
| DESCRIPTION | EXISTING |
| RUNWAY PROTECTION ZONE | |
| INNER APPROACH/DEPARTURE ZONE | |
| INNER TURNING ZONE | |
| OUTER APPROACH/DEPARTURE ZONE | |
| SIDELINE ZONE | |
| TRAFFIC PATTERN ZONE | |
| PROJECT LOCATION | |



T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

Michael Baker INTERNATIONAL

0 1,500 3,000 Feet

# Airport Saftey Zones

Source: Delano Municipal Airport Master Plan, USGS maps, Delorme East (1953), Delano West (1954), McFarland (1954) and Pond (1953)

Figure 4.8-1

## 4.8.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, create a significant hazard to the public or the environment.

5) For a project located within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or a public use airport, result in a safety hazard for people residing or working in the project area.

6) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area.

7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands area adjacent to urbanized areas or where residences are intermixed with wildlands.

### METHODOLOGY

The following impact analysis is based primarily on the Phase I Environmental Site Assessments prepared for the proposed project by Moore Twining Associates, the project applicant's proposed uses of the site, the Delano Municipal Code and General Plan, and other relevant materials, as appropriate.

### PROJECT IMPACTS AND MITIGATION MEASURES

**Routine Transport, Use, or Disposal of Hazardous Materials (Standard of Significance 1)**

**Impact 4.8.1** Implementation of the proposed project would involve limited transport, use, storage, and disposal of hazardous materials during construction and

operation. Compliance with existing regulations would reduce this impact to a level that is **less than significant**.

Project Construction

Construction of the project would involve the use of various products that contain materials classified as hazardous (e.g., solvents, adhesives and cements, certain paints, cleaning agents, and degreasers). Project construction would be required to comply with applicable building, health, fire, and safety codes. Hazardous materials would be used in varying amounts during construction of the project. Construction and maintenance activities would use hazardous materials such as fuels (gasoline and diesel), oils and lubricants, paints and paint thinners, glues, cleaners (which could include solvents and corrosives in addition to soaps and detergents), and possibly pesticides and herbicides.

CCR Title 8 addresses workplace regulations involving the use, storage, and disposal of hazardous materials, and specific applications for construction workers. CCR Titles 22 and 26 set forth environmental health standards for hazardous materials management. California Health and Safety Code Chapter 6.95 sets forth enabling legislation for the application of CCR Titles 8, 22, and 26. Safety precautions for the prevention of fire hazards associated with the use and storage of hazardous materials are addressed in the Uniform Fire Code. Compliance with applicable federal, state, and local regulations including, but not limited to, CCR Titles 8 and 22, the Uniform Fire Code, and California Health and Safety Code Chapter 6.95 would ensure that the project would not create a significant hazard to the public or to the environment through the routine transport, use, or disposal of hazardous materials.

Project Operation

Development of the proposed project would result in residential and commercial/retail uses. None of these uses would be expected to transport, use, store, or dispose of substantial amounts of hazardous materials, but it is common for small amounts of materials that may be considered hazardous to be used daily in these types of uses, including, for example, the use of household or commercial cleaning materials, paints, gasoline in cars, and solvents.

Some of the nonresidential uses may use, sell, or store some hazardous materials as well. For example, the commercial areas could be occupied by uses that may sell paints, oils, and solvents, such as a home improvement store, hardware store, gas station, or auto parts store. Businesses that sell and store hazardous materials are subject to the Hazardous Material Business Plan program, which is regulated by the KCEHSD as part of the Certified Unified Program. The program requires the preparation of a document that provides an inventory of hazardous materials on-site, emergency plans and procedures in the event of an accidental release, and training for employees on safety procedures for handling hazardous materials and what to do in the event of a release or threatened release. These plans are routine documents that are intended to disclose the presence of hazardous materials and provide information on actions to be taken if materials are inadvertently released. The KCEHSD requires that all businesses in the county file a Hazardous Material Business Response Plan, Chemical Information, and a Contingency Plan with the KCEHSD (Kern County 2011b, p. 5).

Conclusion

Hazardous materials regulations, which are codified in CCR Titles 8, 22, and 26, and their enabling legislation set forth in California Health and Safety Code Chapter 6.95, were established at the state level to ensure compliance with federal regulations to reduce the risk to human health and the environment from the routine use of hazardous substances. These regulations must be implemented by employers/businesses, as appropriate, and are monitored by the State (e.g., Cal/OSHA in the workplace or the DTSC for hazardous waste) and/or local jurisdictions.

The use, storage, and transportation of hazardous materials are subject to local, state, and federal regulations, the intent of which is to minimize the public's risk of exposure. Based on the uses that would be part of the project and the existing regulatory structure related to these materials, the proposed project would not cause a threat to public safety during project construction or operation. Therefore, because the transport, use, storage, and disposal of hazardous materials pertaining to the project would be relatively minor and subject to extensive regulatory oversight, this impact is considered to be **less than significant**.

Mitigation Measures

None required.

**Exposure to Hazardous Materials (Standard of Significance 2)**

**Impact 4.8.2** The project site was used for agricultural production during the past. Agricultural practices commonly use herbicides and pesticides that are toxic to humans, the residuals of which may still occur on the project site. This, along with the well and irrigation systems remaining on-site, may be hazardous. Therefore, this is considered a **potentially significant** impact.

The Phase I ESAs did not identify any recognized environmental conditions within the study properties; however, the project site was used for agriculture in the recent past. While no structures indicative of agricultural chemical storage or mixing areas were noted in the aerial photographs, typically crops are maintained with chemicals applied as a normal agricultural process. And while no surficial evidence of misuse or misapplication of residual materials from agricultural chemicals was observed during the site reconnaissance, some such chemicals degrade slowly and/or have very low solubility and may still be present in low concentrations in the subsurface soils. As with any agricultural developed land, the possibility exist that pesticides, herbicides, and/or fertilizers have been applied, which may have impacted the project site. Additionally, the project site contains areas that were used as retention basins. While no evidence of staining, leakage, or odors were observed during the Phase I ESA reconnaissance, because the site has historically been used for agricultural purposes, the potential for environmentally persistent pesticides is a possibility. The possibility that remnant pesticides and herbicides may occur on the project site is considered a **potentially significant** impact.

Subsurface irrigation lines are believed to be located on at least a portion of the project site based on information provided in the Phase I ESA (MTA 2013, p. 18). It is historically common for these irrigation lines to contain asbestos. Asbestos fibers may be released into the air by the disturbance of asbestos-containing material during product use, demolition work, building or home

maintenance, repair, and remodeling. Exposure to asbestos has been identified by the EPA (2014) as increasing a person's risk of developing lung disease. While it is not known for certain that any irrigation lines are buried on the project site or if the potential lines contain asbestos, this potential does exist and therefore this is considered a **potentially significant** impact.

The project site contains agricultural wells that were used for agricultural purposes in the past. The City requires connection to the City's water system as a part of development in Delano. Therefore, the existing well would be abandoned. Water wells not properly abandoned can pose an environmental concern by acting as a direct conduit for contaminants that are dumped or spilled in or near the well which then flow into the groundwater basin. Delano Municipal Code Section 13.09.250 addresses well closure within the city, stating that "destruction of a well shall consist of the complete filling of the well in accordance with the procedures prescribed in Section 23 of Chapter II of the California Department of Water Resources Bulletin No. 74-81; provided, however, that the top fifty feet shall be sealed with concrete or other approved sealing material. All abandoned wells shall be destroyed within ninety days of abandonment." The City requires wells no longer in use to be destroyed or maintained in order to not impair the water quality in the well and the water-bearing formation penetrated by the well (City Code Section 13.09.260). Development of the project would require that the wells on the project site be destroyed according to City standards. Therefore, the potential for exposure to hazardous materials through water contamination from a decommissioned well would result in a **less than significant** impact.

Mitigation Measures

**MM 4.8.2a** Due to the potential for soil contamination, prior to any land disturbance activities on the project site, a Phase II Environmental Site Assessment for the entire site, including the existing retention ponds on-site, shall be completed by a qualified Phase II environmental professional. The Phase II ESA shall provide recommendations for mitigation of any environmental hazards found on-site. The project applicant shall comply with those recommendations in order to remove any potential hazard.

*Timing/Implementation:* *Prior to any land disturbance activities*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

**MM 4.8.2b** Due to the potential for asbestos from buried irrigation facilities, if during construction activities, irrigation lines or other potentially hazardous materials are uncovered, all work at the project site shall immediately stop. A qualified hazardous materials professional shall be contacted in order to assess the materials for potential hazards and make recommendations for removal of the material. If the materials are determined to be hazardous, the project applicant shall comply with all recommendations and remove the hazard in accordance with federal, state, and local laws.

*Timing/Implementation:* *During the construction period*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measures **MM 4.8.2a** and **MM 4.8.2b** would ensure that the potential hazards from agricultural pesticides and herbicides as well as asbestos are properly mitigated. Therefore, with implementation of the above mitigation measures, this impact would be **less than significant**.

### Increase the Potential for Mosquito-Borne Disease (Standard of Significance 2)

**Impact 4.8.3** The project could result in an increase in the potential for mosquito breeding areas, resulting in the potential for an increase of mosquito-borne disease. This is a **potentially significant** impact.

Areas of standing water during construction and resulting from landscape irrigation could produce an environment that is optimal for mosquito breeding areas. Mosquitoes are known vectors for diseases such as encephalitis, West Nile virus, dengue fever, malaria, Rift Valley fever, and yellow fever. The Delano Mosquito Abatement District, Kern County, and the State recommend the adoption of best management practices (BMPs) established for the control of mosquitoes. Both state and local mosquito abatement programs recommend abatement measures during the mosquitoes' larval (in-water) stage of development. Because this impact is **potentially significant**, the following mitigation is required.

Mitigation Measures

**MM 4.8.3a** During construction and operations of the project, universally applicable mosquito control best management practices shall be implemented. These shall include, but are not limited to, the following:

- Examine outdoor areas and drain temporary and unnecessary water that may stand longer than 96 hours.
- Dispose of unwanted or unused artificial containers.
- Properly dispose of old tires.
- If possible, drill drainage holes, cover, or invert any container or object that holds standing water which must remain outdoors. Be sure to check for containers or trash in places that may be hard to see, such as bushes or buildings.
- Clean clogged rain gutters and storm drains. Keep outdoor drains flowing freely and clear of leaves, vegetation, and other debris.
- Aerate ornamental ponds to avoid letting water stagnate.
- Change water in birdbaths and fountains at least once per week.

- Ensure rain and/or irrigation water does not stand in plant containers, trash cans, or other containers on commercial properties.
- Maintain irrigation systems to avoid excess water use and runoff into storm drains.
- Minimize the sites that mosquitoes can use for refuge (harborage) by thinning branches, trimming and pruning ornamental shrubs and bushes, and keeping grass mowed short.
- Contact the Delano Mosquito Abatement District to evaluate the project site for mosquito breeding areas and work cooperatively to prevent a mosquito problem on the site.

*Timing/Implementation:* *During project construction and operations*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

**MM 4.8.3b** The project applicant shall implement the following to manage the landscaped areas at the project site:

- Avoid over-irrigating to prevent excess pooling and runoff.
- Routinely inspect, maintain, and repair irrigation system components.
- All underground drain pipes shall be laid to grade in order to avoid low areas that may hold water for longer than 96 hours.
- Backfill tire ruts or other low areas that hold water for more than 96 hours.
- Improve drainage channels and grading to minimize potential for standing water.
- Keep drainage ditches free of excessive vegetation and debris to provide rapid drainage.
- Check and repair leaky outdoor faucets.
- Report any evidence of standing water to responsible maintenance personnel.
- Use waterfalls, fountains, aerators, and/or mosquitofish in ponds and ornamental water features. Landowners must consult with the local mosquito control agencies or the California Department of Fish and Wildlife regarding proper use of mosquitofish.
- Prevent mosquito breeding in rain barrels by properly screening all openings, preventing mosquito access to the stored water.

- For ponds and ornamental water features where mosquitofish cannot be used, the landowner shall use one of several readily available larval mosquito control products to treat water when immature mosquitoes are seen.

*Timing/Implementation:* *During project construction and operations*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

**MM 4.8.3c** Mosquito control measures for temporary and permanent stormwater control basins or other open water control areas shall be implemented on the site during construction and operations. These shall include, but are not limited to:

1. General Stormwater Management Mosquito Control Best Management Practices

   a) Manage sprinkler and irrigation systems to minimize runoff entering stormwater infrastructure.

   b) Avoid intentionally running water into stormwater systems by not washing sidewalks and driveways, washing cars on streets or driveways, etc.

   c) Inspect facilities weekly during warm weather for the presence of standing water or immature mosquitoes.

   d) Remove emergent vegetation and debris from gutters and channels that accumulate water.

   e) Consider mosquito production during the design, construction, and maintenance of stormwater infrastructure.

   f) Design and maintain systems to fully discharge captured water in 96 hours or less.

   g) Include access for maintenance in system design.

   h) Design systems with permanent water sources such as wetlands, ponds, sumps, and basins to minimize mosquito habitat and plan for routine larval mosquito inspection and control activities with the assistance of a local mosquito control program.

2. Stormwater Conveyance

   a) Provide proper grades along conveyance structures to ensure water flows freely.

b) Inspect on a routine basis to ensure the grade remains as designed and to remove accumulations of sediment, trash, and debris.

c) Keep inlets free of accumulations of sediment, trash, and debris to prevent standing water from backing up on roadways and gutters.

d) Design outfalls to prevent scour depressions that can hold standing water.

3. Stormwater Storage and Infiltration Systems (Aboveground)

a) Design structures so that they do not hold standing water for more than 96 hours to prevent mosquito development. Features to prevent or reduce the possibility of clogged discharge orifices (e.g., debris screens) shall be incorporated into the design. The use of weep holes is not permitted due to rapid clogging.

b) Provide a uniform grade between the inlets and outlets to ensure all water is discharged in 96 hours or less. Routine inspection and maintenance are required to ensuring the grade remains as designed.

c) Avoid the use of loose rock riprap that may hold standing water.

d) Design distribution pumping and containment basins with adequate slopes to drain fully. The design slope should take into consideration buildup of sediment between maintenance periods.

4. Stormwater Structures with Permanent-Water Sumps or Basins (Belowground)

a) Where possible, seal access holes (e.g., pickholes in manhole covers) to belowground structures designed to retain water in sumps or basins to minimize entry of adult mosquitoes. If using covers or screens, maximum allowable gaps of 1/16 inch (2 mm) will exclude entry of adult mosquitoes. Inspect barriers frequently and replace when needed.

b) If the sump or basin is completely sealed against mosquitoes, with the exception of the inlet and outlet, the inlet and outlet shall be completely submerged to reduce the available surface area of water for mosquitoes to lay eggs (female mosquitoes can fly through pipes).

c) Where possible, design belowground sumps with the equipment necessary to allow easy dewatering of the unit.

d) Contact the local mosquito control program for advice with problem systems.

5. Stormwater Treatment Ponds and Constructed Treatment Wetlands

a) Whenever possible, stock stormwater ponds and constructed wetlands with mosquito-eating fish available from local mosquito control programs.

b) Design and maintain accessible shorelines to allow periodic maintenance and/or control of emergent and shoreline vegetation, and routine monitoring and control of mosquitoes. Emergent plant density shall be routinely managed so mosquito predators can move throughout the vegetated areas and are not excluded from pond edges.

c) Whenever possible, design and maintain deep zones in excess of 4 feet (1.2 meters) to limit the spread of invasive emergent vegetation such as cattails. The edges below the water surface shall be as steep as practicable and uniform to discourage dense plant growth that may provide immature mosquitoes with refuge from predators and increased nutrient availability.

d) Use concrete or liners in shallow areas to discourage plant growth where vegetation is not necessary.

e) Whenever possible, provide a means for easy dewatering if needed.

f) Manage the spread and density of floating and submerged vegetation that encourages mosquito production (i.e., water hyacinth, water primrose, parrot's feather, duckweed, and filamentous algal mats).

g) If possible, compartmentalize managed treatment wetlands so the maximum width of ponds does not exceed two times the effective distance (40 feet [12 meters]) of land-based application technologies for mosquito control agents.

6. General Access Requirements for Stormwater Treatment Structures

a) All structures shall be easily and safely accessible, without the need for special requirements (e.g., Occupational Safety and Health Administration [OSHA] requirements for "confined space"). This will allow monitoring and, if necessary, abatement of mosquitoes.

b) If utilizing covers, the design should include spring-loaded or lightweight access hatches that can be easily opened.

c) Provide all-weather road access (with provisions from turning a full-size work vehicle) along at least one side of large aboveground structures that are less than 7 meters wide, or both sides if shore-to-shore distance is greater than 7 meters. Note: Mosquito larvicides are applied with hand-held equipment at small sites and with backpack- or truck-mounted high-pressure sprayers at large sites. The effective

swath width of most backpack- or truck-mounted larvicide sprayers is approximately 20–25 feet (6–7 meters) on a windless day.

d) Build access roads as close to the shoreline as possible to allow maintenance and vector control crews to periodically maintain, control, and remove emergent vegetation and conduct routine mosquito monitoring and abatement. Remove vegetation and/or other obstacles between the access road and the structure that might obstruct the path of larvicides to the water.

e) Control vegetation (by removal, thinning, or mowing) periodically to prevent barriers to access.

*Timing/Implementation:* *During project construction and operations*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measures **MM 4.8.3a** through **MM 4.8.3c** would ensure that the potential hazards from mosquito-borne disease are properly mitigated. Therefore, with implementation of the above mitigation measures, this impact would be **less than significant**.

### Increase the Potential for Valley Fever (Standard of Significance 2)

**Impact 4.8.4** The project could result in an increase the potential for infection from valley fever during construction. This is a **potentially significant** impact.

As discussed previously, valley fever (*Coccidioidomycosis*) is caused by the fungus *Coccidioides immitis*. Valley fever is found in the southwestern United States including in Arizona, California, New Mexico, Nevada, and Utah, as well as in parts of Mexico. In about 50 to 75 percent of people, valley fever causes either no symptoms or mild symptoms and those infected never seek medical care; when symptoms are more pronounced, they usually present as lung problems (cough, shortness of breath, sputum production, fever, and chest pains). The disease can progress to chronic or progressive lung disease and may even become disseminated to the skin, lining tissue of the brain (meninges), skeleton, and other body areas.

The California Department of Public Health (2013, p. 2) considers Kern County a highly endemic area for valley fever. When soil containing this fungus is disturbed by construction activities such as digging or grading, by vehicles raising dust, or by the wind, the fungal spores get into the air. When people breathe the spores into their lungs, they may get valley fever. Fungal spores are small particles that can grow and reproduce in the body. The highest infection period for valley fever occurs during the dry months in California between June and November (CDPH 2013, p. 2). The California Department of Public Health (CDPH) provides recommendations for reducing the potential for valley fever infection during construction activities. The following mitigation measures are based on those recommendations.

Mitigation Measures

**MM 4.8.4a** In order to reduce the potential for exposure to valley fever during construction activities, the following actions shall be implemented by the project applicant and maintained during construction by the project contractor:

- Suspend work during period of high winds or dust storms.
- When soil will be disturbed by heavy equipment or vehicles, wet the soil before disturbing it and continuously wet it while digging to keep dust levels down.
- Heavy equipment, trucks, and other vehicles generate heavy dust. Provide vehicles with enclosed, air-conditioned cabs and make sure workers keep the windows closed. Heavy equipment cabs should be equipped with high-efficiency particulate air (HEPA) filters.
- When digging a trench or fire line or performing other soil-disturbing tasks, position workers upwind when possible.
- When exposure to dust is unavoidable, require that workers wear NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA.

*Timing/Implementation:* *During project construction*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division*; project applicant; project contractor*

**MM 4.8.4b** To increase awareness to workers about the potential for valley fever, the following actions shall be required:

- Workers and supervisors shall be trained on:
  - Symptoms of valley fever.
  - Effective practices for preventing valley fever such as avoiding dust and working upwind of dust, using respirators when necessary.
  - Showering as soon as possible after work to limit exposure and transport of the fungal spores.
- The following CDPH materials on valley fever shall be distributed to all workers and supervisors:
  - CDPH pamphlet "*Preventing Work-Related Coccidioidomycosis (Valley Fever).*" Available at

http://www.cdph.ca.gov/HealthInfo/discond/Pages/Coccidioidomycosis.aspx.

- CDPH Valley Fever Fact Sheet. Available at http://www.cdph.ca.gov/HealthInfo/discond/Pages/Coccidioidomycosis.aspx.

*Timing/Implementation:* *During project construction*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division*; project applicant; project contractor*

Implementation of mitigation measures **MM 4.8.4a** and **MM 4.8.4b** would ensure the potential hazards from valley fever are properly mitigated. With implementation of the above mitigation measures, this impact would be **less than significant**. In addition, infection from valley fever during construction can be partially mitigated through a Dust Control Plan as required by the San Joaquin Valley Air Pollution Control District's (SJVAPCD's) Regulation VIII, used to reduce air quality impacts. As described in Section 4.3, Air Quality, the project is required to prepare a SJVAPCD-approved Dust Control Plan that describes all fugitive dust control measures that are to be implemented before, during, and after any dust generating activity.

### Hazardous Emissions or Substances Near a School Site (Standard of Significance 3)

**Impact 4.8.5** The project site is not located within one-quarter mile of an existing or proposed school site. There is **no impact**.

The nearest public education facility to the project site is Valley Vista Elementary School located at 120 Garces Highway, approximately 0.75 miles from the project site. Therefore, there is no school site within one-quarter mile of the project. Furthermore, as discussed under Impact 4.8.1, implementation of the proposed project would not result in the release of hazardous emissions or substances. Therefore, the project would have **no impact** regarding hazardous emissions near a school.

Mitigation Measures

None required.

### Located on a List of Hazardous Materials Site (Standard of Significance 4)

**Impact 4.8.6** The project site has not been listed as a hazardous material release site. The project would have a **less than significant** impact in this area.

As a part of the Phase I ESA prepared for the Vineyard and the West Pavilion site**,** a search of available environmental records was performed to identify any known hazardous materials sites on or in the vicinity of the project site. The search included databases published by local, state, tribal, and federal agencies (MTA 2013 and 2014). The project site and adjoining and surrounding properties were not identified as known hazardous materials sites and are therefore

not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Other hazardous materials sites near the project site include the McFarland-Delano Sanitary Landfill, which was closed in 1996 but is currently monitored by the Kern County Environmental Health Department, and the Sunset Wastepaper Transfer Station. These sites were identified within the search area of the Phase I ESA, but were determined by MTA (2013, pp. 14–15; 2014, pp. 13) not to be relevant to the proposed project because they would be unlikely to impact the project site based primarily on the following factors:

- The relative distance between the hazardous materials sites and the Vineyard and West Pavilion site.
- Flow of groundwater from the Vineyard and West Pavilion site is cross-gradient to the MDSL site.
- No detection of constitutes of concern at the closest monitoring well (MD1-26).
- No reported releases, spills, incidents, or violations for the Transfer Station.

Because the project site is not listed as a hazardous material release site and the MDSL and the Sunset Wastepaper Transfer Station are considered to have an unlikely impact on the project, this impact is **less than significant**.

Mitigation Measures

None required.

### Located Within the Delano Municipal Airport Safety Zone

**Impact 4.8.7** The project site is located within Zone C and Traffic Pattern Zone for Delano Municipal Airport. However, commercial and residential uses are an allowed use in this zone. This is a **less than significant** impact.

The project site is located approximately 0.5 miles from Delano Municipal Airport and as stated previously, the project is within Airport Land Use Capability Zone C and Safety Zone 6 (Traffic Pattern Zone). Zone 6 is considered to have a low likelihood of aircraft-related accident occurrence. Allowed uses within this zone include residential and nonresidential development, with the exception of outdoor stadiums or similar very high intensity uses.

Since the project site is in a Delano Municipal Airport influence area, it is also located in the City's Airport Approach Height Combining (H) District (Municipal Code Section 20.3.30(13)(b)). This district provides density standards based on location and type of use. No density limits apply to residential uses in Zone 6. For commercial uses in Zone 6, the density limit is based on the location and density of surrounding uses. Density is based on the average number of people per acre and is divided into three categories: Rural Farmland/Open Space (minimal development), Rural/Suburban (mostly to partially undeveloped), and Urban (heavily developed).

Because actual project specifics for the commercial portion of the proposed project have not been established, density estimates cannot be made at this time. However, as discussed, Zone 6

has been established to allow most commercial uses and all residential uses. Additionally, the proposed project is consistent with General Plan land use designations. Any project proposed in the city which is in the airport influence area is subject to the requirements of the H overlay zone and would be reviewed by the City for compliance with these requirements. As such, this is considered a **less than significant** impact.

Mitigation Measures

None required.

### Located in the Vicinity of a Private Airstrip (Standard of Significance 6)

**Impact 4.8.8** There are no private airports in the vicinity of the proposed project site. There would be **no impact**.

The closest private airstrip to the project is the Cashen Airport located north of Wasco approximately 13.5 miles from the project site. Development of the project would not result in a safety hazard for persons living or working on the project site because of this airport. There is **no impact**.

Mitigation Measures

None required.

### Interfere with Emergency Response or Evacuation (Standard of Significance 7)

**Impact 4.8.9** The proposed project would not substantially impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. This impact would be **less than significant**.

Currently, the City of Delano does not have an Emergency Response Plan or designated emergency evacuation routes. No emergency response facilities such as fire or police stations or hospitals are located in the immediate vicinity of the project site.

In the event of a hazardous material emergency, several agencies are responsible for timely response. The KCEHSD responds to large-scale, emergency hazardous material incidents in the county. The Kern County Fire Department is responsible for emergency operations within city boundaries. The proposed project would not alter the city's overall land use patterns or land use designations to such an extent that they would conflict with the operations or effectiveness of Kern County Environmental Health Services Department or the Fire Department. Therefore, impacts are considered **less than significant**.

Mitigation Measures

None required.

### Wildland Fire Hazards (Standard of Significance 8)

**Impact 4.8.10** The project site is not designated by the California Department of Forestry and Fire Protection (Cal Fire) as a Fire Hazard Severity Zone and is not located in proximity to any wildlands. This impact would be **less than significant**.

As described in the Environmental Setting subsection, the project site is not in an area designated by Cal Fire (2007) as a Fire Hazard Severity Zone. Furthermore, no Very High Fire Hazard Severity Zones are located nearby. Finally, the location of the project site makes it readily accessible by emergency personnel and vehicles in the event of a wildland fire. For these reasons, this impact would be **less than significant**.

Mitigation Measures

None required.

## 4.8.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

Hazardous material, human health, and safety impacts as described in CEQA Appendix G are generally site-specific and not cumulative by nature, as impacts generally vary by land use, site characteristics, and site history.

### CUMULATIVE IMPACTS AND MITIGATION MEASURES

### Cumulative Hazardous Materials and Emergency Response Impacts

**Impact 4.8.11** Implementation of the proposed project, in combination with other existing, proposed, and reasonably foreseeable future development in the city, could cumulatively increase exposure of people, property, and the environment to hazardous materials and interference with emergency response. This impact would be **less than cumulatively considerable.**

Cumulative hazardous material impacts would result if other existing, planned, or reasonably foreseeable projects in the vicinity of the project area included the addition of hazardous materials above planning thresholds. This would change the total amount of hazardous materials being transported over public roadways and being used and stored near the proposed project site.

There are no identified hazardous material sites on the proposed project site. While the McFarland-Delano Sanitary Landfill (MDSL) is located near the project site to the west, it was closed in 1996 and is currently monitored by the KCEHSD. Furthermore, no hazardous materials are currently used at the closed landfill.

The proposed project would not increase the exposure of persons or structures to wildland fires beyond current conditions. Mitigation identified under Impacts 4.8.2, 4.8.3, and 4.8.4 would reduce the proposed project's contribution to hazards and hazardous materials impacts under cumulative conditions. Therefore, the project's contribution to significant cumulative impacts to

human health associated with hazards and hazardous materials or conditions is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

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———. 2014. *Phase I Environmental Site Assessment, Approximately 32 Acre Property, Assessor's Parcel Numbers 521-010-19 and 521-010-20, Northeastern Corner of Woollomes and Stradley Avenue, Delano, California.*

# 4.9 HYDROLOGY AND WATER QUALITY

This section addresses the potential environmental impacts of the proposed project related to hydrology and water quality. The existing surface water and groundwater hydrologic conditions on the project site and in the surrounding area are characterized, and a summary of relevant law and regulations as they apply to the proposed project is provided. The impact analysis focuses on potential degradation of water quality, alteration of existing drainage patterns, and flooding hazards. Information used in the preparation of this section was obtained primarily from the Delano General Plan and zoning regulations, Federal Emergency Management Agency (FEMA) flood data, and the proposed grading and drainage plans for the project site.

## 4.9.1 ENVIRONMENTAL SETTING

### SURFACE WATER RESOURCES

The city is situated in the southern portion of the San Joaquin Valley and is encompassed by the Tulare Lake Hydrologic Region. Delano does not have any actual surface water running through it, though there are irrigation canals that traverse the city's periphery. Lake Woollomes, a storage facility for the Friant-Kern Canal, is located approximately 4.5 miles east of the project site.

Drainage in the Tulare Lake Hydrologic Region, which encompasses the proposed project, is completely internal. Inflowing water leaves the region through evaporation and losses due to plant transpiration. All drainages terminate on the valley floor in lakes and sinks. Drainage runoff in the Delano vicinity, including the project site, travels in a northwesterly direction to the historic Tulare Lake bed.

### GROUNDWATER RESOURCES

The project site is underlain by the San Joaquin Valley Groundwater Basin and the Kern County Subbasin. The average Kern County Subbasin water level was essentially unchanged from 1970 to 2000, after experiencing cumulative changes of approximately -15 feet through 1978, a 15-foot increase through 1988, and an 8-foot decrease through 1997. However, net water level changes in different portions of the subbasin were quite variable through the period from 1970 to 2000 (DWR 2006).

Natural recharge is primarily from stream seepage along the eastern subbasin and the Kern River; recharge of applied irrigation water, however, is the largest contributor. Inflows to the subbasin from natural recharge equals approximately 150,000 acre-feet (AF) per year, artificial recharge of 308,000 AF per year, applied water recharge 843,000 AF per year, and an average estimated subsurface inflow of 233,000 AF per year, for a total subbasin inflow of 1,534,000 acre-feet per year (DWR 2006). Subbasin outflows are urban extraction of 154,000 AF per year, agricultural extraction of 1,160,000 AF per year, and other extractions (oil industry related) of 86,333 AF, for a total subbasin outflow of 1,400,300 acre-feet per year. In addition to the above, the Kern County Water Agency has prepared a detailed long-term water balance from 1970 to 1998, which shows an average change in storage of -325,000 AF per year (DWR 2006). However, this analysis does not consider subsurface inflow.

The Kern County Water Agency estimates the total groundwater in storage to be 40,000,000 AF and drought aquifer storage to be 10,000,000 AF (DWR 2006). It appears that these calculations consider areas of the subbasin that are known to overlay usable groundwater, which the agency reports to be about 1,000,000 acres (DWR 2006).

### WATER QUALITY

In general, groundwater quality throughout the region is suitable for most urban and agricultural uses with only local impairments (DWR 2003). The primary constituents of concern are high total dissolved solids (TDS), nitrate, arsenic, and organic compounds. The areas of high TDS content are primarily along the west side of the San Joaquin Valley and in the trough of the valley. High TDS content in the trough of the valley is the result of the concentration of salts because of evaporation and poor drainage. In the central and west-side portions of the valley, where the Corcoran Clay confining layer exists, water quality is generally better beneath the clay than above it. The average TDS of groundwater is 400–450 milligrams/liter (mg/L) and can be as high as 5,000 mg/L (DWR 2003).

Elevated arsenic concentrations exist in some areas of the groundwater basin and can exceed the maximum contaminant level (MCL). MCLs are derived as health-based protective drinking water standards and are to be met by the public drinking water systems. California's arsenic MCL standard is 10 micrograms per liter. Arsenic concentrations in all but two of the City's wells exceeded the state MCL standard. The City implemented the Arsenic Mitigation Project which resulted in well head treatment for four wells and the drilling of ten new wells. By 2013, the City's water did not exceed the MCL standards (City of Delano 2014).

### FLOODING

The FEMA Flood Insurance Rate Map for the project area (Map No. 06029C0725E) shows that the project site is in Flood Zone A, indicating that it has a 1 percent annual chance of flooding. Flood Zone A is considered a Special Flood Hazard Area (SFHA), meaning land area covered by the floodwaters of the base flood.

### ON-SITE DRAINAGE

The project site contains no natural drainage channels. Under existing conditions, stormwater runoff from the project site is minimal due to the level topography and the fallow agricultural land on the project site.

## 4.9.2 REGULATORY SETTING

### FEDERAL

#### Clean Water Act

The Clean Water Act (CWA), initially passed in 1972, regulates the discharge of pollutants into watersheds throughout the nation. Section 402(p) of the act establishes a framework for regulating municipal and industrial stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) Program. The State Water Resources Control Board (SWRCB) is responsible for implementing the Clean Water Act and issues NPDES permits to cities and counties through Regional Water Quality Control Boards (RWQCBs). The project site is located in a portion of the state regulated by the Central Valley Regional Water Quality Control Board.

The SWRCB has issued a Statewide General Permit (Water Quality Order No. 99-08-DWQ) for construction activities within the state. The Construction General Permit (CGP) is implemented

and enforced by the RWQCBs. The CGP applies to construction activity that disturbs 1 acre or more and requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP) that identifies best management practices (BMPs) to minimize pollutants from discharging from the construction site to the maximum extent practicable.

On September 2, 2009, the SWRCB adopted a new CGP (Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ) that superseded the existing Construction General Permit on July 1, 2010. A summary of the differences between the prior and the current CGP follows (SWRCB 2009).

**Rainfall Erosivity Waiver:** This General Permit includes the option allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (R value) for their site's given location and time frame compute to be less than or equal to 5.

**Technology-Based Numeric Action Levels:** This General Permit includes NALs [numeric action levels] for pH and turbidity.

**Technology-Based Numeric Effluent Limitations:** This General Permit contains daily average NELs [numeric effluent limitations] for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 NTU [turbidity] to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.

**Risk-Based Permitting Approach:** This General Permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: (1) Project Sediment Risk and (2) Receiving Water Risk.

**Minimum Requirements Specified:** This General Permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

**Project Site Soil Characteristics Monitoring and Reporting:** This General Permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

**Effluent Monitoring and Reporting:** This General Permit requires effluent monitoring and reporting for pH and turbidity in storm water discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether NALs included in this General Permit are exceeded.

**Receiving Water Monitoring and Reporting:** This General Permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bioassessments.

**Post-Construction Stormwater Performance Standards:** This General Permit specifies runoff reduction requirements for all sites not covered by a Phase I or

Phase II MS4 NPDES permit, to avoid, minimize, and/or mitigate post-construction stormwater runoff impacts.

**Rain Event Action Plan:** This General Permit requires certain sites to develop and implement a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.

**Annual Reporting:** This General Permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information.

**Certification/Training Requirements for Key Project Personnel:** This General Permit requires that key personnel (e.g., SWPPP preparers, inspectors) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.

**Linear Underground/Overhead Projects:** This General Permit includes requirements for all Linear Underground/Overhead Projects (LUPs).

Certain actions during construction may also need to conform to the waste discharge requirements included in the General Order for Dewatering and Other Low Threat Discharges to Surface Waters (Water Quality Order No. 5-00-175). The Dewatering General Order requires that a permit be acquired for dewatering and other low threat discharges to surface waters, provided that they do not contain significant quantities of pollutants and either (1) are four months or less in duration, or (2) the average dry weather discharge does not exceed 0.25 million gallons per day (mgd). Examples of activities that may require the acquisition of such a permit include well development, construction dewatering, pump/well testing, pipeline/tank pressure testing, pipeline/tank flushing or dewatering, condensate discharges, water supply system discharges, and other miscellaneous dewatering/low threat discharges. However, the actions applicable to site development may already be covered under the CGP, and therefore a separate permit under the Dewatering General Order may not be required.

On December 8, 1999, the US Environmental Protection Agency (USEPA) circulated regulations requiring permits for stormwater discharges from Small Municipal Separate Storm Sewer System operators. Permits for small municipal storm sewer systems (MS4s) generally fall under the "Phase II" permits program, which regulates non-point source pollutants. In California, the NPDES Program is administered by the State Water Resources Control Board. Federal regulations allow two permitting options for stormwater discharges (individual permits and general permits). The SWRCB elected to adopt a statewide general permit (Water Quality Order No. 2003-0005-DWQ) for small MS4s covered under the Clean Water Act to efficiently regulate numerous stormwater discharges under a single permit. Permittees must meet the requirements in Provision D of the General Permit that require the development and implementation of a stormwater management plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable.

Sections 401 and 404 of the CWA are administered through the Regulatory Program of the US Army Corps of Engineers (USACE) and regulate the water quality of all discharges of fill or

dredged material into waters of the United States, including wetlands and intermittent stream channels. Section 401, Title 33, Section 1341 of the CWA sets forth water-quality certification requirements for any applicant applying for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters.

Section 404, Title 33, Section 1344 of the Clean Water Act in part authorizes the USACE to:

- Set requirements and standards pertaining to such discharges: subparagraph (e);
- Issue permits "for the discharge of dredged or fill material into the navigable waters at specified disposal sites:" subparagraph (a);
- Specify the disposal sites for such permits: subparagraph (b);
- Deny or restrict the use of specified disposal sites if "the discharge of such materials into such area would have an unacceptable, adverse effect on municipal water supplies and fishery areas:" subparagraph (c);
- Specify type of and conditions for non-prohibited discharges: subparagraph (f);
- Provide for individual state or interstate compact administration of general permit programs: subparagraphs (g), (h), and (j);
- Withdraw approval of such state or interstate permit programs: subparagraph (i);
- Ensure public availability of permits and permit applications: subparagraph (o);
- Exempt certain federal or state projects from regulation under this section: subparagraph (r); and
- Determine conditions and penalties for violation of permit conditions or limitations: subparagraph (s).

### National Pollutant Discharge Elimination System

As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) Program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. It is the responsibility of the local water boards, which are discussed in more detail below, to preserve and enhance the quality of the state's waters through the development of water quality control plans and the issuance of waste discharge requirements. Waste discharge requirements for discharges to surface waters also serve as NPDES permits (SWRCB 2011). The NPDES program is discussed in more detail below.

### Total Maximum Daily Loads

Under CWA Section 303(d) and California's Porter-Cologne Water Quality Control Act of 1969 (discussed below), the State of California is required to establish beneficial uses of state waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes the total maximum daily load (TMDL) process to assist in guiding the application of state water

quality standards, requiring the states to identify waters whose water quality is "impaired" (affected by the presence of pollutants or contaminants) and to establish a TMDL or the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects on the beneficial use identified. The establishment of TMDLs is generally a stakeholder-driven process that involves investigation of sources and their loading (pollution input), estimation of load allocations, and identification of an implementation plan and schedule. Where stakeholder processes are not effective, total maximum daily loads can be established by the RWQCBs or the EPA.

#### Federal Emergency Management Agency

FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to jurisdictions that comply with FEMA regulations to limit development within floodplains. FEMA also prepares Flood Insurance Rate Maps (FIRMs) to identify areas subject to flooding. These FIRMs provide flood information and identify flood hazard zones. The design standards for flood protection are also established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event, also described as a flood having a 1 percent annual chance of occurring.

In addition, FEMA has created requirements and procedures for evaluating earthen levee systems and mapping areas affected by those systems. Levee systems are evaluated for their ability to provide protection from 100-year flood events, with the results documented in the FEMA Levee Inventory System (FLIS). Levee systems must meet minimum freeboard standards and must be maintained according to an officially adopted maintenance plan. Other FEMA levee system evaluation criteria include structural design and interior drainage.

#### National Polluant Discharge Elimination System Permit

The Clean Water Act established the NPDES permit program to regulate municipal and industrial discharges to surface waters of the United States from their municipal separate storm sewer systems (MS4s). Federal NPDES permit regulations have been established for a broad range of discharges, including point source municipal waste discharges and non-point source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge, prohibitions on discharges not specifically allowed under the permit, and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

### STATE

#### Porter-Cologne Water Quality Act

In 1969, the California Legislature enacted the Porter-Cologne Water Quality Control Act to preserve, enhance, and restore the quality of the state's water resources. The act established the State Water Resources Control Board and nine Regional Water Quality Control Boards as the principal state agencies with the responsibility for controlling water quality in California. Under the act, water quality policy is established, water quality standards are enforced for both surface water and groundwater, and the discharges of pollutants from point and non-point sources are regulated. The act authorizes the State Water Resources Control Board to establish water quality principles and guidelines for long-range resource planning including groundwater

and surface water management programs and control and use of recycled water (SWQCB 2014).

### State Water Resources Control Board

The five-member State Water Resources Control Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine Regional Water Quality Control Boards located in the state's major watersheds. The joint authority of water allocation and water quality protection enables the SWRCB to provide comprehensive protection for California's waters (SWRCB 2011). The SWRCB is responsible for implementing the Clean Water Act and issues NPDES permits to cities and counties through Regional Water Quality Control Boards.

### AB 3030 Groundwater Management Plans

In 1992, the State passed Assembly Bill (AB) 3030 (and later amended it in Senate Bill 1938), which provides authority for local water agencies to adopt groundwater management plans if certain procedures are followed (California Water Code Section 10753). These plans involve collaboration among numerous agencies and thus offer opportunities for local governments to participate in groundwater management planning in cooperation with water providers. No new level of government is formed under AB 3030, and action is voluntary rather than mandatory. The California Water Code also provides the local water supplier with the powers of a water replenishment district in order to raise revenue to pay for facilities used for basin management (including extraction, recharge, conveyance, and water quality).

## REGIONAL

### Central Valley Regional Water Quality Control Board

The Central Valley RWQCB, which as previously described regulates the portion of the state in which Delano and the project site are located, provides planning, monitoring, and enforcement techniques for surface water and groundwater quality in the Central Valley region, including the project site. A basin plan provides more specific information for specific waterways in the region in terms of establishing monitoring techniques to control pollutant levels in the waterways. The RWQCB also monitors stormwater quality from construction activities through a NPDES permitting process. The RWQCB is responsible for establishing water quality standards and objectives that protect the beneficial uses of various waters. In Delano, the RWQCB is responsible for protecting surface water and groundwater from both point and non-point sources of pollution.

#### Central Valley Regional Water Quality Control Plan

The Central Valley Regional Water Quality Control Plan (2011, also known as the Basin Plan, covers all the drainage basin areas for the Sacramento and San Joaquin rivers, extending approximately 400 miles from the California-Oregon border to the headwaters of the San Joaquin River. This plan describes the beneficial uses to be protected in these waterways, water quality objectives to protect those uses, and implementation measures to make sure those objectives are achieved.

## National Pollutant Discharge Elimination System

The NPDES permit system, as previously described, was established in the Clean Water Act to regulate municipal and industrial discharge to surface waters of the United States. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Permits require the municipal authority to evaluate the quality of its stormwater discharge and receiving waters, identify areas of pollutant loading, and implement a program of best management practices (BMPs) to control pollutant discharges to the maximum extent practicable. It is within the existing authority of the Central Valley RWQCB to issue a NPDES permit for any stormwater outfall that discharges to waters in the region.

### Municipal Storm Water Permitting Program

Discharges from municipal separate storm sewer systems (MS4s) are regulated because of concern over the high concentration of pollutants found in those discharges. MS4 permits were issued by the various RWQCBs in two phases.

Under Phase I, which started in 1990, the RWQCBs have adopted NPDES General Permit stormwater permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. These permits are reissued as the permits expire.

As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities, including non-traditional Small MS4s, which are governmental facilities such as military bases, public campuses, and prison and hospital complexes.

The MS4 permits require the discharger to develop and implement a stormwater management plan with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Clean Water Act Section 402(p). The management plans specify the best management practices that will be used to address certain program areas. The program areas include public education and outreach, illicit discharge detection and elimination, construction and post-construction, and good housekeeping for municipal operations. In general, medium and large municipalities are required to conduct chemical monitoring, though small municipalities are not.

### General Construction Activity Storm Water Permits and Stormwater Pollution Prevention Plans

In accordance with NPDES regulations, the State requires that any construction activity affecting 1 acre or more obtain a General Construction Activity Storm Water Permit (General Permit) to minimize the potential effects of construction runoff on receiving water quality. Performance standards for obtaining and complying with the General Permit are described in NPDES General Permit No. CAS000002, Waste Discharge Requirements, Order No. 2009-0009-DWQ, adopted September 2, 2009, and effective as of July 1, 2010.

General Permit applicants are required to submit to the appropriate regional board Permit Registration Documents (PRDs) for the project, which include a Notice of Intent (NOI), a risk assessment, a site map, a signed certification statement, an annual fee, and a stormwater

pollution prevention plan. The permit program is risk based wherein a project's risk is based on the project's potential to cause sedimentation and the risk of such sedimentation on the receiving waters. A project's risk determines its water quality control requirements ranging from Risk Level 1, which consists of only narrative effluent standards, implementation of BMPs, and visual monitoring, to Risk Level 3, which consists of numeric effluent limitations, additional sediment control measures, and receiving water monitoring. Additional requirements include compliance with post construction standards focusing on low impact development (LID), preparation of rain event action plans, increased reporting requirements, and specific certification requirements for certain project personnel.

The SWPPP must include implementing best management practices to reduce construction effects on receiving water quality by implementing erosion control measures and reducing or eliminating non-stormwater discharges. Examples of typical construction best management practices included in SWPPPs include, but are not limited to, using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; and installing sediment control devices such as gravel bags, inlet filters, fiber rolls, or silt fences to reduce or eliminate sediment and other pollutants from discharging to the City's drainage system or receiving waters.

### LOCAL

#### City of Delano General Plan

The Delano General Plan has multiple policies and action programs to ensure water quality and to manage stormwater and flood protection. These policies and action programs are as follows:

##### Open Space and Conservation Element

*Natural Resources Policies*

Policy 1. Protect areas of natural groundwater recharge from land uses and disposal methods, which would degrade groundwater quality. Promote activities, which combine stormwater control, and water recharges.

Policy 2. Expand programs that enhance groundwater recharge in order to maintain the groundwater supply, including the installation of detention ponds in new growth areas.

Policy 3. No urban level development shall be approved in the City unless the development is, or can be served by the City sewer system.

Policy 4. Water conservation methods shall be continued.

##### Public Services and Facilities Element

*Public Facility Improvement Policies*

Policy 7. Design storm \water runoff drainage structures to decrease erosion.

Policy 8. Development in floodway areas shall be in accordance with regulations of the Federal Emergency Management Agency.

Policy 11. Temporary drainage facilities such as ponding basins may be constructed by the developer if the major facilities are not available, subject to City determination and approval. The developer will also be required to pay all applicable drainage fees in addition to constructing temporary facilities at his own cost.

Policy 12. Temporary drainage facilities such as retention basins shall be dedicated to the City. If the basin is abandoned within ten years, the property would revert to the original owner, subject to redevelopment of the site in a manner satisfactory to the City.

Policy 14. To encourage groundwater recharge, ponding basins shall be designed as retention basins. However, pumping facilities shall be included in such facilities to handle peak flows and to provide for disposal of storm water into irrigation ditches when necessary. Stormwater inflow into irrigation district canals and pipelines shall be subject to existing or future agreements by and between the City and the irrigation districts specifying maximum inflow, maximum service area boundary and any other limitation thereto.

## Safety Element

*Safety Policies*

Policy 2. Protect community residents from the hazards of flooding.

a. In areas deemed by the Federal Emergency Management Agency (FEMA) or the City Engineer as being within the 100-year flood zone, all proposed development must implement appropriate protective measures. These measures, subject to the approval by the City Engineer, shall not adversely affect drainage of surrounding properties, and shall not increase the flood potential in the area. One of the protective measures shall include a provision that the construction pad of the project shall be less than one foot above flood elevation.

b. Encourage the usage of high flood hazard areas as open space or limited recreational uses.

*Safety Hazard Action Programs*

Policy 19. The City shall adhere to the designated flood hazard areas as identified in the Kern County Insurance Study for the City of Delano.

Policy 20. The City shall require that all development located within designated flood hazard areas be required to construct at least one foot above flood elevation.

### City of Delano Municipal Code

Municipal Code Chapter 14.60, Floodplain Management, illustrates the City's concern with the potential for flooding. This chapter includes a number of standards that are designed to protect humans and buildings in the event of a flood. Section 14.60.040 provides a short list of methods to reduce flood hazards. Section 14.60.260(A) requires that buildings located in a special flood hazard area be designed so the lowest floor, including any basements, be elevated 1 foot above the base flood elevation.

### Urban Water Management Plan

The City of Delano (2011) prepared an Urban Water Management Plan in accordance with the California Water Code and the Urban Water Management Planning Act of 1983, as amended. Urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet of water annually, are required to prepare an urban water management plan (UWMP). The purpose of the UWMP is to maintain the efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions.

## 4.9.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Violate any water quality standards or waste discharge requirements.

2) Substantially deplete ground-water supplies or interfere substantially with ground-water recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have be granted).

3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site.

4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.

5) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

6) Otherwise substantially degrade water quality.

7) Place housing within a 100-year flood hazard area as mapped on Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

9) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

10) Inundation by seiche, tsunami, or mudflow

## METHODOLOGY

The hydrology and water quality analysis presented below is based on a review of published information, reports, and plans regarding regional and local hydrology, climate, topography, and geology obtained from private and governmental agencies as well as from Internet websites. Primary sources include the Delano General Plan (2005), the Central Valley RWQCB's Basin Plan, California Stormwater Quality Association Best Management Practices Handbooks, and FEMA Flood Insurance Rate Maps.

### Water Quality

The proposed development plans for the project and general water quality information sources were reviewed to determine potential sources and types of pollutants that could be generated by project construction and/or operation. The SWRCB statewide permit requirements and proposed drainage plan were reviewed to determine whether water quality would be sufficiently protected or if further mitigation would be required.

### Drainage

The proposed site plans and drainage plan were reviewed by Cornerstone Engineering, Inc., to determine anticipated changes to the existing drainage patterns on the site as well as the adequacy of the proposed drainage mechanism in terms of capacity and water quality treatment (see **Appendix 4.9-A**).

### Flooding

The FEMA Flood Insurance Rate Map covering the site was reviewed to determine whether any portion of the project site is designated as a flood hazard zone. In addition, the proposed site plans were reviewed to determine whether any development is proposed in such areas. A preliminary hydraulic modeling summary prepared by West Consultants (2014) was also completed for the project (see **Appendix 4.9-B**).

## PROJECT IMPACTS AND MITIGATION MEASURES

### Violate Water Quality Standards or Waste Discharge Requirements (Standard of Significance 1)

**Impact 4.9.1** Construction activities associated with the proposed project could result in erosion and water quality degradation of downstream surface water and groundwater resources. Compliance with the requirements of the SWRCB's Construction General Permit would minimize the potential for such degradation. This impact would be **less than significant.**

Construction of the proposed project would introduce sediments and other contaminants typically associated with construction into stormwater runoff, potentially resulting in the degradation of downstream surface water and groundwater quality. Stormwater flowing over the project site during construction could carry various pollutants downstream such as sediment, nutrients, bacteria and viruses, oil and grease, heavy metals, organics, pesticides, gross pollutants, and miscellaneous waste. These pollutants could originate from soil disturbances, construction equipment, building materials, and workers. The proposed project has the potential to result in the generation of new dry weather runoff containing these pollutants and also has the potential to increase the concentration and/or total load of the pollutants in wet weather stormwater runoff. Erosion potential and the possibility of water quality impacts are always present during construction and occur when protective vegetative cover is removed and soils are disturbed. In the case of the proposed project, it is primarily grading and cut/fill associated with the site improvements, utilities, roadways, and building pads that could contribute to erosion and water quality degradation.

The SWRCB is responsible for implementing the Clean Water Act and has issued a Statewide General Permit (Water Quality Order 2009-0009-DWQ) for construction activities within the state (see the Regulatory Setting subsection above). In the project area, the Construction General Permit (CGP) is implemented and enforced by the Central Valley RWQCB. In accordance with the requirements of the CGP, prior to construction of the proposed project, a risk assessment must be prepared and submitted to the Central Valley RWQCB to determine the project's risk level and associated water quality control requirements. These requirements will, at a minimum, include the preparation and implementation of a SWPPP identifying specific best management practices to be implemented and maintained on the site in order to comply with the applicable narrative effluent standards.

The best management practices that must be implemented as part of a SWPPP can be grouped into two major categories: (1) erosion and sediment control BMPs and (2) non-stormwater management and materials management BMPs. Erosion and sediment control BMPs fall into four main subcategories:

- Erosion controls
- Sediment controls
- Wind erosion controls
- Tracking controls

Erosion controls include practices to stabilize soil, to protect the soil in its existing location, and to prevent soil particles from migrating. Examples of erosion control BMPs are preserving existing vegetation, mulching, and hydroseeding. Sediment controls are practices to collect soil particles after they have migrated, but before the sediment leaves the site. Examples of sediment control BMPs are street sweeping, fiber rolls, silt fencing, gravel bags, sand bags, storm drain inlet protection, sediment traps, and detention basins. Wind erosion controls prevent soil particles from leaving the site in the air. Examples of wind erosion control BMPs include applying water or other dust suppressants to exposed soils on the site. Tracking controls prevent sediment from being tracked off-site via vehicles leaving the site to the extent practicable. A stabilized construction entrance not only limits the access points to the construction site, but also functions to partially remove sediment from vehicles prior to leaving the site.

Non-stormwater management and material management controls reduce non-sediment-related pollutants from potentially leaving the construction site to the extent practicable. The Construction General Permit prohibits the discharge of materials other than stormwater and authorized non-stormwater discharges (such as irrigation and pipe flushing and testing). Non-stormwater BMPs tend to be management practices with the purpose of preventing stormwater from coming into contact with potential pollutants. Examples of non-stormwater BMPs include preventing illicit discharges and implementing good practices for vehicle and equipment maintenance, cleaning, and fueling operations, such as using drip pans under vehicles. Waste and materials management BMPs include implementing practices and procedures to prevent pollution from materials used on construction sites. Examples of materials management BMPs include:

- Good housekeeping activities such as storing of materials covered and elevated off the ground in a central location.
- Securely locating portable toilets away from the storm drainage system and performing routine maintenance.
- Providing a central location for concrete washout and performing routine maintenance.
- Providing several dumpsters and trash cans throughout the construction site for litter/floatable management.
- Covering and/or containing stockpiled materials and overall good housekeeping on the site.

The CGP also requires that construction sites be inspected before and after storm events and every 24 hours during extended storm events. The purpose of the inspections is to identify maintenance requirements for the BMPs and to determine the effectiveness of the BMPs that are being implemented. The SWPPP is a "living document" and as such can be modified as construction activities progress. Additional requirements include compliance with post construction standards focusing on low impact development (LID) and preparation of rain event action plans.

The SWRCB has also issued a Statewide General Permit (Water Quality Order R5-2008-0081, NPDES No. CAG995001) for dewatering and other low threat discharges to surface waters in the state. Should construction of the proposed project require dewatering, the project applicant would be required to submit a Notice of Intent, as well as a Best Management Practices Plan, to comply with the general permit. The BMP Plan would include disposal practices to ensure compliance with the general permit such as the use of sediment basins or traps, dewatering tanks, or gravity or pressurized bag filters. Monitoring and reporting would also be performed to ensure compliance with the permit.

Compliance with the various requirements of the SWRCB statewide general permits for construction and dewatering would ensure that water quality degradation during the construction phase of the proposed project would be minimized. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

### Degrade Water Quality – Operational (Standards of Significance 1, 3, 5, and 6)

**Impact 4.9.2** Operation of the proposed project would introduce sediments and other contaminants typically associated with urban development into stormwater runoff, potentially resulting in the degradation of downstream surface water and groundwater quality. Implementation of proposed water quality treatment facilities and compliance with the post-construction standards of the SWRCB's General Construction Permit would minimize the potential for such degradation. This impact would be **less than significant.**

The proposed project would convert approximately 110 acres from naturally vegetated open space to urban uses. This conversion will substantially increase the impervious surface area of the site through the introduction of new and improved roads and driveways, parking areas, rooftops, and other surfaces. An increase in impervious surface area would substantially increase runoff potentially containing oil and grease, heavy metals, chemicals, and other urban pollutants. Runoff from the proposed landscape areas could also contribute pollutants from fertilizers and pesticides.

The project proposes a drainage collection system consisting of underground drainage pipes conveying stormwater to an existing retention basin on City-owned land at the southwest corner of Woollomes Avenue and Stradley Avenue. This existing retention basin would serve as a water quality treatment facility. Stormwater retention basins are a reliable BMP used throughout the valley (Cornerstone Engineering 2014). Furthermore, consistent with the post-construction requirements of the SWRCB General Construction Permit, best management practices will be implemented and low impact development (LID) techniques will be utilized to minimize off-site drainage and water quality degradation. Potential BMPs to be implemented on the project site are described in detail under Impact 4.9.1 above. Incorporation of LID techniques into the proposed development and implementation of appropriate BMPs post-construction would remove sediment and pollutants from site runoff and minimize impacts to downstream surface water and groundwater resources. This impact would be **less than significant**.

Mitigation Measures

None required.

### Interference with Groundwater Recharge Impacts (Standard of Significance 2)

**Impact 4.9.3** The proposed project would introduce impervious surfaces in the form of structures and parking lots to a previously undeveloped piece of land. This would result in an incremental reduction in recharge of the local groundwater aquifer. This impact is considered **less than significant**.

With development of the project, some of the pervious soils on the site will be replaced with impervious surfaces such as paving and buildings. Proposed development associated with the project would be limited to 110 acres. The addition of impervious surfaces would decrease the

area available for water penetration, thereby reducing local groundwater recharge potential. However, all runoff from impervious surfaces would be directed to the existing retention basin on City-owned land at the southwest corner of Woollomes and Stradley avenues. Therefore, because runoff would eventually be directed to an area with pervious surfaces, the potential reduction in groundwater recharge associated with the project is small. This impact is considered **less than significant**.

Mitigation Measures

None required.

### Increase Stormwater Runoff/Alter Drainage Patterns (Standards of Significance 3, 4, and 5)

**Impact 4.9.4** The proposed project would increase stormwater runoff and alter drainage patterns on the project site. However, the project proposes a drainage system to effectively manage drainage on the site to prevent erosion/sedimentation and localized flooding. This impact would be **potentially significant.**

As described above, the proposed project would convert 110 acres from naturally vegetated open space to urban uses. This conversion would substantially increase the impervious surface area of the site through the introduction of roads and driveways, parking areas, rooftops, and other surfaces. An increase in impervious surface area would substantially increase runoff.

The proposed drainage system for the project will consist of various underground lateral mains connecting to 54-inch reinforced concrete piping, which will convey stormwater to an existing retention basin on City-owned land at the southwest corner of Woollomes and Stradley avenues. The proposed drainage plan and associated drainage study will be reviewed by City staff to ensure it has adequate capacity to manage anticipated stormwater drainage on the site and to prevent any on- or off-site flooding. Furthermore, the proposed water quality treatment facilities and other erosion control measures to be implemented during and post-construction pursuant to the State's NPDES requirements (see Impacts 4.9.1 and 4.9.2) would minimize soil erosion and sedimentation.

The hydraulic modeling summary prepared for the project considered the potential to impede or redirect flood flows impacting adjacent lands during a 100-year flood event (West Consultants 2014). According to this hydraulic modeling summary, the flood depth increases by about 1 foot on the property south of the West Pavilion project site and increases about 0.6–0.8 foot on the property to the west of Stradley (southwest of the West Pavilion site) as a result of the proposed project (see Figure 8 in **Appendix 4.9-B**). Such potential impacts to adjacent lands are discussed fully under Impact 4.9.5, which concluded that impacts would be less than significant with implementation of mitigation. Therefore, this impact would be **less than significant**.

Mitigation Measures

Implement mitigation measure **MM 4.9.5**.

### Flooding Hazards (Standards of Significance 7 and 8)

**Impact 4.9.5** Development is proposed within the portion of the site designated by FEMA as a special flood hazard area. This impact would be **potentially significant.**

As previously described, the FEMA Flood Insurance Rate Map for the project area (Map No. 06029C0725E) shows that the project site is in Flood Zone A, indicating that it has a 1 percent annual chance of flooding. Flood Zone A is considered a Special Flood Hazard Area, meaning land area covered by the floodwaters of the base flood. The project applicant will be required to construct structures in accordance with Flood Insurance Rate Map building guidelines, subject to review and approval by the City of Delano. Structures in the Special Flood Hazard Area in Delano, which participates in the National Flood Insurance Program, are subject to floodplain management regulations that affect building standards and are designed to minimize flood risk. These building requirements include but are not limited to requiring the lowest floor of a structure to be built at least 1 foot above the base flood elevation. Flood elevations will be demonstrated on final improvement plans, and an Elevation Certificate will be prepared by a licensed land surveyor or appropriately licensed civil engineer, certifying the floor elevations. As a result of these requirements, the project is proposing to raise the grade of land underlying the proposed structures 1 foot above the 100-year flood event depths in order to ensure that the proposed structures would not be impacted by a 100-year flood event. The precise 100-year flood event depths were identified by the hydraulic modeling summary (West Consultants 2014) prepared for the project (see **Appendix 4.9-B**). Therefore, the structures proposed by the project would be located above the 100-year flood event depths and thus would not be impacted.

The hydraulic modeling summary prepared for the project also considered the potential to impede or redirect flood flows from raising the grade of land underlying the proposed structures 1 foot above the 100-year flood event depths and thus impacting adjacent lands during a 100-year flood event (West Consultants 2014). According to this hydraulic modeling summary, the flood depth increases by about 1 foot on the property south of the West Pavilion project site and increases about 0.6–0.8 foot on the property to the west of Stradley (southwest of the West Pavilion site) as a result of the proposed project (see Figure 8 in **Appendix 4.9-B**).

The property to the south is a soccer park, owned by Kern County, and serves as a buffer to development around the Delano County Landfill (now closed). There are no inhabited structures on this site; therefore, an increase of flood depth would have no impact to this site. It is Kern County's intention to retain this site as a soccer park with no other development in order to retain it as a buffer area. The property to the west of Stradley Avenue is zoned for agriculture and under the existing conditions can be affected by floodwater up to 2 feet deep. As a result of the proposed project, this depth could increase by 0.8 foot maximum under the worst-case condition. There are no inhabited structures on this site either, as it is already subject to flooding and is used for agricultural operations.

The FEMA standard for development on a flood plane is for all structures to be elevated a minimum of 1 foot above the base flood elevation (BFE) as approved by the floodplain manager. The pre-project BFE(s) have been evaluated by West Consultants. The worst-case post-development model shows that flood depths would be increased by no more than 1 foot at any point on the model. Thus it can be assumed that when the project is developed and the site is fully open to floodwaters passing through the site (with some structures elevated above the BFE), the off-site impacts will be reduced to a level well below the allowable FEMA standard

of a 1-foot BFE increase. The western portion of the Pavilion site will be developed with multi-family residential units. These units will be constructed well to the north of the southern project boundary, leaving ample room for floodwaters to pass from east to west across the site without creating a significant net increase in the off-site BFE.

The following mitigation is required in order to ensure less than significant impacts.

Mitigation Measures

**MM 4.9.5** The project applicant shall be required to adhere to the following:

- All structures shall be elevated a minimum of 1 foot above the base flood elevation (BFE) as approved by the City of Delano. The BFE(s) shall be determined based on an analysis prepared for the developer, at the developer's expense, utilizing methods and procedures approved by the National Flood Insurance Program (NFIP) and shall be based on a fully developed project condition.

- Prior to recordation of a final map, or as otherwise determined by the City, the project applicant shall obtain a Letter of Map Revision (LOMR) from FEMA for project site areas currently zoned within Zone A. The LOMR shall identify the area of the proposed development that has been removed from the "Zone A" FEMA designation and shall be submitted to the City.

- The developer shall have prepared an analysis of the floodplain encroachment resulting from this project (in conjunction with all existing, proposed, and future developments), subject to the approval of the City of Delano. The resultant maximum encroachment shall not exceed 1 foot at any point within the floodplain.

- The floodplain analysis prepared for this Environmental Impact Report (EIR) should be considered preliminary, as it is based on a conservative hydrologic determination of peak flows that may impact the project and the surrounding area. The base flood elevations may be revised on submittal to, review by, and approval of revised hydrologic and hydraulic analysis by the City of Delano.

- Any fencing or walls along the southern side of the project shall be designed so that floodwaters can pass through the fence structures.

*Timing/Implementation:* *Prior to any land disturbance activities*

*Monitoring/Enforcement:* City of Delano Community Development Department and Public Works Department, Engineering Division

Adherence to mitigation measure **MM 4.9.5** will ensure a **less than significant** impact.

### Dam or Levee Failure Inundation (Standard of Significance 9)

**Impact 4.9.6** The project site is located approximately 50 miles west of Lake Isabella Dam. In addition, Lake Woollomes and the Friant-Kern Canal, which are retained by levees, are located 4.5 miles east of the project site. Failure of the dam or levees could result in inundation of portions of the project site. This impact is **less than significant.**

The project site is located approximately 50 miles west of Lake Isabella Dam. All dams greater than 25 feet in height and with a capacity of 50 acre-feet or more come under the jurisdiction of the Division of Safety of Dams (DSOD), a division of the California Department of Water Resources. The DSOD has several programs that ensure dam safety. When a new dam is proposed, DSOD engineers and geologists inspect the site and the subsurface exploration to learn firsthand of the geologic conditions. Upon submittal of an application, the DSOD reviews the plans and specifications prepared by the owner to ensure that the dam is designed to meet minimum requirements and that the design is appropriate for the known geologic conditions. After approval of the application, the DSOD oversees the construction to ensure the work is being done in accordance with the approved plans and specifications. Following construction, the DSOD inspects each dam on an annual basis to ensure the dam is safe, is performing as intended, and is not developing problems. Roughly a third of these inspections include in-depth instrumentation reviews of the dam surveillance network data. Lastly, the DSOD periodically reviews the stability of dams and their major appurtenances in light of improved design approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California. Therefore, the proposed project would have a less than significant impact with respect to the exposure of people and structures to inundation as a result of the failure of this dam.

Lake Woollomes and a segment of the Friant-Kern Canal are located approximately 4.5 miles east of the project site. Lake Woollomes is a storage facility for the Friant-Kern Canal, which is directly adjacent to Lake Woollomes. These two features are approximately 393 feet above mean sea level, and the project site is approximately 300 feet above mean sea level. Therefore, failure of the levees that contain these features would result in a diffusion of waters toward the project site. These canals are used for irrigation purposes and managed by the US Bureau of Reclamation. All canals under the jurisdiction of the US Bureau of Reclamation are continually patrolled and maintained to control water loss. Maintenance of the canals ensures that the condition of the levee system will be in good order. Additionally, any potential breach of these levees is able to be quickly controlled by the use of control valves spaced along the Friant-Kern Canal that can stop the flow of water.

Therefore, impacts would be considered to be **less than significant**.

Mitigation Measures

None required.

### Tsunami and/or Seiche (Standard of Significance 10)

**Impact 4.9.7** The project site is not located in an area that is affected by seiches or tsunamis. There is **no impact.**

A tsunami is a wave caused by an underwater earthquake, landslide, or volcanic eruption. A seiche is a rhythmic motion of water in a partially or completely landlocked water body caused by landslides, earthquake-induced ground accelerations, or ground offset. There are no water bodies in the vicinity of the project site of sufficient size to pose a risk to the project site of inundation by tsunami or seiche waves, including Lake Woollomes. There is **no impact.**

Mitigation Measures

None required.

**Mudslides, Mudflow Inundation (Standard of Significance 10)**

**Impact 4.9.8** The project site is located in an area with flat topography. With an elevation gain of approximately 6 feet on the project site, the potential for mudflow does not exist. There is **no impact.**

Mudslides, also known as debris flows or mudflows, are a common type of fast-moving landslide that tends to flow in channels. Landslides occur when masses of rock, earth, or debris move down a slope. Mudslides develop when water rapidly collects in the ground and results in a surge of water-soaked rock, earth, and debris. Mudslides usually begin on steep slopes and can be triggered by natural disasters. Landslides are caused by disturbances in the natural stability of a slope. They can happen after heavy rains, droughts, earthquakes, or volcanic eruptions. Landslide activity is a function of slope, soil type and depth, soil moisture, bedrock, and seismic activities.

The project site is located in an area with flat topography. With an elevation gain of approximately 6 feet on the project site, the potential for mudflow does not exist. There is **no impact.**

Mitigation Measures

None required.

## 4.9.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

The cumulative setting for hydrology and water quality is the Tulare Lake Hydrologic Region.

**Cumulative Water Quality, Runoff, and Flooding Impacts**

**Impact 4.9.9** The proposed project, in combination with existing, approved, proposed, and reasonably foreseeable development in the Tulare Lake Hydrologic Region, would alter drainage conditions, rates, volumes, and water quality, which could result in potential flooding and stormwater quality impacts within the overall watershed. This is considered a **less than cumulatively considerable** impact.

All existing, approved, proposed, and reasonably foreseeable development in the Tulare Lake Hydrologic Region would alter drainage conditions, rates, volumes, and water quality, which could result in potential flooding and stormwater quality impacts within the overall hydrologic region. However, as discussed in Impacts 4.9.1 through 4.9.5 above, proposed project site design, including the proposed drainage system, water quality treatment facilities, and the requirement to build the lowest floor of a structure at least 1 foot above the base flood elevation, would reduce the proposed project's contributions to cumulative runoff, water quality, and flooding impacts. Furthermore, implementation of state regulations as identified above would effectively provide mitigation against project impacts. Proposed site design and existing regulations would render the project non-contributory to cumulative hydrology and water quality impacts. As such, the proposed project's contribution to cumulative water quality, runoff, and flooding impacts is considered to be **less than cumulatively considerable.**

Mitigation Measures

None required.

## REFERENCES

CSQA (California Stormwater Quality Association. 2009. *Best Management Practices Handbooks*. Available at: https://www.casqa.org/resources/bmp-handbooks.

Central Valley RWQCB (Regional Water Quality Control Board). 2011. *Central Valley Regional Water Quality Control Plan*. October 2011. Available at: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.shtml.

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This section describes the existing and proposed land uses on the project site, characterizes surrounding land uses, identifies potential conflicts between uses, and discusses project consistency with the City's environmental policy and other applicable planning documents.

## 4.10.1 ENVIRONMENTAL SETTING

### EXISTING LAND USES

The project site is approximately 110 acres located on historic agriculture land that is currently fallow. A pond/retention basin is located on the site. Additionally, a small dirt road trends through the central portion of the West Pavilion site in a north–south direction. No structures exist on the property.

### CURRENT GENERAL PLAN LAND USE DESIGNATIONS AND ZONING

The 110-acre project site includes parcels within the city (Vineyard; APNs 521-010-019 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion; APN 521-040-43). The Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial (GC). The West Pavilion project site is currently within the jurisdiction of Kern County. It is zoned Exclusive Agriculture and has the Kern County General Plan land use designation of Intensive Agriculture. The Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial.

See **Figures 3.0-3** and **3.0-4** for General Plan land use and zoning designations on the project site.

The Delano General Plan identifies the Medium Residential and Commercial land use designations as follows:

- Medium Density Residential (up to14.0 dwelling units/gross acre). This land use category provides for a land use pattern characterized predominantly by small scale multiple family residential developments (Delano 2005, p. 2-15).

- *Commercial:* The Commercial land use designation provides for the development of neighborhood commercial uses within 5–10 acre clusters to serve the everyday convenience goods and personal service needs of a defined neighborhood (Delano 2005, p. 2-16).

The Delano Zoning Ordinance identifies the General Commercial zoning district as follows:

- *General Commercial:* The primary purpose of the General Commercial (GC) district is to provide sites for commercial uses that will serve a large segment of the population with a wide variety of retail, wholesale, service, and office uses.

### ADJACENT LAND USES

Surrounding land uses include agriculture, commercial, and public facilities. To the west of the 33-acre Vineyard at Delano site is fallow agriculture land under the jurisdiction of Kern County.

These lands are designated by Kern County as Intensive Agriculture. To the north is a combination of vacant and residential land, which is designated as Low Residential by the City. The land to the east of the Vineyard at Delano site is also vacant, but has recently been approved for commercial land uses by the City as the future Grapevine commercial development project. To the south is the 77-acre West Pavilion site.

In addition to the Vineyard at Delano site, the West Pavilion site is also bordered by the recently City-approved Grapevine commercial development project to the north. The vacant land directly east of the West Pavilion site is also designated for commercial uses by the City. The lands to the immediate west of the Delano West Pavilion site contain a City of Delano Community Facility General Plan designation and are the location of the McFarland-Delano Transfer Station and Landfill and the Sunset Waste Paper Transfer Station. The areas to the south of the West Pavilion site are located within the jurisdiction of Kern County, with a County designation of Intensive Agriculture and Solid Waste Facilities. This area once accommodated the McFarland-Delano Sanitary Landfill; however, this landfill has been closed since 1996 (CalRecycle 2014). Currently, the Delano Soccer Park operates adjacent to the southern boundary of the West Pavilion site.

## 4.10.2 REGULATORY SETTING

### LOCAL

#### City of Delano General Plan

California state law requires cities and counties to prepare a general plan, which describes the location and types of desired land uses and other physical attributes in the city or county. General plans are required to address land use, circulation, housing, conservation, open space, noise, and safety. The General Plan is the City of Delano's basic planning document. This planning document provides a comprehensive, long-term plan for the physical development of the city. The following policies from the Land Use Element are relevant to the proposed project:

*General Plan, Zoning Consistency, and Plan Administration Policies*

Policy 1. New development shall be consistent with the adopted land use map and policies of the General Plan.

Policy 2. All development shall conform to the land use density and intensity standards depicted in the General Plan

Policy 3. Changes to zoning shall be consistent with the General Plan. A zone district shall be deemed consistent with a land use designation when such zone district is specified as consistent in the Plan Consistency Table. In no case, however, shall the overall maximum density of the plan designation be exceeded.

a. Residential densities on a portion of a development site may exceed the maximum densities, if the density for the entire site conforms to the Plan Consistency Table. Variable residential uses and density incentives may be provided if adequate open space can be provided on the project

site. Site area shall be a minimum of two acres and a Conditional Use Permit will be required.

Policy 6. Lands outside of the existing urban area that are designated for urban use may be developed if adequate infrastructure (water, sewer, etc.) is available, and the proposed uses will not be incompatible or detrimental to surrounding land uses.

*Residential Land Use Policies*

Policy 1. The following residential density designations shall be used:

d. Medium Density Residential (up to14.0 dwelling units/gross acre). This land use category provides for a land use pattern characterized predominantly by small scale multiple family residential developments. The typical residential pattern includes duplexes and larger scale, high-amenity apartments. Areas designated medium-high density residential are to be integrated throughout the community adjacent to transportation, community services and commercial developments. To avoid inappropriate concentration of these facilities, such developments shall be limited to 25 contiguous units when integrated into a single family neighborhood and to 50 contiguous units when developed as a free standing development. New development shall conform to the Community Design Element of the General Plan.

*Commercial Land Use Policies*

Policy 1. Establish the following commercial land use designations:

a. Commercial. The Commercial land use designation provides for the development of neighborhood commercial uses within 5–10 acre clusters to serve the everyday convenience goods and personal service needs of a defined neighborhood. The service radius of a neighborhood commercial use is generally 1/2 mile. The Commercial land use designation also provide for the development of 10-acre or larger cluster of commercial establishments serving needs similar to the neighborhood commercial centers, but serving larger areas. These community commercial areas are intended to be clustered along State Route 99 and along arterial roadways within the community. The community commercial center generally serves a market area as large as ten miles, depending upon its specific uses. Such facilities should be located along State Route 99, with center providing supermarkets within in each residential quadrant of the community to minimize cross-town traffic. The Commercial land use designation also provides for mixed use activity in the downtown area and within Block H between the downtown and State Route 99. It is intended to provide for a wide range of uses and to promote feasibility in the reuse of downtown buildings. Mixed use development, including residential development may be permitted within the downtown area and Block H, subject to approval of a specific plan by the City Council. The maximum allowable development intensity shall be

a floor area ratio of 1.0 within the downtown and Block H area, 0.50in other portions of the City.

### City of Delano Zoning Ordinance

The City's Zoning Ordinance can be found in Chapter 20 of the Municipal Code. The Zoning Ordinance implements the policies of the General Plan by classifying and regulating the lands uses and associated development standards in the city in order to "protect and promote the public health, safety, convenience, and welfare of present and future citizens of the City." The Zoning Ordinance states its intent as follows (City of Delano 2013, Section 20.1.10):

- Implement the goals, objectives, policies, and programs of the General Plan and manage future growth and change in accordance with that plan;.
- Protect the physical, social, and economic stability and vitality of residential, commercial, industrial, public, institutional, and open space uses within the city to assure their orderly development.
- Reduce or eliminate hazards to the public resulting from potentially inappropriate location, use, or design of buildings and other improvements.
- Attain the physical, social, and economic advantages resulting from comprehensive and orderly land use and resource planning.

Section 20.1.100(1)(a) of the Zoning Ordinance requires that "no use of land, buildings, or structures for which an application is required pursuant to this Title [Zoning Ordinance] is to be approved for processing under this Title [Zoning Ordinance] unless it is consistent with the General Plan or a concurrent General Plan amendment request. In any case where there is a conflict in regulations between this Title [Zoning Ordinance] and the General Plan, the General Plan shall prevail."

## 4.10.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Guidelines Appendix G states that a project may have a significant effect on the environment if the project would:

1) Physically divide an established community.
2) Conflict with any applicable land use plan, policy, or regulation of any agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
3) Conflict with any applicable habitat conservation plan or natural community conservation plan.

## METHODOLOGY

CEQA does not treat project consequences relating solely to land use, socioeconomic, or population, employment, or housing issues as direct physical impacts to the environment. An EIR may provide information regarding land use, planning, and socioeconomic effects; however, CEQA does not recognize these types of project consequences as typical impacts on the physical environment. The impact assessment in this section focuses on changes in land use, use compatibility, and General Plan consistency to the extent that potential General Plan conflicts may lead to physical impacts on the environment. Physical effects on the environment that could result from implementation of the project are addressed in the appropriate technical sections (Sections 4.1 through 4.14) of this EIR.

Because the potential impacts described in this section are related to land use compatibility and consistency with the General Plan and would not directly result in physical impacts on the environment, no mitigation is proposed. Any mitigation measures needed to address indirect physical impacts are addressed in the appropriate technical sections (Sections 4.1 through 4.14).

It should be noted that potential inconsistency with an adopted plan or policy does not necessarily mean that a significant physical impact would occur, but since the plans and policies analyzed here are specifically intended to avoid or mitigate potential environmental impacts, for the purposes of this analysis, inconsistencies with these plans and policies are considered to be significant impacts.

In addition, direct impacts associated with a project's compatibility with applicable land use plans and policies are project-specific in nature, so a cumulative impact assessment is not pertinent to the land use evaluation.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Physically Divide an Established Community (Standard of Significance 1)

**Impact 4.10.1** Implementation of the proposed project would not physically divide an established community. There would be **no impact**.

Division of an established community commonly occurs as a result of development of physical features that constitute a barrier to easy and frequent travel between two or more constituent parts of a community. For example, a large freeway structure with few crossings could effectively split a community.

The project proposes to construct residential and commercial land uses on an undeveloped site that straddles the southern boundary of Delano, with the northern portion of the project in the city and the southern portion currently under the jurisdiction of Kern County. The site is in a transitional area between the more intense, populated residential and commercial land uses to the north and east, public facilities (Delano Soccer Park and the closed McFarland-Delano Sanitary Landfill to the south, and the agricultural land uses and public facilities (Sunset Waste Paper Transfer Station, McFarland-Delano Solid Waste Transfer Station, and Delano storm drainage facilities) to the west. The location of future residential and commercial uses in this transitional area is appropriate in that it would not introduce an incompatible land use to the area, and there is no physical division of a community. There would be **no impact**.

Mitigation Measures

None required.

### Potential Conflicts with Applicable Land Use Plans and Policies (Standard of Significance 2)

**Impact 4.10.2** Implementation of the proposed project would not result in inconsistencies with adopted plans and policies intended to avoid or mitigate physical environmental effects. This would be a **less than significant impact**.

The 110-acre project site includes parcels within the city and outside the southwest boundary of the city in an unincorporated area of Kern County. The Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial (GC). The West Pavilion project site is currently within the jurisdiction of Kern County and is zoned Exclusive Agriculture, with the Kern County General Plan land use designation of Intensive Agriculture. The Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial.

The project proposes to amend the City's Zoning Map for the Vineyard at Delano site from General Commercial (GC) to Multiple-Family Residential (R-3). The project further proposes to annex the West Pavilion site and prezone the western portion to Multiple-Family Residential and the eastern portion to General Commercial.

Approval of the proposed project would eliminate all conflicts between the proposed project and the City General Plan and Zoning Ordinance. Upon approval, the proposed project would not conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Impacts would be considered **less than significant**.

Mitigation Measures

None required.

### Conflict with a Habitat Conservation Plan or Natural Community Conservation Plan (Standard of Significance 3)

**Impact 4.10.3** The project site is not within the boundaries of or otherwise subject to any habitat conservation plans or natural community conservation plans. **No impact** would occur.

No adopted habitat conservation plans (HCPs) or natural community conservation plans (NCCPs) affect the project site. The project site and surrounding area are not subject to any such plans. Therefore, the proposed project would not conflict with a HCP or NCCP, and there would be **no impact**.

Mitigation Measures

None required.

## 4.10.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

The setting for this cumulative analysis generally includes Delano and surrounding unincorporated areas of Kern County and all existing, proposed, approved, and planned projects within these areas. Development in the cumulative setting area would change the intensity of land uses in the region and would provide additional housing, employment, shopping, and recreational opportunities.

### CUMULATIVE IMPACTS AND MITIGATION MEASURES

**Cumulative Land Use Impacts**

**Impact 4.10.4** The project would introduce growth into an area that is currently undeveloped and could encourage growth on lands outside of the city. This impact is **less than cumulatively considerable.**

The proposed project will provide for development in an area of the city and unincorporated Kern County that is currently vacant. The land has been designated for development since adoption of the City's General Plan. As previously described, the Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial, and the City General Plan identifies the West Pavilion site as Medium Residential and Commercial. As the proposed land uses are consistent with the City's expectations in this area, this impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

## REFERENCES

CalRecycle (California Department of Resources Recycling and Recovery). 2014. Facility/Site Summary Details: McFarland-Delano Sanitary Landfill (15-AA-0063). Accessed August 13. http://www.calrecycle.ca.gov/SWFacilities/Directory/15-AA-0063/Detail/.

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# 4.11 NOISE

This section describes the existing noise environment in the area of the project site and the potential for the proposed project to result in noise impacts exceeding the City of Delano's applicable noise level criteria. Data used to prepare this report was taken from the traffic impact study prepared by Arch Beach Consulting for the proposed project, and information obtained by measuring and modeling existing and future noise levels at the project site and in the surrounding area (**Appendix 4.11-A**).

## 4.11.1 FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations which make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Because the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound because of its potential to disrupt sleep, to interfere with speech communication, and to damage hearing. A typical noise environment consists of a base of steady "background" noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway.

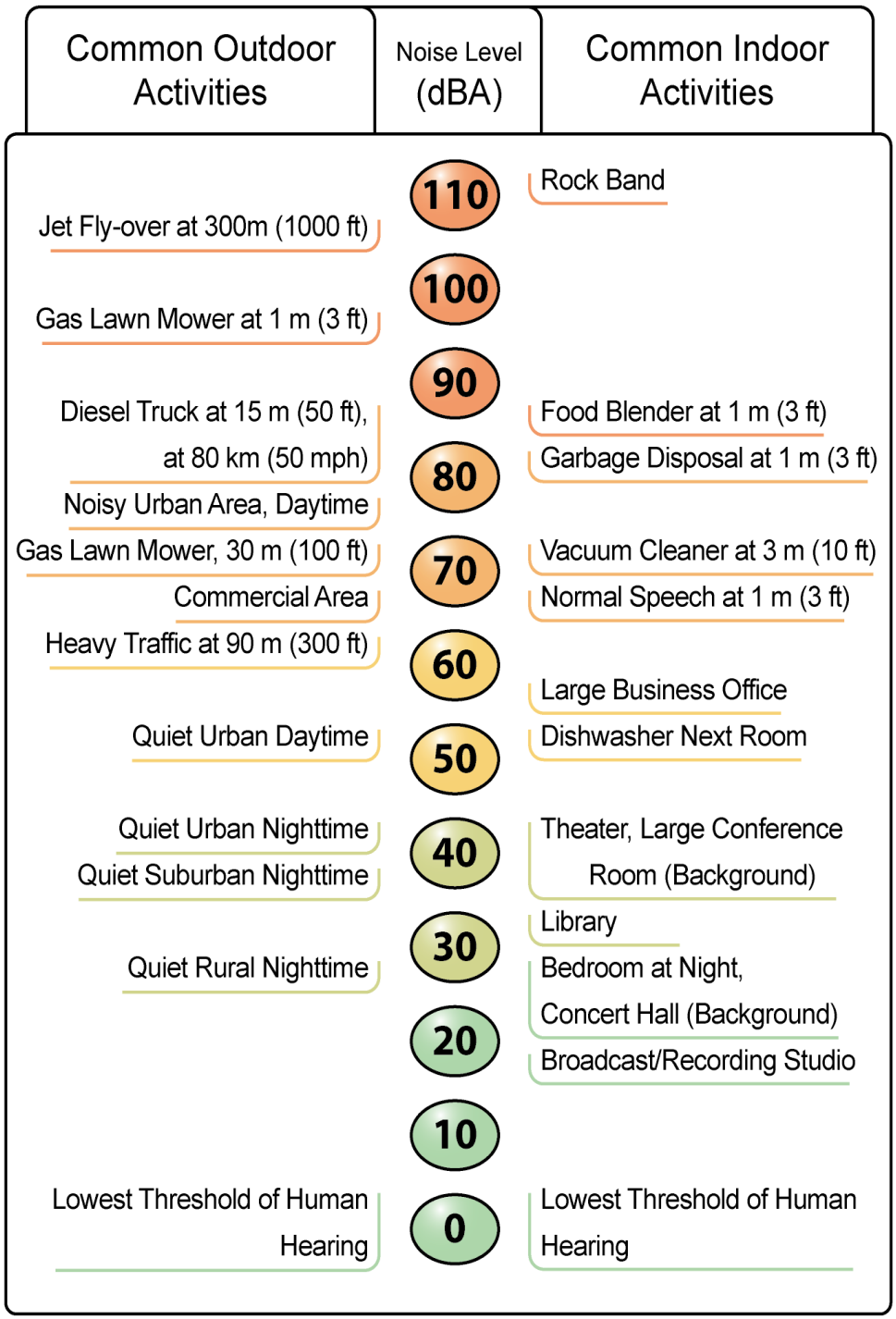
### AMPLITUDE

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

### FREQUENCY

Frequency is the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. To approximate this sensitivity, environmental sound is usually measured in A-weighted decibels. On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in **Figure 4.11-1**.

**FIGURE 4.11-1**
**TYPICAL COMMUNITY NOISE LEVELS**




*Source: Caltrans 2012*

### ADDITION OF DECIBELS

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

### SOUND PROPAGATION AND ATTENUATION

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as roadway noise, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or body of water. Soft surfaces, such soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

### NOISE DESCRIPTORS

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The $L_{eq}$ is a measure of ambient noise, while the $L_{dn}$ and CNEL are measures of community noise. Each is applicable to this analysis and defined below.

- $L_{eq}$, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the $L_{eq}$ of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- $L_{dn}$, the Day-Night Average Level, is a 24-hour average $L_{eq}$ with a 10 dBA "weighting" added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour $L_{eq}$ would result in a measurement of 66.4 dBA $L_{dn}$.

- CNEL, the Community Noise Equivalent Level, is a 24-hour average $L_{eq}$ with a 5 dBA "weighting" during the hours of 7:00 PM to 10:00 PM. and a 10 dBA "weighting" added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour $L_{eq}$ would result in a measurement of 66.7 dBA CNEL.

- $L_{min}$ is the minimum instantaneous noise level experienced during a given period of time.

- $L_{max}$ is the maximum instantaneous noise level experienced during a given period of time.

- Percentile Noise Level ($L_n$) is the noise level exceeded for a given percentage of the measurement time. For example, $L_{10}$ is the noise level exceeded for 10 percent of the measurement duration, and $L_{50}$ is the noise level exceeded for 50 percent of the measurement duration.

### HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night, or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings that can provide noise levels as low as 20 dBA and quiet, suburban, residential streets that can provide noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted for understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans.

- Outside of the laboratory, a 3 dB change is considered a just-perceivable difference.

- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.

- A 10 dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

## 4.11.2 ENVIRONMENTAL SETTING

### NOISE-SENSITIVE RECEPTORS

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Land uses surrounding the project site consist of a mix of industrial, agricultural, and vacant land uses. The nearest noise-sensitive land use consists of single-family residential dwellings in the Casa Hernandez development, located approximately 658 feet north of the project site. The Delano Soccer Park operates adjacent to the southern boundary of the West Pavilion site.

### AMBIENT NOISE ENVIRONMENT

The noise environment in the proposed project area is defined primarily by vehicular traffic on area roadways. To a lesser extent, nearby agricultural activities also contribute to ambient noise levels in the project area. Nearby industrial uses do not appear to significantly contribute to ambient noise levels in the project area.

To document existing ambient noise levels at the project site, short-term ambient noise measurements were conducted on October 8, 2014 by Michael Baker International staff. Existing daytime noise levels were monitored at five locations around the project site, which are depicted in **Figure 4.11-2**, in order to identify representative noise levels at various areas. The measurements were taken with a Larson-Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. Measured ambient noise levels are summarized in **Table 4.11-1;** the measurement locations are depicted in **Figure 4.11-2**.

**TABLE 4.11-1**
**SUMMARY OF MEASURED AMBIENT NOISE LEVELS**

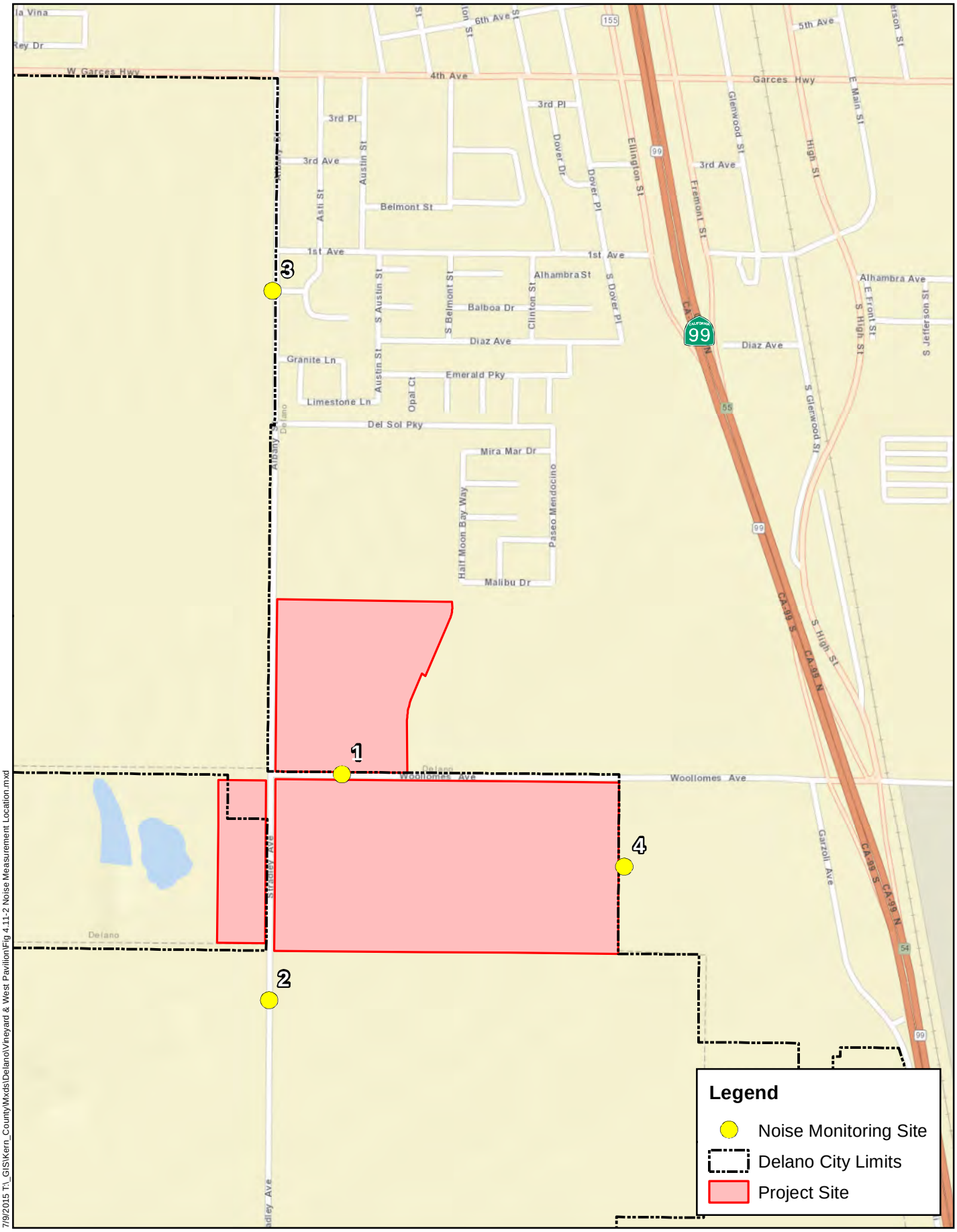
| Location | Noise Source | Monitoring Period | | Noise Levels (dBA) | | |
|---|---|---|---|---|---|---|
| | | Start Date & Time | Duration | $L_{eq}$ | $L_{max}$ | $L_{min}$ |
| Woollomes Ave east of Albany Street, 65 feet from road centerline | Traffic on Woollomes | October 8, 2014, 09:06 AM | 15 | 65.4 | 88.2 | 39.1 |
| Albany Street south of Woollomes Avenue (in front of soccer field), 60 feet from road centerline | Traffic on Albany, agricultural operations to the south | October 8, 2014, 09:27 AM | 15 | 67.9 | 87.1 | 37.9 |
| Albany Street north of Woollomes Avenue (in front of Casa Hernandez development), 62 feet from road centerline | Traffic on Albany, residential HVAC | October 8, 2014, 09:47 AM | 15 | 63.7 | 83.3 | 35.9 |
| Dover Parkway, south of Woollomes Avenue (adjacent to Walmart parking lot), 42 feet from road centerline | Delivery truck idling, traffic on Dover | October 8, 2014, 10:22 AM | 15 | 62.2 | 80.1 | 55.2 |

*Measurement data sheets are included in **Appendix 4.11-A.***
*Note: Ambient noise measurements were conducted using a Larson-Davis SoundExpert LxT integrating sound level meter placed at a height of approximately 5 feet above ground level.*

As shown in **Table 4.11-1**, ambient noise levels ranged between 62.2 dBA and 67.9 dBA $L_{eq}$. The primary source of noise in the vicinity of the project site was vehicle noise, with ongoing agricultural activities also influencing the ambient noise environment. Given the proximity to State Route (SR) 99 and the Delano Marketplace commercial center, noise levels were typical of a busy commercial environment. It should be noted that although the project site is approximately 1 mile from Delano Municipal Airport, no aircraft overflight was observed during the measurement period.

### EXISTING ROADWAY NOISE LEVELS

Existing roadway noise levels were calculated for the roadway segments in the vicinity of the project site. This task was accomplished using the Federal Highway Administration (FHWA) Highway Noise Prediction Model (FHWA-RD-77-108) and traffic volumes from the project traffic analysis (**Appendix 4.14-A**). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) utilized in the FHWA model has been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data show that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average weekday noise levels along these roadway segments are presented in **Table 4.11-2**. Noise levels were also calculated for weekend traffic conditions, and the average weekend roadway noise levels are presented in **Table 4.11-3**.




7/9/2015 T:_GIS\Kern_County\Mxds\Delano\Vineyard & West Pavilion\Fig 4.11-2 Noise Measurement Location.mxd

Michael Baker INTERNATIONAL

0 250 500 1,000 Feet

Source: ESRI Streetmap, 2015; Kern County, 2014

# Noise Measurement Locations

Exhibit 4.11-2

**TABLE 4.11-2**
**EXISTING WEEKDAY TRAFFIC NOISE LEVELS**

| Roadway | Surrounding Uses | CNEL at 75 Feet from Near-Travel-Lane Centerline |
|---|---|---|
| Albany Street – Woollomes Avenue to 1st Avenue | Residential | 63.0 |
| Albany Street – 1st Avenue to Garces Hwy | Residential | 62.6 |
| Stradley Avenue – Schuster Road to Woollomes Avenue | Agricultural | 59.2 |
| Woollomes Avenue – Albany Street to Dover Street | Residential | 61.4 |
| 1st Avenue – Albany Street to Dover Street | Residential | 57.3 |
| Graces Hwy – Albany Street to Dover Street | Residential | 62.6 |
| Dover Street – Grace Hwy to 1st Avenue | Residential | 55.6 |

*Source: Michael Baker International 2014*
*Note: Traffic noise levels were calculated using the FHWA roadway noise prediction model. Refer to **Appendix 4.11-A** for noise modeling assumptions and results.*

**TABLE 4.11-3**
**EXISTING WEEKEND TRAFFIC NOISE LEVELS**

| Roadway | Surrounding Uses | CNEL at 75 Feet from Near-Travel-Lane Centerline |
|---|---|---|
| Albany Street – Woollomes Avenue to 1st Avenue | Residential | 61.8 |
| Albany Street – 1st Avenue to Garces Hwy | Residential | 61.1 |
| Stradley Avenue – Schuster Road to Woollomes Avenue | Agricultural | 58.3 |
| Woollomes Avenue – Albany Street to Dover Street | Residential | 60.0 |
| 1st Avenue – Albany Street to Dover Street | Residential | 56.4 |
| Graces Hwy – Albany Street to Dover Street | Residential | 60.8 |
| Dover Street – Grace Hwy to 1st Avenue | Residential | 54.7 |

*Note: Traffic noise levels were calculated using the FHWA roadway noise prediction model. Refer to **Appendix 4.11-A** for noise modeling assumptions and results.*

## FUNDAMENTALS OF ENVIRONMENTAL GROUNDBORNE VIBRATION

Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and in the United States is referenced as vibration decibels (VdB).

The background vibration velocity level in residential and educational areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or

the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. Groundborne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. In addition, the rumble noise that usually accompanies building vibration is perceptible only inside buildings (FTA 2006). As such, the range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

The general human response to different levels of groundborne vibration velocity levels is described in **Table 4.11-4**.

**TABLE 4.11-4**
**HUMAN RESPONSE TO DIFFERENT LEVELS OF GROUNDBORNE VIBRATION**

| Vibration Velocity Level | Human Reaction |
|---|---|
| 65 VdB | Approximate threshold of perception for many people. |
| 75 VdB | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable. |
| 85 VdB | Vibration acceptable only if there are an infrequent number of events per day. |

*Source: FTA 2006*

### EXISTING GROUNDBORNE VIBRATION

No major groundborne vibration sources were identified in the project area.

## 4.11.2 REGULATORY SETTING

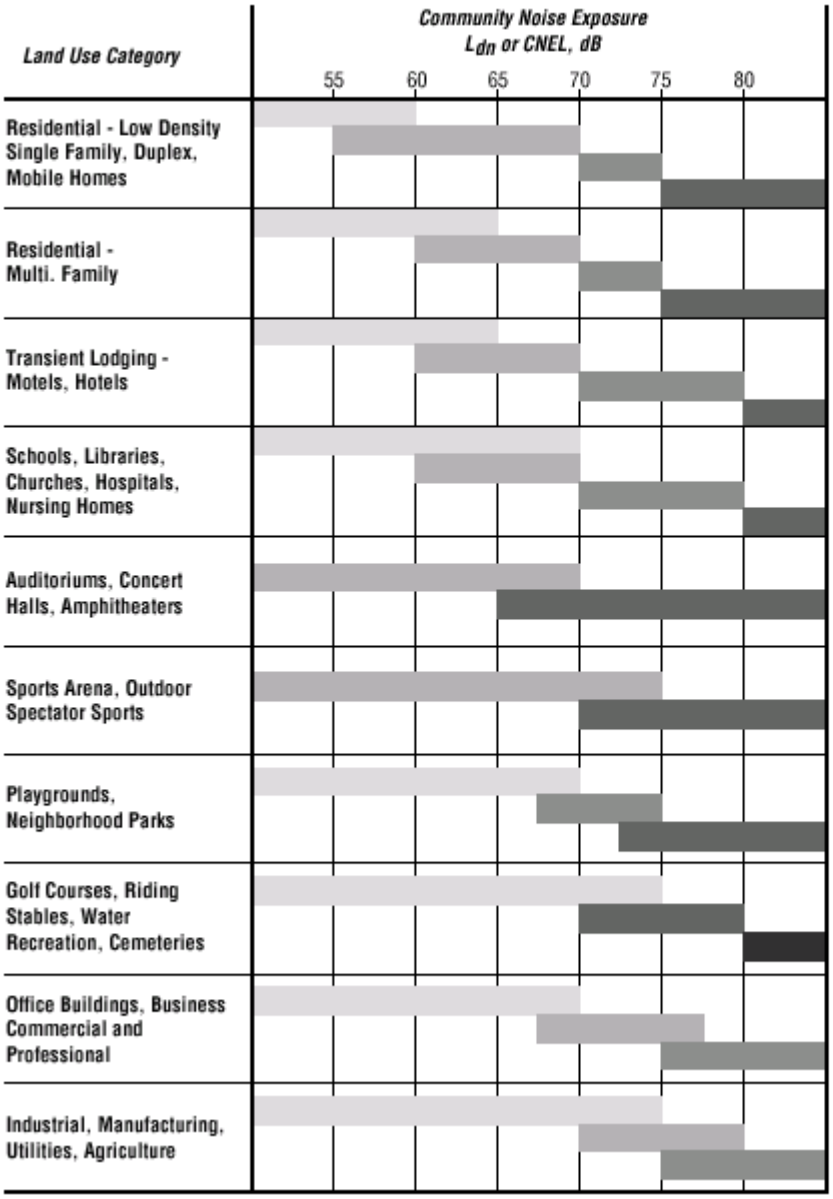
### FEDERAL

No federal noise regulations are applicable to the proposed project.

### STATE

#### Governor's Office of Planning and Research

The Governor's Office of Planning and Research (OPR) published the State of California General Plan Guidelines (2003), which provide guidance for the acceptability of projects in specific noise environments based on average-daily noise conditions (CNEL). These noise standards are shown in **Figure 4.11-3**.




**INTERPRETATION:**

**Normally Acceptable**
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

**Conditionally Acceptable**
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

**Normally Unacceptable**
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

**Clearly Unacceptable**
New construction or development should generally not be undertaken.

**Legend**

T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

Michael Baker INTERNATIONAL

# Land Use Compatibility With Community Noise Environments

Source: OPR (2003)

Figure 4.11-3

As shown in **Figure 4.11-3**, a noise level standard of 60 dBA $L_{dn}$ is used for the exterior living areas of new single-family, duplex, and mobile home residential land uses, and 45–65 dBA $L_{dn}$ for the interior exterior of all new multi-family residential uses. Where a land use is denoted as "normally acceptable" for the given $L_{dn}$ noise environment, the highest noise level in that range should be considered the maximum desirable for conventional construction that does not incorporate any special acoustic treatment. The acceptability of noise environments classified as "conditionally acceptable" or "normally unacceptable" will depend on the anticipated amount of time that will normally be spent outside the structure and the acoustic treatment to be incorporated in the structure's design.

## LOCAL

### City of Delano General Plan

The California Government Code requires that a noise element be included in the general plan of each county and city in the state. Each local government's goals, objectives, and policies for noise control are established by the noise element of the general plan and the passage of specific noise ordinances. The Delano General Plan Noise Element addresses the issue of noise by identifying sources of noise in the city and providing objectives and policies which ensure that noise from various sources would not create an unacceptable noise environment. The General Plan's goals, objectives, and policies are to ensure that new development is compatible with existing land uses and alternately, to ensure that new developments are sited, designed, and constructed in such a manner that ambient noise levels would not create an unacceptable noise environment for the occupants and patrons of the new development. The City has adopted the State's Noise Compatibility Standards in the Noise Element for the development of new land uses. The Noise Element also includes the following policies that are relevant to the proposed project:

*Noise Element*

Policy 1 Table 7-1 [shown as **Figure 4.11-3**] depicts the ranges of noise exposure from transportation noise sources, which are considered acceptable, conditionally acceptable, or conditionally unacceptable for the development of different land uses. Table 7-1 shall be used to determine whether mitigation is needed for development of land uses near major transportation noise sources.

a. In areas where the noise environment is acceptable, new development may be permitted without requiring noise mitigation.

b. For areas where the noise environment is conditionally acceptable, new development will be required to define the site's precise noise environment, and if needed incorporate appropriate mitigation into the design of the project to reduce noise exposure to the levels specified by the Noise Element.

c. For areas where the noise environment is conditionally acceptable, it may not be feasible for new development to provide appropriate mitigation to achieve compliance with applicable noise standards. In such cases,

other, more noise tolerant land uses would be more appropriate for the site and its noise environment.

Policy 2 New development of noise-sensitive land uses shall not be permitted in areas exposed to existing or projected future levels of noise from transportation noise sources which exceed the noise levels specified in Table 7-1 [shown in **Figure 4.11-3**] for the given land use, unless appropriate mitigation is provided.

Policy 3 Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated where feasible so as not to exceed the noise levels specified in Table 7-1 [shown in **Figure 4.11-3**].

Policy 4 New development of noise-sensitive land uses shall be consistent with the noise level standards of Table 7-2 [shown in **Table 4.11-5**], following the implementation of appropriate mitigation measures.

Policy 5 New proposed stationary noise sources, or existing stationary noise sources which undergo modifications, shall not be permitted where the noise level exceeds the standards of Table 7-2 (shown in **Table 4.11-6**]. The Delano Municipal Code shall be amended to conform to these quantitative standards.

**TABLE 4.11-5**
**MAXIMUM ALLOWABLE NOISE EXPOSURE – TRANSPORTATION NOISE SOURCES**

| Land Use | Outdoor Activity Areas $L_{dn}$/CNEL, dBA | Interior Spaces $L_{dn}$/CNEL, dBA |
|---|---|---|
| Residential (except temporary dwellings) | 65* | 45 |
| Hotels & Motels | 65* | 45 |
| Hospitals, Nursing and Personal Care | 65* | 45 |
| Churches, Meeting Halls | — | 45 |
| Schools – Preschool to Secondary, College and University, Specialized Education and Training, Libraries and Museums | — | 45 |

*Source: Delano 2005*
*Notes: *Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the boundary of planned or zoned noise-sensitive uses.*

Policy 6 The preferred method of noise control is thoughtful site design. Secondarily, noise control should be achieved through the use of noise barriers. Site and building design guidelines may include:

a. Commercial and industrial structures shall be designed so that noisy equipment is located far as possible from noise-sensitive land uses, and/or is shielded by structures.

b. Loading and unloading activities for commercial uses that are located near noise-sensitive uses should be conducted in an enclosed loading

dock with a positive seal between the loading dock and trucks, and should be screened by a noise barrier and dense landscaping.

Policy 7 Prior to approval of the proposed development in a noise impacted area, or the development of an industrial, commercial or other noise generating land use in or near an area containing existing or planned noise-sensitive land uses, an acoustical analysis may be required if:

a. The existing or projected future noise exposure at the exterior of the buildings, which will contain noise sensitive uses, or within proposed outdoor activity areas (patios, decks, backyards, pool areas, recreation areas, etc.) may exceed 65 dBA $L_{dn}$ (or CNEL).

b. Interior residential noise levels resulting from offsite noise may exceed 45 dBA.

**TABLE 4.11-6**
**MAXIMUM ALLOWABLE NOISE EXPOSURE – STATIONARY NOISE SOURCES***

| Noise Level Descriptor (dBA) | Daytime (7 AM to 10 PM) | Nighttime (10 PM to 7 AM) |
|---|---|---|
| Hourly Equivalent Sound Level ($L_{eq}$) | 55 | 50 |
| Maximum Sound Level ($L_{max}$) | 75 | 70 |

*Source: Delano 2005*
*Notes: *Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the boundary of planned or zoned noise-sensitive uses.*

## City of Delano Municipal Code and Zoning Ordinance

The City of Delano has also adopted a Noise Ordinance (Chapter 9.36 of the Delano Municipal Code), which identifies noise standards, specific noise restrictions, exemptions, and variances for sources of noise within the city. As such, the Municipal Code provides standards against noises such as loud gatherings, unauthorized construction-generated noise, and other intrusive noises. Chapter 9.36.040 establishes ambient noise levels as depicted in **Table 4.11-7**, while Chapter 9.36.050 states that a noise violation occurs when a person creates noise greater than 5 dBA above the levels identified in Chapter 9.36.040. Chapter 9.36.110 prohibits construction-related noise within a residential zone from exceeding the limits set forth in Chapter 9.36.040 unless a construction permit has been obtained from the City's Building Department.

**TABLE 4.11-7**
**CITY OF DELANO NOISE ORDINANCE NOISE STANDARDS**

| Zone | Ambient Noise Levels | |
|---|---|---|
| | 10:00 PM to 7:00 AM | 7:00 AM to 10:00 PM |
| R-1 and R-2 and other residential | 50 | 55 |
| Commercial | 55 | 60 |
| Manufacturing | 60 | 65 |

| Zone | Ambient Noise Levels | |
|---|---|---|
| | 10:00 PM to 7:00 AM | 7:00 AM to 10:00 PM |
| Heavy Industry Airport District | 65 | 75 |

*Source: Delano 2014*

The Zoning Ordinance includes additional provisions related to the control of noise. Chapter 20.12.120 establishes maximum allowable noise exposure levels for stationary sources associated with commercial and industrial land uses. In accordance with the City's Zoning Ordinance, all commercial and industrial uses shall be operated so that no loudspeakers, bells, gongs, buzzers, or other noise attention or attracting devices exceed 70 dBA in nonresidential areas or 55 dBA in residential areas at any one time beyond the boundaries of the property. Chapter 20.12.160 prohibits the creation of continuous steady-state, earthborne oscillation occurring more frequently than 100 times per minute on adjacent properties. The ground vibration caused by moving vehicles, trains, aircraft, or temporary construction or demolition is exempted from the limits.

Additionally, Section 9.36.110 of the Delano Municipal Code requires a permit from the City's building department to operate equipment or perform any outside construction or repair work on buildings, structures or projects or to operate any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other construction type device which may be a noise nuisance. In or within 300 feet of a residential zone.

## 4.11.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

In accordance with the California Environmental Quality Act (CEQA), project-related effects are evaluated to determine if they would result in a significant impact on the environment. Implementation of feasible mitigation measures is required to avoid or lessen any identified significant impacts. The criteria, or standards, used to determine the significance of impacts may vary depending on the nature of the project. Noise impacts resulting from the implementation of the proposed project could be considered significant if they cause any of the following to occur:

1) Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.

2) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

3) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

4) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

5) Located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels.

6) Located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels.

### Additional Thresholds

Generally, a project could have a significant effect on the environment if it would substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local planning criteria or ordinances, or substantially increase noise levels at noise-sensitive land uses.

For the project, the significance of anticipated noise effects is based on a comparison between predicted noise levels and noise criteria defined by the City of Delano. For this project, noise impacts are considered significant if existing or proposed noise-sensitive land uses would be exposed to noise levels in excess of the Delano Municipal Code standards as described above under the Regulatory Setting or if the project would exceed the land use compatibility standards set out in the City's General Plan, as shown above in **Figure 4.11-3, Table 4.11-5,** and **Table 4.11-6**.

In addition, the analysis takes into account the increases in noise levels over the pre-project noise conditions. With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments. FICON-recommended noise evaluation criteria are summarized in **Table 4.11-8**.

**TABLE 4.11-8**
**FEDERAL INTERAGENCY COMMITTEE ON NOISE**
**RECOMMENDED CRITERIA FOR EVALUATION OF INCREASES IN AMBIENT NOISE LEVELS**

| Ambient Noise Level Without Project | Increase Required for Significant Impact |
|---|---|
| < 60 dB | 5.0 dB, or greater |
| 60–65 dB | 3.0 dB, or greater |
| > 65 dB | 1.5 dB, or greater |

*Source: FAA 2000; FICON 1992*

As depicted in **Table 4.11-8**, a noise level increase of 5 dB, or greater, would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. Within areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels

increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 1992; FAA 2000). For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5 dB, or greater, where the noise levels, without project implementation, are less than 60 dBA CNEL; 3 dB, or greater, where the noise level, without project implementation, ranges from 60 to 65 dBA CNEL; and 1.5 dB, or greater, where the noise level, without project implementation, exceeds 65 dBA CNEL, based on the previously discussed FICON noise criteria (**Table 4.11-8**). The rationale for these noise criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause a substantial increase in annoyance.

### Impacts Not Further Evaluated

There are no private airports or airstrips within 2 miles of the city. Therefore, standard of significance 6 is not addressed further in the DEIR.

## METHODOLOGY

This analysis of the existing and future noise environments is based on noise level monitoring, noise prediction modeling, and empirical observations. As defined in the City's General Plan Noise Element, noise-sensitive land uses include public schools, hospitals, and institutional uses such as churches, museums, and private schools. Typically, residential uses are also considered noise-sensitive receptors. Therefore, for the purposes of this analysis, the nearest sensitive receptors to the project site would be the residential uses at the Casa Hernandez development, located approximately 658 feet to the north of the project site. As noted in Section 3.0, Project Description, construction of the proposed project would occur in distinct phases over several years. The first four phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard at Delano site. Following the completion of the Vineyard at Delano development, the Delano West Pavilion development would begin construction and would also be developed in four distinct phases. Therefore, this analysis assumes that the residential uses of the proposed project would be occupied during construction of subsequent phases of development.

### Long-Term Operational Stationary-Source Noise

Predicted noise levels associated with on-site stationary noise sources for the project were calculated based on representative data obtained from existing literature and noise assessments prepared for similar projects. Operational noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source. Operational noise levels were calculated at the project site property lines and nearby land uses for comparison to the City's noise standards.

### Long-Term Traffic Noise

The potential for the project to permanently increase traffic noise is addressed under the following scenarios: the Existing Plus Project and the Cumulative Buildout Baseline condition represent buildout of the General Plan land uses in the study area based on traffic growth up to year 2040, consistent with the traffic analysis. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise emission factors and traffic data obtained from the traffic analysis prepared for the project.

Additional input data included vehicle speeds, ground attenuation factors, and roadway widths. Predicted noise levels were calculated at a distance of 75 feet from the near-travel-lane centerline. Traffic noise levels were evaluated based on traffic volumes obtained from the traffic analysis prepared for the proposed project. See Section 4.14, Traffic and Circulation, for more information. Vehicle distribution was adjusted based on truck volume data obtained from the traffic analysis prepared for the proposed project.

### Groundborne Vibration

Groundborne vibration levels associated with construction-related activities for the project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from the Caltrans guidelines set forth above. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated taking into account the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

### Short-Term Construction Noise

Predicted noise levels at nearby noise-sensitive land uses were calculated utilizing typical noise levels and usage rates associated with construction equipment, derived from representative data obtained from similar construction projects. Construction noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Exposure of Persons to or Generation of Noise Levels in Excess of Standards (Standard of Significance 1)

### Create a Substantial Temporary or Periodic Increase in Ambient Noise Levels (Standard of Significance 4)

**Impact 4.11.1** Construction of the proposed project could result in exposure of persons to or generation of noise levels in excess of the City of Delano's General Plan Noise Element or Noise Ordinance standards. This would be a **potentially significant** impact.

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges are generally similar for all construction phases, the initial site preparation phase tends to involve the most heavy-duty equipment having a higher noise-generation potential. Noise levels associated with individual construction equipment are summarized in **Table 4.11-9.**

**TABLE 4.11-9**
**TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS**

| Equipment | Typical Noise Level (dBA $L_{max}$) 50 Feet from Source |
|---|---|
| Air Compressor | 81 |
| Backhoe | 80 |
| Compactor | 82 |
| Concrete Mixer | 85 |
| Concrete Vibrator | 76 |
| Crane, Mobile | 83 |
| Dozer | 85 |
| Generator | 81 |
| Grader | 85 |
| Impact Wrench | 85 |
| Jackhammer | 88 |
| Loader | 85 |
| Truck | 88 |
| Paver | 89 |
| Pneumatic Tool | 85 |
| Roller | 74 |
| Saw | 76 |

*Source: FTA 2006*

As depicted in **Table 4.11-9**, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 89 dBA $L_{max}$ at 50 feet (FTA 2006). Average-hourly noise levels associated with construction projects can vary, depending on the activities performed, reaching levels of up to approximately 83 dBA $L_{eq}$ at 50 feet. Short-term increases in vehicle traffic, including worker commute trips and haul truck trips, may also result in temporary increases in ambient noise levels at nearby receptors.

As noted earlier, the nearest noise-sensitive land uses in the project area consist of residential dwellings within the Casa Hernandez development, located approximately 648 feet north of the project site. Conservatively assuming construction noise levels of 83 dBA $L_{eq}$ at 50 feet, predicted noise levels at these nearest noise-sensitive land uses would be approximately 60 dBA $L_{eq}$. In addition and as previously stated, the proposed project would be developed in phases, with the residential uses associated with the Vineyard at Delano being developed first, followed by the Delano West Pavilion. As construction activities would occur while the earlier phases were occupied, this analysis assumes that construction activity would occur within 50 feet of the project's residential uses. As such, noise levels for on-site residents would be approximately 83 dBA during the noisiest construction activities.

Most of the types of exterior construction activities associated with the proposed project would not generate continuously high noise levels, although occasional single-event disturbances from grading and external building construction are possible. With regard to residential land uses, exterior construction activities occurring during the more noise-sensitive nighttime hours would be of particular concern given the potential for increased levels of sleep disruption to occupants of nearby residential dwellings. As the project does not identify hourly restrictions for construction activities, noise-generating construction activities occurring during the nighttime hours, if required, could have a potentially significant short-term noise impact to occupants of nearby residential land uses. For this reason, this is considered a **potentially significant** impact.

Mitigation Measures

**MM 4.11.1a** The applicant shall require by contract specifications that the following construction best management practices (BMPs) be implemented by contractors to reduce construction noise levels:

- Notification shall be mailed to owners and occupants of all developed land uses immediately bordering or directly across the street from the project site providing a schedule for major construction activities that will occur for the duration of the construction period. In addition, the notification will include the identification of and contact number for a community liaison and a designated construction manager who would be available on-site to monitor construction activities. The construction manager will be located at the on-site construction office during construction hours for the duration of all construction activities. Contact information for the community liaison and the construction manager will be located at the construction office, City Hall, and the police department.

- Noise-generating exterior construction activity shall be limited to weekdays between 7:00 AM and 7:00 PM and Saturdays between 9:00 AM and 6:00 PM., with no construction on Sundays or federally recognized holidays. Loading, unloading, and other exterior activities are prohibited in other than the above-noted hours. Interior construction that does not result in audible noise at the property lines may be allowed outside of the above-noted hours.

- The best available technology shall be utilized to reduce noise levels from construction activities, including but not limited to the use of noise blankets or temporary sound barriers.

- Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

*Timing/Implementation:* *Implemented during construction activities*

*Enforcement/Monitoring:* City of Delano Community Development Department and Public Works Department, Engineering Division

**MM 4.11.1b** The applicant shall require by contract specifications that construction staging areas, along with the operation of earthmoving equipment within the project site, are located as far away from vibration- and noise-sensitive sites as possible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed and approved by the City.

*Timing/Implementation:* *Implemented during construction activities*

*Enforcement/Monitoring:* City of Delano Community Development Department and Public Works Department, Engineering Division

Although construction of the proposed project would generate noise levels higher than the 55 dBA exterior limit for residential properties such as the residential uses located in the Casa Hernandez development and on-site residential uses, construction-related noise is exempt under the City's Municipal Code 9.36.110, provided a permit is granted by the City's Building Department. Further, construction-related noise is intermittent in nature and would not generate continuous noise levels above the Municipal Code standards. Under mitigation measure **MM 4.11.1a**, the implementation of noise attenuation measures may include the use of noise barriers (e.g., sound walls) or noise blankets. As a general rule, a sound wall is able to reduce noise by 5 dBA (FTA 2006). In addition, mitigation measure **MM 4.11.1b**, which requires that construction staging areas and earthmoving equipment be located as far away from noise- and vibration-sensitive land uses as possible, would also reduce construction-related noise levels. Implementation of mitigation measures **MM 4.11.1a** and **MM 4.11.1b** would ensure that impacts associated with construction activities resulting from implementation of the proposed project would be **less than significant.**

### Exposure of Persons to or Generation of Noise Levels in Excess of Standards (Standard of Significance 1)

**Impact 4.11.2** Operation of stationary equipment and project-related traffic could result in exposure of persons to or generation of noise levels in excess of the City of Delano's General Plan Noise Element or Noise Ordinance standards. This impact would be a **potentially significant**.

Implementation of the proposed project could result in an increase in traffic at the project sites and on local roadways, which could increase noise levels. Operational sources of noise generated by the proposed project could include new stationary sources such as rooftop heating, ventilation, and air conditioning (HVAC) units.

Stationary Noise Sources

Large-scale HVAC systems would be installed on the new residential, retail, and commercial buildings located on the project site. Large HVAC systems associated with these buildings can result in noise levels that average between 50 and 65 dBA $L_{eq}$ at 50 feet from the equipment. These HVAC units would be mounted within HVAC wells on the rooftops of the proposed buildings and would be screened from view by the wells and other building features; therefore, noise levels would not impact sensitive receptors on or off the project site. Additionally, noise from mechanical equipment associated with operation of the project would be required to comply with California Building Code requirements pertaining to noise attenuation and with City regulations requiring adequate buffering of such equipment.

Operation of the proposed project would also involve the delivery of goods and foodstuffs to the commercial and retail operations associated with the proposed project, as well as refuse pickup for both the commercial and residential components. Two noise sources would be identified with delivery operations: the noise of the diesel engines of the semi-trailer trucks and the backup beeper alarm that sounds when a truck is put in reverse, as required and regulated by the California Department of Occupational Safety and Health (Cal/OSHA). The noise generated by idling diesel engines typically ranges between 64 and 66 dBA $L_{eq}$ at 75 feet. This noise would be temporary in nature, typically lasting no more than 5 minutes. Backup beepers are required by Cal/OSHA to be at least 5 dBA above ambient noise levels. These devices are highly directional in nature, and when in reverse the trucks and the beeper alarms would be directed toward the loading area and adjacent commercial structures. Backup beepers are, of course, intended to warn persons who are behind the vehicle when it is backing up. Further, the loading docks associated with the proposed project would be screened from sensitive receptors both on- and off-site by intervening structures and the design of the loading spaces.

### Transportation Noise Sources

The following describes the effects of adding the proposed project's traffic to existing noise levels to determine whether standards would be exceeded. As shown in **Table 4.11-1**, measured ambient noise levels along Woollomes Avenue and Albany Street range between 63.7 dBA and 67.9 dBA. These ambient noise levels are representative of the "Conditionally Acceptable" range as identified by **Figure 4.11-3**. Additionally, the City's General Plan Noise Element has established a 65 dBA CNEL noise standard for exposure to transportation-related noise, as shown in **Table 4.11-5**. Modeled roadway noise levels above 65 dBA CNEL would result in the exposure of noise-sensitive uses to excessive noise levels and would result in a potentially significant impact.

### Existing Plus Project Scenario

Implementation of the proposed project would result in increased traffic volumes along area roadways. The increase in traffic volumes resulting from implementation of the proposed project would therefore contribute to predicted increases in traffic noise levels. An Existing Plus Project scenario is included for informational purposes to compare noise levels that would result from the proposed project trip distribution to existing baseline noise levels. This scenario is conservative and does not represent the actual anticipated impact of the proposed project. Additional growth and development would occur in the city prior to project operation, which would affect the project's noise impact relative to conditions that would occur without the proposed project. Existing and Existing Plus Project traffic noise levels for both weekdays and Saturdays are summarized in **Table 4.11-10**.

**TABLE 4.11-10**
**PREDICTED INCREASES IN TRAFFIC NOISE LEVELS**
**EXISTING PLUS PROJECT CONDITIONS**

| Roadway Segment | CNEL at 75 Feet from Near-Travel-Lane Centerline[1] | | Exceed Standard? |
|---|---|---|---|
| | Without Project | With Project | |
| **Existing Plus Project (Weekday)** | | | |
| Albany Street – Woollomes Avenue to 1st Avenue | 63.0 | 66.4 | **Yes** |
| Albany Street – 1st Avenue to Garces Hwy | 62.6 | 65.4 | **Yes** |
| Stradley Avenue – Schuster Road to Woollomes Avenue | 59.2 | 62.7 | No |
| Woollomes Avenue – Albany Street to Dover Street | 61.4 | 68.8 | **Yes** |
| 1st Avenue – Albany Street to Dover Street | 57.3 | 57.3 | No |
| Graces Hwy – Albany Street to Dover Street | 62.6 | 63.8 | No |
| Dover Street – Grace Hwy to 1st Avenue | 55.6 | 58.3 | No |
| **Existing Plus Project (Saturday)** | | | |
| Albany Street – Woollomes Avenue to 1st Avenue | 61.8 | 66.0 | **Yes** |
| Albany Street – 1st Avenue to Garces Hwy | 61.1 | 65.9 | **Yes** |
| Stradley Avenue – Schuster Road to Woollomes Avenue | 58.3 | 63.6 | No |
| Woollomes Avenue – Albany Street to Dover Street | 60.0 | 67.9 | **Yes** |
| 1st Avenue – Albany Street to Dover Street | 56.4 | 55.2 | No |
| Graces Hwy – Albany Street to Dover Street | 60.8 | 63.0 | No |
| Dover Street-–Grace Hwy to 1st Avenue | 54.7 | 58.6 | No |

*Notes: [1] Traffic noise levels were calculated using the FHWA roadway noise prediction model based on data obtained from the traffic analysis prepared for this project (Arch Beach Consulting 2015).*

As shown in **Table 4.11-10**, under the Existing Plus Project conditions, traffic noise levels would result in an increase in noise levels above the 65 dBA CNEL exterior standards for residential noise-sensitive receptors. Because the proposed project would result in the construction of new residential uses along Woollomes Avenue, these new residential uses would be exposed to noise levels in excess of the City's General Plan 65 dBA CNEL standard, and this would be a potentially significant impact.

Mitigation Measures

**MM 4.11.2a** All heating, ventilation, and air conditioning (HVAC) systems shall be screened such that noise levels do not exceed the City's stationary noise standard of 55 dBA at the project's residential uses.

*Timing/Implementation:* *Prior to building construction activities*

*Enforcement/Monitoring:* City of Delano Community Development Department and Public Works Department, Engineering Division

**MM 4.11.2b** Prior to issuance of a certificate of occupancy, the applicant shall prepare an acoustical analysis ensuring that interior noise levels due to exterior noise sources will be at or below 45 dBA CNEL in all units. One or a combination of the following measures will be incorporated as necessary to ensure interior noise will be at or below 45 dBA CNEL:

- Construct an exterior solid masonry wall along Woollomes Avenue and Albany/Stradley Street.
- Limit opening and penetrations on portions of buildings impacted by noise.
- Apply noise insulation to walls, roofs, doors, windows, and other penetrations.
- Install dual-paned windows. For some units, it may be necessary for the windows to be able to remain closed to ensure that interior noise levels meet the interior standard of 45 dBA CNEL. Consequently, a ventilation or air conditioning system would be required for these units to provide a habitable interior environment with the windows closed.

*Timing/Implementation:* *Prior to building construction activities*

*Enforcement/Monitoring:* City of Delano Community Development Department and Public Works Department, Engineering Division

Implementation of mitigation measures **MM 4.11.2a** and **MM 4.11.2b** would reduce stationary and transportation noise level impacts to on-site residential uses to levels consistent with those established in the City's General Plan. Implementation of the identified mitigation measures would ensure that the residential occupants of the proposed project would not be exposed to excessive noise levels. Therefore, this impact would be considered **less than significant**.

### Exposure to Groundborne Vibration (Standard of Significance 2)

**Impact 4.11.3** Construction and operation activities associated with the proposed project would not generate or expose persons off-site to excessive groundborne vibration. This would be a **less than significant** impact.

This analysis uses the Federal Transit Administration (FTA) vibration impact thresholds for sensitive buildings, residences, and institutional land uses. These thresholds are 85 VdB, which is the vibration level that is considered by the FTA to be acceptable only if there are an infrequent number of events per day as described in **Table 4.9-4**. In terms of groundborne vibration impacts on nearby structures, this analysis will use the FTA's vibration damage threshold of approximately 100 VdB for fragile buildings (FTA 2006).

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Implementation of the proposed project would not include the installation or operation of sources of groundborne vibration that would be detectable beyond the project site property line. Primary sources of ground vibration with project operations result from the on-site heavy-duty truck operations associated with the commercial uses of the Delano West Pavilion site. As noted in **Table 4.11-11**, groundborne vibration levels typically associated with heavy-duty trucks would be approximately 80 VdB at 50 feet, which would not exceed the minimum recommended criteria for human annoyance of 85 VdB at on- or off-site vibration-sensitive uses.

Construction activities associated with the proposed project would likely require the use of various off-road equipment, such as tractors, concrete mixers, and haul trucks. The use of major groundborne vibration-generating construction equipment, such as pile drivers, is not anticipated to be required for this project.

Groundborne vibration levels associated with representative construction equipment are summarized in **Table 4.11-11**. Based on the vibration levels presented in the table, ground vibration generated by construction equipment would not be anticipated to exceed approximately 85 VdB at 50 feet. Maximum predicted vibration levels at the nearest off-site structures, which are located in excess of 650 feet from the project site, are estimated at 59 VdB, which is below the identified threshold. On-site residential uses associated with the first phases of development would be exposed to vibration levels of approximately 81 VdB, which is below the identified threshold. Additionally, Chapter 20.12.160 of the Delano Zoning Code exempts construction-related vibration. As a result, this impact would be considered **less than significant.**

**TABLE 4.11-11**
**REPRESENTATIVE VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | Approximate VdB | |
|---|---|---|
| | 50 Feet | 650 Feet |
| Large Bulldozer | 81 | 58 |
| Caisson Drilling | 81 | 58 |
| Loaded Trucks | 80 | 59 |
| Jackhammer | 73 | 50 |
| Small Bulldozer | 52 | 30 |

Source: *FTA 2006*; *Michael Baker International 2014*

*Notes: The vibration levels at the off-site sensitive uses are determined with the following equation from the FTA Transit Noise and Vibration Impact Assessment, Final Report: Lv(D)=Lv(25 ft)–20log(D/25), where Lv = vibration level of equipment, D = distance from the equipment to the receiver, Lv(25 ft) = vibration level of equipment at 25 feet.*

Mitigation Measures

None required.

**Create a Substantial Permanent Increase in Ambient Noise Levels (Standard of Significance 3)**

**Impact 4.11.4** Operation of the proposed project would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in the project vicinity. This impact would be considered **potentially significant.**

Operation of the proposed project would generate local traffic as a result of residents, employees, and patrons entering and exiting the site. A noise level increase of 3 dBA $L_{dn}$ is not readily perceptible to most people. Thus, for the purpose of this analysis, a permanent increase of 3 dBA $L_{dn}$ over ambient noise levels without the project is considered to be substantial. The increase in traffic resulting from implementation of the proposed project could increase the ambient noise levels at off-site locations (such as residential uses) in the project vicinity. For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5 dBA, or greater, where the noise levels, without project implementation, are less than 60 dBA CNEL; 3 dBA, or greater, where the noise level, without project implementation, ranges from 60 to 65 dBA CNEL; and 1.5 dB, or greater, where the noise level, without project implementation, exceeds 65 dBA CNEL.

As previously described, an Existing Plus Project scenario is included for informational purposes to compare noise levels that would result from the proposed project trip distribution to existing baseline noise levels.

Existing and Existing Plus Project traffic noise levels are provided in **Table 4.11-12**. The Existing Plus Project scenario is conservative in estimating the project's contribution to area traffic noise because additional growth in the city would occur prior to completion of project construction, which would generate increased ambient traffic noise. **Table 4.11-12** shows the calculated roadway noise levels under existing (2014) traffic levels compared to the "with project" condition.

**TABLE 4.11-12**
**PREDICTED INCREASES IN TRAFFIC NOISE LEVELS**
**EXISTING PLUS PROJECT CONDITIONS**

| Roadway Segment | CNEL at 75 Feet from Near-Travel-Lane Centerline[1] | | Increase | Threshold | Impact |
|---|---|---|---|---|---|
| | Without Project | With Project | | | |
| **Existing Plus Project (Weekday)** | | | | | |
| Albany Street – Woollomes Avenue to 1st Avenue | 63.0 | 66.4 | **3.4** | **3.0** | **Yes** |
| Albany Street – 1st Avenue to Garces Hwy | 62.6 | 65.4 | 2.8 | 3.0 | No |
| Stradley Avenue – Schuster Road to Woollomes Avenue | 59.2 | 62.7 | **3.5** | **3.0** | **Yes** |
| Woollomes Avenue – Albany Street to Dover Street | 61.4 | 68.8 | **7.4** | **3.0** | **Yes** |
| 1st Avenue – Albany Street to Dover Street | 57.3 | 57.3 | 0.0 | 5.0 | No |
| Graces Hwy – Albany Street to Dover Street | 62.6 | 63.8 | 1.2 | 3.0 | No |

| Roadway Segment | CNEL at 75 Feet from Near-Travel-Lane Centerline[1] | | Increase | Threshold | Impact |
|---|---|---|---|---|---|
| | Without Project | With Project | | | |
| Dover Street – Grace Hwy to 1st Avenue | 55.6 | 58.3 | 2.7 | 5.0 | No |
| **Existing Plus Project (Saturday)** | | | | | |
| Albany Street – Woollomes Ave to 1st Avenue | 61.8 | 66.0 | **5.2** | **3.0** | **Yes** |
| Albany Street – 1st Avenue to Garces Hwy | 61.1 | 65.9 | **4.8** | **3.0** | **Yes** |
| Stradley Avenue – Schuster Road to Woollomes Avenue | 58.3 | 63.6 | **5.3** | **5.0** | **Yes** |
| Woollomes Avenue – Albany Street to Dover Street | 60.0 | 67.9 | **7.9** | **3.0** | **Yes** |
| 1st Avenue – Albany Street to Dover Street | 56.4 | 55.2 | -1.2 | 5.0 | No |
| Graces Hwy – Albany Street to Dover Street | 60.8 | 63.0 | 2.2 | 3.0 | No |
| Dover Street – Grace Hwy to 1st Avenue | 54.7 | 58.6 | | 5.0 | |

*Notes:*
1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model based on data obtained from the traffic analysis prepared for this project (Arch Beach Consulting 2015).*
2. *For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5.0 dB, or greater, where the noise levels, without project implementation, are less than the City's "normally acceptable" noise standard. Where the noise level, without project implementation, equals or exceeds applicable noise standards, an increase of 3.0 dB, or greater, would be considered a substantial increase.*

As shown in **Table 4.11-12**, implementation of the proposed project under the Existing Plus Project scenario would result in roadway noise level increases of up to 7.4 dBA during weekdays along Woollomes Avenue and 7.9 dBA on Saturdays along Woollomes Avenue. Additionally, Albany Street and Stradley Avenue would experience an increase in roadway noise levels above the 3.0 dB threshold. As there is no feasible mitigation available to reduce the increase in roadway noise levels, this impact would be **significant and unavoidable**.

Mitigation Measures

No feasible mitigation available.

**Exposure of Persons to Excessive Airport Noise Levels (Standard of Significance 5)**

**Impact 4.11.5** The project site is located within Zone C and Traffic Pattern Zone for Delano Municipal Airport. However, the proposed project is not within the 60 dBA CNEL airport noise contour. This is a **less than significant** impact.

The project site is located approximately 1 mile from Delano Municipal Airport. The project site is located outside of the 60 dBA CNEL noise contour of Delano Municipal Airport (Kern County 2011, p. 4-29). As discussed under Impact 4.11.2, traffic noise is the dominant noise source on the project site. Noise levels from traffic noise exceed 60 dBA on the project site. Therefore, although the site may experience intermittent noise from overflights, noise levels would not exceed 60 dBA CNEL and would generally not by noticeable over surrounding traffic noise. Therefore, the project would not be exposed to excessive noise from Delano Municipal Airport. This impact is considered **less than significant**.

Mitigation Measures

None required.

## 4.11.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

### CUMULATIVE SETTING

The geographic extent of the cumulative setting for noise consists of the project site and vicinity. Based on the noise measurement surveys conducted, ambient noise levels at the nearest residential land uses are primarily affected by vehicle traffic on nearby area roadways. To a lesser extent, occasional agricultural activities also contribute to the ambient noise environment. However, no major stationary sources of noise have been identified in the vicinity of the nearest noise-sensitive land uses. As a result, the primary factor for cumulative noise impact analysis is the consideration of future traffic noise levels along area roadways.

### Contribution to Cumulative Noise Levels

**Impact 4.11.6** Long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels. This impact would be considered **potentially cumulatively considerable.**

Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to the proposed project and other projects within the project vicinity. Therefore, cumulative traffic-generated noise impacts have been assessed based on the contribution of the proposed project to the future cumulative base traffic volumes in the project vicinity. The noise levels associated with cumulative base traffic volumes without the project and cumulative base traffic volumes with the project are identified in **Table 4.11-13**. Noise level increases would reach a maximum of 7.9 dBA CNEL along Woollomes Avenue on Saturdays and by 1.7 dBA CNEL along Dover Parkway on weekdays. These increases would exceed the thresholds of significance established for this EIR. As such, the proposed project would cumulatively contribute to a substantial increase in noise levels and this would be **cumulatively considerable** and **significant and unavoidable** impact.

**TABLE 4.11-13**
**PREDICTED INCREASES IN TRAFFIC NOISE LEVELS**
**PROJECT BUILDOUT CONDITIONS (2040)**

| Roadway Segment | CNEL at 75 Feet from Near-Travel-Lane Centerline[1] | | Increase | Threshold | Impact |
|---|---|---|---|---|---|
| | Without Project | With Project | | | |
| **Project Buildout (Weekday)** | | | | | |
| Albany Street – Woollomes to 1st Avenue | 66.6 | 68.4 | 2.8 | 3.0 | No |
| Albany Street – 1st Avenue to Garces Hwy | 65.9 | 66.9 | 1.0 | 1.5 | No |
| Stradley Avenue – Schuster Road to Woollomes | 62.6 | 64.6 | 2.0 | 3.0 | No |

| Roadway Segment | CNEL at 75 Feet from Near-Travel-Lane Centerline[1] | | Increase | Threshold | Impact |
|---|---|---|---|---|---|
| | Without Project | With Project | | | |
| Woollomes – Albany Street to Dover Parkway | 70.3 | 72.5 | 1.2 | 1.5 | No |
| 1st Avenue – Albany Street to Dover Street | 60.9 | 60.9 | 0.0 | 3.0 | No |
| Bellmont Street – Woollomes to Morse Blvd | 55.1 | 57.4 | 2.5 | 5.0 | No |
| Morse Blvd – Bellmont Street to Dover Parkway | 50.1 | 51.7 | 1.7 | 5.0 | No |
| Garces Hwy – Albany St to Dover Parkway | 64.1 | 64.1 | 0.0 | 3.0 | No |
| Dover Parkway – Grace Hwy to 1st Avenue | 64.5 | 66.2 | **1.7** | **1.5** | **Yes** |
| **Project Buildout (Saturday)** | | | | | |
| Albany Street – Woollomes to 1st Avenue | 68.9 | 68.6 | -0.3 | 1.5 | No |
| Albany Street – 1st Avenue to Garces Hwy | 65.8 | 67.0 | 1.2 | 1.5 | No |
| Stradley Avenue – Schuster Road to Woollomes | 69.5 | 65.0 | -4.5 | 1.5 | No |
| Woollomes – Albany Street to Dover Parkway | 65.3 | 72.5 | **7.2** | **1.5** | **Yes** |
| 1st Avenue – Albany Street to Dover Street | 58.8 | 60.9 | 1.9 | 5.0 | No |
| Bellmont Street – Woollomes to Morse Blvd | 58.3 | 56.1 | -2.2 | 5 | No |
| Morse Blvd – Bellmont Street to Dover Parkway | 49.5 | 51.7 | 2.2 | 5.0 | No |
| Garces Hwy – Albany Street to Dover Parkway | 63.1 | 63.1 | 0.0 | 3.0 | No |
| Dover Parkway – Grace Hwy to 1st Avenue | 65.3 | **67.1** | **1.8** | **1.5** | **Yes** |

*Notes:*

1. *Traffic noise levels were calculated using the FHWA roadway noise prediction model based on data obtained from the traffic analysis prepared for this project (Arch Beach Consulting 2015).*
2. *For purposes of this analysis, a substantial increase in noise levels is defined as an increase of 5.0 dB, or greater, where the noise levels, without project implementation, are less than the City's "normally acceptable" noise standard. Where the noise level, without project implementation, equals or exceeds applicable noise standards, an increase of 3.0 dBA, or greater, would be considered a substantial increase.*

## Mitigation Measures

None feasible.

## REFERENCES

Arch Beach Consulting. 2015. *Traffic Impact Study, Vineyard at Delano and Delano West Pavilion Projects.*

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Kern County. 2011. *Airport Land Use Compatibility Plan*. Accessed July 7, 2014. http://www.co.kern.ca.us/planning/pdfs/ALUCP2011.pdf.

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This section discusses the population and housing impacts of the proposed project. Impacts on the current conditions, as well as the projected conditions, are examined. This section also contains information regarding the project's relationship to adopted programs and plans.

## 4.12.1 ENVIRONMENTAL SETTING

### POPULATION

According to the California Department of Finance (DOF), Delano has a current (2014) estimated population of 52,591 of which 8,729 are identified as being in group quarters, the majority of whom are inmates of North Kern State Prison or Kern Valley State Prison located in the city (DOF 2014). The DOF has estimated that the average household size in the city is 4.21 persons per household in 2014. This average household size does not include those persons incarcerated at the state prisons.

**Table 4.12-1** compares Delano population estimates for the period 2000 through 2014. As shown, the city experienced a 29.5 percent net population increase between 2000 and 2014.

**TABLE 4.12-1**
**DELANO POPULATION ESTIMATES 2000–2014**

| | 2000 | 2010 | 2014 | Percentage Growth 2000-2014 | Average Annual Growth Rate 2000–2014 |
|---|---|---|---|---|---|
| Total Population | 39,499 | 53,041 | 52,591 | 33.1% | 2.19% |
| Inmate Population | 4,805[a] | 10,530[a] | 8,540[b] | 77.7% | 4.19% |
| Net Population | 34,019 | 42,511 | 44,051 | 29.5% | 1.86% |
| Total Households | 8,409 | 10,260 | 10,418 | 23.9% | 1.54% |
| Average Household Size[c] | 4.02 | 4.11 | 4.21 | — | — |

*Source: DOF 2000, 2014*

*Notes:*

*a. Total persons in group quarters: 2000 = 4,982; 2010 = 10,719*

*b. DOF estimates include all persons identified as living in group quarters as a whole (8,729). The 2014 inmate population estimate assumes that those non-inmate persons living in group quarters (189) in the 2010 Census has not changed in 2014.*

*c. Does not include those persons identified as living in group quarters.*

Delano is forecast to reach a population of 60,100 by the year 2020 (Kern COG 2014, p. 3-4). This would be a nearly 14.2 percent increase from the city's current (2014) population of 52,591. According to the Kern Council of Governments (Kern COG), Delano will reach a population of 68,100 by 2030.

### HOUSING

#### Housing Trends

As shown in **Table 4.12-2**, the city had a total of 8,830 housing units in 2000 and as of 2014 is estimated to have a total of 10,882 housing units, an increase of approximately 21.3 percent.

Vacancy rates are an indicator of both housing supply and demand. Low vacancy rates indicate an undersupply of housing; housing costs may be inflated, and households may find it difficult to find housing with an affordable monthly payment. A high number of vacant units indicates an oversupply of housing. A 4–6 percent vacancy rate is considered to allow the housing market to operate efficiently (Delano 2005, p. 5-28). In 2000, the vacancy rate in Delano was estimated to be approximately 4.8 percent. By 2010, this number had decreased to 3.5 percent, which is below the optimal rate. However, by 2014 the vacancy rate increased to 4.2 percent.

**TABLE 4.12-2**
**DELANO HOUSING UNITS AND VACANCY RATE 2000–2014**

| | 2000 | 2010 | 2014 | Percentage Growth 2000–2014 | Average Annual Growth 2000–2014 |
|---|---|---|---|---|---|
| Total Housing Units | 8,830 | 10,713 | 10,882 | 21.3% | 1.50% |
| Occupied Housing Units | 8,409 | 10,260 | 10,422 | 22.0% | 1.54% |
| Vacancy Rate | 4.8% | 3.5% | 4.2% | — | — |

*Source: DOF 2000, 2014*

The city is forecast to reach a total of 11,600 housing units by the year 2020 (Kern COG 2014). This would be a nearly 6.5 percent increase from its current (2014) housing unit total of 10,882.

## Housing Stock

As described above, Delano had a total of 10,882 housing units in 2014. Approximately 74.6 percent of the housing units in the city were in the single-family unit category (see **Table 4.12-3**). Multifamily units represented approximately 21.3 percent and mobile homes represented approximately 4.1 percent of the housing stock (DOF 2014).

**TABLE 4.12-3**
**DELANO HOUSING UNITS BY TYPE**

| Housing Unit Type | 2010 | | 2014 | | Percentage Change |
|---|---|---|---|---|---|
| | Units | Percentage of Total | Units | Percentage of Total | |
| Single-Family | | | | | |
| Detached | 7,548 | 70.5% | 7,647 | 70.3% | 1.3% |
| Attached | 468 | 4.4% | 468 | 4.3% | 0.0% |
| **Total Single-Family** | **8,016** | **74.8%** | **8,115** | **74.6%** | **1.2%** |
| Multifamily | | | | | |
| 2–4 Units | 1,245 | 11.6% | 1,245 | 11.4% | 0.0% |
| 5+ Units | 1,003 | 9.4% | 1,073 | 9.9% | 7.0% |
| **Total Multifamily** | **2,248** | **21.0%** | **2,318** | **21.3%** | **3.1%** |
| Other | | | | | |
| Mobile Homes | 449 | 4.2% | 449 | 4.1% | 0.0% |
| **Total Housing Units** | **10,713** | **100.0%** | **10,882** | **100.0%** | **1.6%** |

*Source: DOF 2014*

## 4.12.2 REGULATORY SETTING

### STATE

#### California Housing Policies

State policies affecting land use regulations in cities throughout California are included in housing policies as established by the Housing Element of the Delano General Plan. The Housing Element is the primary policy document regarding the development, rehabilitation, and preservation of housing for all economic segments of the population within a jurisdiction and is required by law. Accordingly, Delano's Housing Element identifies and analyzes the existing and projected housing needs and states goals toward providing sufficient housing. The element contains policies, quantified objectives, and implementation programs for the preservation, improvement, and development of housing in Delano.

State law sets out a process for determining each local jurisdiction's fair share of regional housing needs, called the Regional Housing Needs Allocation (RHNA). As a first step in the process, the California Department of Housing and Community Development (HCD) assigns each regional council of governments a needed number of new housing units for that region, including affordable housing.

### LOCAL

#### City of Delano General Plan

The Delano General Plan was adopted in 2005 and serves as the overall guiding policy document for land use, development, and environmental quality in the city. The Housing Element of the General Plan was updated in 2012 and identifies that by the year 2020, the city is anticipated to have a population of 68,000 (Delano 2012, p. 2-2). This population estimate was derived from the 2010 Regional Transportation Plan (RTP) prepared by Kern COG. However, this estimate is inconsistent with the 2014 RTP of 60,100 persons for the city by the year 2020 (Kern COG 2014, p. 3-4). The City's General Plan does not have any population and housing policies or programs that have been implemented for the protection of the natural environment.

#### Kern Council of Governments 2014 Regional Transportation Plan

Kern COG is the state affiliate data center for Kern County. It oversees transportation plans, programs, and transportation-related projects for its eleven cities: Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, and Wasco. In addition, Kern COG has oversight of similar plans, programs, and projects in the unincorporated areas of Kern County. In 2001, the Kern COG Board adopted a policy to revisit the regional growth forecast every 3–5 years. The Board has adopted forecasts three times since the policy was implemented.

The highly successful forecast and planning assumptions process is implemented by joint subcommittees: the Kern COG Transportation Technical Advisory Committee (TTAC), the Regional Planning Advisory Committee (RPAC), and the Transportation Modeling Committee (TMC). The Kern COG Board set up the TMC in May 2001 with the adoption of the Transportation Modeling Policy and Procedure. This procedure was reconfirmed with the adoption of a Memorandum of Understanding on Transportation Modeling Coordination between the California Department of Transportation (Caltrans), City of Bakersfield, Kern County, and Kern COG on January 15, 2004. The TMC consists of the technical staff from Kern COG member

agencies' planning and public works departments. The committee is also responsible for sub-area distribution of the growth forecast as well as numerous other regional transportation modeling issues.

As previously stated, Kern COG (2014, p. 3-4) has forecast that Delano will reach a population of 60,100 by the year 2020 and a population of 68,100 by 2030.

## 4.12.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

According to California Environmental Quality Act (CEQA) Guidelines Appendix G, impacts to population, housing, and socioeconomics are considered significant if implementation of the project would result in any of the following conditions:

1) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).

2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.

3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

### METHODOLOGY

Evaluation of potential population and housing impacts of the proposed project was based on data obtained from the California Department of Finance, and the Kern Council of Governments, as well as the project site's development potential as provided in Section 3.0, Project Description, of this EIR. The focus of the analysis is on the proposed project's potential to directly and/or indirectly induce growth in the region or displace a substantial number of existing housing units or residents. As stated above, the City's General Plan Housing Element was updated in 2012 and identifies that by the year 2020, the city is anticipated to have a population of 68,000 (Delano 2012, p. 2-2). This population estimate was derived from the 2010 Regional Transportation Plan prepared by Kern COG (Delano 2012, p. 2-2). However, since preparation of the City's General Plan Housing Element, Kern COG has updated the 2010 Regional Transportation Plan and associated regional population forecasts. Therefore, for the purposes of this analysis, population growth resulting for the proposed project has been compared with the population estimates of both the Delano General Plan Housing Element and the 2014 Kern COG Regional Transportation Plan.

### PROJECT IMPACTS AND MITIGATION MEASURES

#### Induce Substantial Population Growth (Standard of Significance 1)

**Impact 4.12.1** Implementation of the proposed project would result in an increase of 3,583 new residents in Delano. This is a **less than significant** impact.

Buildout of the proposed Vineyard at Delano project would include the development of up to 432 residential units. Buildout of the proposed West Pavilion project would include an additional

440 residential units. As previously stated, the average household size in Delano was estimated to be 4.21 in 2014. Based on this average household size, the Vineyard project site would provide housing for approximately 1,818 persons (432 units x 4.21 persons per household) persons at full buildout and the West Pavilion project site would provide housing for approximately 1,852 persons (440 units x 4.21 persons per household). Therefore, full implementation of both the Vineyard and West Pavilion projects would result in an increase of 3,670 new residents in Delano.

Given the city's current (2014) population of approximately 52,591, this would represent a 7.0 percent increase in the city's population to approximately 56,261. This increase would be within the year 2020 population forecast of 68,000 cited in the General Plan Housing Element (Delano 2012, p. 2-2). Similarly, this increase would be within the year 2020 population forecast (60,100) and the year 2030 population forecast (68,100) estimated by Kern COG (Kern COG 2014, p. 3-4).

In addition, implementation of the proposed West Pavilion project would result in the construction of up to 340,000 square feet of retail and restaurant uses. This development would result in the addition of jobs, which could affect population in the city if the employment demand requires employees from outside the city. Potential growth-related impacts could result if the jobs generated by the proposed West Pavilion project require a significant number of highly skilled or trained personnel currently not available in the community. However, the new jobs created by the West Pavilion project would likely include nontechnical retail sales and service jobs. Thus, it is unlikely that the jobs created by the project would require personnel from outside the community.

Moreover, the unemployment rate of 26.8 percent currently experienced in the city is the highest in the state (Homefacts 2014) and is such that the city could easily absorb the retail, restaurant, and office jobs generated by the project. Furthermore, the proposed project would create short-term employment related to design and construction. If workers were to move into the area to fill these positions, additional housing, public services, and utilities would be required to accommodate the new residents, and environmental effects would result. However, given the high unemployment rate in the city, it can be assumed that these positions would likely be filled by local workers, resulting in a positive effect on the local economy and no additional environmental effects.

Because the anticipated growth was planned for by the City in its General Plan as well as by Kern COG, the proposed project would not result in substantial unexpected population growth or growth for which inadequate planning has taken place. As such, the proposed project's potential to result in direct growth inducement is considered to be a **less than significant** impact.

Mitigation Measures

None required.

### Displacement of a Substantial Number of Persons or Housing (Standards of Significance 2 and 3)

**Impact 4.12.2** Implementation of the proposed project would occur on vacant property and would not result in the displacement of a substantial number of housing or people. Therefore, there would be **no impact** in association with displacement of housing or people.

The project site is currently vacant of any structures. Since the project site is currently vacant, no housing units or people would be affected and the construction of replacement housing is not

required. Therefore, there would be **no impact** in association with displacement of housing or people.

Mitigation Measures

None required.

### 4.12.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The setting for the cumulative analysis generally includes Delano and surrounding unincorporated areas of Kern County and all existing, proposed, approved, and planned projects in these areas.

Development in the cumulative setting area would change the intensity of land uses in the region and would provide additional housing, employment, shopping, and recreational opportunities. This projected regional growth would result in significant environmental effects. The reader is referred to the other technical sections of this EIR for a complete analysis of the anticipated cumulative environmental effects of anticipated regional growth in combination with the proposed project.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

**Cumulative Growth Inducement**

**Impact 4.12.3** The proposed project, in combination with other existing, approved, proposed, and reasonably foreseeable development in Delano and the region, could result in substantial growth inducement. This impact is **less than cumulatively considerable**.

Cumulative development in Delano would result in substantial, direct population growth through the construction of new housing units and the creation of new employment opportunities. In addition, such development could result in indirect growth through the extension of existing and the construction of new roadways and infrastructure. As described under Impact 4.12.1, the proposed project's potential to result in direct growth inducement is considered to be a less than significant impact on its own. Other reasonably foreseeable development in the city includes the Grapevine project located directly adjacent to the Vineyard at Delano project site. However, this project is not residential in nature, as it involves the development of a regional shopping center. Therefore, it would not contribute to population growth. In addition, no reasonably foreseeable development is proposed near Delano within the unincorporated county. For these reason, this impact is considered to be **less than cumulatively considerable**.

Mitigation Measures

None required.

## REFERENCES

Delano, City of. 2005. *Delano General Plan*. Adopted December 2005. http://www.cityofdelano.org/index.aspx?nid=113.

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DOF (California Department of Finance). 2000. *E-8 Historical Population and Housing Estimates for Cities, Counties and the State, January 1, 2011–2014 with 2010 Benchmark*.

———. 2014. *E-5 Population and Housing Estimates for Cities, Counties and the State, January 1, 2011–2014 with 2010 Benchmark*.

Homefacts. 2014. Delano, CA, Unemployment Rate Report. Accessed August 11. http://www.homefacts.com/unemployment/California/Kern-County/Delano.html.

Kern COG (Kern Council of Governments). 2014. *2014 Regional Transportation Plan.*

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This section discusses potential environmental impacts associated with public services that would serve the project area. Public services include fire protection, law enforcement, schools, parks and recreation, and the library.

## 4.13.1 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

### 4.13.1.1 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES ENVIRONMENTAL SETTING

**Kern County Fire Department**

The Kern County Fire Department (KCFD) provides fire protection and suppression and emergency medical response in the city. The KCFD has 625 permanent employees protecting an area of over 8,000 square miles. Over 546 uniformed firefighters are stationed in 46 fire stations throughout Kern County (KCFD 2014).

The city is served by two KCFD stations. Station #34 is located at 1001 12th Avenue, approximately 1.75 miles for the project site. Station #37 is located at 132 West 11th Avenue, approximately 1.5 miles from the project site. In 2012, Station #34 responded to 1,435 calls including 202 fires and 540 medical calls. Station #37 responded to 1,325 calls including 237 fires and 480 medical calls (KCFD 2012, p. 10). According to the Delano General Plan, these two stations were adequate for the population of the city in 2005 (Delano 2005, p. 8-5). However, General Plan Safety Element Objective B, Policy 1b presents a fire station standard of one station for every 14,000 persons (Delano 2005, p. 9-11). The current (2014) population is estimated at 44,051 (see **Table 4.12-1** in Section 4.12, Population and Housing). This would indicate that the city is in need of one additional fire station at this time.

### 4.13.1.2 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES REGULATORY SETTING

**State**

California Occupational Safety and Health Administration

In accordance with the California Code of Regulations, Title 8, Sections 1270 “Fire Prevention” and 6773 “Fire Protection and Fire Fighting Equipment,” the California Occupational Safety and Health Administration (Cal/OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Uniform Fire Code

The Uniform Fire Code contains regulations relating to construction, maintenance, and use of buildings. Topics addressed in the code include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The code also contains specialized technical regulations related to fire and life safety.

California Health and Safety Code

State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code, which includes regulations for building standards, fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, high-rise buildings, childcare facility standards, and fire suppression training.

**Local**

City of Delano General Plan

The General Plan identifies specific objectives, policies, and safety hazard programs regarding fire protection and emergency medical services. The following objective, policies, and program are applicable to the proposed project:

*Public Services and Facilities Element*

*Public Facilities Improvement Policies*

3. Developers shall prepare an infrastructure and public services assessment as part of each annexation application determine infrastructure needs, feasibility, timing, and financing.

19. A finding shall be made by the Public Works Department to document that an adequate supply of potable water can be provided to serve the domestic and fire suppression needs of each proposed development prior to approval by the City Council.

*Safety Element*

*Safety Element Objectives*

B. Provide adequate fire protection services throughout the Delano Planning Area.

*Safety Element Policies*

1. Promote and encourage adequate fire control within the Delano Planning Area.

    a. Ensure that all sectors of the City maintain adequate water pressure and water supply for firefighting purposes.

    b. Maintain an effective and well-trained Fire Department that will protect the community from fire danger, meeting the Kern County Fire Department standard of one fire company for every 14,000 residents.

    e. Utilize proper mitigation measures to protect new development from areas with high brush fire potential.

*Safety Hazard Action Programs*

14. The Fire Marshal shall, in conjunction with the Chief Building Official, require the installation of smoke detectors in residential dwelling units.

### 4.13.1.3 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES IMPACTS AND MITIGATION MEASURES

**Standards of Significance**

The impact analysis provided below is based on the following California Environmental Quality Act (CEQA) Guidelines Appendix G threshold of significance. A public services impact with regard to fire protection is considered significant if implementation of the project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection.

**Methodology**

The following impact analysis is based on a review of the project description and the City of Delano General Plan, as well as identification of existing KCFD facilities and services.

**Project Impacts and Mitigation Measures**

Fire Protection and Emergency Medical Services (Standard of Significance 1)

**Impact 4.13.1.1** Implementation of the proposed project would increase demand for fire protection services that could trigger the need for additional fire stations, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

As the project area develops, the demand for fire protection and emergency medical services would increase. Due to the increase in residents, estimated at 3,670 persons, and jobs the proposed project would generate, the need for additional firefighters and emergency medical personnel may result from an increased demand for services. However, the addition of firefighters and emergency personnel is not considered an environmental impact under CEQA. The addition of fire facilities needed to serve a project would be considered an impact and therefore analyzed. The need for new fire stations/facilities is based on a level of service (LOS) standard identified by the City. For Delano, the LOS standard is established in Safety Element Policy 1b, which states, "Maintain an effective and well-trained Fire Department that will protect the community from fire danger, meeting the Kern County Fire Department standard of one fire company for every 14,000 residents." The current non-incarcerated population of the city is 44,051 (see **Table 4.12-1**). Based on Safety Element Policy 1b, the city's population would necessitate three fire stations. Currently, there are two fire stations in Delano. The addition of the proposed project's population of 3,670 would result in a total population in the city of 47,721. This would increase the number of fire stations required by Policy 1b to three.

The two fire stations in the city are located less than 2 miles from the project site. The stations have a response time of approximately 4 minutes to the project site. The City collects development impact fees for fire protection facilities in Delano and would require the project to pay this fee. The payment of these fees would assist in the development of new fire stations, as needed, including any necessary environmental analysis. Fee programs are regularly evaluated

and updated to ensure adequate service levels are maintained. Physical impacts associated with the provision of fire and emergency medical services would be **less than significant**.

Mitigation Measures

None required.

### 4.13.1.4 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for fire and emergency medical services includes all approved, proposed, and reasonably foreseeable development projects in the city.

**Cumulative Impacts and Mitigation Measures**

Cumulative Impacts to Fire Protection and Emergency Medical Services

**Impact 4.13.1.2** Implementation of the proposed project, in combination with other development in the city, would increase demand for fire protection and emergency medical services. This impact would be **cumulatively considerable**.

Delano General Plan Safety Element Policy 1b requires one fire company for every 14,000 residents. The proposed project, in combination with other proposed, approved, and reasonably foreseeable development in the city, would contribute to a cumulative increase in the demand for fire protection and emergency medical services. Based on existing population and the proposed project's anticipated population, Policy 1b would require additional fire facilities in the City. While funding from property taxes, development impact fees, and other alternative sources of funding would provide resources to expand fire department staff, equipment, and facilities to accommodate future growth within the KCFD service area, the project's anticipated population of 3,670 would represent 26 percent of the 14,000 resident demand factor. Therefore, the proposed project's contribution to this impact would be **cumulatively considerable** and require mitigation.

Mitigation Measures

**MM 4.13.1.1** The project applicant shall dedicate land not to exceed 0.75 acres to the City within the West Pavilion project site for potential development of a future fire station by the City and/or Kern County Fire Department. The project applicant shall not be responsible for planning and construction of the fire station, only the dedication of land described above. Any future development of a fire station will be the responsibility of the City, in coordination with the Kern County Fire Department.

*Timing/Implementation:* *Prior to the issuance of a building or grading permit.*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

Implementation of mitigation measure **MM 4.13.1.1** would reduce this impact to a less than significant level.

## 4.13.2 LAW ENFORCEMENT

### 4.13.2.1 LAW ENFORCEMENT ENVIRONMENTAL SETTING

**Delano Police Department**

The Delano Police Department provides police protection at the project site. According to 2012 statistics, the department currently employs 68 full-time employees, including 42 sworn police officers. The City's police station is located at 2330 High Street, approximately three miles from the project site. Police level of service (LOS) ratios are usually based on the number of officers per 1,000 residents. General Plan Safety Element Objective C Policy 1 identifies the City's LOS ratio for police services as 1.4 equivalent officers for every 1,000 persons to the extent feasible. Equivalent officers include non-sworn field staff. The current police LOS ratio is 1.54 officers per 1,000 persons. This ratio is based on the number of equivalent officers (68) in the city and the 2014 population estimate of 44,051 (see **Table 4.12-1**).

The Police Department is divided into three divisions: Administration, Patrol, and Investigation. The Administration Division includes school resource officers, animal control officers and shelter volunteers, reserves, explorers, and property and evidence. The Patrol Division consists of 1 commander, 4 sergeants, 4 police corporals, 20 patrol officers, and 15 reserve officer positions (Delano 2014a). The Patrol Division responds to all calls for service seven days a week, 24 hours a day. The Investigations Division conducts investigations on homicide, robbery, sexual assault, financial/computer crimes, narcotics, and traffic accident investigations.

In 2012, there were 274 violent crimes (0 murders, 6 rapes, 53 robberies, and 215 aggravated assaults) and 1,437 property crimes (545 burglaries, 552 larceny-thefts, 340 vehicle thefts, and 34 arsons) reported in the city (FBI 2012). The number of violent crimes increased from 247 in 2010 to 274 in 2012. This is mainly due to an increase in aggravated assault (186 in 2010 and 215 in 2012). During the same time period, property crimes decreased by 214 (1,638 in 2010).

Incremental costs associated with new development are captured in part by public facilities development impact fees imposed on all new development by the City of Delano in accordance with the then-applicable fee schedule. These fees include funds for law enforcement facilities, equipment, and infrastructure, but may not be used to provide additional staffing.

### 4.13.2.2 LAW ENFORCEMENT REGULATORY SETTING

**Local**

Delano General Plan

The General Plan identifies specific objectives and policies regarding law enforcement. The following objective and policies are applicable to the proposed project:

*Public Services and Facilities Element*

*Public Facilities Improvement Policies*

3. Developers shall prepare an infrastructure and public services assessment as part of each annexation application determine infrastructure needs, feasibility, timing, and financing.

*Safety Element*

*Safety Element Objectives*

C. Provide adequate law enforcement services to the City.

*Safety Element Policies*

1. Maintain police staffing ratios of 1.4 equivalent officers for every 1,000 persons to the extent feasible. An equivalent officer includes non-sworn field staff.

### 4.13.2.3 LAW ENFORCEMENT IMPACTS AND MITIGATION MEASURES

**Standards of Significance**

The impact analysis provided below is based on the following CEQA Guidelines Appendix G threshold of significance. A public services impact with regard to law enforcement is considered significant if implementation of the project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.

**Methodology**

The following impact analysis is based on identification of existing Delano Police Department services and facilities as well as review of the Delano General Plan.

**Project Impacts and Mitigation Measures**

Impacts to Police Protection Services (Standard of Significance 1)

**Impact 4.13.2.1** Implementation of the proposed project would increase demand for law enforcement services that may trigger the need for additional law enforcement personnel, equipment, and facilities, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

Development of the project is estimated to increase the population of the city by 3,670 persons. Based on the LOS standard identified in General Plan Safety Element Policy 1, which requires that police staffing ratios be maintained at 1.4 equivalent officers for every 1,000 persons, the project would result in a need for an additional five officers. While the increase of five officers would place

additional monetary demands on the City to pay and equip the officers, this increase would not result in the need for new or expanded facilities. In December 2013, the City opened the new police station. The Police Department operates out of this centralized facility and does not currently use any other facilities such as substations. Therefore, no new law enforcement facilities would be needed to serve the project. This impact would be **less than significant**.

Mitigation Measures

None required.

#### 4.13.2.4 LAW ENFORCEMENT CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for law enforcement services includes all approved, proposed, and reasonably foreseeable development projects in Delano.

**Cumulative Impacts and Mitigation Measures**

Cumulative Law Enforcement Impacts

**Impact 4.13.2.2** Implementation of the proposed project, in combination with other development in Delano, would increase demand for law enforcement services. This impact would be **less than cumulatively considerable**.

The proposed project, in combination with other proposed, approved, and reasonably foreseeable development in the city, would contribute to a cumulative increase in the demand for law enforcement services. Funding from property taxes, development impact fees, and other alternative sources of funding would provide sufficient resources to expand the Delano Police Department's staff and equipment to accommodate future growth in the city. As described under Impact 4.13.2.1, the Police Department operates from a new centralized facility and would not require any new facilities, such as substations, as the city develops. Therefore, this impact would be less than significant, and the proposed project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

None required.

### 4.13.3 PUBLIC SCHOOLS

#### 4.13.3.1 PUBLIC SCHOOLS ENVIRONMENTAL SETTING

The Delano Union School District (DUSD) and the Delano Joint Union High School District (DJHSD) provide public educational services in the city. The DUSD includes one K–8 school, eight elementary schools, and three middle schools and has 7,685 students in the 2013/14 school year (CDE 2014). The DJUHSD has four high schools serving a student population of 4,238 in the 2013/14 school year (CDE 2014). In addition, two public charter schools—Paramount Bard Academy and Sequoia Christina Academy—are located in Delano. Paramount Bard Academy provides educational opportunities for grades 6 through 12. This school had an enrollment of 582 students during the 2012/13 school year (Paramount Bard Academy 2013). Sequoia Christian

Academy serves students in kindergarten through eighth grade. Also located in the city are the secondary educational facilities of Bakersfield College, Delano Campus, and the University of La Verne, Kern County Campus. The Delano Campus of Bakersfield College provides the community with local access to Bakersfield College programs and services. The University of La Vern has colleges in the disciplines of Arts and Sciences, Business and Public Management, Education and Organizational Leadership, and Law.

The nearest public education facilities to the project site are Nueva Vista Language Academy, which is located at 120 Garces Highway approximately 0.75 miles from the project site. Almond Tree Middle School is located at 1210 West 15th Street and Kennedy High School at 1401 Hiett Avenue, each approximately 1.8 miles from the project site. Nueva Vista Academy had an enrollment of 603 students, Almond Tree Middle School had an enrollment of 727 students, and Kennedy High School had an enrollment 1,101 students during the 2013/14 school year (CDE 2014).

Incremental costs associated with new development are captured in part by development impact fees imposed on all new development, in accordance with state law, by the DUSD and the DJUSD. These fees are assessed on all new residential construction. The DUSD (2014b) School Facilities Needs Analysis analyzed the potential impacts to K–8 school facilities and the need for future facilities resulting from future growth in Delano. This analysis determined that the DUSD did not have enough existing capacity to meet the needs of future development and that the school district must construct a new school as a result (DUSD 2014b, p. 21). As such, the analysis determined that the future need, along with other factors, allowed the DUSD to adopt Level 2 and Level 3 development impact fees per the Leroy F. Greene School Facilities Act of 1998. The Level 2 fee was established at $4.29 per square foot for residential dwellings and the Level 3 fee was established at $8.58 per square foot for residential units. Currently, the DUSD only charges the Level 2 fee. The current DUSD Level 1 impact fee is $2.18 per square foot for residential development and $0.35 per square foot for commercial/industrial development. The current DJHSD Level 1 fee is $1.18 per square foot for residential development and $0.19 per square foot for commercial/industrial development (DUSD 2014b, p. 5).

### 4.13.3.2 PUBLIC SCHOOLS REGULATORY SETTING

**State**

Leroy F. Greene School Facilities Act of 1998 (SB 50)

California voters approved Proposition 1A in November of 1998. Proposition 1A authorized $9.2 billion in state general obligation bonds for the financing of school facilities. Proposition 1A's companion legislation (Chapter 407, Statutes of 1998, SB 50) went into effect upon the measure's approval. SB 50 significantly altered the system of fees that can be placed on new development in order to pay for the construction of school facilities. Prior to the passage of Proposition 1A, school districts were limited in the amount of school facility developer fees they could charge. Also, as a result of the Mira, Hart, and Murietta decisions made in the years preceding the passage of Proposition 1A, cities and counties were able to impose additional school facility fees on development as a condition of obtaining land use approval. Senate Bill (SB) 50 and Proposition 1A provided a comprehensive school facilities financing and reform program by authorizing the $9.2 billion school facilities bond issue, school construction cost containment provisions, and an eight-year suspension of the Mira, Hart, and Murrieta court cases. SB 50 created different levels of developer fees and prohibited local agencies from denying either legislative or adjudicative land use approvals on the basis that school facilities are inadequate. They also reinstated the school facility fee cap for legislative actions, which is adjusted biannually in January. According to Government Code Section 65996, the

development fees authorized by SB 50 are deemed to be full and complete school facilities mitigation. These provisions were in effect until 2006 and will remain in place as long as subsequent state bonds are approved and available.

The three levels of developer fees established by SB 50 are described below.

1) Level 1 fees are base statutory fees. As of January 22, 2014, the maximum assessment for fees was $3.36 per square foot of residential development and $0.54 per square foot of commercial/industrial development.

2) Level 2 fees allow the school district to impose developer fees above the statutory levels, up to 50 percent of certain costs under designated circumstances. The State will match the 50 percent funding if funds are available.

3) Level 3 fees apply if the State runs out of bond funds after 2006, allowing the school district to impose 100 percent of the cost of the school facility or mitigation minus any local dedicated school monies.

In order to levy the alternate (Level 2) fee and qualify for 50 percent State-matching funds, a school district must prepare and adopt a School Facilities Needs Analysis, apply and be eligible for state funding, and satisfy specified criteria. The ability of a city or county to impose fees is limited to the statutory and potential additional charges allowed by the act, as described above.

### Local

City of Delano General Plan

The General Plan identifies specific objectives and policies regarding public facilities, including schools. The following policy is applicable to the proposed project:

*Public Services and Facilities Element*

*Public Facilities Improvement Policy*

3. Developers shall prepare an infrastructure and public services assessment as part of each annexation application determine infrastructure needs, feasibility, timing, and financing.

### School District Funding

Delano Unified School District and Delano Joint Union High School District operations are primarily funded through local property tax revenue that is first accrued in a common statewide pool and then allocated to each school district on the basis of average daily attendance. State law also permits the charging of development fees to assist the DUSD and the DJUHSD in funding capital acquisition and improvements to programs for school facilities, based on documented justification that residential and nonresidential development projects generate students.

### 4.13.3.3 PUBLIC SCHOOLS IMPACTS AND MITIGATION MEASURES

**Standards of Significance**

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A public services impact with regard to public schools is considered significant if implementation of the project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools.

**Methodology**

Evaluation of potential public school impacts was based on student generation calculations discussed previously and existing school facilities and services.

**Project Impacts and Mitigation Measures**

Public School Facilities (Standard of Significance1)

**Impact 4.13.3.1** Implementation of the proposed project would result in the generation of school-age children that may require the construction of new public school facilities, the construction of which could have impacts on the physical environment. This impact would be **less than significant**.

Different methods are available to determine the potential student population of a proposed project. If a school district has student generation factors, those can be used to project the future student population of a proposed project. While the DUSD does have student generation factors, they are based on single-family residential development and as such do not necessarily relate to the proposed project, as the project's residential units are multi-family. Single-family units usually have a higher student population than multi-family units because the majority of single-family units generally have more bedrooms than multi-family units, allowing for a larger household size. Additionally, these student generation factors do not account for students attending private schools or schools outside the districts. As such, this analysis uses the 2010 Census population by age proportions to determine the proposed project's student population.

As discussed in Section 4.12, Population and Housing, the projected population of the proposed project's residential units is 3,670. According to the 2010 Census, school-age persons (ages 5 through 18) represented 27.8 percent of the city's population in 2010 (US Census Bureau 2010, Table QT-P2). Student ages broken down by school type are:

- Elementary school students (ages 5–11) = 13.8 percent of total population
- Middle school students (ages 12–14) = 5.8 percent of total population
- High school students (ages 15–18) = 8.2 percent of total population

Using the project population and the student percentage, an estimated number of students can be determined for the proposed project as follows:

- Elementary school students (ages 5–11) = 506
- Middle school students (ages 12–14) = 213
- High school students (ages 15–18) = 301

The proposed project does not include the development of any schools. New students would attend public schools at campuses located in Delano. The nearest public education facilities to the project site are Valley Vista Elementary School, Almond Tree Middle School, and Kennedy High School.

However, the proposed project alone would not trigger the need for additional school facilities, and exceeding school capacity would not be considered a physical impact under CEQA. California Government Code Section 65995(h) states that "the payment or satisfaction of a fee, charge or other requirement levied or imposed...[is] deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization as defined in Section 56021 or 56073, on the provision of adequate school facilities." The proposed project's residential development would be subject to the school district impact fees in place at the time an application is submitted for a building permit. Under CEQA, payment of school district development impact fees is considered to mitigate the need for school facilities generated by project implementation. Therefore, anticipated impacts to schools would be **less than significant**.

Mitigation Measures

None required.

### 4.13.3.4 PUBLIC SCHOOLS CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for the proposed project is the service area of the Delano Union School District and the Delano Joint Union High School District. Recently approved and proposed projects, and any other reasonably foreseeable development envisioned by the City of Delano General Plan and in surrounding areas in the district, constitute the cumulative setting for schools.

**Cumulative Impacts and Mitigation Measures**

Cumulative Public School Impacts

**Impact 4.13.3.2** Implementation of the proposed project, in combination with other development in the DUSD and DJUHSD service areas, would result in the generation of additional students. Each project would be required to pay development fees on a project-by-project basis, which would fund school facility construction. This impact would be **less than cumulatively considerable**.

The proposed project, in combination with other planned and approved projects in the DUSD and DJUHSD service areas, would cumulatively increase student population in the districts. While some development projects would include school sites, providing new school sites would result in cumulative environmental impacts on traffic congestion, noise, potential loss of habitat, water, solid waste, etc. The environmental impacts associated with the development of future school sites would be evaluated individually by the DUSD and the DJUHSD for project-specific and cumulative impacts as required by the State Board of Education and CEQA.

Per California Government Code Section 65996, the adoption of all or some combination of Mello-Roos taxes and SB 50 funding fully mitigates the potential cumulative impacts on school and related facilities. Funding is currently available from statewide school bonds as discussed in the Regulatory Setting subsection above. The existing funding mechanisms, bond measures within the school districts, and compliance with Delano General Plan Public Facilities Improvement Policy 3 would reduce cumulative impacts on school facilities. Therefore, this impact would be less than significant, and the proposed project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

None required.

## 4.13.4 PARKS AND RECREATION

### 4.13.4.1 PARKS AND RECREATION ENVIRONMENTAL SETTING

The City of Delano provides parks and recreation services to the community through its Community Services Department. The city has approximately 75 acres of parkland in ten existing parks, including a 40-acre soccer park and a skate park. The parks range from 3 to 40 acres in size. **Table 4.13.4-1** identifies the amenities at each park. Additionally, the Delano Public Golf Course is a City-owned nine-hole course. Further, Kern County's Delano Memorial Park is located in the city and Lake Woollomes is about 3 miles east of the city. All of the park and recreational facilities in the area are located within 4 miles of the proposed project site. The Delano Soccer Park is directly south of the project site.

**TABLE 4.13.4-1**
**CITY PARKS**

| Park | Location | Amenities | Distance from Project Site (miles) |
|---|---|---|---|
| **City Parks** | | | |
| Albany Park | Albany St. and 20th Ave. | Two covered gazebos, children's play area, picnic tables, restrooms | 2.2 |
| Cecil Park | Cecil Ave. and Norwalk St. | Gazebos, children's play area, picnic tables, restrooms, stage, basketball courts, skate park | 2.3 |
| Caesar Chavez Park | Ellington St. and 10th Ave. | Gazebo, children's play area, picnic tables, restrooms, baseball fields | 1.4 |
| Delano Soccer Park | 1150 S. Stradley Ave. | Five soccer fields, two football fields, restrooms, concession building | 0.25 |
| Delano Skate Park | Cecil Park south | Skate park | 2.1 |

| Park | Location | Amenities | Distance from Project Site (miles) |
|---|---|---|---|
| Jefferson Park | Jefferson St. and 5th Ave. | Gazebo, children's play area, picnic tables, restrooms, tennis courts, baseball field | 1.3 |
| Kalibo Park | Kalibo St. and Alila Ave. | Gazebo, children's play area, picnic tables, restrooms | 2.9 |
| Morningside Park | 20th Ave. and Morningside St. | Picnic tables, restrooms, volleyball pit, baseball field | 3.0 |
| Martin Luther King Jr. Park | Garces Hwy and Austin St. | Gazebos, children's play area, picnic tables, restrooms, water park | 0.9 |
| Veneto Park | Veneto St. and Primavera Dr. | Children's play area, picnic tables, restrooms, basketball court, exercise station | 3.5 |
| Delano Public Golf Course | Lexington St. | Nine-hole golf course, driving range | 1.1 |
| **County Parks** | | | |
| Delano Memorial Park | 100 Lexington St. | Lighted baseball stadium with bleachers, concession stand, and brick dugouts, softball field, t-ball field, two tot lots, play equipment, group picnic areas, raised platform/stage, arena with bleachers, concession buildings, large lighted restroom | 1.2 |
| Lake Woollomes | East of city on Woollomes Ave. | Boat launch, caretaker residence, basketball court, tot lot, restroom buildings, two swing sets, fenced group picnic shelter | 4.0 |

*Source: Delano 2014b; Kern County 2010*

The Delano Recreation Department offers a multitude of recreational activities for city residents. These include yoga classes, basketball leagues, a spray park, swimming, aerobics, racquetball, movies in the park, family fun day, adult co-ed softball, and fitness boot camp. The Delano Fitness Center is open to the public and is located in the Delano Community Center. Also, the Leonard T. Velasco Technology Center is open to the public and offers 47 computers and meeting rooms (Delano 2014b).

## Park/Facility Standards

General Plan Parks and Recreation Element Policy 6 sets the standard parkland acreage in the city as 3.0 acres per 1,000 people. According to this policy, the acreage may include school district property which is available for use by the public during non-school hours, park ponds (to the extent they are accessible and usable recreational areas), neighborhood parks, pocket parks, community parks, and community recreational facilities. **Table 4.13.4-2** identifies the recreational facilities that should be provided in accordance with the standards shown in General Plan Table 11.1. The City's intent to utilize the maximum allowable park acreage standard (up to 5.0 acres per 1,000 people) should the availability of school facilities for use by the public during non-school hours increase the amount of usable park land within the city above 3.0 acres per 1,000 population (Delano 2005, p. 11-2).

**TABLE 4.13.4-2**
**PARKS AND COMMUNITY STANDARDS AND 2025 DEMANDS**

| Facility Description | Facility Standard | Facility/Unit Standard | Additional Needed Facilities at Buildout |
|---|---|---|---|
| Park Acreage | 5 acres | Per 1,000 persons | 150 acres |
| Swimming Pool | 1 pool | Per 30,000 persons | 1 |
| Community Center | 1 center | Per 30,000 persons | 2 |
| Golf Course | 9 holes | Per 30,000 persons | 1 |
| Tennis Courts | 4 courts | Per 10,000 persons | 3 |
| Basketball Courts | 4 courts | Per 5,000 persons | 6 |
| Baseball Fields | 1 field | Per 5,000 persons | 6 |
| Soccer Field | 1 field | Per 10,000 persons | 3 |

*Source: Delano 2005, Table 11.1*

### 4.13.4.2 PARKS AND RECREATION REGULATORY SETTING

**State**

Quimby Act

The goal of the 1975 Quimby Act (California Government Code Section 66477) was to require developers to help mitigate the impacts of property improvements by requiring them to set aside land, donate conservation easements, or pay fees for park improvements. The act gave authority for passage of land dedication ordinances only to cities and counties, thus requiring special districts to work with cities and/or counties to receive parkland dedication and/or in-lieu fees. The fees must be paid and land conveyed directly to the local public agencies that provide parks and recreation services community-wide. Revenues generated through the Quimby Act cannot be used for the operation and maintenance of park facilities (Westrup 2002).

Originally, the Quimby Act was designed to ensure "adequate" open space acreage in jurisdictions adopting Quimby Act standards (e.g., 3 to 5 acres per 1,000 residents). In some California communities, the acreage fee was very high where property values were high, and many local governments did not differentiate on their Quimby fees between infill projects and greenbelt developments. In 1982, the Quimby Act was substantially amended via Assembly Bill (AB) 1600. The amendments further defined acceptable uses of or restrictions on Quimby funds, provided acreage/population standards and formulas for determining the exaction, and indicated that the exactions must be closely tied (nexus) to a project's impacts as identified through traffic studies required by CEQA.

In other words, AB 1600 requires agencies to clearly show a reasonable relationship between the public need for the recreation facility or park land and the type of development project on which the fee is imposed (Westrup 2002). Cities or counties with a high ratio of parkland to inhabitants can set a standard of 5 acres per 1,000 residents for new development. Cities or counties with a lower ratio can only require the provision of up to 3 acres of parkland per 1,000 residents. The calculation of a city's or county's parkland-to-population ratio is based on a comparison of the population count of the last federal census to the amount of city- or county-owned parkland.

**Local**

City of Delano General Plan

The following General Plan policies are relevant to parks and recreation.

*Parks and Recreation Element Policies*

6. The standard park acreage for residents is 3.0 acres per 1,000 people. This acreage may include school district property, which is available for use by the public during non-school hours, park ponds (to the extent that they are accessible and usable recreational areas), neighborhood parks, pocket parks, community parks and community recreational facilities. Consideration should be given to development of active recreation and sports areas in conjunction with existing and new school facilities. Recreational facilities should be provided in accordance with the standards in Table 4-4. It is the City's intent to utilize the maximum allowable park acreage standard (up to 5.0 acres per 1,000 people) should the availability of school facilities for use by the public during non-school hours increase the amount of usable park land within the city above 3.0 acres per 1,000 population.

17. Parks shall be protected from intrusion by others. Areas designated for park sites shall be preserved through zoning or the specific plan process. Alternative sites to those shown on the Land use Map may be permitted through a General Plan Amendment.

27. Parkland acreage dedication obtained through the provisions of California Government Code section 66477 shall be consistent with the Delano Municipal Code, Section 16.34.

Delano Municipal Code

Municipal Code Chapter 16.34 provides parkland dedication standards for all new residential development in Delano. Section 16.34.030 identifies the park acreage standard of 3.0 acres per 1,000 persons. Section 16.34.040 provides the formula for determining land dedication. Section 16.34.050 provides the formula for in-lieu fees of land dedication. Section 16.34.060 requires the dedication of land as well as the payment of park fee for subdivisions of over 50 parcels.

### 4.13.4.3 PARKS AND RECREATION IMPACTS AND MITIGATION MEASURES

**Standards of Significance**

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A public services impact with regard to parks and recreation is considered significant if implementation of the project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives for parks.

2) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

3) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

### Methodology

The following impact analysis is based on the project's population projections contained in Section 4.12, Population and Housing, as well as the City's park standards contained in the General Plan and Municipal Code Section 16.34.030.

### Project Impacts and Mitigation Measures

Increased Demand for Parks and Recreational Facilities (Standards of Significance 1, 2, and 3)

**Impact 4.13.4.1** Implementation of the proposed project would increase demand for park and recreation facilities, the construction of which could result in impacts on the physical environment. This impact would be **less than significant**.

The General Plan Land Use Map identifies areas of the Delano Planning Area for the Public Facilities land use designation, which includes parks. The project site is not identified on the Land Use Map as a location for parkland.

Municipal Code Section 16.34.040 describes the City's formula for determining land dedication of parks related to new development in the city. This formula uses an average density of 3.40 persons per dwelling unit for Medium Residential land uses such as the proposed project. As described in Section 3.0, Project Description, at buildout the proposed project is anticipated to provide 872 new residential units. Based on the City's Medium Residential standards of 3.40 persons per dwelling unit, the parkland formula would result in a resident population of 2,616 persons. Based on the City's parkland standards, which require a minimum of 3.0 acres of developed parkland per 1,000 residents, the proposed project would generate the need for 7.85 acres of developed parkland.[1]

The proposed project site plan does not include any parkland. The City allows the payment of an in-lieu fee instead of the dedication of land as identified in Municipal Code Section 16.34.070. This fee is based on the fair market value of the land which would otherwise be required for park dedication. Section 16.34.070 provides the City's formula for this fee. The project would be required to either dedicate parkland or pay the in-lieu fee.

Future parkland would be developed by the City as the need arises and funding becomes available. Payment of the in-lieu fee would assist in the future development of parks in the city. The location of these park facilities would be based on land uses identified on the General Plan Land Use Map. Environmental impacts associated with the construction of future park facilities would be addressed when the City proposes the park. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

[1] Required parkland is 2,616 persons/1,000 persons X 3.0 acres = 7.85 acres of parkland required.

### 4.13.4.4 PARKS AND RECREATION CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for parks and recreation is the City of Delano.

Cumulative Impacts and Mitigation Measures

**Cumulative Impacts to Parks and Recreational Facilities**

**Impact 4.13.4.2** Implementation of the proposed project, in combination with other development in the city, would result in a cumulative increase in demand for parkland and recreational facilities, the construction of which could impact the physical environment. This impact would be **less than cumulatively considerable**.

The proposed project, in combination with other proposed, approved, and reasonably foreseeable development in the city, would contribute to a cumulative increase in the demand for parks and recreational facilities. The City ensures that adequate developed parkland and associated facilities are provided to city residents in accordance with the established minimum standard of 3.0 acres of developed parkland per 1,000 residents as part of the development review process. Funding from Quimby Act fees, park development impact fees, and other sources such as property taxes, and grants provide sufficient resources for the design, construction, and maintenance of new parks and associated facilities needed to accommodate future growth in the city. Therefore, this impact would be less than significant. The proposed project would pay in-lieu fees to assist in the development of parkland for future residents and comply with the City standard. Therefore, the proposed project's contribution to this impact would be **less than cumulatively considerable**.

Mitigation Measures

None required.

## 4.13.5 LIBRARY SERVICES

### 4.13.5.1 LIBRARY SERVICES ENVIRONMENTAL SETTING

Library services in Delano are provided by the Kern County Library, which has 24 branches. The Kern County Library system serves a population of over 850,000 persons with 167,124 registered borrowers in 2012 (Kern County Library 2012). Funding for the library system is provided by general purpose discretionary funds, bonds, special use funds, and donations (Kern County Library 2002, p. 14).

The 6,000-square-foot Delano Library, located at 925 10th Avenue, was built in 1966. The library provides access to a collection of approximately 34,394 volumes, as well as the Kern County Library's entire collection, computers, a virtual library and e-books, various events, and public meeting space. The Delano Library is open Tuesday through Thursday from 11:00 a.m. to 7:00 p.m. and on Saturday from 9:00 a.m. to 5:00 p.m. According to the Library Facilities Master Plan, the Delano Library requires 42,323 square feet to meet the needs of a projected city population of 60,000 by the year 2020 (Kern County Library 2002, p. 18). This results in a ratio of 0.71 square feet per person.

### 4.13.5.2 LIBRARY SERVICES REGULATORY SETTING

**Local**

City of Delano General Plan

The General Plan identifies specific objectives and policies regarding public facilities, including schools. The following policy is applicable to the proposed project:

*Public Services and Facilities Element*

*Public Facilities Improvement Policies*

3. Developers shall prepare an infrastructure and public services assessment as part of each annexation application determine infrastructure needs, feasibility, timing, and financing.

### 4.13.5.3 LIBRARY SERVICES IMPACTS AND MITIGATION MEASURES

**Standards of Significance**

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. A public services impact with regard to parks and recreation is considered significant if implementation of the project would result in the following:

1) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts.

**Methodology**

The following impact analysis is based on the project's population projections contained in Section 4.12, Population and Housing, as well as analysis of existing library to population ratios and projected future need for library services.

**Project Impacts and Mitigation Measures**

Library Services (Standard of Significance 5)

**Impact 4.13.5.1** The project proposes residential uses that may increase the demand for library services in the city. This impact is **less than significant.**

Development of the proposed project would result in an increase in the city's population by approximately 3,670 persons, which may result in an increase in demand for library services. Based on the projected library square footage/population ratio discussed previously, the projected project population would result in an increase of 2,606 square feet of library space to serve project residents.[2] The Kern County Library is funded through general purpose discretionary funds, bonds, special use funds, and donations. The Kern County Library identified a need for additional library facilities in Delano in the Library Facilities Master Plan. The development of the

[2] 3,670 persons X 0.71 sq. ft./person = 2,606 sq. ft.

project would not result in an increase in the need for additional library facilities beyond those identified by the Kern County Library. Any new facilities would be required to undergo environmental review in compliance with CEQA. As such, this impact is **less than significant**.

Mitigation Measures

None required.

### 4.13.5.4 LIBRARY SERVICES CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for library services is the City of Delano.

Cumulative Impacts and Mitigation Measures

**Cumulative Impacts to Library Services**

**Impact 4.13.5.2** Implementation of the proposed project, in combination with other development in the city, would result in a cumulative increase in demand for library services and/or facilities, the construction of which could impact the physical environment. This impact would be **less than cumulatively considerable**.

The proposed project, in combination with other proposed, approved, and reasonably foreseeable development in the city, would contribute to a cumulative increase in the demand for library facilities. As stated previously, according to the Library Facilities Master Plan, the Delano Library requires 42,323 square feet to meet the needs of a projected city population of 60,000 by the year 2020 (Kern County Library 2002, p. 18). The Kern County Library is funded through general purpose discretionary funds, bonds, special use funds, and donations. The Kern County Library identified a need for additional library facilities in Delano in the Library Facilities Master Plan. The development of the project would not result in an increase in the need for additional library facilities beyond those identified by the Kern County Library. Any new facilities would be required to undergo environmental review in compliance with CEQA. As such, this impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

## 4.13.6 WASTEWATER, WATER, STORM DRAINAGE, AND SOLID WASTE

### 4.13.6.1 WASTEWATER, WATER, STORM DRAINAGE, AND SOLID WASTE ENVIRONMENTAL SETTING

**Wastewater**

Conveyance

Project wastewater collection and treatment would be provided by the City of Delano. The City provides wastewater collection service to all parts of Delano, as well as North Kern State Prison

and some unincorporated areas surrounding the city. Wastewater flows are collected by a City-owned and operated system consisting of collection lines, lifts stations, and the treatment facility. The project would connect to the existing lines located in Woollomes Avenue.

Treatment

The City's wastewater treatment plant (WWTP) consists of flow metering, screening, an aerated grit chamber, primary clarification, biofiltration, secondary clarification, primary and secondary sludge pumping facilities, effluent pumping facility, sludge digesters, and a sludge thickener (Delano 2011, p. 4-8). The current average dry weather flow (ADWF) at the plant is approximately 4.3 million gallons per day (mgd) (Delano 2014c). The WWTP was updated in 2011 and has a current capacity of 7.2 mgd (Delano 2014c). The City of Delano General Plan identifies that the WWTP capacity of 7.2 mgd will serve a population of 62,845 (Delano 2005, p. 8-6). This number results in an average daily wastewater flow of 114.6 gallons per person.

**Water**

The City of Delano completed a Water Supply Assessment (WSA) for the proposed project in December 2014 to determine the project's impact to the City's water resources and system. The following analysis is based on that assessment. The WSA is included as **Appendix 4.13A.**

Supply

The City provides potable water service to residential, commercial, industrial, and institutional customers in the city. In 2010, the City adopted the 2010 Urban Water Management Plan (UWMP). The projected water demand associated with the proposed project was not accounted for in the 2010 UWMP (Delano 2014d, p. 10).

Groundwater is the sole source of water in the city. The groundwater body from which Delano extracts water is the Kern County Subbasin, which is a subbasin of the Tulare Lake Groundwater Basin. Groundwater aquifers in the San Joaquin Valley subbasin are generally quite thick, with groundwater wells commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the San Joaquin Valley. Typical well yields in the San Joaquin Valley range from 300 gallons per minute (gpm) to 2,000 gpm with yields of 4,000 gpm possible. The smaller basins in the mountains surrounding the San Joaquin Valley have thinner aquifers and generally lower well yields averaging less than 500 gpm. Typical well yields in the City's service area range from 500 gpm to 2,100 gpm, with depths ranging from 800 feet to 1,400 feet (Delano 2014d, p. 10).

The Kern County Subbasin is not adjudicated. There are no restrictions on the City's beneficial use of groundwater to supply domestic water for urban use; however, the City pumps only the amount of groundwater needed to meet demand.

Since the City groundwater supply relies on the Kern County Subbasin alone, it is not directly affected by the reduction of the surface water deliveries in drought years and is buffered from the effects of potential water shortages. Supplies are not expected to be impacted by long-term shortages due to legal or environmental factors. Therefore, the available supply is directly proportional to the total pumping capacity of the system wells, at 24,842 acre-feet per year (af/yr) (Delano 2014d, p. 13).

### Demand

As previously stated, the City provides potable water service to its residential, commercial, industrial, and governmental/institutional customers within the city limits and Sphere of Influence (SOI). In 2010, the City extracted approximately 3.02 billion gallons or 9,272 acre-feet (af) of water servicing a population of approximately 48,957. **Table 4.13.6-1** illustrates the historical and projected annual water demand through 2035 as identified in the City's 2010 UWMP. As shown, the City anticipates a water demand of 13,023 af/yr by 2025 and 15,902 af/yr by 2035. All of this water will be supplied by groundwater pumping.

**TABLE 4.13.6-1**
**HISTORICAL AND PROJECTED WATER DEMAND**

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|---|
| Water Demand (af/yr) | 9,744 | 9,272 | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Groundwater percentage of source | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

*Source: Delano 2014d, p. 12*

### Infrastructure

Delano is entirely reliant on local groundwater supplies for municipal water. The City has 15 active wells and five storage reservoirs. The total pumping capacity of the City wells is at 15,400 gpm, approximately 24,842 acre-feet per year. The City currently maintains five storage reservoirs in the service area with a total capacity of 10.6 million gallons and a total boosting capacity of 8,950 gpm. Water is conveyed from the wells to consumers via approximately 110 miles of distribution system, with pipe sizes ranging between 4 and 16 inches in diameter (Delano 2014d, pp. 9 and 10). Existing water lines are located adjacent to the project site in Woollomes Avenue and Stradley Avenue/Albany Street.

### Recycled Water

According to the 2010 Urban Water Management Plan, the treated effluent coming from the Delano WWTP is pumped to seven storage ponds prior to being used as irrigation water for 1,467 acres of adjacent farmland (Delano 2011, p. 4-9). Table 4-5 in the UWMP indicates that by 2015, 1,736 million gallons per year of recycled water coming from the City's WWTP could be used for agricultural irrigation (Delano 2011, Table 4-5). By 2030, this amount is anticipated to be 2,342 million gallons per year. Other use of this recycle water has not yet been determined, according to the UWMP. However, anticipated uses could include landscape irrigation at parks, schools, cemeteries, and churches, as well as industrial and golf course irrigation. The expansion of recycled water use would reduce the need for groundwater as a water source in the city. However, according to the UWMP, there are no plans to optimize the use of recycled water or actions to facilitate the installation of dual distribution systems at this time (Delano 2011, p. 4-11).

## Stormwater Drainage

The City of Delano stormwater drainage facility is located at the southwest corner of Woollomes Avenue and Stradley Avenue. The existing drainage basin has a stormwater containment capacity of approximately 30 acre-feet (Cornerstone 2014, p. 1).

### Solid Waste

The City of Delano provides solid waste collection and disposal and recycling services for the city. The majority of collected waste generated in the city is currently sent to the Shafter-Wasco Recycling and Sanitary Landfill.

According to the figures published by the California Department of Resources Recycling and Recovery (CalRecycle) (2014), in 2013, the Shafter-Wasco Landfill received approximately 131,078 tons of solid waste, with 26,660 tons of that originating in Delano. As of 2010, the landfill had a maximum permitted capacity of 21.9 million cubic yards and a daily permitted tonnage of 1,550. The estimated closure year is 2053 (CalRecycle 2010). **Table 4.13.6-2** illustrates the amount of solid waste by year produced in the city. CalRecycle also reports that Delano sent an additional 8,560 tons of solid waste to the Avenal Regional Landfill, 5,190 tons to the H. M. Holloway Landfill, and small amounts to several other landfills. The total solid waste disposed of in the city increased by more than 12,000 tons between 2012 and 2013. In 2012, the average residential disposal rate in Delano was 3.0 pounds per day per person and the average commercial disposal rate was 9.5 pounds per day per employee (CalRecycle 2012).

**TABLE 4.13.6-2**
**DELANO SOLID WASTE DISPOSAL**

| Destination Facility | 2010 | | 2011 | | 2012 | | 2013 | |
|---|---|---|---|---|---|---|---|---|
| American Avenue Disposal Site | 425 | 1.5% | 494 | 1.8% | 247 | 0.9% | 42 | 0.1% |
| Avenal Regional Landfill | 720 | 2.6% | 919 | 3.4% | 285 | 1.0% | 8,560 | 21.0% |
| Azusa Land Reclamation Co. Landfill | | | | | | | 1 | 0.0% |
| Bakersfield Metropolitan (Bena) SLF | 537 | 2.0% | 402 | 1.5% | 232 | 0.8% | 124 | 0.3% |
| Chemical Waste Management, Inc. | | | | | | | 139 | 0.3% |
| Forward Landfill, Inc. | | | 5 | 0.0% | 6 | 0.0% | | |
| H. M. Holloway Landfill | | | | | | | 5,190 | 12.7% |
| Forward Landfill, Inc | 8 | 0.0% | | | 6 | 0.0% | | |
| McKittrick Waste Treatment Site | | | | | 2,668 | 9.4% | 2 | 0.0% |
| Shafter-Wasco Recycling & Landfill | 25,885 | 93.9% | 25,100 | 93.2% | 24,868 | 88.9% | 26,660 | 65.5% |
| Simi Valley Landfill | 8 | 0.0% | 4 | 0.0% | | | | |
| Visalia Disposal | | | 1 | 0.0% | | | | |
| **Yearly Totals** | **27,582** | **100%** | **26,924** | **100%** | **28,305** | **100%** | **40,718** | **100%** |

*Source: CalRecycle 2014*

## 4.13.6.2 WASTEWATER, WATER, STORM DRAINAGE, AND SOLID WASTE REGULATORY SETTING

### Federal

#### Clean Water Act

The Water Pollution Control Act of 1972, more commonly known as the Clean Water Act (CWA), regulates the discharge of pollutants into watersheds throughout the nation. Under the CWA, the

US Environmental Protection Agency (EPA) implements pollution control programs and sets wastewater standards.

### Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA), an amendment to the Solid Waste Disposal Act of 1965, was enacted in 1976 to address the huge volumes of municipal and industrial solid waste generated nationwide. The RCRA gives the EPA the authority to control hazardous waste from "cradle to grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA also sets forth a framework for the management of nonhazardous solid wastes.

## State

### California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of by transformation and land disposal, the California Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000.

The act further required every city and county to prepare two documents to demonstrate how the mandated rates of diversion would be achieved. The first document is the Source Reduction and Recycling (SRR) Element describing the chief source of the jurisdiction's waste, the existing diversion programs, and the current rates of waste diversion and new or expanded diversion programs intended to implement the act's mandate. The second document is the Household Hazardous Waste (HHW) Element, describing what each jurisdiction must do to ensure that household hazardous wastes are not mixed with regular nonhazardous solid waste and deposited of at a landfill.

### California Solid Waste Reuse and Recycling Access Act of 1991

The California Solid Waste Reuse and Recycling Access Act requires areas in development projects to be set aside for collecting and loading recyclable materials. The act required CalRecycle to develop a model ordinance for adoption by any local agency relating to adequate areas for collection and loading of recyclable materials as part of development projects. Local agencies are required to adopt the model ordinance, or an ordinance of their own, governing adequate areas in development projects for collection and loading of recyclable materials.

### CALGreen Building Code

The California Green Building Standards Code (CALGreen) went into effect for all projects beginning January 1, 2011. Section 4.408, Construction Waste Reduction Disposal and Recycling, mandates that in the absence of a more stringent local ordinance, a minimum of 50 percent of nonhazardous construction and demolition debris must be recycled or salvaged. The code requires the applicant to have a waste management plan (WMP) for on-site sorting of construction debris, which would be submitted to the City of Delano for approval. The WMP identifies the materials to be diverted from disposal by recycling, reuse on the project, or salvage for future use or sale; specifies whether materials will be sorted on-site or mixed for transportation to a diversion facility; identifies the diversion facility where the material collected

will be taken; specifies that the amount of materials diverted will be calculated by weight or volume, but not by both; and identifies construction methods employed to reduce the amount of waste generated.

### Local

City of Delano General Plan

The Delano General Plan contains several policies intended to ensure the adequate provision of public utilities. The Open Space and Conservation Element, Community Design Element, and Public Services and Facilities Element all contain objectives, policies, and action programs for the protection of public utilities in the city. The following are applicable to the proposed project:

*Open Space and Conservation Element*

*Natural Resources Policies*

2. Expand programs that enhance groundwater recharge in order to maintain the groundwater supply, including the installation of detention ponds in new growth areas.

3. No urban level development shall be approved in the City unless the development is, or can be served by the City sewer system.

4. Water conservation methods shall be continued.

*Community Design Element*

*Gateways/Streetscape Design Policies*

2. The undergrounding of utilities along the City's main corridors is a priority. In developing areas, new development projects shall place all new utility lines underground. The City will also explore a range of options for undergrounding utilities in existing developed areas.

*Public Services and Facilities Element*

*Public Facility Improvement Policies*

3. Developers shall prepare an infrastructure and public services assessment as part of each annexation application determine infrastructure needs, feasibility, timing, and financing.

5. Require the extension and construction of infrastructure to proposed developments according to adopted elements and master plans. The City shall use reimbursement agreements or other financing techniques to reimburse developments for any oversizing cost, which may be required.

9. Development fee credit may be given for public improvements made by a builder but shall not exceed the amount of fees.

10. Developers shall construct all tributary facilities necessary to connect to major facilities, whether or not the major facilities have yet been constructed.

15. New development shall demonstrate that adequate sewerage capacity exists prior to development or that conditions of project approval will insure that sewerage capacity will be created as part of the project prior to the issuance of building permits. Conditions may include installation of necessary facilities or other methods acceptable to the City.

16. New municipal water well sites should be planned which include pump, storage, pressure filtration and/or treatment equipment. These new wells should be located so that they will not conflict with planned residential neighborhoods. They should have design, screening, landscaping and architectural improvements which make them compatible with adjacent land uses.

18. The City shall require the connection of existing and new businesses, residents and industries to the City's water and sewer system. The City shall establish fees, which enable it to recover the costs of such connection.

19. A finding shall be made by the Public Works Department to document that an adequate supply of potable water can be provided to serve the domestic and fire suppression needs of each proposed development prior to approval by the City Council.

20. Conditions of approval shall be implemented with each development to assure that the necessary water production, distribution and/or treatment facility is in place prior to issuance of a building permit.

23. A finding shall be made by the Public Works Department to document that sewer collection and wastewater treatment can be provided to serve each proposed development prior to approval by the City Council.

24. Conditions of approval shall be implemented with each development to assure that the necessary sewer collection facility is in place and/or wastewater treatment plant capacity is available prior to issuance of a building permit.

### Delano Municipal Code

Municipal Code Section 13.52.060(A) requires that prior to starting a project, every applicant must submit a properly completed waste management plan to the WMP compliance official, in a form as prescribed by that official, as a portion of the building or demolition permit process. In estimating the volume or weight of materials as identified in the WMP, the applicant is to use the standardized conversion rates approved by the City of Delano for this purpose. Approval of the WMP as complete and accurate is a condition for the issuance of any building or demolition permit. If the applicant calculates the projected feasible diversion rate as described above and finds the rate does not meet the diversion goal, the applicant must then submit information supporting the lower diversion rate.

### Urban Water Management Plan

The City of Delano's 2010 Urban Water Management Plan was prepared in June 2011 in accordance with the California Water Code and the Urban Water Management Planning Act

of 1983, as amended. Urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet of water annually, are required to prepare an urban water management plan. The purpose of the UWMP is to maintain the efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions.

### 4.13.6.3 WASTEWATER, WATER, STORM DRAINAGE, AND SOLID WASTE IMPACTS AND MITIGATION MEASURES

#### Standards of Significance

CEQA Guidelines Appendix G states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

2) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

3) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

4) Lack sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.

5) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

6) Be served by a landfill without sufficient permitted capacity to accommodate the project's solid waste disposal needs.

7) Does not comply with federal, state, and local statues and regulations related to solid waste.

#### Methodology

The evaluation of potential utilities impacts is based on several documents, including a water supply assessment prepared for the proposed project (**Appendix 4.13.A**), the Delano General Plan and Delano General Plan EIR, the 2010 Urban Water Management Plan, and oral discussions with staff of the Delano Public Works Department.

The proposed project's wastewater generation was estimated using the City's Municipal Code Section 13.16.140 establishing a residential equivalents factor for various development types in the city. Water demand was calculated in the WSA prepared for the proposed project (**Appendix 4.13A**). Solid waste generation was estimated using CalRecycle's Waste Disposal Rates for Disposal Rates Detail for Delano for employees (9.5 pounds per day) and residents (3.0 pounds per day).

## Project Impacts and Mitigation Measures

Wastewater (Standards of Significance 1, 2, and 5)

**Impact 4.13.6.1** The proposed project would require the construction of wastewater conveyance infrastructure within the project site but would not require off-site construction or expansion of facilities. Wastewater flows from the proposed project would not exceed the capacity of the Delano WWTP, so no new or expanded facilities are needed. This would be a **less than significant** impact.

The proposed project would require new wastewater collection infrastructure within the project site. Wastewater collection infrastructure has already been constructed in the roadways adjacent to the project site, including an 18-inch sanitary sewer line in Woollomes Avenue. Potential impacts from construction of on-site wastewater infrastructure are evaluated in the appropriate technical sections of this EIR. With the presence of existing, appropriately sized wastewater conveyance infrastructure at the edge of the project site, no additional conveyance infrastructure would be needed to serve the proposed project.

Because no development currently exists at the project site, the proposed project would result in increased wastewater flows to the Delano WWTP. The City of Delano bases wastewater flow demand projections on residential equivalents (RE). Municipal Code Section 13.16.140 establishes residential equivalent as that wastewater flow and strength equivalent to the flow and strength normally expected from a typical single-family residence. For the purpose of establishing a typical residential equivalent, the flow is assumed as 270 gallons per day (Delano 2013). Multi-family and commercial demand projections are based on a factor of the residential equivalent.

For the multi-family residential uses of the proposed project, the City's multi-family RE rate factor of 0.9 was used to determine the project's potential wastewater flow. Based on this calculation, the project would be projected to produce 215,820 gallons per day (gpd) of wastewater.[3]

Commercial uses for wastewater demand projections are divided by type of use. To determine the demand potential for the commercial uses of the West Pavilion project, the "shopping center, convenience stores, convenience/service station" category was used. This category is based on 1,000 square feet at an RE of 1.86. For the proposed project's commercial uses, the projected wastewater daily flow would be 173,910 gallons per day.[4]

Using this information, total project wastewater flow would be 389,730 gallons per day or 0.39 million gallons per day. As previously stated in the Environmental Setting subsection, the Delano WWTP has an existing capacity of 7.2 mgd, with a current average dry weather flow of approximately 4.3 mgd. With approximately 2.9 mgd of capacity available, the addition of 0.39 mgd of new wastewater flows to the wastewater treatment plant from the proposed project would be well within the plant's existing capacity. No expansions of the WWTP would be needed to accommodate the proposed project.

Additionally, in accordance with the City of Delano fee schedule, sewer impact fees will be assessed to cover the cost of infrastructure necessary to service the proposed project and to contribute toward future expansions. Development of the proposed project would not result in exceedance of the wastewater treatment requirements of the Regional Water Quality Control

[3] Based on 872 dwelling units X 275 gallons per day X 0.9 RE = 215,820 gallons per day.
[4] Based on 340,000 s.f./1,000 s.f. X 275 gallons per day X 1.86 RE = 173,910 gallons per day.

Board, nor will the project require the construction of a new or expanded wastewater conveyance facilities or wastewater treatment facility. Given these conditions, the project would result in **less than significant** impacts to wastewater services.

Mitigation Measure

None required.

Water (Standards of Significance 2 and 4)

**Impact 4.13.6.2** The proposed project will increase the demand for water at the project site. The existing water system cannot adequately meet future water demands in the city with development of the proposed project. As such, the impact to water services and supplies is considered a **potentially significant** impact.

*Water Demand*

As discussed previously, the projected water demand associated with the proposed project was not accounted for in the 2010 UWMP. As such, Water Code Section 10910(c)(3) requires identification of the City's 20-year projected water supplies available during normal, single dry, and multiple dry water years ability to meet the water demand associated with the proposed project.

The water demand for the project has been estimated based on the City of Delano's service area past yearly domestic use, the number of domestic connections, and the average number of persons per unit. The City's 2010 UWMP established an interim urban water use target of 176 gallons per capita per day (gpcd) in order to meet future requirements and conservation efforts per the Water Conservation Bill of 2009.

The WSA determined the average water demand for the proposed project as:

- The Vineyard at Delano project has an average water demand of 88 mg/yr (271 af/yr) at project buildout (2024).
- The Delano West Pavilion project has an average water demand of 120 mg/yr (368 af/yr) at project buildout (2030).
- Combined, the average water demand is 208 mg/yr (639 af/yr), as shown in **Table 4.13.6-3** (Delano 2014d, p. 4).

**TABLE 4.13.6-3**
**ESTIMATED TOTAL WATER DEMAND**

| Project Phase (Year[1]) | Annual Demand (mg/yr) | Annual Demand (af/yr) |
|---|---|---|
| **Vineyard at Delano** | | |
| Phase I (2020) | 24 | 72 |
| Phase II (2021) | 22 | 67 |
| Phase III (2022) | 22 | 67 |
| Phase IV (2024) | 22 | 67 |
| **Subtotal** | **88** | **271** |

| Project Phase (Year[1]) | Annual Demand (mg/yr) | Annual Demand (af/yr) |
|---|---|---|
| **Delano West Pavilion** | | |
| Phase I (2025) | 48 | 149 |
| Phase II (2026) | 44 | 137 |
| Phase III (2027) | 13 | 42 |
| Phase IV (2030) | 13 | 42 |
| Subtotal | 120 | 368 |
| **Grand Total** | **208** | **639** |

*Source: Delano 2014d, Table 4*

*Note:*

1. *Assumed project phase start*

*Water Supply*

According to conservative estimates, the City's 15 active groundwater wells have a daily municipal capacity of 15,400 gpm (24,842 af/yr). According to the WSA, the average day demand of the project translated in annual terms is estimated to be 639 af/yr. At full project buildout, the total net increase in water system demand is estimated to be 15,029 af/yr. Considering that the proposed project will be constructed in eight phases, the projected water demand will not be fully realized until 2030. **Table 4.13.6-4** compares the City's water supply and demand with and without the proposed project under Average Day Demand (ADD) and Maximum Day Demand (MDD) conditions.

As shown, under Average Day Demand conditions and maximum day demand conditions, the City will have adequate water supply to serve the project at full buildout. However, the water supply, under Maximum Day Demand conditions, approaches an inadequate supply scenario. In accordance with industry standard practices and the California Department of Public Health Services (CDPH) criteria for Adequate Source Capacity on water supply, the source should be sized to serve the MDD, which is the highest water demand during a 24-hour period of the year. Water system sources are typically sized to meet the anticipated MDD of a water system.

**TABLE 4.13.6-4**
**SUPPLY AND DEMAND COMPARISON IN ACRE-FEET**

| | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| Supply | 20,059 | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| **Average Day Demand** | | | | | | |
| Demand without Project | 9,272 | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Demand with Project | 9,272 | 10,666 | 11,857 | 13,442 | 15,029 | 16,540 |
| Projected Water Surplus | 10,787 | 14,176 | 12,985 | 11,400 | 9,813 | 8,302 |
| **Maximum Day Demand** | | | | | | |
| Demand without Project | 13,908 | 15,999 | 17,679 | 19,535 | 21,586 | 23,852 |
| Demand with Project | 13,908 | 15,999 | 17,785 | 20,163 | 22,543 | 24,809 |
| Projected Water Surplus | 6,151 | 8,843 | 7,057 | 4,679 | 2,299 | 33 |

*Source: Delano 2014d, Table 9*

In addition to the above supply and demand comparison, the WSA provided a dry year supply analysis. Not all hydrologic dry years lead to water supply shortages and groundwater overdraft. In an average or wet year, the water supply sources may exceed or equal the water needs. The annual quantity of groundwater available to the City is not expected to vary significantly in relation to wet or dry years. This assumes that the groundwater yield is not reduced due to water quality issues. During extended drought periods, groundwater levels generally decline and will require more aggressive demand management practices and continued implementation of recycled water reuse for agriculture irrigation.

In determining the adequacy of water supply facilities, the source must be large enough to meet the varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural disasters.

**Table 4.13.6-5** shows the water supply using the Average Day Demand as the basis for water demand during normal year, dry year, and multiple dry year scenarios for the next 20 years. As shown, the City has an adequate water supply to meet its Average Day Demand through 2035 including the proposed project's water demand.

**TABLE 4.13.6-5**
**NORMAL YEAR, DRY YEAR, AND MULTIPLE DRY YEAR ASSESSMENT WITH PROJECT BASED ON AVERAGE DAY DEMAND**

| | Normal Year (acre-feet) | Single Dry Year (acre-feet) | Multiple Dry Years (acre-feet) | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| **2015** | | | | | |
| Water Demand[1] | 10,666 | 11,306 | 11,306 | 10,879 | 10,559 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 14,176 | 13,536 | 13,536 | 13,963 | 14,283 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2020** | | | | | |
| Water Demand[1] | 11,857 | 12,568 | 12,568 | 12,094 | 11,738 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 12,985 | 12,274 | 12,274 | 12,748 | 13,104 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2025** | | | | | |
| Water Demand[1] | 13,442 | 14,249 | 14,249 | 13,711 | 13,308 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 11,400 | 10,593 | 10,593 | 11,131 | 11,534 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2030** | | | | | |
| Water Demand[1] | 15,029 | 15,931 | 15,931 | 15,330 | 14,879 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 9,813 | 8,911 | 8,911 | 9,512 | 9,963 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |

| | Normal Year (acre-feet) | Single Dry Year (acre-feet) | Multiple Dry Years (acre-feet) | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| **2035** | | | | | |
| Water Demand[1] | 16,540 | 17,532 | 17,532 | 16,871 | 16,375 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 8,302 | 7,310 | 7,310 | 7,971 | 8,467 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |

*Source: Delano 2014d, Table 13*
Note: 1. Includes proposed project.

**Table 4.13.6-6** shows the water supply using the Maximum Day Demand as the basis for water demand during normal year, dry year, and multiple dry year scenarios for the next 20 years. As discussed previously, CDPH criteria for adequate source capacity states that the source should be sized to serve the Maximum Day Demand. Based on these criteria, the Delano domestic water system's total projected water supplies available during normal, single dry, and multiple dry water years in a 20-year projection do not meet the projected water demand of the proposed project, in addition to existing and planned future uses (Delano 2014d, p. 18). Additional wells need to be developed in the future to rectify this deficiency (Delano 2014d, p. 19). As shown in **Table 4.13.6-6**, there will be a water supply deficiency in a single dry year and multiple dry years in the magnitude of 1,456 acre-feet per year. Since the project will be served by groundwater through the City's water system, it is imperative that the City construct a new groundwater well to abate this deficiency by developing a 1,000-gpm-capacity well on or about the project buildout date (Delano 2014d, p. 20). Therefore, this impact is considered to be **potentially significant**.

**TABLE 4.13.6-6**
**NORMAL YEAR, DRY YEAR, AND MULTIPLE DRY YEAR ASSESSMENT WITH PROJECT BASED ON MAXIMUM DAY DEMAND**

| | Normal Year (acre-feet) | Single Dry Year (acre-feet) | Multiple Dry Years (acre-feet) | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| **2015** | | | | | |
| Water Demand[1] | 15,999 | 16,959 | 16,959 | 16,319 | 15,839 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 8,843 | 7,883 | 7,883 | 8,523 | 9,003 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2020** | | | | | |
| Water Demand[1] | 17,786 | 18,853 | 18,853 | 18,142 | 17,608 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 7,056 | 5,989 | 5,989 | 6,700 | 7,234 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2025** | | | | | |
| Water Demand[1] | 20,164 | 21,373 | 21,373 | 20,567 | 19,962 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 4,679 | 3,469 | 3,469 | 4,275 | 4,880 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |

| | Normal Year (acre-feet) | Single Dry Year (acre-feet) | Multiple Dry Years (acre-feet) | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| **2030** | | | | | |
| Water Demand[1] | 22,543 | 23,896 | 23,896 | 22,994 | 22,318 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 2,299 | 946 | 946 | 1,848 | 2,524 |
| Adequate Supply? | Yes | Yes | Yes | Yes | Yes |
| **2035** | | | | | |
| Water Demand[1] | 24,809 | 26,298 | 26,298 | 25,305 | 24,561 |
| Water Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 33 | -1,456 | -1,456 | -463 | 281 |
| Adequate Supply? | Yes | No | No | No | Yes |

*Source: Delano 2014d, Table 14*
Note:
1. Includes proposed project.

### *Infrastructure*

It is anticipated that the proposed project would connect to existing water conveyance infrastructure located adjacent to the project site in Woollomes Avenue and Stradley Avenue/Albany Street. Currently, the City has 15 active wells and five storage reservoirs. As stated previously, the City will need an additional well to meet future water demands. However, this need for a new well would not occur until after 2030. However, without the proposed project, the City would not need an additional well, as the water demand would be 23,852 af/yr and the City's supply would be 24,842 af/yr under the Maximum Day Demand scenario. As such, the need for a new well is a result of developing the proposed project. This is considered a **potentially significant** impact.

### Mitigation Measures

**MM 4.13.6.2** The project applicant shall dedicate a 125-foot by 125-foot lot to the City within the Vineyard at Delano project site for development of a future 1,000 gpm well. The City will credit the project applicant the cost of the proposed well site from the development impact fees.

*Timing/Implementation:* *Prior to the start of project grading and throughout project construction*

*Monitoring/Enforcement:* *City of Delano Community Development Department and Public Works Department, Engineering Division*

Implementation of mitigation measure **MM 4.13.6.1** will ensure that the City would have adequate water supplies to serve future water demand in the city. With mitigation, the project's impact and demand on the City's water supply would be **less than significant**.

Stormwater Drainage (Standard of Significance 3)

**Impact 4.13.6.3** The proposed project includes drainage improvements and the construction of new stormwater drainage infrastructure, the construction of which could result in significant environmental effects. These effects are addressed in the appropriate technical sections of this EIR and where necessary, are mitigated to a less than significant level with mitigation measures identified in this EIR. Therefore, this impact would be **less than significant**.

The project proposes a drainage collection system consisting of underground drainage pipes conveying stormwater to an existing retention basin on City-owned land at the southwest corner of Woollomes Avenue and Stradley Avenue. This existing retention basin would serve as a water quality treatment facility; however, this basin would require an expansion in order to accommodate the project's stormwater flows.

The proposed drainage system for the project will consist of various underground lateral mains connecting to 54-inch reinforced concrete piping, which will convey stormwater to the City's existing retention basin. The existing retention basin has a stormwater containment capacity of approximately 30 acre-feet. The preliminary analysis indicates that an additional 33.4 acre-feet of volume would be required to accommodate the proposed projects (which includes the Delano Marketplace project, the Delano Grapevine project, and the proposed project) (Cornerstone 2014, p. 1). The proposed retention facility will be designed to accommodate approximately 68 acre-feet and will be an expansion of the existing facility. This expansion would require the movement of approximately 74,000 cubic yards of dirt. Of this, 24,000 cubic yards would be used to expand the retention facility. The remaining 50,000 cubic yards would be excavated and transported to the West Pavilion site for use as fill (Cornerstone 2014, p. 1). The project developer would enlarge the existing sump to create the storage capacity needed for the project's stormwater containment. Expansion of this facility by the project developer would reduce the stormwater drainage facility impact to **less than significant.**

Mitigation Measures

None required.

Solid Waste (Standard of Significance 6)

**Impact 4.13.6.4** The proposed project would be served by area landfills with sufficient permitted capacity to serve the project. Therefore, impacts to solid waste services can be considered **less than significant**.

Precise estimates regarding solid waste generation are difficult to establish due to the anticipated variations in commercial/retail uses for the proposed West Pavilion site and the actual number of future residents for the proposed project. However a rough estimate can be determined using the Delano solid waste generation data provided by CalRecycle. Information provided by CalRecycle's (2012) Disposal Rates Detail for employees (9.5 pounds per day) and residents (3.0 pounds per day) in Delano was used to calculate the amount of solid waste associated with the proposed project. According to these waste disposal rates and the estimated employees (887) and residents (3,670) of the proposed project, approximately 3,547 tons of solid waste would be generated by the project per year as full buildout of the project. **Table 4.13.6-7** illustrates the solid waste generation by source. All solid waste generated at the project site would need to be disposed of at one of the landfills used for collecting solid waste generated in the city. Using Delano's total 2013 solid waste disposal of 40,718 tons as reported by

CalRecycle, the estimated solid waste that could be generated by the proposed project would represent an increase of approximately 8.7 percent over existing solid waste generated in Delano.

Solid waste generated in Delano was disposed of at eight disposal sites in 2013. The three landfills that accepted the majority of Delano's solid waste (99.2 percent) were the Shafter-Wasco Recycling and Sanitary Landfill (26,660 tons, 65.5 percent), the Avenal Regional Landfill (8,560 tons, 21.0 percent), and the H.M. Holloway Landfill (5,190 tons, 12.7 percent).

The Shafter-Wasco Recycling and Sanitary Landfill has a maximum permitted daily throughput of 1,500 tons and a maximum permitted capacity of 21,895,179 cubic yards. The cease operation date for the Shafter-Wasco Recycling and Sanitary Landfill is estimated to be December 31, 2053 (CalRecycle 2014). The Avenal Regional Landfill has a maximum daily throughput of 6,000 tons and a maximum permitted capacity of 26,000,000 cubic yards. The anticipated cease operation date is December 31, 2020 (CalRecycle 2014). The H. M. Holloway Landfill has a maximum daily throughput of 2,000 tons and a maximum permitted capacity of 12,600,000 cubic yards. The anticipated cease operation date is January 31, 2019 (CalRecycle 2014). The project is estimated to produce 10.7 tons per day of solid waste. This amount would not increase the daily throughput beyond the permitted levels of the three landfills.

**TABLE 4.13.6-7**
**SOLID WASTE GENERATION ESTIMATE**

| | Residential | | | | Commercial | | | |
|---|---|---|---|---|---|---|---|---|
| | Units | Residents[1] | Solid Waste Generated[2] | | Square Footage | Employees[3] | Solid Waste Generated[2] | |
| | | | lbs/day | tons/yr | | | lbs/day | tons/yr |
| Vineyards | 432 | 1,818 | 5,454 | 995 | — | — | — | — |
| West Pavilion | 440 | 1,852 | 5,556 | 1,014 | 340,000 | 887 | 8,427 | 1,538 |
| Total | 872 | 3,670 | 11,010 | 2,009 | 340,000 | 887 | 8,427 | 1,538 |
| **Total Solid Waste Commercial and Residential** | | | **21,313 lbs/day or 10.7 tons/day or 3,890 tons/year** | | | | | |

*Source: CalRecycle 2012; USGBC 2008*
*Notes:*
1. *Number of residents is based on an average household size of 4.11 as discussed in Section 4.12, Population and Housing.*
2. *Solid waste generated is based on 3.0 pounds per person per day for residential uses and 9.5 pounds per employee per day for commercial uses provided by CalRecycle (2012).*
3. *The number of employees is based on information provided by the USGBC (2008) for Community Retail at 383 square feet per employee (340,000 sq. ft./383 sq. ft. per employee = 887 employees).*

Solid waste generated during construction can be reduced through recycling and diversion of certain materials, such as scrap metal and wood. The City requires the diversion of at least 50 percent of waste tonnage from construction, demolition, and renovation waste from disposal in landfills or similar facilities (Municipal Code Section 13.52.030). The City compels projects to reduce construction waste through the implementation of a Waste Management Plan (WMP). Municipal Code Section 13.52.060(A) requires that, prior to starting a project, each applicant must submit a properly completed WMP. Approval of the WMP as complete and accurate is a condition precedent to the issuance of any building or demolition permit. Additionally, Municipal Code Section 13.52.070 requires all projects to post a deposit, in an amount set by the City Council, which will be returned after proof is provided to the City that the required amount of construction waste has been diverted from disposal and recycled or reused. The City requires record keeping of construction recycling and reuse by the project. Section 13.52.090 requires

that upon completion of a construction project as a condition of final inspection and receipt of certificate of occupancy, the applicant must submit documentation to the WMP compliance official that proves compliance with the requirements of the WMP and Municipal Code Section 13.52.030.

The proposed project would increase the amount of solid waste generated in the city. As stated previously, the area landfills have sufficient capacity to accommodate the waste disposal needs of the proposed project. Additionally, the City requires the reduction of construction waste and requires that the project submit a WMP to be approved by the City which would assist in the reduction of solid waste generated by the project during construction. Therefore, no new or expanded facilities would be required to serve the proposed project. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

### 4.13.6.4 WASTEWATER, WATER, STORM DRAINAGE, AND SOLID WASTE CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

**Cumulative Setting**

The cumulative setting for wastewater, water, storm drainage, and solid waste generally encompasses the cumulative setting conditions considered in the City of Delano General Plan (adopted December 2005) and the projects listed in **Table 4.0-1**. The General Plan Housing Element identified a year 2020 projected population of 68,000 (Delano 2012, p. 2-2). Those development projects listed in **Table 4.0-1** result in 986,342 square feet of commercial uses, 17.65 acres of industrial uses, and 447 residential dwelling units.

Cumulative Water and Sewer Impacts

**Impact 4.13.6.5** The proposed project would need new on-site infrastructure but would not require new or upgraded public infrastructure for the conveyance and treatment of sewage. However, development of the proposed project would require the development of water supply facilities (well) under future conditions. Therefore, this is considered a **potentially cumulatively considerable** impact.

Development of the project site would contribute to cumulative impacts to Delano's wastewater treatment and infrastructure when combined with other growth and development. However, General Plan Natural Resources Policy 3 requires that no urban level development be approved in the city unless the development is or can be served by the City sewer system. Additionally, Public Facilities Improvement Policy 15 requires new development to demonstrate that adequate wastewater treatment capacity exists prior to development or that one of the conditions of project approval will ensure that sewerage capacity will be created as part of the project prior to the issuance of building permits. Further, Public Facilities Improvement Policy 23 requires that a finding be made by the Public Works Department to document that sewer collection and wastewater treatment can be provided to serve each proposed development prior to approval by the City Council. Finally, Public Facility Improvement Policy 24 requires that conditions of approval are be implemented with each development to ensure that the necessary sewer collection facility is in place and/or wastewater treatment plant capacity is available prior to issuance of a building permit. Compliance with these General Plan policies

would ensure that the City has adequate wastewater treatment and conveyance facilities to serve all future projects. Additionally, the proposed project will be required to pay sewer impact fees to cover its share of the cumulative impact on municipal systems. As such, the proposed project would have a **less than cumulatively considerable** impact with regard to wastewater conveyance and treatment facilities.

As discussed previously in **Impact 4.13.6.2**, development of the proposed project would result in a shortage of water supply after the year 2030. General Plan Public Facilities Improvement Policy 19 requires that a finding be made by the Public Works Department to document that an adequate supply of potable water can be provided to serve the domestic and fire suppression needs of each proposed development prior to approval by the City Council. Additionally, Public Facilities Improvement Policy 20 requires that conditions of approval be implemented with each development to ensure that the necessary water production distribution and/or treatment facility is in place prior to issuance of a building permit. Finally, the proposed project will be required to pay water impact fees to cover its share of the cumulative impact on municipal systems.

Mitigation Measures

Implementation of mitigation measure **MM 4.13.6.2**.

General Plan policy requirements and the implementation of mitigation measure **MM 4.13.6.2** would reduce potential water supply cumulative impacts to a **less than cumulatively considerable** level.

Cumulative Storm Drainage Impacts

**Impact 4.13.6.6** The proposed project would increase the amount of storm drainage to the City's storm drainage system. This impact is **less than cumulatively considerable.**

Development of the proposed project and other future development projects in the city would increase the demand for adequate storm drainage in the city. As part of the proposed project, an expansion of the City's existing stormwater retention basin is proposed. This expansion is intended to accommodate the proposed project stormwater drainage, as well as the Delano Marketplace project and the Delano Grapevine project. Expansion of this facility would reduce any cumulative impacts resulting from development of the proposed project to a **less than cumulatively considerable** level.

Mitigation Measures

None required.

Cumulative Solid Waste Impacts

**Impact 4.13.6.7** The proposed project would add solid waste to the city's waste stream, which would be sent to regional landfills, but not in amounts that would be cumulatively considerable. This impact is **less than cumulatively considerable**.

Development of the proposed project would contribute to cumulative solid waste impacts on landfills serving Delano. Under cumulative conditions, the amount of solid waste generated within the city would increase, so deliveries of solid waste to landfills would increase. With the number of landfills used to dispose of Delano's solid waste (see **Table 4.13.6-1**), the potential for

all landfills to exceed capacity and be unable to serve the city prior to expansion of existing or opening of new facilities is unlikely. In addition, all development, both new and existing, in Delano and in all jurisdictions sending solid waste to regional landfills is subject to statewide requirements to increase diversion rates to reduce the amount of solid waste going to landfills. However, if at some point additional landfill capacity is needed, landfills and other solid waste facilities must undergo rigorous environmental review prior to the expansion of existing landfills or the opening of new facilities. While the expansion of existing or the development of new landfill facilities could result in cumulative impacts, the proposed project's contribution, as mentioned above, would increase the city's waste stream by 8.7 percent. This percentage would decrease as additional developments are constructed. This represents a small amount of solid waste being delivered among several landfills. Therefore, the proposed project's contribution is **less than cumulatively considerable.**

Mitigation Measures

None required.

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This analysis is based on the Traffic Impact Study (TIS) for the Vineyard at Delano and Delano West Pavilion projects (Arch Beach Consulting 2015). The study is included in **Appendix 4.14-A.** The TIS was prepared consistent with the methodologies and requirements of the City, the Kern Council of Governments (Kern COG), and the California Department of Transportation (Caltrans).

## 4.14.1 ENVIRONMENTAL SETTING

### EXISTING CONDITIONS

#### Study Area

The project site is located in southwestern Delano; regional access to the project site would be provided via State Route (SR) 99. **Figure 4.14-1** illustrates the traffic study area intersections, roadway segments, and freeway mainline segments listed below.

| Intersections | |
|---|---|
| 1. Albany Street/Garces Highway | 10. Woollomes Avenue/Belmont Street (future intersection) |
| 2. Dover Place/Garces Highway | 11. Woollomes Avenue/Grapevine-West Pavilion Driveway (future intersection) |
| 3. Albany Street/1st Avenue | 12. Woollomes Avenue/Dover Parkway |
| 4. Dover Place/1st Avenue | 13. Woollomes Avenue/Marketplace Drive |
| 5. Ellington Street-SR 99 southbound on-ramp/ 1st Avenue | 14. Woollomes Avenue/Home Depot East |
| 6. Fremont Street-SR 99 northbound off-ramp/ 1st Avenue | 15. Woollomes Avenue/SR 99 southbound ramps |
| 7. Belmont Street/Morse Boulevard (future intersection) | 16. Woollomes Avenue/SR 99 northbound ramps |
| 8. Dover Parkway/Morse Boulevard (future intersection) | 17. Woollomes Avenue/S. Lexington Street |
| 9. Woollomes Avenue/Stradley Avenue-Albany Street | |

| Roadway Segments | |
|---|---|
| 1. Woollomes Avenue, Stradley Avenue-Albany Street to Belmont Street (future street) | 8. Albany Street, north of Woollomes Avenue |
| 2. Woollomes Avenue, Belmont Street (future street) to Grapevine-West Pavilion Driveway (future street) | 9. Stradley Avenue, south of Woollomes Avenue |
| 3. Woollomes Avenue, Grapevine-Pavilion Driveway (future street) to Dover Parkway | 10. Belmont Street (future street), north of Woollomes Avenue |
| 4. Woollomes Avenue, Dover Parkway to Home Depot East | 11. Belmont Street (future street), south of Woollomes Avenue |

5. Woollomes Avenue, Home Depot East to SR 99 southbound ramps
6. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps
7. Woollomes Avenue, SR 99 northbound ramps to S. Lexington Street
12. Lexington Street, north of Woollomes Avenue
13. Lexington Street, south of Woollomes Avenue

| Freeway Mainline Segments | |
|---|---|
| 1. SR 99 northbound, north of Woollomes Avenue | 3. SR 99 northbound, south of Woollomes Avenue |
| 2. SR 99 southbound, north of Woollomes Avenue | 4. SR 99 southbound, south of Woollomes Avenue |

### Roadway Network

The 110-acre project site is bounded by Stradley Avenue-Albany Street to the west, existing and under construction commercial uses to the east, the Delano Soccer Park to the south, and residential and vacant land to the north.

Regional access to the project site would be provided via SR 99, while local access would be provided by Woollomes Avenue, Stradley Avenue-Albany Street, and the future planned roadways of Belmont Street, Dover Parkway, and Morse Boulevard.

#### State Route 99

State Route 99 is a major state freeway facility that traverses Central and Northern California in a north–south direction. Regionally, SR 99 serves as the primary interregional auto and truck travel route that connects the Central Valley cities of Tulare, Visalia, and Fresno to the north and Bakersfield, Interstate 5 (I-5), and the greater Los Angeles region to the south. In Kern County, SR 99 serves as a vital north–south artery and is a six-lane divided freeway (three travel lanes in each direction) with a posted speed limit of 70 miles per hour (MPH) in the project vicinity. Based on 2013 Caltrans traffic volumes, the average daily traffic (ADT) volume on SR 99 in the project vicinity is 54,000.

#### Woollomes Avenue

Woollomes Avenue is an east–west arterial in the southern portion of the city that extends from Stradley Avenue-Albany Street to the west, crosses SR 99, and ends at Lexington Street to the east. Per the City's General Plan Circulation Element, Woollomes Avenue is designated as an arterial. Between Stradley Avenue-Albany Street and Dover Parkway, Woollomes Avenue is a two-lane undivided roadway with no curb and gutter on either side of the road. East of Dover Parkway to SR 99, Woollomes Avenue is a five-lane divided roadway (three eastbound lanes and two westbound lanes with a raised median) providing access to recently constructed retail/commercial shopping centers. East of SR 99 to Lexington Street, it is a wide two-lane undivided roadway. Based on daily traffic counts collected in late August 2014, the ADT volumes on Woollomes Avenue range from 3,700 west of Dover Parkway to 11,000 west of State Route 99.

Dover Parkway

Dover Parkway is a north–south roadway that currently provides access to the western side of the Marketplace shopping center on the south side of Woollomes Avenue. Per the City's General Plan Circulation Element, Dover Parkway will be extended to the north to connect to the existing roadway segment of Dover Place, just south of Diaz Street. This new roadway extension will provide a new four-lane divided north–south corridor on the western side of the city.

Stradley Avenue-Albany Street

This roadway is named Stradley Avenue south of Woollomes Avenue and Albany Street north of Woollomes Avenue. It is a two-lane undivided north–south roadway that provides local access to the western part of the city and to McFarland to the south. Albany Street terminates at County Line Road to the north. Per the City's General Plan Circulation Element, Albany Street (north of Woollomes Avenue) is designated as an arterial.

### Existing Intersection/Roadway Geometrics and Traffic Volumes

**Figure 4.14-2** illustrates the existing traffic controls and lane geometrics at the study area intersections and roadway segments. Existing weekday daily, AM and PM peak-hour, and Saturday midday peak-hour traffic volumes were collected at the study area intersections and roadway segments in late August 2014 from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM for a typical weekday, and 11:00 AM to 1:00 PM for a typical Saturday. The only school in the study area, the Nueva Vista Language Academy School, was in session during the weekday traffic counts. **Figure 4.14-3** and **Figure 4.14-4** illustrate the existing weekday daily and AM and PM peak-hour traffic volumes and the Saturday midday peak-hour traffic volumes, respectively. The raw traffic volume count sheets are provided in the TIS (see **Appendix 4.14-A**).

### Levels of Service

Intersections

The existing weekday AM and PM peak-hour and Saturday midday peak-hour traffic volumes were input into the Synchro LOS software to determine the existing intersection delays and resulting level of service (LOS) values. **Table 4.14-1** presents the results of the existing intersection level of service analysis for the weekday AM and PM and Saturday midday peak hours.

Based on the existing weekday AM and PM and Saturday midday peak-hour LOS analysis, all of the study area intersections are currently operating with satisfactory level of service at LOS C in the weekday AM and PM and Saturday midday peak hours.

**TABLE 4.14-1**
**EXISTING PEAK-HOUR INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 1. Garces Highway/Albany Street | AWSC | C | 10.1 | B | 11.8 | B | 9.4 | A |
| 2. Garces Highway/Dover Place | AWSC | C | 9.0 | A | 11.4 | B | 8.9 | A |

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 3. 1st Avenue/Albany Street | 1-way S | C | 9.3 | A | 10.2 | B | 10.3 | B |
| 4. 1st Avenue/Dover Place | 2-way S | C | 10.0 | B | 9.7 | A | 8.9 | A |
| 5. 1st Ave/Ellington St-SR 99 on-ramp | 1-way S | C | 10.1 | B | 11.2 | B | 10.7 | B |
| 6. 1st Ave/Fremont St-SR 99 off-ramp | AWSC | C | 6.7 | A | 7.3 | A | 6.7 | A |
| 7. Morse Boulevard/Belmont Street | future int | C | — | — | — | — | — | — |
| 8. Morse Boulevard/Dover Parkway | future int | C | — | — | — | — | — | — |
| 9. Woollomes Ave/Stradley-Albany | 1-way S | D | 9.1 | A | 9.7 | A | 9.7 | A |
| 10. Woollomes Ave/Belmont Street | future int | D | — | — | — | — | — | — |
| 11. Woollomes Ave/Grapevine Drwy | future int | D | — | — | — | — | — | — |
| 12. Woollomes Ave/Dover Parkway | signal | D | 12.4 | B | 13.0 | B | 13.7 | B |
| 13. Woollomes/Home Depot West | signal | D | 23.4 | C | 9.3 | A | 12.6 | B |
| 14. Woollomes/Home Depot East | 2-way S | D | 11.1 | B | 12.8 | B | 14.1 | B |
| 15. Woollomes Ave/SR 99 SB ramps | signal | D | 10.1 | B | 13.1 | B | 13.5 | B |
| 16. Woollomes Ave/SR 99 NB ramps | signal | D | 7.7 | A | 14.5 | B | 6.9 | A |
| 17. Woollomes Ave/Lexington St | AWSC | D | 8.3 | A | 12.2 | B | 8.8 | A |

*Source: Arch Beach Consulting 2015, Table E*

*Notes: LOS determined using HCM method in the Synchro LOS software.*

*future int = future intersection; AWSC = all-way stop control; 1-way S = one-way stop control; 2-way S = two-way stop control*

## Roadway Segments

The existing weekday daily traffic volumes counted in late August 2014 were compared with the roadway capacities in **Table 4.14-7** to determine the existing roadway segment LOS values. **Table 4.14-2** presents the results of the existing weekday daily roadway level of service.

Based on the table, all roadway segments in the study area have daily traffic volumes within their acceptable daily capacities (at LOS D capacity or better).

**TABLE 4.14-2**
**EXISTING DAILY ROADWAY SEGMENT LEVELS OF SERVICE**

| Roadway Segment | Capacity Configuration | Target LOS | Existing | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 1. Woollomes Ave, Stradley to Belmont | 2-lane undivided (<2 signals/mi) | D | 3,750 | A–B |
| 2. Woollomes Ave, Belmont to Grapevine | 2-lane undivided (2 to 4.5 signals/mi) | D | 3,750 | A–C |
| 3. Woollomes Ave, Grapevine Drwy to Dover | 2-lane undivided (2 to 4.5 signals/mi) | D | 3,750 | A–C |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane divided (>4.5 signals/mi) | D | 2,690 | A–C |
| 5. Woollomes Ave, Home Depot E to SR 99 | 4-lane divided (>4.5 signals/mi) | D | 10,990 | A–C |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 2-lane undivided (>4.5 signals/mi) | D | 9,290 | D |

| Roadway Segment | Capacity Configuration | Target LOS | Existing | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 7. Woollomes Ave, SR 99 to Lexington | 2-lane undivided (>4.5 signals/mi) | D | 7,990 | D |
| 8. Albany St, north of Woollomes | 2-lane undivided (<2 signals/mi) | C | 4,150 | A–B |
| 9. Stradley Ave, south of Woollomes | 2-lane undivided (<2 signals/mi) | C | 1,700 | A–B |
| 10. Belmont St, north of Woollomes | *future segment* | C | — | — |
| 11. Belmont St, south of Woollomes | *future segment* | C | — | — |

*Source: Arch Beach Consulting 2015, Table F*

*Note: Thresholds based on Quality/Level of Service Handbook (FDOT 2009). Adjustments made according to appropriate area conditions, following FDOT guidelines.*

## Freeway Mainline and Ramps

The existing weekday and Saturday midday peak-hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into the Highway Capacity Software (HCS) to determine the existing mainline segment and ramp level of service values. **Table 4.14-3** presents the results of the existing weekday peak-hours and Saturday midday peak-hour freeway mainline level of service.

As shown in **Table 4.14-3,** all freeway mainline segments in the study area are currently operating with satisfactory level of service, at LOS C or better, per Caltrans criteria.

**TABLE 4.14-3**
**EXISTING FREEWAY MAINLINE SEGMENT PEAK-HOUR LEVELS OF SERVICE**

| Mainline Segment | Target LOS | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | Saturday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS |
| SR 99 NB n/o Woollomes Ave | C | 1,073 | 5.6 | A | 2,384 | 12.5 | B | 2,670 | 14.0 | B |
| SR 99 NB s/o Woollomes Ave | C | 1,136 | 6.0 | A | 2,524 | 13.2 | B | 2,826 | 14.8 | B |
| SR 99 SB n/o Woollomes Ave | C | 1,788 | 9.4 | A | 2,145 | 11.2 | B | 1,997 | 10.5 | A |
| SR 99 SB s/o Woollomes Ave | C | 1,893 | 9.9 | A | 2,271 | 11.9 | B | 2,115 | 11.1 | B |

*Source: Arch Beach Consulting 2015, Table G*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*

**Table 4.14-4** presents the results of the existing weekday peak-hours and Saturday midday peak-hour freeway ramp level of service. Based the calculation shown in **Table 4.14-4,** the SR 99 northbound off-ramp at Woollomes Avenue currently operates with unsatisfactory level of service (LOS D) per Caltrans criteria during the Saturday midday peak hour.

**TABLE 4.14-4**
**EXISTING FREEWAY RAMPS PEAK-HOUR LEVELS OF SERVICE**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Midday Peak | |
|---|---|---|---|---|---|---|---|---|
| | | | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS |
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 10.2 | B | 17.3 | B | 18.9 | B |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 9.7 | A | 18.3 | B | ***19.8*** | ***D*** |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 12.0 | B | 14.7 | B | 13.2 | B |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 13.1 | B | 15.4 | B | 14.5 | B |

*Source: Arch Beach Consulting 2015, Table H*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*
***Bold italics*** *indicates unsatisfactory level of service.*

## Transit Service

Delano Area Rapid Transit (DART) provides fixed-route bus service on four routes and Dial-A-Ride service to Delano and surrounding areas within the boundaries of SR 43 to the west, County Line Road to the north, Pond Road to the south, and Kyte Avenue to the east. DART Route 2 provides service in the project study area with a stop at the Home Depot on Woollomes Avenue. At this time, Route 2 does not travel farther west on Woollomes Avenue beyond the stop at Home Depot. Route 2 includes stops on Lexington Street, High Street, Garces Highway, 1st Avenue, and Albany Street.

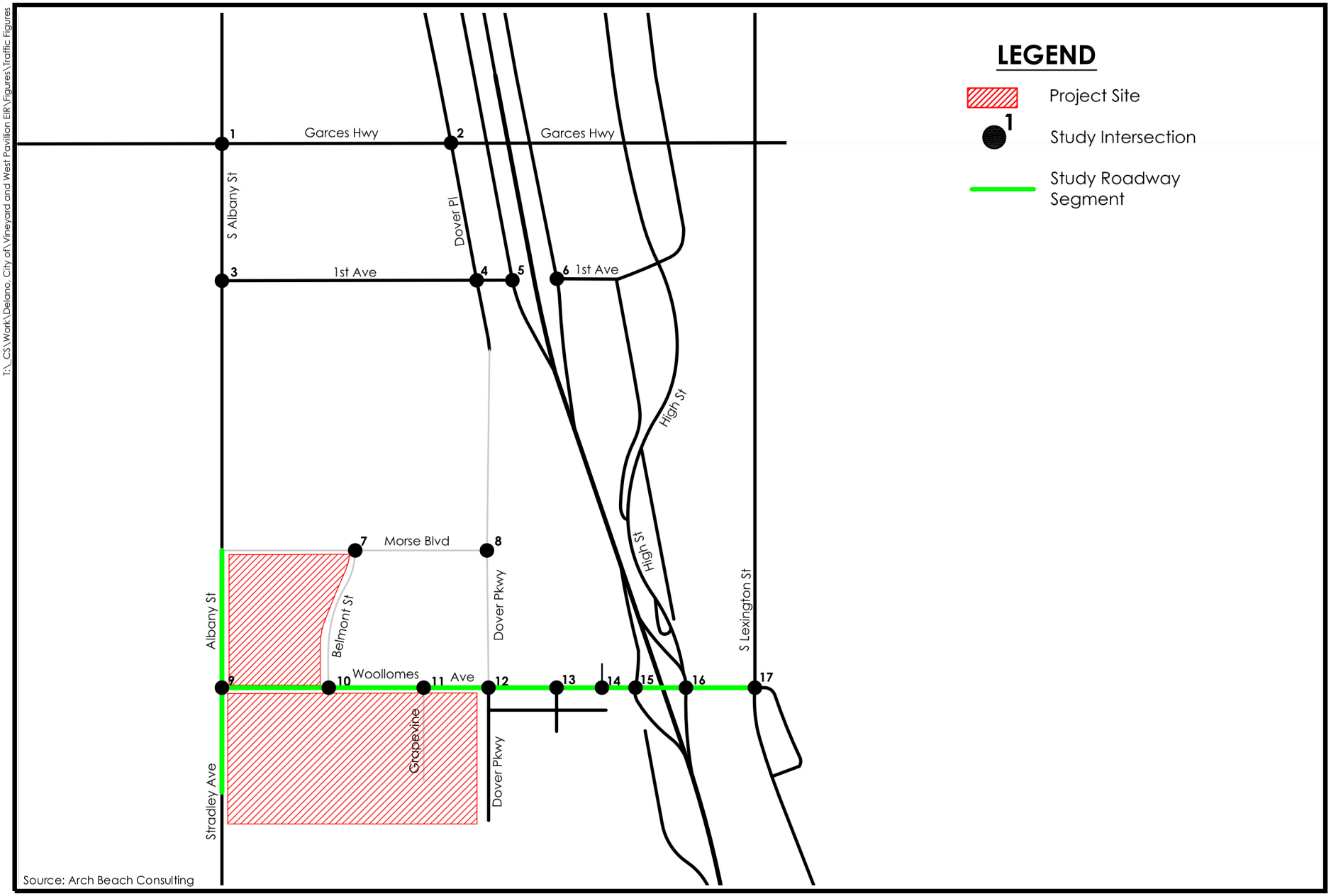
Delano is currently served by the main line of the Union Pacific Railroad (UPRR). The railroad runs in a north–south direction, parallel to SR 99 (east of SR 99 in the project study area). The railroad crossing at Woollomes Avenue, east of SR 99, is one of seven crossings in the city. Currently, no Amtrak passenger train service serves Delano. The closest Amtrak station is in Wasco, approximately 15 miles southeast of Delano.

Delano Municipal Airport is located at the eastern terminus of Woollomes Avenue in the southeast portion of the city. Currently, the airport offers no commercial passenger air service.

## Pedestrian and Bicycle Facilities

Per the Delano General Plan Circulation Element, the city currently has no designated bicycle routes. Most of the bicycle activity in the city occurs near schools by school-aged children. Pedestrian facilities in the city are limited to sidewalks, crosswalks, and pedestrian crossing lights. Curb cuts and ramps are required for all new construction in the city. In the project study area, sidewalks have been constructed on the developed segments of Woollomes Avenue, and the signalized intersections at Dover Parkway, Marketplace Drive, and the SR 99 interchange contain crosswalks with pedestrian phases.

The Delano Bicycle Master Plan (2007) was developed to set a proactive course toward making bicycling an integral part of daily life in Delano and to enhance the safety of bicyclists. In the area of the proposed project, the Master Plan indicates that bike lanes or routes should connect Woollomes Avenue to areas of Delano north of the project site via Albany Street west of SR 99 and via Lexington Street east of SR 99.




Not to Scale

N

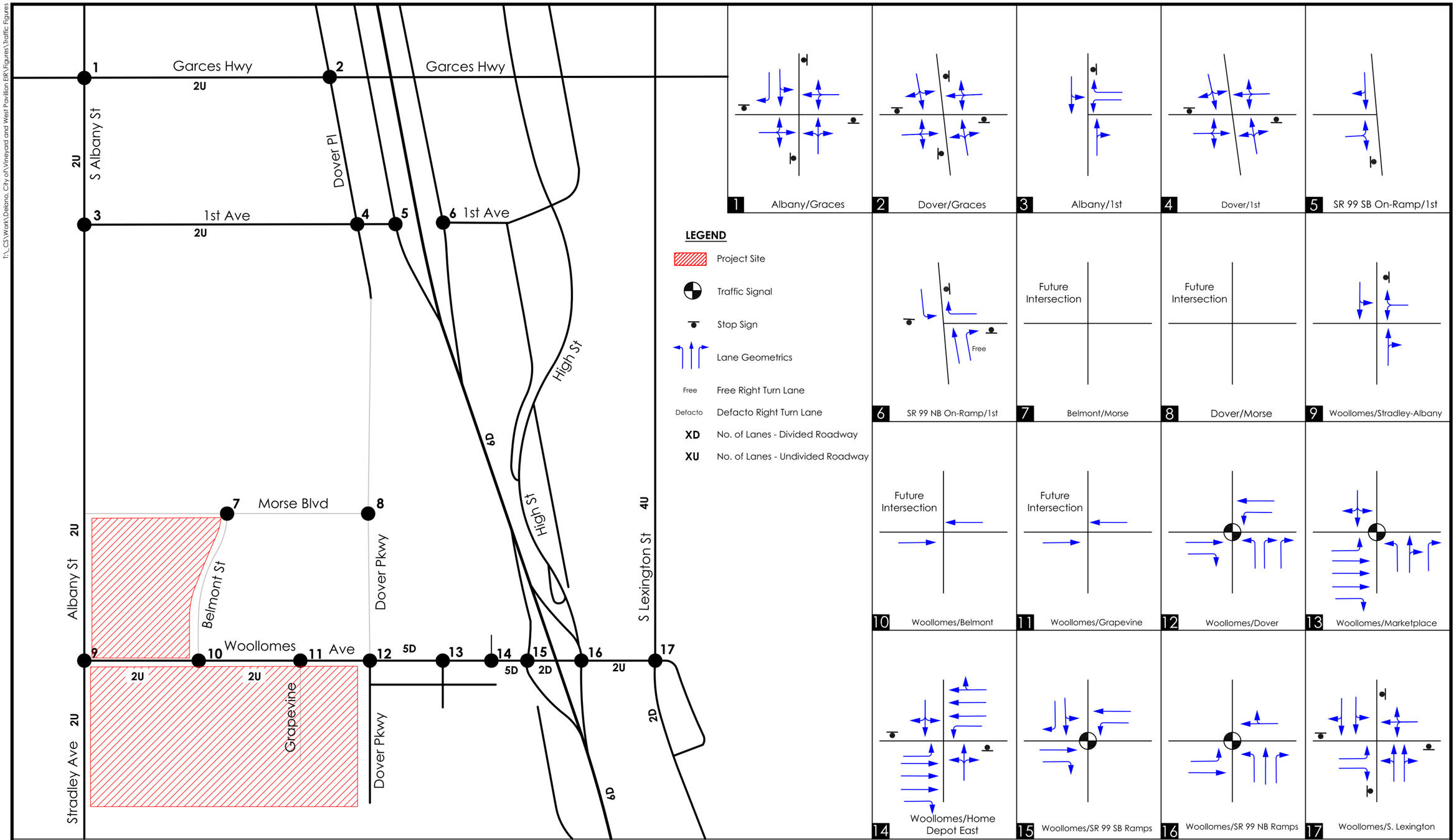
**Figure 4.14-1**

Project Study Area Intersections and Roadway Segments

PMC®

T:_GS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures\Traffic Figures

T:_CS\Work\Delano, City of\Vineyard and West Pavilion EIR\Figures\Traffic Figures




Source: Arch Beach Consulting

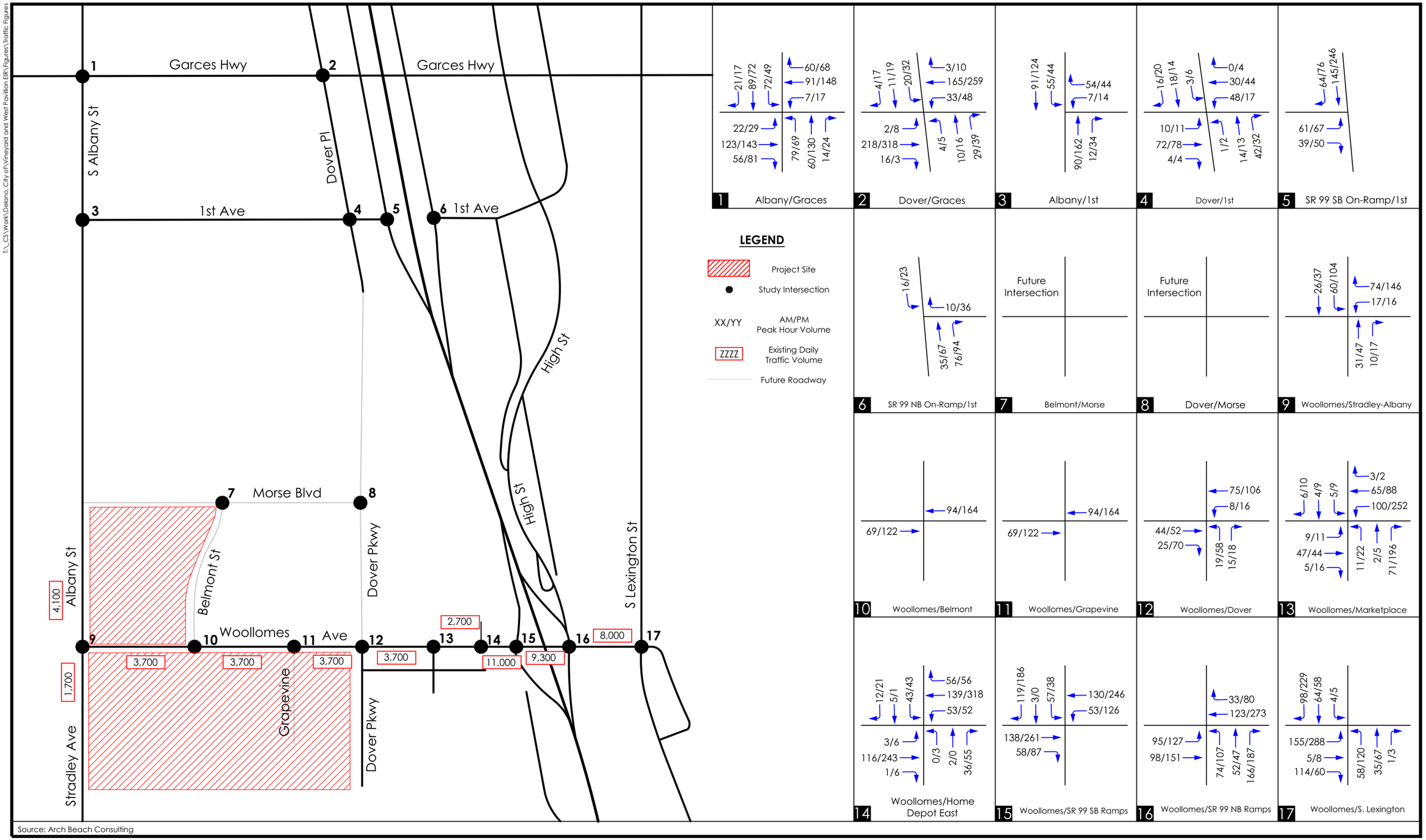
Not to Scale

N

**Figure 4.14-2**

Existing Traffic Controls and Geometrics

PMC®

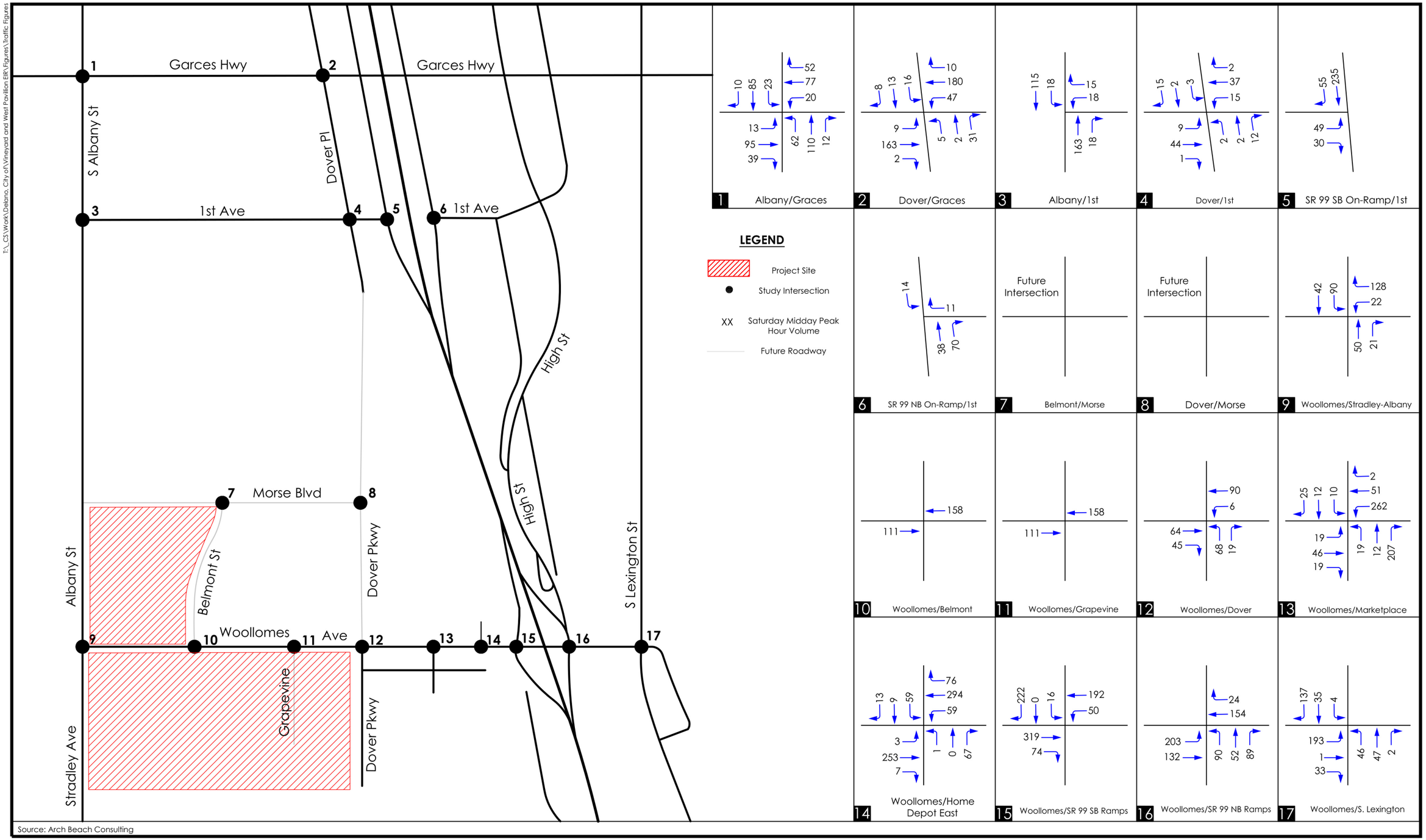



Not to Scale

**Figure 4.14-3**

Existing Weekday Daily and Peak Hour Traffic Volumes

PMC




Source: Arch Beach Consulting

Not to Scale

N

**Figure 4.14-4**

Existing Saturday Midday Peak Hour Traffic Volumes

PMC®

## 4.14.2 REGULATORY SETTING

### LOCAL/REGIONAL

#### Regional Transportation Plan/Sustainable Communities Strategy

Developed by the Kern Council of Governments (Kern COG), the 2014 Regional Transportation Plan (RTP) is a 26-year blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County. The adopted RTP establishes a basis on which funding applications are evaluated. Use of any state or federal transportation funds by local governments must conform to the RTP, the State Implementation Plan (SIP) for air quality improvements, and the Federal Transportation Improvement Program (FTIP).

State transportation planning laws (California Government Code Section 65080 et seq.) also specify that actions by transportation agencies, such as Caltrans, must be consistent with the RTP. Land use decisions should consider and accommodate transportation facilities and programs specified in the RTP whenever possible but are not required to be consistent with the RTP. The facilities listed in the RTP should be incorporated into city and county general plans. Local transportation projects must be consistent with the RTP in order to obtain state or federal funding.

#### City of Delano General Plan

The Delano General Plan Circulation Element provides objectives, policies, and standards for the city's circulation system. Those policies and standards that pertain to the proposed project are listed below.

*Roadway Classification Standards*

Policy 4. Apply consistent standards for new street development, based on traffic carrying capacity and classification.

Policy 6. Arterial, collector and local street standards shall be developed which provide adequate capacity for their appropriate function, and these shall be incorporated into the Subdivision Standards for the City of Delano.

Policy 7. Actual design and improvement to ultimate standards shall be achieved through inclusion of facilities as part of the City-wide Capital Improvements Program, or by new developers as areas adjoining the designated circulation system are developed, with allowance for bicycle lanes, in locations adopted by the City Council.

Policy 8. The design of arterials, collectors, local collectors, and local streets shall comply with the Subdivision Standards for the City of Delano, as amended.

Policy 9. Standards for new street development can be altered or refined through the specific plan or planned unit development process when it can be demonstrated that projected traffic flows can be accommodated.

Policy 10. New street developments in areas of urban expansion should not be limited to a "grid system." More efficient and varied street layouts should be encouraged, wherever possible.

Policy 11. New arterial and collector streets shall be designed to operate at Level of Service "C" level or better for a period of at least 20 years following their construction, wherever feasible. Freeway interchanges and high volume intersections where it is not feasible to achieve and maintain LOS "C" shall be designed to achieve and maintain LOS "D" for a period of at least 20 years following their construction.

Policy 12. The right-of-way widths and construction widths of all classes of streets from local to arterial shall be updated as necessary to reflect the street classifications in the Circulation Element.

Policy 13. Right-of-way essential to the circulation system should be dedicated and/or developed to the appropriate extent and width when a zone change to a greater density, division of property or development occurs.

Policy 16. All land development proposals shall be reviewed to assure consistency with this Circulation Element.

*Arterials*

Policy 17. The following streets are proposed to be arterial streets within Delano's urban area:

| East–West Arterials | North–South Arterials |
|---|---|
| County Line Road | Wasco-Pond Road |
| Cecil Avenue | Casey Avenue |
| Garces Highway (SR 155 E of SR 99) | Melcher Road |
| Woollomes Avenue | Albany Street/Stradley Avenue |
| Schuster Road | Garzoli Avenue |
| Pond Road | High Street |
| | Browning Road |

These major arterials shall be developed with a minimum right-of-way of 110 feet, to include four travel lanes, parking, and a two-way left center turn lane or median. Where the Public Works director determines that a 110-foot right-of-way is not required to meet applicable level of service standards, arterials may be developed within a 90-foot right-of-way, eliminating either the center median or on-street parking, as determined appropriate by the Public Works Director.

Policy 18. The primary purpose of arterials is to carry traffic. Parking should be discouraged on such streets and eliminated where it now exists, along existing arterials as traffic safety conditions warrant.

Policy 19. Arterials shall be built in areas where traffic demand warrants the development of this facility to meet the adopted level of service standard.

*Local Streets*

Policy 25. Local street right-of-way shall be a minimum of 50 feet which allows two travel lanes and parking.

Policy 26. Local streets shall serve residential neighborhoods, and shall not be used to carry through traffic or high traffic volumes.

Policy 27. Local streets shall not carry an unreasonable level of through traffic. Should it be determined that a local street is carrying an unacceptable level of through traffic, the City may use appropriate means to reduce traffic through creation of one-way traffic flow, upgrade the street to collector status, installation of traffic diversion devices, and/or any other means deemed to be acceptable under the Vehicle Code of the State of California.

Policy 28. Permit design standards for local streets to reduce right-of-way width and paving where innovative approaches to street design are proposed within a planned unit development.

*Arterial Street Standards*

Policy 30. Driveway access to major activity centers should be provided with adequate separation from the adjacent intersection of a collector or arterial street, measured from the curb return to the nearest edge of the driveway. If driveways must be provided near intersections for facilities (such as service stations) these driveways shall not be serviced by median breaks.

Policy 31. Adequate separation shall be maintained between driveways along commercially developed arterials. Where minimum spacing pursuant to City standards is not practical, the development shall provide acceptable traffic mitigation measures in addition to those already required.

Policy 32. Where practical and desirable, driveways should be located on adjacent collector streets rather than on arterial streets.

Policy 33. Driveway consolidation shall be encouraged through joint access agreements along arterials.

*Safety Standards*

Objective B. Promote traffic safety throughout the City by enforcement of speed limits, installation of appropriate traffic control devices, and construction of pedestrian facilities.

Policy 1. Minimize hazardous encounters among all transportation modes by utilizing special safety techniques and precautions at intersecting points.

Policy 3. Encourage bicycle routes along less intensive vehicular paths.

Policy 6. In order to promote safe and efficient traffic flow throughout the City, traffic signals shall be spaced no closer than 1/4 mile on arterials except in unusual circumstances. The intersections of arterial and collector streets and the access driveways to major traffic generators shall be located so as to maintain this minimum spacing.

Objective C. Maximize the use of site planning techniques to improve traffic safety.

Policy 2. Left hand-turn lanes shall be provided where necessary for access from arterials into high traffic commercial or multi-family developments.

Policy 3. Project streets shall be designed in a manner that reduces through traffic on local streets and reduces the number of intersections with collectors and arterials.

Policy 4. New subdivisions shall contain non-continuous street patterns for interior local streets to protect neighborhoods from the intrusion of through traffic from collectors and arterial streets.

Policy 5. Residential subdivisions shall be designed to encourage access from collector streets.

Policy 6. Promote design standards that allow for safe and efficient transport, delivery, loading and unloading of goods from service vehicles within commercial and industrial areas.

Policy 7. Where major new activity centers are proposed along arterial streets, designs shall be encouraged which minimize construction along the property line or along the adopted set-back line, whichever is appropriate.

Policy 8. Developers shall mitigate traffic impacts associated with their projects.

Policy 10. Where arterials and collector streets are required, residential development shall be oriented away (side-on or rear-on) from such streets, and properly buffered so that the traffic carrying capacity on the street will be preserved and the residential environment protected from the adverse characteristics of the street.

Policy 11. Due to the traffic congestion which results from numerous points of ingress and egress along commercial streets, future commercial developments or modifications to existing developments shall be master planned with limited points of ingress and egress onto a major street. Ingress and egress to shopping centers should be carefully designed in order to promote traffic safety. Left-hand movements into and out of commercial areas should be minimized and existing points of ingress and egress shall be consolidated whenever possible.

*Transportation Systems and Congestion Management*

Policy 2. Transportation System Management and Transportation Demand Management are the preferred strategies for the mitigation of traffic and parking congestion. Public transit, traffic management, ridesharing and parking management are to be used to the greatest extent practical to implement transportation management strategies.

Policy 4. Large development shall be encouraged to incorporate transit passenger facilities, bicycle racks or lockers, shower facilities, as well as on site services (eating, mail, banking, etc.) as ways to encourage alternative modes for commute trips.

*Street Improvements*

Policy 1. Establish street dedication requirements as conditions of approval of development entitlements.

*Parking*

Policy 1. Adequate off-street parking shall be required of all commercial and industrial land uses to accommodate parking demand. Off-street parking shall also be required of multi-family residential land uses to accommodate tenants.

*Bicycle Facilities*

Policy 3. In order to provide a continuous and well integrated bikeway system linking public and private uses, a bicycle master plan will be prepared and adopted.

a. *Bike lanes* are an on-street bikeway in which separate automobile and bicycle travel lanes are designed visually by signs and street markings. Bike lanes shall be implemented on new improved street or segments, where appropriate.

b. *Bike routes* are a system of streets with signs denoting them as a bike route, warning motorists to anticipate bicycles on these streets and indicating to bicyclists a desirable routing because of low traffic volumes or continuity to activity centers. Bike routes will be implemented on existing street segments.

c. *Bike paths* have their own right-of-way and are developed exclusively for bicycle travel and are entirely separate from streets and highways.

Policy 4. On street parking is prohibited on all new or improved sections of major streets planned for bike lanes where adequate street width is not available to accommodate both on street parking and a bike lane.

Policy 5. Secure bicycle parking facilities shall be required as conditions of approval for all new major activity centers, public and private places of assembly, and commercial or industrial developments.

*Pedestrian Facilities*

Policy 7. The City shall require curb, gutter, and sidewalks in all areas of the community to accommodate pedestrian traffic, especially along routes with high pedestrian traffic such as schools, parks, and the Downtown area. Installation of these improvements shall be encouraged to the extent feasible in existing neighborhoods where they do not currently exist.

Policy 9. Where walls or fences are proposed for residential developments along major arterials, arterials, or collector streets, pedestrian access will be provided between the major arterial, arterial, or collector, and the development to allow access to transit vehicles operating on the street.

## City of Delano Zoning Ordinance

Delano Municipal Code Section 20.10.40 identifies the development requirements for circulation, transportation, and trails facilities in the city. This section is intended to ensure that development proposals which include the design and/or construction of new roads, trails, and transit facilities are consistent with the adopted Circulation Element and Open Space/Conservation Element of the General Plan and contribute to the implementation of the goals and policies of those elements.

Section 20.10.40(2)(a) requires that all streets, highways, alleys, and ways be designed and constructed in accordance with Title 16, Subdivision Ordinance, of the Municipal Code and any engineering design standards that may be periodically updated by the City Engineer.

Section 20.10.40(4) discusses the requirements for the inclusion of sidewalks, walking paths, bicycle paths, and horse trails as follows:

a. Sidewalks shall be constructed in conjunction with public and private streets unless they are determined by the City Council to be unnecessary, considering the rural nature of the development and/or pedestrian circulation needs. Sidewalk construction shall be in accordance with the City's Subdivision Ordinance and Engineering Design Standards.

b. The City may require dedication of walking paths, equestrian, and/or other trails for public use when such paths are determined to be necessary to further the goals and objectives, policies, or programs of the General Plan. In addition, and in conjunction with required street dedications, a project applicant may also be required to dedicate such additional land as may be necessary and feasible to provide bicycle paths for the use and safety of the residents of the development.

Section 20.10.40(5) discusses the requirements for local transit facilities. The City may require the dedication or irrevocable offer of dedication of land for local transit facilities such as bus turnouts, benches, shelters, loading pads, and similar items. If a subdivision is involved, such requirements are to directly benefit the residents of the subdivision and apply only if the subdivision as shown on the tentative map has the potential for 100 dwelling units or more if developed to the maximum density shown in the City's General Plan and if the City finds that transit services are or will, within a reasonable time, be made available to the subdivision.

## Development Impact Fees for Traffic and Circulation

The City adopted Resolution No. 2007-42 in June 2007 – *Development Impact Fees for Traffic and Circulation* (Ordinance No. 928 – *Development Impact Fees*) that levies fees on new development, on a one-time basis, as a Condition of Approval (COA) to cover the cost of infrastructure or facilities needed by that development as authorized by Section 66000(b) of the Government Code. A copy of the Development Impact Fee is located in **Appendix 4.14-A** (as Appendix H of the TIS). Under the program, new local streets are constructed by developers as a COA for new developments. The program is one of several sources of funding used to maintain and develop streets. Ordinance No. 928 amended the City Municipal Code allowing impact fees to be established by resolution.

## 4.14.3 IMPACTS AND MITIGATION MEASURES

### STANDARDS OF SIGNIFICANCE

The standards of significance for traffic related impacts are based on California Environmental Quality Act (CEQA) Guidelines Appendix G, which states that a project may have a significant effect on the environment if the project would result in any of the following:

1) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

2) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

5) Result in inadequate emergency access.

6) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

**Capacity Thresholds**

Intersections and Roadway Segments

The City's General Plan Circulation Element establishes LOS C or LOS D as the threshold for satisfactory operations on intersections and roadway segments in the city:

> *Achieve and maintain Level of Service "C" at all intersections throughout the City, with the exception of freeway interchanges and high volume intersections where the City's objective is to achieve and maintain Level of Service "D".*

Consistent with the General Plan policy above, LOS D will be the minimum acceptable level of service standard for all study intersections and roadway segments along Woollomes Avenue as it is developed and planned as a high-volume commercial corridor and freeway interchange with SR 99. Therefore, for all intersections and roadway segments on Woollomes Avenue, the minimum acceptable level of service will be LOS D. For all other intersections and roadway segments in the study area, the minimum acceptable level of service will be LOS C.

Freeway Mainline Segments and On/Off-Ramps

As required by Caltrans District 6 and consistent with the Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), LOS C will be the minimum acceptable level of service for SR 99 mainline segments and on- and off-ramps.

## METHODOLOGY

### Intersections

As discussed previously, the analysis is based on the Traffic Impact Study, Vineyard at Delano and Delano West Pavilion Projects, prepared by Arch Beach Consulting in October 2014. The methodology used for the analysis is described in detail in **Appendix 4.14-A**; however, the basic premise of the study addresses level of service in terms of vehicle control delay (in seconds per vehicle) for signalized and unsignalized intersections. The level of service grades (LOS A to LOS F), as reported in the Transportation Research Board's Highway Capacity Manual (HCM), are dependent on vehicle control delay (in seconds) at the signalized and unsignalized intersections.

Both signalized and unsignalized study area intersections have been analyzed using the HCM operations method. The Synchro LOS software was used to determine intersection level of service for all study scenarios. Synchro is consistent with the HCM methodologies as well as with the City's requirements.

The degree of congestion at an intersection is described by the level of service, which ranges from LOS A to LOS F, with LOS A representing free-flow conditions with little delay and LOS F representing oversaturated traffic flow throughout the peak hour. A complete description of the meaning of level of service can be found in the Highway Research Board Special Report 209, *Highway Capacity Manual* (HCM). Brief descriptions of the six levels of service for signalized intersections are shown in **Table 4.14-5**, while **Table 4.14-6** provides detailed descriptions of each level of service.

**TABLE 4.14-5**
**LEVEL OF SERVICE DEFINITIONS**

| Level of Service | V/C Ratio or ICU (signalized) | Control Delay in Seconds (unsignalized) |
|---|---|---|
| A | 0.00–0.60 | 0.0–10.0 seconds |
| B | 0.61–0.70 | 10.1–15.0 seconds |
| C | 0.71–0.80 | 15.1–25.0 seconds |
| D | 0.81–0.90 | 25.1–35.0 seconds |
| E | 0.91–1.00 | 35.1–50.0 seconds |
| F | 1.01 or greater | 50.1 seconds or greater |

*Source: Transportation Research Board 2000*

**TABLE 4.14-6**
**LEVEL OF SERVICE DESCRIPTIONS**

| LOS | Description |
|---|---|
| A | No approach phase is fully utilized by traffic, and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily, and nearly all drivers find freedom of operation. |
| B | This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are nearing full use. Many drivers begin to feel restricted within platoons of vehicles. |

| LOS | Description |
|---|---|
| C | This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. |
| D | This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups. |
| E | Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand. |
| F | This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially, and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero. |

*Source: Transportation Research Board 2000*

## Roadway Segments

Consistent with the City of Delano Circulation Element, the Florida Department of Transportation's (1992) Level of Service Standards and Guidelines Manual for Planning was used to evaluate roadway segments on a volume-to-capacity basis. **Table 4.14-7** identifies the roadway segment level of service thresholds by facility type in the study area.

**TABLE 4.14-7**
**DAILY ROADWAY SEGMENT LOS THRESHOLDS**

| | LOS A | LOS B | LOS C | LOS D | LOS E |
|---|---|---|---|---|---|
| All Roadway Facilities Volume-to-Capacity (V/C) | <0.60 | 0.6–0.7 | 0.7–0.8 | 0.8–0.9 | 0.9–1.0 |
| | **Two-Way Average Daily Traffic (ADT) Threshold** | | | | |
| **Roadway Segment Type** | **LOS A** | **LOS B** | **LOS C** | **LOS D** | **LOS E** |
| 6-Lane Divided (>4.5 signals/mile) | — | — | 17,730 | 39,330 | 43,380 |
| 4-Lane Divided (>4.5 signals/mile) | — | — | 11,340 | 25,380 | 28,710 |
| 2-Lane Undivided (>4.5 signals/mile) | — | — | 4,845 | 11,305 | 14,155 |
| 6-Lane Divided (2–4.5 signals/mile) | — | — | 35,100 | 45,270 | 47,790 |
| 4-Lane Divided (2–4.5 signals/mile) | — | — | 22,500 | 29,880 | 31,590 |
| 2-Lane Divided (2–4.5 signals/mile) | — | — | 9,450 | 13,680 | 14,580 |
| 4-Lane Undivided (<2 signals/mile) | — | 19,045 | 23,075 | 23,855 | — |
| 2-Lane Undivided (<2 signals/mile) | — | 8,640 | 13,860 | 14,850 | — |

*Source: Arch Beach Consulting 2015*

*Notes:*

1. *Thresholds based on Florida Department of Transportation Quality/Level of Service Handbook (FDOT 2009). Adjustments made according to appropriate area conditions, following FDOT guidelines.*
2. *All volumes are approximate and assume typical roadway characteristics. Actual threshold volumes for each LOS listed above may vary depending on a variety of factors including (but not limited to) roadway curvature and grade, intersection or interchange spacing, driveway spacing, percentage of trucks and other heavy vehicles, travel lane widths, signal timing characteristics, on-street parking, volume of cross traffic and pedestrians, etc.*

Per the Florida Department of Transportation (2009) Quality/Level of Service Handbook, if a roadway segment has an uneven number of lanes (e.g., five-lane divided, three in eastbound direction and two in westbound direction), the lower roadway segment type capacity threshold (e.g., four-lane divided) should be used.

### Freeway Mainline Segments

Existing (2013) annual average daily traffic (AADT) volumes were obtained from the Caltrans Traffic and Vehicle Data Systems Unit web page. The "K" and "D" factors used to get the peak-hour directional volumes for the weekday AM and PM peak hours and the Saturday midday peak hour were obtained from the Peak Hour Volume Data Report on the Caltrans Traffic Data Branch website. Future traffic volume forecasts were post-processed in accordance with Kern COG modeling procedures. The delay and level of service were calculated using the HCM methodology for basic freeway segments. The Highway Capacity Software (HCS) program was used to perform these calculations.

### Study Scenarios

In addition, four study scenarios were evaluated in the traffic study that analyzed the change to the roadway network:

- **Scenario 1: Existing Conditions** – This scenario represents existing weekday daily, AM and PM peak-hour, and Saturday midday peak-hour traffic volumes collected at the study area intersections and roadway segments in late August 2014 from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM for a typical weekday, and 11:00 AM to 1:00 PM for a typical Saturday. The only school in the study area, the Nueva Vista Language Academy School, was in session during the weekday traffic counts. The existing traffic scenario constitutes the environmental setting in accordance with the CEQA analysis at the time that the hearing body reviews the proposed project.

- **Scenario 2: Existing Plus Project Conditions** – This scenario was developed by adding the proposed project traffic to the existing conditions. This scenario is the basis for determining project-specific impacts and mitigation measures.

- **Scenario 3: Cumulative Buildout (2040) Baseline Conditions** – This scenario assumes that the proposed project would be constructed within a 10-year time frame with several phases of development on each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion were analyzed at full buildout (i.e., one single phase—buildout of project) to determine the total traffic mitigation measures required at full buildout of the project. The Cumulative Buildout Baseline condition represents buildout of the General Plan land uses in the study area based on traffic growth up to year 2040 in the Kern COG travel demand model, plus traffic from cumulative (approved/pending) projects in the study area as provided by the City.

- **Scenario 4: Cumulative Buildout (2040) Plus Project Conditions** – This scenario includes the Cumulative Buildout (2040) Plus Project Conditions traffic, developed by adding the proposed project traffic to the Cumulative Buildout (2040) Baseline Condition. This scenario is also the basis for determining project-specific impacts, mitigation measures, and project contributions to impacted facilities.

## PROJECT IMPACTS AND MITIGATION MEASURES

### Exceed Level of Service Standards Established by the General Plan (Standards of Significance 1 and 2)

**Impact 4.14.1** The proposed project would result in significant increases in level of service at the study intersections. This increase would result in a **potentially significant** impact.

Existing Plus Project Conditions

Traffic generated by the proposed project was added to the Existing Baseline scenario, and the project impacts on the circulation system were analyzed. This scenario would determine project-specific impacts and mitigation measures (if required).

### Intersection/Roadway Geometrics and Traffic Volumes

The intersections and roadway segments surrounding the project site would be improved by the roadway improvements constructed as a part of the proposed project. Based on discussions with the City, it is anticipated that the proposed project would be conditioned to construct the following street improvements (from east to west side of project):

- Construct the half-(street) section of Dover Parkway (west side of centerline) from Woollomes Avenue to its southern project boundary to have two lanes in the southbound direction. The east side has already been constructed to its ultimate width. Dover Parkway has an ultimate right-of-way of 90 feet.

- Construct the half-section of Woollomes Avenue (south side of centerline) from the future Belmont Street to Dover Parkway to have two lanes in the eastbound direction. Woollomes Avenue has an ultimate right-of-way of 110 feet.

- Connect a primary access driveway on the West Pavilion site to the future Grapevine Shopping Center primary access driveway. This intersection will be signalized.

- Construct the half-section of Belmont Street (west side of centerline) from the future Morse Boulevard to Woollomes Avenue to have two lanes in the southbound direction. Belmont Street has an ultimate right-of-way of 90 feet.

- Construct the full section of Belmont Street (both sides of centerline) from Woollomes Avenue to its southern project boundary to have four total lanes (two lanes in each direction) plus a median. Belmont Street has an ultimate right-of-way of 90 feet.

- Install a traffic signal at the Belmont Street/Woollomes Avenue intersection.

- Construct the full section of Woollomes Avenue (both sides of centerline) from Stradley Avenue-Albany Street to Belmont Street to have four total lanes (two lanes in each direction) plus a median. Woollomes Avenue has an ultimate right-of-way of 110 feet.

- Construct the half-section of Morse Boulevard (south side of centerline) from Albany Street to the future Belmont Street to have two lanes in the eastbound direction. Morse Boulevard has an ultimate right-of-way of 90 feet.

- Construct the half-section of Stradley Avenue-Albany Street (east side of centerline) from the northern project boundary to the southern project boundary to have two lanes in the northbound direction. Stradley Avenue-Albany Street has an ultimate right-of-way of 90 feet.

These improvements were assumed in the base roadway network for the Existing Plus Project condition traffic analysis.

The proposed project trip assignments for the weekday peak hours and the Saturday midday peak hour of the residential and retail/commercial land uses were added to the Existing Baseline weekday AM and PM peak-hour and Saturday midday peak-hour traffic volumes (**Figure 4.14-3** and **Figure 4.14-4**, respectively). This resulted in the Existing Plus Project traffic volumes. **Figure 4.14-5** illustrates the Existing Plus Project weekday daily, AM and PM peak-hour traffic volumes, and **Figure 4.14-6** illustrates the Saturday midday peak-hour traffic volumes at the study intersections and roadway segments.

According to the TIS, the proposed project would generate 23,370 weekday daily trips, including 1,103 AM peak-hour trips and 1,004 PM peak-hour trips as shown in **Table 4.14-8**. Additionally, the proposed project would generate 29,116 Saturday trips. These trips would result in impacts to the surrounding roadway network.

**TABLE 4.14-8**
**PROPOSED PROJECT TRIP GENERATION**

| Land Use | Units[1] | Daily Trips | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Trip Rates** | | | | | | | | |
| Apartment (ITE 220) Weekday | per du | 6.65 | 0.10 | 0.41 | 0.51 | 0.40 | 0.22 | 0.62 |
| Apartment (ITE 220) Saturday | per du | 6.39 | 0.26 | 0.26 | 0.52 | — | — | — |
| Shopping Center (ITE 820) Weekday and Saturday | per sq ft | ITE | ITE equation[1] | | | ITE equation[1] | | |
| **Weekday Trip Generation** | | | | | | | | |
| Apartment at Vineyard (Phases I–IV) | 432 du | 2,873 | 44 | 176 | 220 | 174 | 94 | 268 |
| Apartment at West Pavilion (Phases I–IV) | 440 du | 2,926 | 45 | 180 | 224 | 177 | 95 | 273 |
| Commercial at West Pavilion (Phase III) | 170,000 sq ft | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| Pass-by trips (8%)[2] | | -802 | -11 | -7 | -18 | -34 | -37 | -72 |
| | ***Subtotal*** | ***8,786*** | ***122*** | ***75*** | ***197*** | ***376*** | ***407*** | ***783*** |
| Commercial at West Pavilion (Phase IV) | 170,000 sq ft | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| Pass-by trips (8%)[2] | | -802 | -11 | -7 | -18 | -34 | -37 | -72 |
| | ***Subtotal*** | ***8,786*** | ***122*** | ***75*** | ***197*** | ***376*** | ***407*** | ***783*** |
| **Project Net Effective Trip Generation** | | **23,370** | **334** | **506** | **840** | **1,103** | **1,004** | **2,107** |

| Land Use | Units[1] | Daily Trips | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Saturday Trip Generation** | | | | | | | | |
| Apartment at Vineyard (Phases I–IV) | 432 du | 2,760 | 112 | 112 | 225 | | | |
| Apartment at West Pavilion (Phases I–IV) | 440 du | 2,812 | 114 | 114 | 229 | | | |
| Commercial at West Pavilion (Phase III) | 170,000 sq ft | 12,907 | 642 | 592 | 1,234 | | | |
| Pass-by trips (9%)[2] | | -1,136 | -56 | -52 | -109 | | | |
| | ***Subtotal*** | ***11,772*** | ***585*** | ***540*** | ***1,126*** | | | |
| Commercial at West Pavilion (Phase IV) | 170,000 sq ft | 12,907 | 642 | 592 | 1,234 | | | |
| Pass-by trips (9%)[2] | | -1,136 | -56 | -52 | -109 | | | |
| | ***Subtotal*** | ***11,772*** | ***585*** | ***540*** | ***1,126*** | | | |
| **Project Net Effective Trip Generation** | | **29,116** | **1,397** | **1,307** | **2,705** | | | |

*Source: Arch Beach Consulting 2015, Table D*

*Notes:*

1. *Shopping Center trip generation estimates are based on the logarithmic equations contained in the ITE Trip Generation, 9th Edition.*
2. *Per the ITE Trip Generation Handbook 2nd Edition (ITE 2004), the calculated pass-by trip percentage for the size of Shopping Center use is approximately 33% for the weekday and 35% for Saturday. A conservative estimate of one-quarter of that percentage (8% and 9%, respectively) was used of this analysis.*

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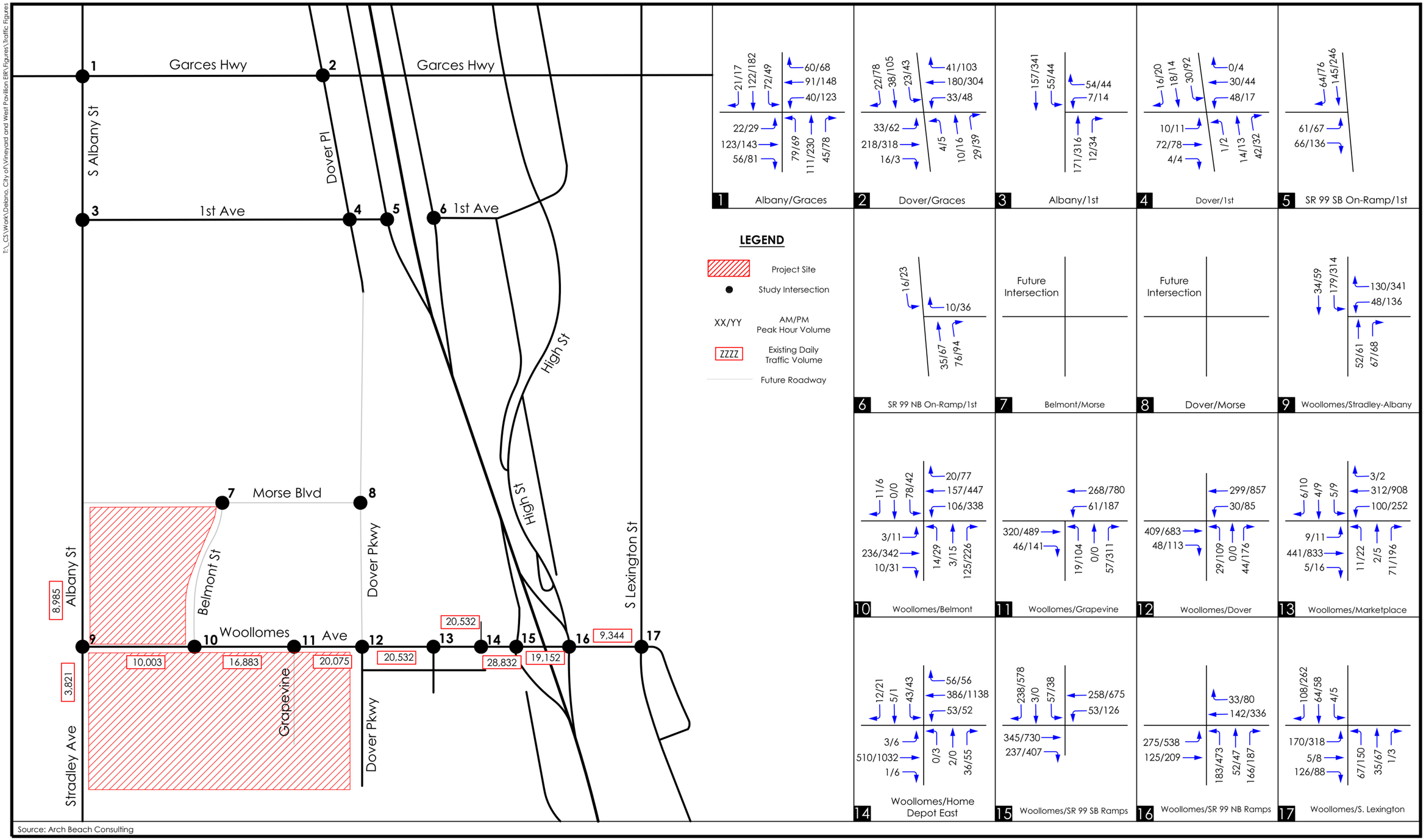
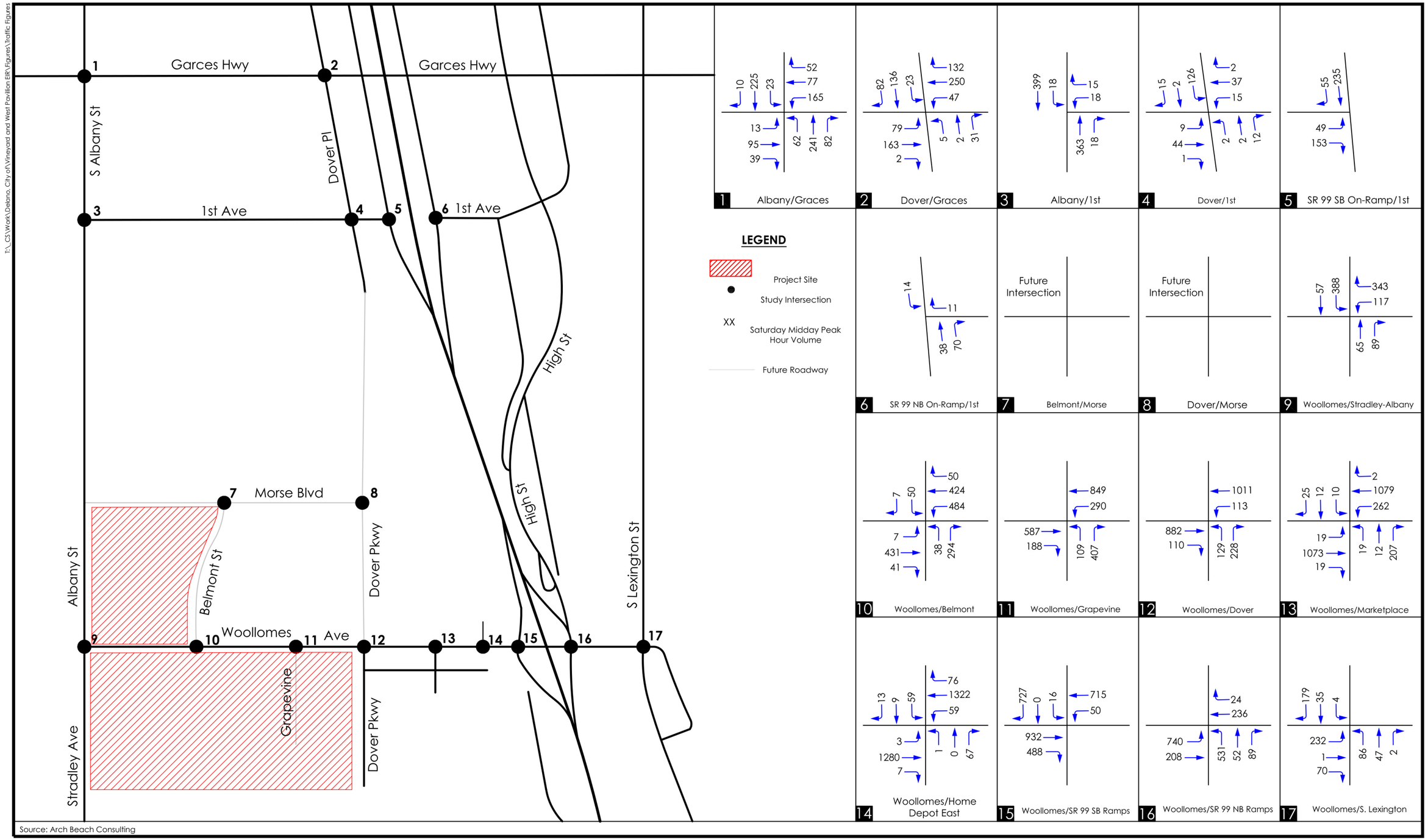



Not to Scale

**Figure 4.14-5**

Existing Plus Project Weekday Daily, AM and PM Peak Hour Traffic Volumes

PMC




Not to Scale

N

**Figure 4.14-6**

Existing Plus Project Saturday Midday Peak Hour Traffic Volumes

PMC®

## Levels of Service

*Intersections*

Based on the analysis methodology described previously, the Existing Plus Project weekday AM and PM peak-hour and Saturday midday peak-hour traffic volumes were input into the Synchro LOS software to determine the Existing Plus Project intersection delays and resulting level of service values. **Table 4.14-9** presents the results of the Existing Plus Project intersection level of service analysis for the weekday AM and PM peak hours, and **Table 4.14-10** shows the results for the Saturday midday peak hour.

Based on the Existing Plus Project level of service analysis and the City's significance criteria, the proposed project would create significant impacts at the following study area intersections:

- Garces Highway/Albany Street (from LOS B without the project to LOS D with the project in the weekday PM peak hour)
- Woollomes Avenue/Home Depot Driveway East (from LOS B without the project to LOS E with the project in the weekday PM peak hour, and from LOS B to LOS F in the Saturday midday peak hour)
- Woollomes Avenue/SR 99 northbound ramps (from LOS A without the project to LOS F with the project in the Saturday midday peak hour)

*Roadway Segments*

Based on the analysis methodology described previously, the Existing Plus Project weekday daily traffic volumes (shown in **Figure 4.14-6**) were compared with the roadway capacities in **Table 4.14-7** to determine the Existing Plus Project roadway segment level of service values. **Table 4.14-11** presents the results of the Existing Plus Project weekday daily roadway level of service.

Based on the table, the proposed project would significantly impact the following roadway segments in the study area per the City's significance criteria:

- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (from LOS A–C without the project to LOS F with the project)
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (from LOS D without the project to LOS F with the project)

**TABLE 4.14-9**
**EXISTING PLUS PROJECT WEEKDAY INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Target LOS | Existing Conditions | | | | Existing Plus Project Conditions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | | PM Peak Hour | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS | Difference (sec.) | Delay (sec.) | LOS | Difference (sec.) |
| 1. Albany St/Garces Hwy | All-way stop | C | 10.1 | B | 11.8 | B | 11.7 | B | 1.6 | ***27.9*** | ***D*** | ***16.1*** |
| 2. Dover Pl/Garces Hwy | All-way stop | C | 9.0 | A | 11.4 | B | 9.9 | A | 0.9 | 20.7 | C | 9.3 |
| 3. Albany St/1st Ave | 1-way stop | C | 9.3 | A | 10.2 | B | 10.0 | A | 0.7 | 12.5 | B | 2.3 |
| 4. Dover Pl/1st Ave | 2-way stop | C | 10.0 | B | 9.7 | A | 10.9 | B | 0.9 | 11.3 | B | 1.6 |
| 5. Ellington St – SR 99 SB on-ramp/1st Ave | 1-way stop | C | 10.1 | B | 11.2 | B | 10.3 | B | 0.2 | 12.3 | B | 1.1 |
| 6. Fremont St – SR 99 NB off-ramp/1st Ave | All-way stop | C | 6.7 | A | 7.3 | A | 6.7 | A | 0.0 | 6.9 | A | -0.4 |
| 7. Belmont St/Morse Blvd | Future int. | C | — | — | — | — | — | — | — | — | — | — |
| 8. Dover Pky/Morse Blvd | Future int. | C | — | — | — | — | — | — | — | — | — | — |
| 9. Woollomes Avenue/Stradley Ave-Albany St | 1-way stop | D | 9.1 | A | 9.7 | A | 10.7 | B | 1.6 | 20.8 | C | 11.1 |
| 10. Woollomes Ave/Belmont St | Future int. | D | — | — | — | — | 18.5 | B | 18.5 | 19.3 | B | 19.3 |
| 11. Woollomes Ave/Grapevine-West Pavilion Drwy | Future int. | D | — | — | — | — | 13.2 | B | 13.2 | 13.4 | B | 13.4 |
| 12. Woollomes Ave/Dover Pky | Signal | D | 12.4 | B | 13.0 | B | 14.3 | B | 1.9 | 7.8 | A | -5.2 |
| 13. Woollomes Ave/Marketplace Dr | Signal | D | 23.4 | C | 9.3 | A | 12.4 | B | -11.0 | 15.5 | B | 6.2 |
| 14. Woollomes Ave/Home Depot East | 2-way stop | D | 11.1 | B | 12.8 | B | 14.0 | B | 2.9 | ***40.0*** | ***E*** | ***27.2*** |
| 15. Woollomes Ave/SR 99 SB ramps | Signal | D | 10.1 | B | 13.1 | B | 7.6 | A | -2.5 | 21.8 | C | 8.7 |
| 16. Woollomes Avenue/SR 99 NB ramps | Signal | D | 7.7 | A | 14.5 | B | 8.1 | A | 0.4 | 53.1 | D | 38.6 |
| 17. Woollomes Ave/S Lexington St | All-way stop | D | 8.3 | A | 12.2 | B | 8.6 | A | 0.3 | 14.2 | B | 2.0 |

*Source: Arch Beach Consulting 2015, Table I*
*Notes: **Bold italics** = Significant project impact per the City's General Plan Circulation Element.*

**TABLE 4.14-10**
**EXISTING PLUS PROJECT SATURDAY INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Target LOS | Existing Condition | | Existing Plus Project | | |
|---|---|---|---|---|---|---|---|
| | | | Saturday Midday Peak | | Saturday Midday Peak | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Difference (sec.) |
| 1. Albany St/Garces Hwy | All-way stop | C | 9.4 | A | 19.4 | C | 10.0 |
| 2. Dover Pl/Garces Hwy | All-way stop | C | 8.9 | A | 14.8 | B | 5.9 |
| 3. Albany St/1st Ave | 1-way stop | C | 10.3 | B | 14.6 | B | 4.3 |
| 4. Dover Pl/1st Ave | 2-way stop | C | 8.9 | A | 10.5 | B | 1.6 |
| 5. Ellington St – SR 99 SB on-ramp/1st Ave | 1-way stop | C | 10.7 | B | 11.9 | B | 1.2 |
| 6. Fremont St – SR 99 NB off-ramp/1st Ave | All-way stop | C | 6.7 | A | 6.7 | A | 0.0 |
| 7. Belmont St/Morse Blvd | Future int. | C | — | — | — | — | — |
| 8. Dover Pky/Morse Blvd | Future int. | C | — | — | — | — | — |
| 9. Woollomes Avenue/Stradley Ave-Albany St | 1-way stop | D | 9.7 | A | 28.6 | D | 18.9 |
| 10. Woollomes Ave/Belmont St | Future int. | D | — | — | 23.3 | C | 23.3 |
| 11. Woollomes Ave/Grapevine-West Pavilion Drwy | Future int. | D | — | — | 15.7 | B | 15.7 |
| 12. Woollomes Ave/Dover Pky | Signal | D | 13.7 | B | 10.1 | B | -3.6 |
| 13. Woollomes Ave/Marketplace Dr | Signal | D | 12.6 | B | 17.2 | B | 4.6 |
| 14. Woollomes Ave/Home Depot East | 2-way stop | D | 14.1 | B | ***115.6*** | ***F*** | ***101.5*** |
| 15. Woollomes Ave/SR 99 SB ramps | Signal | D | 13.5 | B | 48.5 | D | 35.0 |
| 16. Woollomes Avenue/SR 99 NB ramps | Signal | D | 6.9 | A | ***85.3*** | ***F*** | ***78.4*** |
| 17. Woollomes Ave/S Lexington St | All-way stop | D | 8.8 | A | 9.8 | A | 1.0 |

*Source: Arch Beach Consulting 2015, Table J*

*Notes: **Bold italics** = Significant project impact per the City's General Plan Circulation Element.*

**TABLE 4.14-11**
**EXISTING PLUS PROJECT DAILY ROADWAY SEGMENT LEVELS OF SERVICE**

| Roadway Segment | Capacity Configuration | Target LOS | Existing Plus Project Conditions | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 1. Woollomes Ave, Stradley to Belmont | 4-lane divided (>4.5 signals/mi) | D | 10,051 | A–C |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane divided (>4.5 signals/mi) | D | 16,931 | A–C |
| 3. Woollomes Ave, Grapevine Drwy to Dover | 4-lane divided (>4.5 signals/mi) | D | 20,123 | D |

| Roadway Segment | Capacity Configuration | Target LOS | Existing Plus Project Conditions | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane divided (>4.5 signals/mi) | D | 20,521 | A–C |
| 5. Woollomes Ave, Home Depot E to SR 99 | 4-lane divided (>4.5 signals/mi) | D | ***28,817*** | ***F*** |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 2-lane undivided (>4.5 signals/mi) | D | ***19,140*** | ***F*** |
| 7. Woollomes Ave, SR 99 to Lexington | 2-lane undivided (>4.5 signals/mi) | D | 9,332 | D |
| 8. Albany St, north of Woollomes | 2-lane undivided (<2 signals/mi) | C | 9,034 | C |
| 9. Stradley Ave, south of Woollomes | 2-lane undivided (<2 signals/mi) | C | 3,823 | A–C |
| 10. Belmont St, north of Woollomes | future segment | C | — | — |
| 11. Belmont St, south of Woollomes | future segment | C | — | — |

*Source: Arch Beach Consulting 2015, Table K*

*Note: Thresholds based on Quality/Level of Service Handbook (FDOT 2009). Adjustments made according to appropriate area conditions, following FDOT guidelines.*

***Bold italics*** *= Significant project impact*

## Freeway Mainline and Ramps

The traffic impact study used the HCS program to determine the Existing Plus Project mainline segment and ramp level of service values. **Table 4.14-12** presents the results of the Existing Plus Project weekday peak-hours and Saturday midday peak-hour freeway mainline level of service. All freeway mainline segments in the study area would continue to operate with satisfactory level of service with the addition of project traffic volumes, at LOS C or better, per Caltrans criteria.

**Table 4.14-13** presents the results of the Existing Plus Project weekday peak-hours and Saturday midday peak-hour freeway ramp level of service. The addition of project trips to the SR 99 ramps at Woollomes Avenue would not create any significant impacts to the merge and diverge areas of the interchange. No mitigation measures are required.

**TABLE 4.14-12**
**EXISTING PLUS PROJECT FREEWAY MAINLINE SEGMENT PEAK-HOUR LEVELS OF SERVICE**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | Saturday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS |
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,215 | 6.4 | A | 2,442 | 12.8 | B | 3,085 | 16.2 | B |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,245 | 6.5 | A | 2,890 | 15.1 | B | 3,267 | 17.1 | B |
| SR 99 SB n/o Woollomes Ave | 3 | C | 1,877 | 9.9 | A | 2,439 | 12.8 | B | 2,372 | 12.4 | B |
| SR 99 SB s/o Woollomes Ave | 3 | C | 2,080 | 10.9 | A | 2,591 | 13.6 | B | 2,529 | 13.2 | B |

*Source: Arch Beach Consulting 2015, Table L*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*

**TABLE 4.14-13**
**EXISTING PLUS PROJECT FREEWAY RAMPS PEAK-HOUR LEVELS OF SERVICE**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Midday Peak | |
|---|---|---|---|---|---|---|---|---|
| | | | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS |
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 12.1 | B | 20.9 | C | 25.3 | C |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 10.6 | B | 21.1 | C | 23.1 | C |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 14.1 | B | 18.9 | B | 18.6 | B |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 13.9 | B | 17.9 | B | 17.8 | C |

*Source: Arch Beach Consulting 2015, Table M*

*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*

**Summary**

As discussed above, the proposed project would create impacts at the following study area intersections:

- Garces Highway/Albany Street
- Woollomes Avenue/Home Depot Driveway East
- Woollomes Avenue/SR 99 northbound ramps

Additionally, the proposed project would create impacts to the following roadway segments in the study area:

- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps

These impacts are considered to be **potentially significant.** The project applicant would be required to implement the following mitigation measures to restore these impacted roadway segments to satisfactory levels of service.

All freeway mainline segments in the study area would continue to operate with satisfactory level of service with the addition of project traffic volumes, at LOS C or better, per Caltrans criteria in the Existing Plus Project condition. No mitigation measures are required.

The addition of project trips to the SR 99 ramps at Woollomes Avenue would also not create any significant impacts to the merge and diverge areas of the interchange. No mitigation measures are required.

Mitigation Measures

*Intersections*

**MM 4.14.1a** The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be

reviewed and approved by the City's Public Works Department and/or Caltrans (where required).

a) Garces Highway/Albany Street

- Restripe the existing northbound approach to have a dedicated left turn lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *Delano Public Works Department*

With implementation of this improvement, the intersection would operate at LOS C in the weekday PM peak hour and the impact would be **less than significant**.

b) Woollomes Avenue/Home Depot Driveway East

- Restrict the southbound left and through movement through the intersection. These vehicles could use the existing signalized intersection at the Home Depot Driveway West.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *Delano Public Works Department*

With implementation of this improvement, the intersection would operate at LOS C in the weekday PM peak hour and the Saturday midday peak hour and the impact would be **less than significant.**

c) Woollomes Avenue/SR 99 northbound ramps

- Restripe the northbound through lane to a shared left plus through lane.

- Restripe the eastbound through lane to a shared left plus through lane.

- Widen the northbound on-ramp to accommodate two lanes at its split with High Street. Prior to the SR 99 mainline, the second on-ramp lane can merge to a single lane. This would accommodate two lanes of on-ramp traffic from the existing eastbound left turn lane and the new left turn plus shared lane.

- Modify the traffic signal to have a split phase for the eastbound and westbound approaches.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *Delano Public Works Department*

With implementation of these improvements, the intersection would operate at LOS D in the Saturday midday peak hour. Due to the existing configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be made, unless the intersection is significantly reconfigured. LOS D would still be a significant impact per Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99 to address impacts on the facilities addressed in **MM 14.4.1a**. Without jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM 14.4.1a**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant, for that reason, this impact remains **significant and unavoidable**.

*Roadway Segments*

**MM 14.4.1b** The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be reviewed and approved by the City's Public Works Department and/or Caltrans (where required).

a) Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps

- Restripe the existing two-lane westbound segment, approximately 100 feet west of the southbound off-ramp, to a three-lane segment. This segment would become a six-lane divided segment. There is adequate pavement width to accommodate this lane striping improvement.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *Delano Public Works Department*

With implementation of this mitigation measure, the roadway segment would operate at LOS A–C and the impact would be **less than significant**.

b) Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps

- Convert the existing two-lane divided segment to a four-lane divided segment.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *Delano Public Works Department*

With implementation of these improvements, the roadway segment would operate at LOS D. However, due to the existing configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be made, unless the intersection is significantly reconfigured. LOS D would still be a significant impact per City/Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99 to address impacts on the facilities addressed in **MM 4.14.1b**. Without jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM 4.14.1b**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant, for that reason, this impact remains **significant and unavoidable**.

### Result in Conflicts with Air Traffic Patterns (Standard of Significance 3)

**Impact 4.14.2** Development of the proposed project would not result in conflicts with the air traffic patterns of the Delano Municipal Airport. This would be a **less than significant** impact.

The only airport in the project vicinity is Delano Municipal Airport, located approximately 1 mile from the project site. As discussed in Section 4.8, Hazards and Hazardous Materials, of this DEIR, the project is within Airport Land Use Capability Zone C and Safety Zone 6 (Traffic Pattern Zone). Zone 6 is considered to have a low likelihood of aircraft-related accident occurrence. Allowed uses in this zone include residential and nonresidential development, with the exception of outdoor stadiums or similar very high intensity uses.

Since the project site is in a Delano Municipal Airport influence area, it is also located in the City's Airport Approach Height Combining (H) District (Municipal Code Section 20.3.30(13)(b)). This district has density standards based on location and type of use. No density limits apply to residential uses in Zone 6. For commercial uses in Zone 6, the density limit is based on the location and density of surrounding uses. Density is based on the average number of people per acre and is divided into three categories: Rural Farmland/Open Space (minimal development), Rural/Suburban (mostly to partially undeveloped), and Urban (heavily developed).

Because actual project specifics for the commercial portion of the proposed project have not been established, density cannot be estimated at this time. However, as discussed, Zone 6 has been established to allow most commercial uses and all residential uses. Additionally, the proposed project is consistent with General Plan land use designations. Any project proposed in the city that is in the airport influence area is subject to the requirements of the H overlay and would be reviewed by the City for compliance with these requirements.

While approximately 3,670 new residents may live in the proposed project's residential units, this potential increase in population in the city would not result in a substantial increase in air traffic levels to the point of increasing safety risks. Any increase in air traffic would be required to follow the safety standards of Delano Municipal Airport. The airport is a general aviation airport and does not provide commercial passenger service. Therefore, the increase in the city's population would have little impact on traffic levels at Delano Municipal Airport.

As such, this is considered a **less than significant** impact with regard to a change in air traffic patterns and service levels.

Mitigation Measures

None required.

### Result in a Design Hazard (Standard of Significance 4)

**Impact 4.14.3** The proposed project would not result in or create other significant design hazards. This impact is expected to be **less than significant**.

As discussed under Impact 4.14.1, the proposed project would include the improvement to and/or construction of roadways in the project area. Additionally, development of the Vineyard and West Pavilion residential neighborhoods would result in the construction of internal streets to serve the neighborhoods. All of these roadway improvements/new roadways would be required to be designed to conform with Delano Municipal Code Section 20.10.40, including those safety standards considered necessary. Additionally, the posted speed limits on these roadways would be required to comply with City and Caltrans speed limit standards. No other potential design hazards were identified for the proposed project. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

### Emergency Access (Standard of Significance 5)

**Impact 4.14.4** Implementation of the proposed project would not result in inadequate emergency access within the project area. This impact would be **less than significant**.

As shown on **Figure 3.0-2** (see Section 3.0, Project Description), at this time, there is no specific development plan in terms of detailed layouts of structures and access driveway locations. The project site would be served by Woollomes Avenue, Stradley Avenue-Albany Street, and Dover Parkway. New street segments of Belmont Street and Morse Boulevard would also be constructed as part of the project. The project proposes a new street, Belmont Street, which would bisect the project sites in a north–south direction, forming a new intersection at Woollomes Avenue and providing access between the Vineyard development and the West Pavilion development.

Once the individual site plans have been submitted to the City, as part of the review process these plans would be reviewed by the Police Department and the Kern County Fire Department to ensure they are properly designed to provide adequate emergency access. In addition, all proposed roadway improvements would be required to conform with Delano Municipal Code Section 20.10.40 to ensure they are designed properly and in accordance with City standards and would not create a hazard for drivers or pedestrians. Compliance with existing City policies, which would be evaluated through the City's existing review process, would ensure this impact would be **less than significant**.

Mitigation Measures

None required.

### Public Transit, Bicycle, and Pedestrian Facilities (Standard of Significance 6)

**Impact 4.14.5** Implementation of the proposed project would not disrupt or interfere with existing or planned transit, bicycle, or pedestrian facilities. This impact would be **less than significant**.

Because actual site plans have not been prepared, it is possible that the proposed project may conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The project would create a demand for bicycle facilities, including bike lanes along the project frontages and on-site bicycle facilities (e.g., racks and lockers).

However, Bicycle Facilities Policy 3a in the Delano General Plan states that bike lanes must be implemented on improved street segments. Policy 5 requires that secure bicycle parking facilities be provided in all commercial development as a standard condition of project approval. Policy 7 requires curb, gutter, and sidewalks in all areas of the community to accommodate pedestrian traffic. Additionally, Delano Municipal Code Section 20.10.40 identifies the required bicycle, pedestrian, and transit facilities for new development projects in the city.

Implementation of the proposed project would not disrupt or interfere with the operation or implementation of any existing or planned bicycle or pedestrian facilities. This impact would be **less than significant**.

Mitigation Measures

None required.

## CUMULATIVE CONDITIONS

### Cumulative Buildout (2040) Baseline Condition

The proposed project would be constructed within a 10-year time frame with several phases of development on each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion were analyzed at full buildout (i.e., one single phase—buildout of project) to determine the total traffic mitigation measures required at full project buildout. The Cumulative Buildout Baseline condition represents buildout of the General Plan land uses in the study area based on traffic growth up to year 2040 in the Kern COG travel demand model, plus traffic from cumulative (approved/pending) projects listed below, as provided by the City.

**TABLE 4.14-14**
**APPROVED/PENDING PROJECTS**

| Project | Type | Units/Size |
|---|---|---|
| Grapevine Commercial | Shopping Center | 329,000 sq. ft. |
| Delano Vineyard Plaza Shopping Center Phases I & II | Shopping Center | 657,342 sq. ft. |
| Commercial-Industrial Parcels (Millennium III, LLC) | General Light Industrial | 17.65 acres |
| Pacific Holt Corp. (Tract 6470) | Single-Family Detached | 165 du |
| Ennis Homes (Tract 6327) | Single-Family Detached | 128 du |
| Ennis Homes (Tract 6326) | Single-Family Detached | 137 du |
| Kern County Housing Authority/Self Help Enterprises | Single-Family Detached | 84 du |
| Belmont Meadows Apartments | Low-Rise Apartments | 70 du |

*Source: Arch Beach Consulting 2015, Table N*

### Traffic Volumes

Traffic volumes for the Cumulative Buildout Baseline condition were developed by applying 26 years of ambient growth (2040–2014) in traffic plotted from the Kern COG travel demand model (for year 2040) and traffic from cumulative (approved/pending) projects that would generate traffic in the study area to the existing 2014 daily and peak-hour traffic volumes.

The ambient growth determined from the post-processed model volumes and traffic from the cumulative projects was added to the existing traffic volumes to derive the Cumulative Buildout (2040) Baseline traffic volumes. **Figure 4.14-7** and **Figure 4.14-8** illustrate the resulting Cumulative Buildout (2040) Baseline weekday AM and PM peak-hour traffic volumes and Saturday midday peak-hour traffic volumes, respectively.

### Levels of Service

Intersections

**Table 4.14-15** presents the results of the Cumulative Buildout Baseline intersection level of service analysis for the weekday AM and PM peak hours and the Saturday midday peak hour as shown in the TIS. Based on the Cumulative Buildout Baseline weekday AM and PM peak-hour and Saturday midday peak-hour level of service analysis, the following study area intersections are forecast to operate with unsatisfactory level of service per the City's LOS standards:

- Garces Highway/Albany Street (LOS D in the weekday PM peak hour)
- Garces Highway/Dover Place (LOS F in the weekday PM peak hour and the Saturday midday peak hour)
- 1st Avenue/Dover Place (LOS F in the weekday PM peak hour and the Saturday midday peak hour)
- Stradley Avenue-Albany Street/Woollomes Avenue (LOS E in the Saturday midday peak hour)

**TABLE 4.14-15**
**CUMULATIVE BASELINE PEAK-HOUR INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 1. Garces Highway/Albany Street | AWSC | C | 12.9 | B | ***25.7*** | ***D*** | 17.4 | C |
| 2. Garces Highway/Dover Place | AWSC | C | 11.6 | B | ***98.7*** | ***F*** | ***63.7*** | ***F*** |
| 3. 1st Avenue/Albany Street | 1-way S | C | 10.8 | B | 14.0 | B | 14.5 | B |
| 4. 1st Avenue/Dover Place | 2-way S | C | 16.8 | C | ***123.8*** | ***F*** | ***199.2*** | ***F*** |
| 5. 1st Ave/Ellington St-SR 99 on-ramp | 1-way S | C | 11.2 | B | 16.7 | C | 16.7 | C |
| 6. 1st Ave/Fremont St-SR 99 off-ramp | AWSC | C | 6.9 | A | 7.1 | A | 6.9 | A |
| 7. Morse Boulevard/Belmont Street | 1-way S | C | 8.4 | A | 8.4 | A | 8.4 | A |

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS |
| 8. Morse Boulevard/Dover Parkway | 1-way S | C | 9.5 | B | 10.9 | B | 11.7 | B |
| 9. Woollomes Ave/Stradley-Albany | signal | D | 16.3 | B | 46.2 | D | ***66.5*** | ***E*** |
| 10. Woollomes Ave/Belmont Street | signal | D | 8.0 | A | 9.7 | A | 9.3 | A |
| 11. Woollomes Ave/Grapevine Drwy | signal | D | 12.2 | B | 9.6 | A | 12.0 | B |
| 12. Woollomes Ave/Dover Parkway | signal | D | 12.3 | B | 17.8 | B | 25.0 | C |
| 13. Woollomes/Home Depot West | signal | D | 13.9 | B | 10.5 | B | 18.5 | B |
| 14. Woollomes/Home Depot East | 2-way S | D | 9.1 | A | 11.7 | B | 13.0 | B |
| 15. Woollomes Ave/SR 99 SB ramps | signal | D | 9.9 | A | 39.3 | D | 48.9 | D |
| 16. Woollomes Ave/SR 99 NB ramps | signal | D | 8.1 | A | 10.1 | B | 17.3 | B |
| 17. Woollomes Ave/Lexington St | signal | D | 13.3 | B | 19.8 | B | 15.0 | B |

*Source: Arch Beach Consulting 2015, Table O*
*Notes: LOS determined using HCM method in the Synchro LOS software.*
***Bold italics*** *value indicates unsatisfactory level of service.*
*future int = future intersection; AWSC = all-way stop control; 1-way S = one-way stop control; 2-way S = two-way stop control*

## Roadway Segments

The Cumulative Buildout Baseline weekday daily traffic volumes were compared with the roadway capacities in **Table 4.14-7** to determine the Cumulative Buildout Baseline roadway segment level of service values. **Table 4.14-16** presents the results of the Cumulative Buildout Baseline weekday daily roadway level of service.

As shown in **Table 4.14-16**, the following roadway segments in the study area are forecast to have daily traffic volumes beyond their acceptable daily capacities per the City's General Plan:

- Woollomes Avenue, Grapevine Driveway to Dover Parkway (LOS E)
- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS E)

**TABLE 4.14-16**
**CUMULATIVE BUILDOUT BASELINE DAILY ROADWAY SEGMENT LEVELS OF SERVICE**

| Roadway Segment | Capacity Configuration | Target LOS | Cumulative Baseline | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 1. Woollomes Ave, Stradley to Belmont | 4-lane divided (>4.5 signals/mi) | D | 19,700 | D |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane divided (>4.5 signals/mi)) | D | 19,900 | D |
| 3. Woollomes Ave, Grapevine Drwy to Dover | 4-lane divided (>4.5 signals/mi) | D | ***25,500*** | ***E*** |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane divided (>4.5 signals/mi) | D | 35,700 | D |
| 5. Woollomes Ave, Home Depot E to SR 99 | 6-lane divided (>4.5 signals/mi) | D | ***40,000*** | ***E*** |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 6-lane divided (>4.5 signals/mi) | D | 35,500 | D |

| Roadway Segment | Capacity Configuration | Target LOS | Cumulative Baseline | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 7. Woollomes Ave, SR 99 to Lexington | 6-lane divided (>4.5 signals/mi) | D | 15,000 | A–C |
| 8. Albany St, north of Woollomes | 4-lane undivided (<2 signals/mile) | C | 9,200 | A–B |
| 9. Stradley Ave, south of Woollomes | 4-lane undivided (<2 signals/mile) | C | 3,700 | A–B |
| 10. Belmont St, north of Woollomes | 4-lane undivided (<2 signals/mile) | C | — | — |
| 11. Belmont St, south of Woollomes | 4-lane undivided (<2 signals/mile) | C | — | — |

*Source: Arch Beach Consulting 2015, Table P*

*Note: Thresholds based on Quality/Level of Service Handbook (FDOT 2009). Adjustments made according to appropriate area conditions, following FDOT guidelines.*

***Bold italics*** *value indicates unsatisfactory level of service.*

## Freeway Mainline and Ramps

The Cumulative Buildout Baseline weekday and Saturday midday peak-hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into HCS to determine the Cumulative Buildout Baseline mainline segment and ramp level of service values. **Table 4.14-17** presents the results of the Cumulative Buildout Baseline weekday peak-hours and Saturday midday peak-hour freeway mainline level of service.

As is shown in the table, all freeway mainline segments in the study area are forecast to continue to operate with satisfactory level of service, at LOS C or better, per Caltrans criteria.

**TABLE 4.14-17**
**CUMULATIVE BUILDOUT BASELINE MAINLINE SEGMENT PEAK-HOUR LEVELS OF SERVICE**

| Mainline Segment | Target LOS | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | Saturday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS |
| SR 99 NB n/o Woollomes Ave | C | 1,294 | 6.8 | A | 2,778 | 14.6 | B | 3,370 | 17.7 | B |
| SR 99 NB s/o Woollomes Ave | C | 1,605 | 8.4 | A | 3,370 | 17.7 | B | 3,844 | 20.3 | C |
| SR 99 SB n/o Woollomes Ave | C | 2,349 | 12.3 | B | 3,202 | 16.8 | B | 3,387 | 17.7 | B |
| SR 99 SB s/o Woollomes Ave | C | 2,342 | 12.3 | B | 3,384 | 17.7 | B | 3,251 | 17.0 | B |

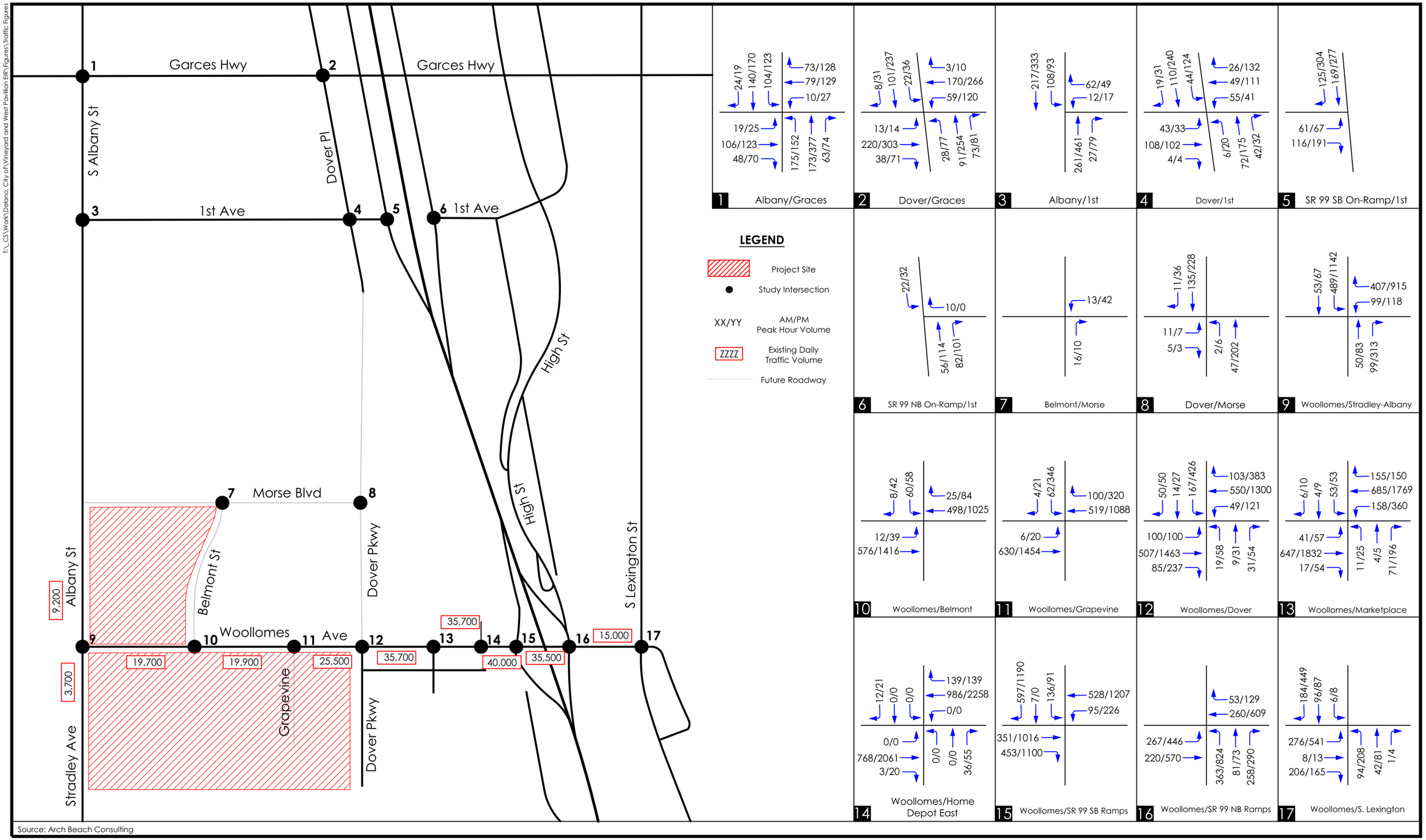
*Source: Arch Beach Consulting 2015, Table Q*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*

**Table 4.14-18** illustrates the results of the Cumulative Buildout Baseline weekday peak-hours and Saturday midday peak-hour freeway ramp level of service. As shown, the SR 99 southbound off-ramp at Woollomes Avenue is forecast to operate with unsatisfactory level of service (LOS D) per Caltrans criteria during the weekday PM peak hour and the Saturday midday peak hour.

**TABLE 4.14-18**
**CUMULATIVE BUILDOUT BASELINE FREEWAY RAMPS PEAK-HOUR LEVELS OF SERVICE**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Midday Peak | |
|---|---|---|---|---|---|---|---|---|
| | | | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS |
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 13.0 | B | 22.4 | B | 28.0 | C |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 13.6 | B | 24.8 | C | 27.4 | C |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 17.8 | B | ***29.2*** | ***D*** | ***28.0*** | ***D*** |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 17.7 | B | 23.8 | C | 25.7 | C |

*Source: Arch Beach Consulting 2015, Table R*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*
***Bold italics** value indicates unsatisfactory level of service.*




Source: Arch Beach Consulting

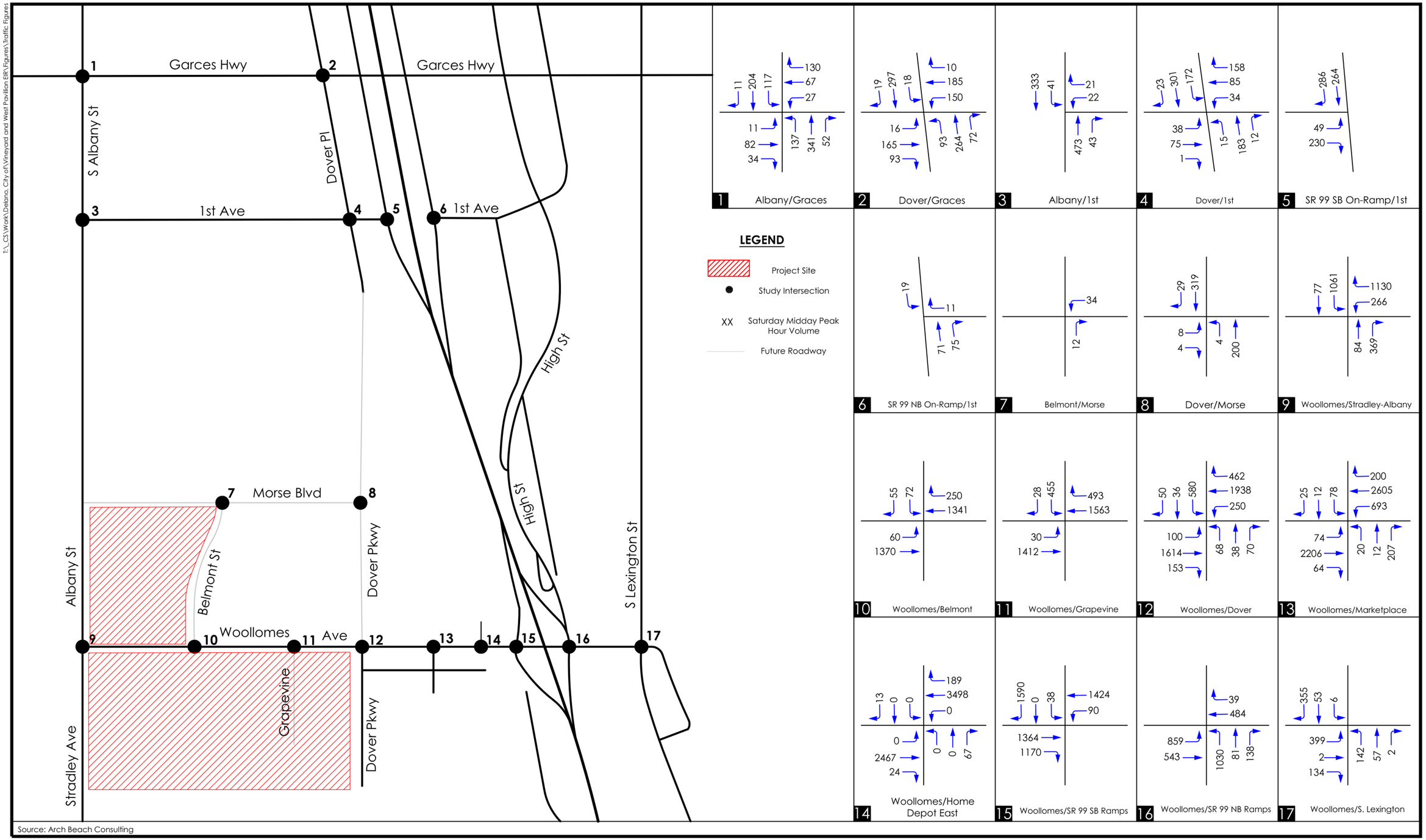
Not to Scale

N

**Figure 4.14-7**

Cumulative Buildout (2040) Baseline Weekday Daily and Peak Hour Volumes

PMC®




Not to Scale

N

**Figure 4.14-8**

Cumulative Buildout (2040) Baseline Saturday Peak Hour Volumes

PMC®

## CUMULATIVE IMPACTS AND MITIGATION MEASURES

Traffic generated by the proposed project was added to the Cumulative Buildout Baseline scenario and the project impacts on the circulation system were analyzed. This scenario would also determine project-specific impacts and mitigation measures (if required).

As previously discussed under Impact 4.14.1, the intersections and roadway segments surrounding the project site would be improved by the proposed project. Based on discussions with the City, it is anticipated that the proposed project would be conditioned to construct the street improvements listed under Impact 4.14.1.

These improvements were assumed in the base roadway network for the Cumulative Buildout Plus Project condition traffic analysis.

The proposed project trip assignments for the weekday peak hours and Saturday midday peak hour of the residential and retail/commercial land uses were added to the Cumulative Buildout Baseline weekday AM and PM peak-hours and Saturday midday peak-hour traffic volumes. This resulted in the Cumulative Buildout Plus Project traffic volumes. **Figure 4.14-9** illustrates the Cumulative Buildout Plus Project weekday daily and AM and PM peak-hour traffic volumes, and **Figure 4.14-10** illustrates the Saturday midday peak-hour traffic volumes at the study intersections and roadway segments.

### Cumulatively Exceed Capacity of Roadway Network and LOS Standards Established by the General Plan

**Impact 4.14.6** The proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would exceed the capacity of the city's roadway network or exceed the level of service standard. This impact is expected to be **potentially cumulatively considerable.**

#### Levels of Service

*Intersections*

The Cumulative Buildout Plus Project weekday AM and PM peak-hours and Saturday midday peak-hour traffic volumes were input into the Synchro LOS software to determine the Cumulative Buildout Plus Project intersection delays and resulting level of service values. **Table 4.14-19** presents the results of the Cumulative Buildout Plus Project intersection level of service analysis for the weekday AM and PM peak hours, while **Table 4.14-20** shows the results for the Saturday midday peak hour.

Based on the Cumulative Buildout Plus Project level of service analysis and the City's significance criteria, the proposed project would create significant impacts at the following study area intersections:

- Garces Highway/Albany Street (from LOS D without the project to LOS F with the project in the weekday PM peak hour, and from LOS C to LOS E in the Saturday midday peak hour)

- Garces Highway/Dover Place (from LOS F without the project to LOS F with the project in the weekday PM peak hour and the Saturday midday peak hour)

- 1st Avenue/Dover Place (from LOS F without the project to LOS F with the project in the weekday PM peak hour and the Saturday midday peak hour)

- Woollomes Avenue/Albany Street-Stradley Avenue (from LOS D without the project to LOS E with the project in the weekday PM peak hour, and LOS E to LOS E in the Saturday midday peak hour)

- Woollomes Avenue/Belmont Street (from LOS A without the project to LOS E with the project in the Saturday midday peak hour)

- Woollomes Avenue/Grapevine Driveway (from LOS A without the project to LOS F with the project in the weekday PM peak hour, and from LOS B to LOS F in the Saturday midday peak hour)

- Woollomes Avenue/Dover Parkway (from LOS C without the project to LOS F with the project in the Saturday midday peak hour)

- Woollomes Avenue/SR 99 southbound ramps (from LOS D without the project to LOS F with the project in the weekday PM peak hour, and from LOS D to LOS F in the Saturday midday peak hour)

*Roadway Segments*

The Cumulative Buildout Plus Project weekday daily traffic volumes (shown in **Figure 4.14-11**) were compared with the roadway capacities in **Table 4.14-7** to determine the Cumulative Buildout Plus Project roadway segment level of service values. **Table 4.14-21** presents the results of the Cumulative Buildout Plus Project weekday daily roadway level of service.

Based on the table, the proposed project would significantly impact the following roadway segments in the study area per the City's significance criteria:

- Woollomes Avenue, Stradley Avenue-Albany Street to Belmont Street (from LOS D without the project to LOS E with the project)

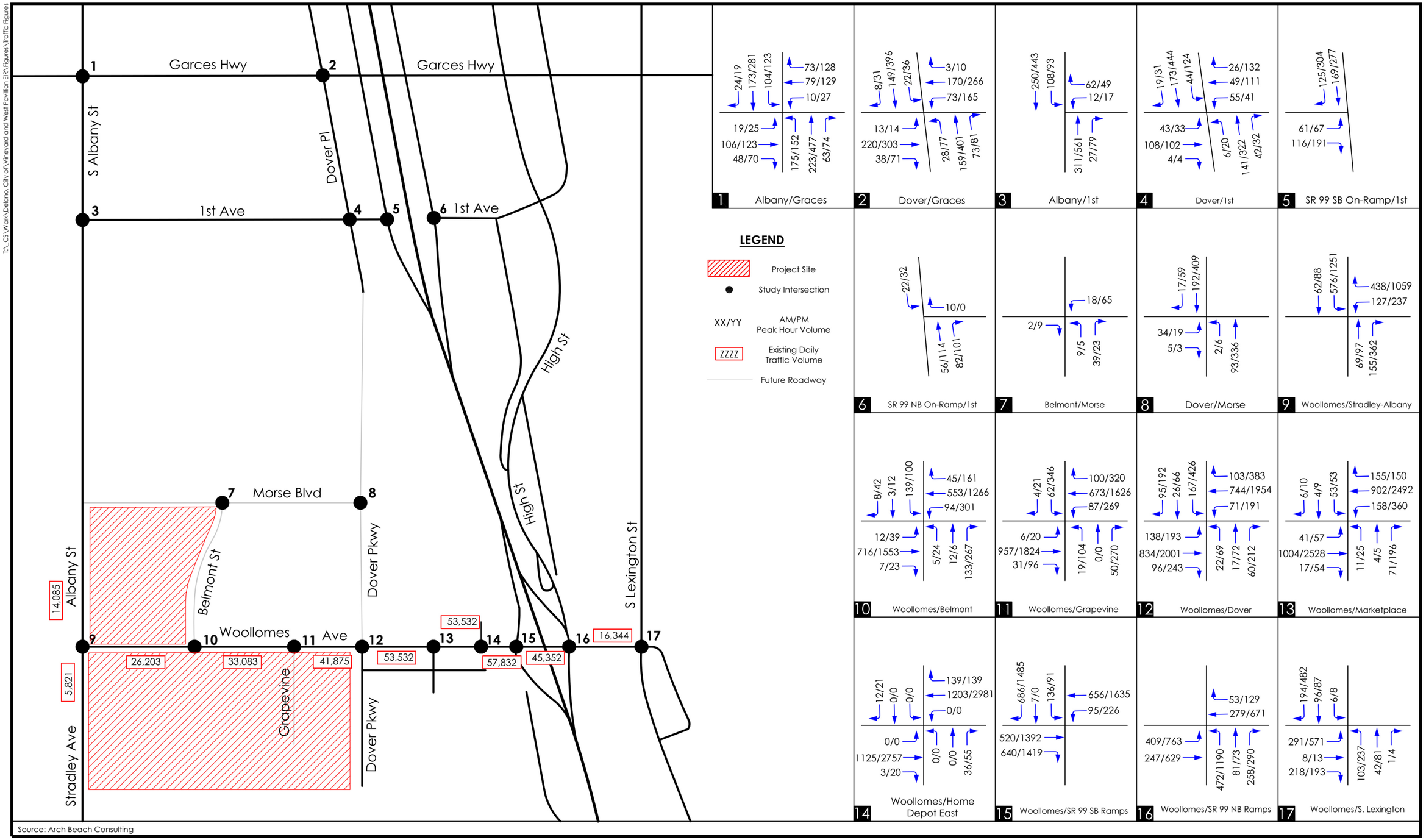
- Woollomes Avenue, Belmont Street to Grapevine Driveway (from LOS D without the project to LOS F with the project)

- Woollomes Avenue, Grapevine Driveway to Dover Parkway (from LOS E without the project to LOS F with the project)

- Woollomes Avenue, Dover Parkway to Home Depot Driveway East (from LOS D without the project to LOS F with the project)

- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (from LOS E without the project to LOS F with the project)

- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (from LOS D without the project to LOS F with the project)




Source: Arch Beach Consulting

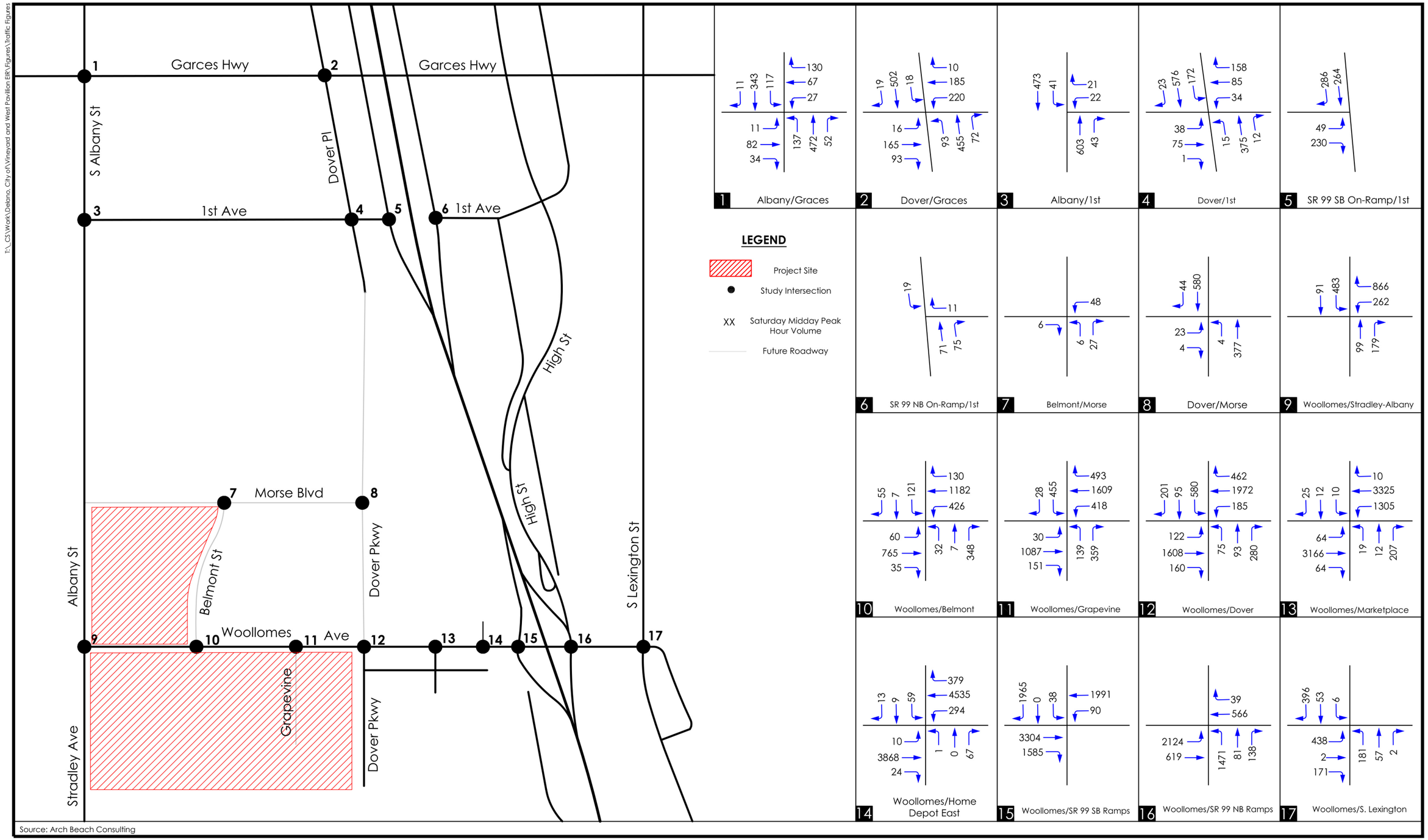
Not to Scale

N

**Figure 4.14-9**

Cumulative Buildout Plus Project Weekday Daily, AM and PM Peak Hour Traffic Volumes

PMC®




Source: Arch Beach Consulting

Not to Scale

N

**Figure 4.14-10**

Cumulative Buildout Plus Project Saturday Midday Peak Hour Traffic Volumes

PMC

**TABLE 4.14-19**
**CUMULATIVE BUILDOUT PLUS PROJECT WEEKDAY INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Target LOS | Cumulative Baseline Buildout | | | | Cumulative Buildout Plus Project Conditions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | | PM Peak Hour | | |
| | | | Delay (sec.) | LOS | Delay (sec.) | LOS | Delay (sec.) | LOS | Difference (sec.) | Delay (sec.) | LOS | Difference (sec.) |
| 1. Albany St/Garces Hwy | All-way stop | C | 12.9 | B | **25.7** | **D** | 14.5 | B | 1.6 | ***51.5*** | ***F*** | ***25.8*** |
| 2. Dover Pl/Garces Hwy | All-way stop | C | 11.6 | B | **98.7** | **F** | 13.8 | B | 2.2 | ***208.0*** | ***F*** | ***109.3*** |
| 3. Albany St/1st Ave | 1-way stop | C | 10.8 | B | 14.0 | B | 11.2 | B | 0.4 | 16.2 | C | 2.2 |
| 4. Dover Pl/1st Ave | 2-way stop | C | 16.8 | C | **123.8** | **F** | 21.6 | C | 4.8 | ***>XX*** | ***F*** | — |
| 5. Ellington St – SR 99 SB on-ramp/1st Ave | 1-way stop | C | 11.2 | B | 16.7 | C | 11.2 | B | 0.0 | 16.7 | C | 0.0 |
| 6. Fremont St – SR 99 NB off-ramp/1st Ave | All-way stop | C | 6.9 | A | 7.1 | A | 6.9 | A | 0.0 | 7.1 | A | 0.0 |
| 7. Belmont St/Morse Blvd | 1-way stop | C | 8.4 | A | 8.4 | A | 8.5 | A | 0.1 | 8.6 | A | 0.2 |
| 8. Dover Pky/Morse Blvd | 1-way stop | C | 9.5 | B | 10.9 | B | 10.4 | B | 0.9 | 14.4 | C | 3.5 |
| 9. Woollomes Avenue/Stradley Ave-Albany St | Signal | D | 16.3 | B | 46.2 | D | 17.3 | B | 1.0 | ***70.3*** | ***E*** | ***24.1*** |
| 10. Woollomes Ave/Belmont St | Signal | D | 8.0 | A | 9.7 | A | 15.2 | A | 7.2 | 31.5 | C | 21.8 |
| 11. Woollomes Ave/Grapevine-West Pavilion Drwy | Signal | D | 12.2 | B | 9.6 | A | 11.0 | A | -1.2 | ***81.0*** | ***F*** | ***71.4*** |
| 12. Woollomes Ave/Dover Pky | Signal | D | 12.3 | B | 17.8 | B | 25.5 | C | 13.2 | 22.0 | C | 4.2 |
| 13. Woollomes Ave/Marketplace Dr | Signal | D | 13.9 | B | 10.5 | B | 13.6 | B | -0.3 | 11.4 | B | 0.9 |
| 14. Woollomes Ave/Home Depot East | 2-way stop | D | 9.1 | A | 11.7 | B | 9.5 | A | 0.4 | 14.2 | B | 2.5 |
| 15. Woollomes Ave/SR 99 SB ramps | Signal | D | 9.9 | A | 39.3 | D | 11.9 | B | 2.0 | ***81.5*** | ***F*** | ***42.2*** |
| 16. Woollomes Avenue/SR 99 NB ramps | Signal | D | 8.1 | A | 10.1 | B | 8.3 | A | 0.2 | 20.5 | C | 10.4 |
| 17. Woollomes Ave/S. Lexington St | Signal | D | 13.3 | B | 19.8 | B | 13.4 | B | 0.1 | 30.5 | C | 10.7 |

*Source: Arch Beach Consulting 2015, Table S*
*Notes: **Bold** = Significant project impact per the City's General Plan Circulation Element.*
***Bold italics** = Significant project impact. Proposed project either (1) causes intersection to operate at LOS E or F from LOS D or better, or (2) increases delay greater than 2.0 seconds at an intersection that would be operating at LOS E or LOS F.*

**TABLE 4.14-20**
**CUMULATIVE BUILDOUT PLUS PROJECT SATURDAY INTERSECTION LEVEL OF SERVICE SUMMARY**

| Intersection | Control | Cumulative Buildout | | Cumulative Buildout Plus Project | | |
|---|---|---|---|---|---|---|
| | | Saturday Midday Peak | | Saturday Midday Peak | | |
| | | Delay (sec.) | LOS | Delay (sec.) | LOS | Difference (sec.) |
| 1. Albany St/Garces Hwy | All-way stop | 17.4 | C | ***39.2*** | ***E*** | ***21.8*** |
| 2. Dover Pl/Garces Hwy | All-way stop | **63.7** | **F** | ***218.8*** | ***F*** | ***155.1*** |
| 3. Albany St/1st Ave | 1-way stop | 14.5 | B | 18.0 | C | 3.5 |
| 4. Dover Pl/1st Ave | 2-way stop | **199.2** | **F** | ***>X.X*** | ***F*** | — |
| 5. Ellington St – SR 99 SB on-ramp/1st Ave | 1-way stop | 16.7 | C | 16.7 | C | 0.0 |
| 6. Fremont St – SR 99 NB off-ramp/1st Ave | All-way stop | 6.9 | A | 6.9 | A | 0.0 |
| 7. Belmont St/Morse Blvd | 1-way stop | 8.4 | A | 8.6 | A | 0.2 |
| 8. Dover Pky/Morse Blvd | 1-way stop | 11.7 | B | 17.9 | C | 6.2 |
| 9. Woollomes Avenue/Stradley Ave-Albany St | Signal | **66.5** | **E** | ***78.7*** | ***E*** | ***12.2*** |
| 10. Woollomes Ave/Belmont St | Signal | 9.3 | A | ***71.4*** | ***E*** | ***62.1*** |
| 11. Woollomes Ave/Grapevine – West Pavilion Drwy | Signal | 12.0 | B | ***173.5*** | ***F*** | ***161.5*** |
| 12. Woollomes Ave/Dover Pky | Signal | 25.0 | C | ***84.2*** | ***F*** | ***59.2*** |
| 13. Woollomes Ave/Marketplace Dr | Signal | 18.5 | B | 46.0 | D | 27.5 |
| 14. Woollomes Ave/Home Depot East | 2-way stop | 13.0 | B | 16.2 | C | 3.2 |
| 15. Woollomes Ave/SR 99 SB ramps | Signal | 48.9 | D | ***103.9*** | ***F*** | ***55.0*** |
| 16. Woollomes Avenue/SR 99 NB ramps | Signal | 17.3 | B | 50.4 | D | 33.1 |
| 17. Woollomes Ave/S. Lexington St | Signal | 15.0 | B | 16.0 | B | 1.0 |

*Source: Arch Beach Consulting 2015, Table T*
*Notes: **Bold** = Significant project impact per the City's General Plan Circulation Element.*
***Bold italics** = Significant project impact.*

**TABLE 4.14-21**
**CUMULATIVE BUILDOUT PLUS PROJECT DAILY ROADWAY SEGMENT LEVELS OF SERVICE**

| Roadway Segment | Capacity Configuration | Target LOS | Cumulative Baseline | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 1. Woollomes Ave, Stradley to Belmont | 4-lane divided (>4.5 signals/mi) | D | ***26,003*** | ***E*** |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane divided (>4.5 signals/mi)) | D | ***33,083*** | ***F*** |
| 3. Woollomes Ave, Grapevine Drwy to Dover | 4-lane divided (>4.5 signals/mi) | D | ***41,875*** | ***F*** |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane divided (>4.5 signals/mi) | D | ***53,532*** | ***F*** |
| 5. Woollomes Ave, Home Depot E to SR 99 | 6-lane divided (>4.5 signals/mi) | D | ***57,832*** | ***F*** |

| Roadway Segment | Capacity Configuration | Target LOS | Cumulative Baseline | |
|---|---|---|---|---|
| | | | ADT | LOS |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 6-lane divided (>4.5 signals/mi) | D | ***45,352*** | ***F*** |
| 7. Woollomes Ave, SR 99 to Lexington | 6-lane divided (>4.5 signals/mi) | D | 16,344 | A–C |
| 8. Albany St, north of Woollomes | 4-lane undivided (<2 signals/mile) | C | 14,085 | A–B |
| 9. Stradley Ave, south of Woollomes | 4-lane undivided (<2 signals/mile) | C | 5,821 | A–B |
| 10. Belmont St, north of Woollomes | 4-lane undivided (<2 signals/mile) | C | — | — |
| 11. Belmont St, south of Woollomes | 4-lane undivided (<2 signals/mile) | C | — | — |

*Source: Arch Beach Consulting 2015, Table U*
*Note: Thresholds based on Quality/Level of Service Handbook (FDOT 2009). Adjustments made according to appropriate area conditions, following FDOT guidelines.*
***Bold italics** value indicates unsatisfactory level of service.*

## Freeway Mainline and Ramps

The Cumulative Buildout Plus Project weekday and Saturday midday peak-hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into HCS to determine the Cumulative Buildout Plus Project mainline segment and ramp level of service values. **Table 4.14-22** presents the results of the Cumulative Buildout Plus Project weekday peak-hours and Saturday midday peak-hour freeway mainline level of service. Based on the table, all freeway mainline segments in the study area would continue to operate with satisfactory level of service with the addition of project traffic volumes, at LOS C or better, per Caltrans criteria.

**TABLE 4.14-22**
**CUMULATIVE BUILDOUT PLUS PROJECT FREEWAY MAINLINE SEGMENT PEAK-HOUR LEVELS OF SERVICE**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | Saturday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS | Volume | Density pc/mi/ln | LOS |
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,436 | 7.5 | A | 2,836 | 14.9 | B | 3,785 | 19.9 | C |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,714 | 9.0 | A | 3,736 | 19.7 | C | 4,285 | 23.0 | C |
| SR 99 SB n/o Woollomes Ave | 3 | C | 2,438 | 12.8 | B | 3,496 | 18.3 | C | 3,762 | 19.8 | C |
| SR 99 SB s/o Woollomes Ave | 3 | C | 2,529 | 13.2 | B | 3,704 | 19.5 | C | 3,665 | 19.3 | C |

*Source: Arch Beach Consulting 2015, Table V*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*

**Table 4.14-23** shows the results of the Cumulative Buildout Plus Project weekday peak-hours and Saturday midday peak-hour freeway ramp level of service.

**TABLE 4.14-23**
**CUMULATIVE BUILDOUT BASELINE FREEWAY RAMPS PEAK-HOUR LEVELS OF SERVICE**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Midday Peak | |
|---|---|---|---|---|---|---|---|---|
| | | | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS | Density pc/mi/ln | LOS |
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 14.9 | B | 25.2 | C | ***33.4*** | ***D*** |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 14.6 | B | 27.7 | C | ***30.7*** | ***D*** |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 20.2 | B | ***33.4*** | ***D*** | ***33.4*** | ***D*** |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 18.4 | B | 26.1 | B | ***28.8*** | ***F*** |

*Source: Arch Beach Consulting 2015, Table W*
*Note: LOS determined using Highway Capacity Software consistent with the Highway Capacity Manual.*
***Bold italics*** *value indicates unsatisfactory level of service.*

Based on this table and **Table 4.14-18,** which shows cumulative conditions without the project, the addition of project trips to the SR 99 ramps at Woollomes Avenue would create significant impacts to the following merge and diverge areas of the interchange:

- SR 99 northbound on-ramp at Woollomes Avenue (from LOS C without project to LOS D with project in the Saturday midday peak hour)
- SR 99 northbound off-ramp at Woollomes Avenue (from LOS C without project to LOS D with project in the Saturday midday peak hour)
- SR 99 southbound on-ramp at Woollomes Avenue (from LOS D without project to LOS D with project in the weekday PM peak hour and the Saturday midday peak hour)
- SR 99 southbound off-ramp at Woollomes Avenue (from LOS C without project to LOS F with project in the Saturday midday peak hour)

Summary

As discussed above, the proposed project would create impacts at the following study area intersections:

- Garces Highway/Albany Street
- Garces Highway/Dover Place
- 1st Avenue/Dover Place
- Woollomes Avenue/Albany Street-Stradley Avenue
- Woollomes Avenue/Belmont Street
- Woollomes Avenue/Grapevine Driveway
- Woollomes Avenue/Dover Parkway
- Woollomes Avenue/SR 99 southbound ramps

Additionally, the proposed project would create impacts to the following roadway segments in the study area:

- Woollomes Avenue, Stradley Avenue-Albany Street to Belmont Street
- Woollomes Avenue, Belmont Street to Grapevine Driveway
- Woollomes Avenue, Grapevine Driveway to Dover Parkway
- Woollomes Avenue, Dover Parkway to Home Depot Driveway East
- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps

Finally, the addition of project trips to the SR 99 ramps at Woollomes Avenue would create significant impacts to the following merge and diverge areas of the interchange:

- SR 99 northbound on-ramp at Woollomes Avenue
- SR 99 northbound off-ramp at Woollomes Avenue
- SR 99 southbound on-ramp at Woollomes Avenue
- SR 99 southbound off-ramp at Woollomes Avenue

These impacts are considered to be **potentially cumulatively considerable.** The project applicant would be required to implement the following mitigation measures to restore these impacted roadway segments to satisfactory levels of service.

Mitigation Measures

*Intersections*

**MM 4.14.6a** The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. Garces Highway/Albany Street

- o Restripe the southbound right turn lane to a shared through plus right turn lane.
- o Restripe the eastbound approach to have a shared left plus through lane and a dedicated right turn lane. Some minor widening of the approach may be required.
- o Restripe the westbound approach to have a shared left plus through lane and a dedicated right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS C in the weekday p.m. peak hour and Saturday midday peak hour.

b. Garces Highway/Dover Place

- Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour and Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements can be done. Installation of a traffic signal would improve the LOS to LOS C or better, however, the forecast volumes at the intersection would not warrant the installation of a traffic signal.

c. 1st Avenue/Dover Place

- Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.
- Convert the intersection to an all-way stop-controlled intersection.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS C in the weekday p.m. peak hour, and LOS D in the Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements can be done. Installation of a traffic signal would improve the LOS to LOS C or better in the Saturday midday peak hour, however, the forecast volumes at the intersection would not warrant the installation of a traffic signal.

d. Woollomes Avenue/Albany Street

- Modify the signal to have a right turn overlap phase for the westbound approach.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of this improvement, the intersection would operate at LOS B in the weekday p.m. peak hour, and LOS C in the Saturday midday peak hour.

e. Woollomes Avenue/Belmont Street

- Construct a separate northbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.
- Construct a separate southbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS D in the Saturday midday peak hour.

f. Woollomes Avenue/Grapevine Driveway

- Restripe the northbound approach to have a separate left turn lane, a shared left plus through plus right turn lane, and a dedicated right turn lane. There is adequate right-of-way to implement this improvement.
- Stripe third eastbound through lane.
- Construct a second (dual) westbound left turn lane.
- Stripe a third westbound through lane.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour and the Saturday midday peak hour.

g. Woollomes Avenue/Dover Parkway

- Modify the signal to have a right turn overlap phase for all approaches.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS E in the Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements are feasible. LOS E would still be a significant impact per City's criteria. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable** impact.

h. Woollomes Avenue/SR 99 southbound ramps

- Restripe the southbound approach to have a single left turn lane, a shared left plus through plus right turn lane, and dual right turn lanes.
- Convert the eastbound dual right turn lanes to free (movement) dual right turn lanes.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour, and LOS E in the Saturday midday peak hour. However, due to the configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be done, unless a significant reconfiguration of the interchange is done. LOS E would still be a significant impact per City/Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM 4.14.6a**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM 4.14.6a**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the proportionate share of the proposed project's impact at the facilities identified in mitigation measure **MM 4.14.6a**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

*Roadway Segments*

**MM 4.14.6b** The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. Woollomes Avenue, Stradley Avenue-Albany Street to Belmont Street

- Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With implementation of these improvements, the roadway segment would operate at LOS D.

b. Woollomes Avenue, Belmont Street to Grapevine Driveway

- Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With implementation of these improvements, the roadway segment would operate at LOS D.

c. Woollomes Avenue, Grapevine Driveway to Dover Parkway

- Restripe the four-lane divided segment to a six-lane divided segment (three travel lanes in each direction, with median).

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With implementation of these improvements, the roadway segment would operate from LOS E to LOS F and the impact would remain significant. The six-lane improvement would construct the ultimate configuration of this segment per the City's Circulation Element. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable impact**.

d. Woollomes Avenue, Dover Parkway to Home Depot Driveway East

This segment would already be built to its ultimate configuration per the City's Circulation Element (six-lane divided roadway with median). With the addition of project traffic, this segment would operate from LOS D to LOS F. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable** impact.

e. Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps

This segment would already be built to its ultimate configuration per the City's Circulation Element (six-lane divided roadway with median). With the addition of project traffic, this segment would operate from LOS E to LOS F. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable** impact.

f. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps

This segment would already be built to its ultimate configuration per the City's Circulation Element (six-lane divided roadway with median). With the addition of project traffic, this segment would operate from LOS D to LOS F.

The City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM 4.14.6b**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM 4.14.6b**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the proportionate share of the proposed project's impact at the facilities identified in mitigation

measure **MM 4.14.6b**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

*Freeway and Mainline Ramps*

**MM 4.14.6c** The project applicant shall fully construct the following improvements, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. SR 99 northbound on-ramp at Woollomes Avenue

- Construct a second on-ramp lane between Woollomes Avenue and SR 99.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour.

b. SR 99 northbound off-ramp at Woollomes Avenue

- Construct a second off-ramp lane between Woollomes Avenue and SR 99.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour.

c. SR 99 southbound on-ramp at Woollomes Avenue

- Construct a second on-ramp lane between Woollomes Avenue and SR 99.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement:* *City of Delano Public Works Department*

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour.

d. SR 99 southbound off-ramp at Woollomes Avenue

- Construct a second off-ramp lane between Woollomes Avenue and SR 99.

*Timing/Implementation:* *Prior to obtaining a certificate of occupancy*

*Monitoring/Enforcement: City of Delano Public Works Department*

With the implementation of these improvements, the on-ramp would operate at LOS C in the weekday PM peak hour and the Saturday midday peak hour.

While the mitigation measures listed above would reduce potential impacts, the City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM 4.14.6c**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM 4.14.6c**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the proportionate share of the proposed project's impact at the facilities identified in mitigation measure **MM 4.14.6c**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

## REFERENCES

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# 5.0 PROJECT ALTERNATIVES

## 5.1 INTRODUCTION

### GENERAL CEQA REQUIREMENTS

California Environmental Quality Act (CEQA) Guidelines Section 15126.6(a) states, "an EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." The EIR need not consider every conceivable alternative, but rather should consider a "reasonable range" of potentially feasible alternatives that foster informed decision-making and public participation. The range of potential alternatives to the proposed project is to include those alternatives that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (CEQA Guidelines Section 15126.6(c)).

### PROJECT OBJECTIVES

As described in Section 3.0, Project Description, the project objectives are:

- To develop commercial and residential projects on the subject property that are consistent with the City's General Plan.
- To provide commercial and residential development that can be adequately served by public services and utilities in a feasible manner.
- To create a well-constructed, visually pleasing residential product that will serve Delano residents far into the future.
- To substantially reduce sales dollar leakage out of the city.
- To provide a commercial retail shopping center on a large, undeveloped lot in close proximity to an existing highway, near other commercial services and residential areas, in order to minimize vehicle travel distances and to utilize existing infrastructure to the fullest extent possible.
- To provide a retail development that meets the current and future unmet demand for goods and services from current and future consumers residing in the city.
- To provide a commercial retail shopping center that serves both the local and regional market areas to attract new customers and retailers into the city.
- To provide a commercial development that results in a net fiscal benefit to the city by generating new sales tax revenue from Delano residents and by increasing property tax revenues.
- To create a commercial development that can capture existing "pass-by" trip on State Route 99, thereby bringing new revenue to the city.
- To provide goods and services at a local site, thereby reducing the number of vehicles trips currently being made to shop for the same goods and services in neighboring cities.

- To provide a commercial development that creates new jobs for the city.

### SUMMARY OF SIGNIFICANT AND UNAVOIDABLE IMPACTS

The analysis presented in the technical sections of this DEIR (Sections 4.1 through 4.14) determined that the following significant and unavoidable impacts would result from implementation of the proposed project:

#### Air Quality

**Impact 4.3.3** Project-generated operational emissions would exceed applicable significance thresholds. This is considered a **significant and unavoidable** impact**.**

**Impact 4.3.8** The proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter. This impact is **cumulatively considerable** and **significant and unavoidable.**

#### Noise

**Impact 4.11.4** Operation of the proposed project would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in the project vicinity. Because no feasible mitigation is available to reduce this impact to a less than significant level, this impact would be considered **significant and unavoidable.**

**Impact 4.11.6** Long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels. Because no feasible mitigation is available to reduce this impact to a less than significant level, this impact would be considered **cumulatively considerable** and **significant and unavoidable.**

#### Traffic and Circulation

**Impact 4.14.1** The proposed project would result in significant increases in level of service at the study intersections. This increase would result in a **significant and unavailable** impact for the Woollomes Avenue/SR 99 northbound ramps.

**Impact 4.14.6** The proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would exceed the capacity of the City's roadway network or to exceed the level of service standard. The project would result in **cumulatively considerable** and **significant and unavoidable** impacts to the intersections of Garces Highway/Dover Place, 1st Avenue/Dover Place, Woollomes Avenue/Dover Parkway, and Woollomes Avenue/SR 99 southbound ramps, Additionally, the project would result in **cumulatively considerable** and **significant and unavoidable** impacts to the roadway segments of Woollomes Avenue, Grapevine Driveway to Dover Parkway; Woollomes Avenue, Dover Parkway to Home Depot Driveway East;

Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps; and Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps.

## ALTERNATIVES CONSIDERED BUT REJECTED

CEQA Guidelines Section 15126.6(c) states that an EIR should identify any alternatives that were considered but rejected as infeasible by the lead agency during the scoping process, and briefly explain the reasons underlying the lead agency's determination. Additional information explaining the choice of alternatives may be included in the administrative record. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are (1) failure to meet most of the stated project objectives, (2) infeasibility, and (3) inability to avoid significant environmental impacts. The alternatives discussed below were considered but rejected from further analysis in the EIR.

### Alternative Site Alternative

Off-site alternatives are generally evaluated in an environmental document to avoid, lessen, or eliminate the significant impacts of a project by considering the proposed development in an alternate location. To be feasible, development of off-site locations must be able to fulfill the project purpose and meet most of the project's stated objectives.

An alternative site located on the eastern border of the city on Garces Highway and west of Browning Road was selected based on the existing General Plan designations and zoning. This site consists of four parcels for a total of 101 acres. Parcels 1 and 2 are each approximately 19 acres in size and are located north of Garces Highway between Mast Avenue and Browning Road. Parcel 3 is approximately 26 acres in size and is located north of Garces Highway, east of Browning Road. Parcel 4 is approximately 37 acres in size and is located south of Garces Highway west of Browning Road. Parcels 1 and 2 have the General Plan land use designation of Commercial and zoning of General Commercial (GC). Parcel 3 is located outside of the existing city limits but within the Delano Planning Area. This parcel has the Delano General Plan land use designation of Medium Density Residential. Parcel 4 has the General Plan land use designation of Commercial on about half of the parcel and High Density Residential on the other half. Zoning for this parcel corresponds to the General Plan land use and is zoned GC and Multiple Family Residential (R-3). Based on existing General Plan designations, the alternative site has approximately 56.6 acres of commercial and 44.5 acres of residential land use designations. As such, in order to be consistent with the proposed project's land uses, a General Plan amendment and rezoning/prezoning of the alternative site land uses would be required. Additionally, as with the proposed project, annexation of a portion of the alternative site, Parcel 3, would be required.

Parcels 1 and 2 are identified as Grazing Land, and Parcels 3 and 4 are identified as Prime Farmland by the California Department of Conservation (DOC). Development of this alternative would result in the direct loss of approximately 63 acres of Prime Farmland. Additionally, much of this site is surrounded by agricultural uses. Development of this site may result in indirect losses of agricultural land. The proposed project would not result in the direct or indirect loss of Prime Farmland. A portion of Parcels 3 and 4 is located in Federal Emergency Management Agency (FEMA) Zone A, while the rest of the alternative site is in Zone X. Flooding impacts would be similar to those on the project site. The alternative site's air quality and greenhouse gas (GHG) impacts would be greater than the proposed project site because of the necessity to move

50,000 cubic yards of earth for fill, removed from the City's retention basin, a much greater distance to the alternative site. Development of this site would also increase the amount of traffic on Garces Highway and may result in necessary changes to the State Route (SR) 99/Garces Highway entrance/exit ramps via Fremont and Ellington streets, as well as improvements to intersections on Garces Highway. Finally, this site is owned by a number of different owners. It is not known whether or not the site could be acquired by the project proponents. While the alternative site alternative would be consistent with the objectives of the proposed project, given the potential increased impacts when compared to the proposed project site—loss of Prime Farmland, increased air quality and GHG impacts, increased traffic impacts—the alternative site alternative was eliminated from further consideration.

## 5.2 PROJECT ALTERNATIVES ANALYZED IN THE DEIR

### DESCRIPTION OF PROJECT ALTERNATIVES

Three alternatives to the proposed project are analyzed in this EIR, as described below. As discussed above, the significant unavoidable impacts identified for the proposed project are related to air quality, noise, and traffic and circulation. Therefore, the alternatives below include the no project alternative and two alternatives that would reduce air pollution and greenhouse gas emissions, noise impacts, and traffic and circulation impacts.

**Project Alternative 1 – No Project Alternative**

CEQA Guidelines Section 15126.6(e)(1) states that a No Project Alternative must be analyzed in every EIR. In the case where the project is a development project on identifiable property, such as with the proposed project, the No Project analysis must discuss the circumstances under which the project does not proceed. The comparison is that of the proposed project versus what can reasonably be expected to occur on the properties should the proposed project not be approved. The analysis allows decision-makers to compare the impacts of approving the project with the impacts of not approving the project (CEQA Guidelines Section 15126.6(e)(3)(B)).

It is important to note that the No Project Alternative does not necessarily mean the properties will remain in their undeveloped state. If no action is taken on the proposed project, it is reasonable to assume that another project would be proposed at some point in the future consistent with the General Plan designations and zoning.

The Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial (GC). For this alternative analysis, it is assumed that this site would be developed as residential uses consistent with the General Plan land use designation. Residential uses were chosen instead of commercial uses because the zoning is required to comply with the General Plan land use designation, not vice versa. The Medium Residential designation allows up to 14 dwelling units per gross acre. As such, for this alternative, the 33-acre Vineyard site would accommodate 462 multi-family dwelling units.

The West Pavilion project site is currently within the jurisdiction of Kern County, with a Kern County General Plan land use designation of Intensive Agriculture and zoned Exclusive Agriculture. The Kern County Intensive Agriculture designation requires a minimum parcel size of 20 acres and allows one single-family home per parcel. Thus, the 77-acre West Pavilion site would accommodate up to three parcels with agriculture-related activities and three single-family

homes. Because this area would not be annexed by the City of Delano but would remain under Kern County's jurisdiction, those utility services provided by the City—water, sewer, and storm drainage—would not be provided for these parcels.

Thus, Alternative 1 consists of 77 acres of agricultural uses with three single-family homes located in Kern County and 33 acres of medium-density residential uses with 462 multi-family housing units located in Delano.

### Project Alternative 2 – Reduced Residential Density

The Reduced Residential Density Alternative assumes that the project's residential portion would be developed at 10 dwelling units per acre instead of the proposed project density of 14 dwelling units per acre. The commercial portion of the project would remain the same. **Table 5.0-1** illustrates the residential and commercial densities for Alternative 2. The decrease in residential units would be approximately 27 percent (237 units). The acreages assigned to the residential and commercial uses would remain the same as the proposed project's acreages. Connection to the City's existing storm drainage, water, and wastewater facilities would be required for this alternative.

**TABLE 5.0-1**
**ALTERNATIVE 2 DEVELOPMENT DENSITIES**

| Phase | Residential Units | | Commercial (Sq. Ft.) |
|---|---|---|---|
| **Vineyard Site** (33 acres residential) | | | |
| | **Units** | **Density** | |
| I | 83 | 10.0 du/ac | — |
| II | 83 | 10.0 du/ac | — |
| III | 82 | 10.0 du/ac | — |
| IV | 82 | 10.0 du/ac | — |
| **West Pavilion Site** (30 acres residential, 47 acres commercial) | | | |
| | **Units** | **Density** | |
| I | 153 | 10.2 du/ac | — |
| II | 152 | 10.2 du/ac | — |
| III | — | — | 170,000 |
| IV | — | — | 170,000 |
| **Total** | **635** | **10.1 du/ac** | **340,000** |

Alternative 2 would result in a residential density of approximately 10.1 dwelling units per gross acre. Alternative 2 would still require the annexation of the West Pavilion site by the City as well as prezoning to Multiple Family Residential (R-3) and General Commercial (GC). The Vineyard site would also still require a rezone from GC to R-3.

### Project Alternative 3 – Reduced Project Development

The Reduced Project Development Alternative would allow a reduction in residential and commercial development by approximately 50 percent. Alternative 3 would have 436 residential units and 170,000 square feet of commercial area. The acreages assigned to the residential and commercial uses would remain the same as the proposed project's acreages.

Connection to the City's existing storm drainage, water, and wastewater facilities would be required for this alternative. However, this reduction would decrease the demand for water and sewer service by approximately half when compared to the proposed project. **Table 5.0-2** shows the development levels for Alternative 3.

**TABLE 5.0-2**
**ALTERNATIVE 3 DEVELOPMENT DENSITIES**

| Phase | Residential Units | | Commercial (Sq. Ft.) |
|---|---|---|---|
| **Vineyard Site** (33 acres residential) | | | |
| | **Units** | **Density** | |
| I | 54 | 6.5du/ac | — |
| II | 54 | 6.5du/ac | — |
| III | 54 | 6.5du/ac | — |
| IV | 54 | 6.5du/ac | — |
| **West Pavilion Site** (30 acres residential, 47 acres commercial) | | | |
| | **Units** | **Density** | |
| I | 110 | 7.3 du/ac | — |
| II | 110 | 7.3 du/ac | — |
| III | — | — | 85,000 |
| IV | — | — | 85,000 |
| **Total** | **436** | **6.9 du/ac** | **170,000** |

This alternative would result in the development of 436 dwelling units at a density 6.9 dwelling units per gross acre. This would allow for the development of single-family units instead of multi-family units. Alternative 3 would also require the annexation of the West Pavilion site by the City as well as prezoning to Multiple-Family Residential (R-3) and General Commercial (GC). The Vineyard site would also still require a rezone from GC to R-3.

## 5.3 COMPARATIVE IMPACT ANALYSIS

For each project alternative, the significant environmental impacts are identified, as well as the impacts of the proposed project that would be avoided. If an alternative would cause one or more significant effects in addition to those that would be caused by the proposed project, the

significant effects of the alternative are discussed but in less detail than the significant effects of the proposed project (CEQA Guidelines Section 15126.6(d)). The discussion for each alternative addresses potential impacts on each of the environmental issues presented in Section 4.1 through 4.14 of this DEIR. If a potential impact under an alternative is similar to that under the proposed project, the discussion will so note and no further analysis of the potential impact is conducted.

### ALTERNATIVE 1 – NO PROJECT

Under the No Project Alternative, future development of the project site could occur according to the existing General Plan land use designations. As such, impacts to the physical environment may also occur. However, because of the reduced intensity of development, impacts for all issue areas would have a reduced severity when compared to the proposed project.

#### Footprint Impacts

If the project site were to be developed according to the existing General Plan land use designations of Intensive Agriculture and Medium Residential, the site would be developed with agricultural uses on 77 acres and medium-density residential uses on 33 acres. Footprint-related effects (those defined by project location such as agriculture, biological resources, cultural resources, geology, hazards, and hydrology) would generally be less because it would be a much smaller developed area. While the impacts on the Vineyard site would be similar to the proposed project because this area has the potential to be developed as residential uses under the current Delano General Plan, the impact on the West Pavilion site would be the same, as the site has the potential to be used for agricultural uses as it was in the past. While agricultural uses could have impacts to biological and cultural resources as well as to hydrology, these impacts are generally less than those resulting from urban development. Therefore, Alternative 1 would have a reduced impact in these areas when compared to the proposed project.

#### Aesthetics

Visually, Alternative 1 would result in a change to land that is currently vacant to agricultural uses and residential uses. However, while the proposed project would allow more intensive development than Alternative 1, visual impacts under this alternative would be similar to those of the proposed project, which would result in less than significant impacts to scenic resources but potential light and glare impacts. While Alternative 1 would potentially convert currently vacant land into agricultural uses and residential uses, the alternative would also result in a less than significant impact to scenic resources and light and glare impacts that could be mitigated to a less than significant level.

#### Air Quality

Project-generated operational air emissions would exceed applicable thresholds, resulting in a significant and unavoidable impact. Additionally, the proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter and result in a cumulatively considerable and significant and unavoidable impact.

Alternative 1 would have a decreased development potential and therefore result in less air emissions and a reduced air quality impact. Construction and operational air emissions of Alternative 1 would be less because of a reduced number of residential units and no commercial uses. This reduction would have fewer construction air impacts because of a much smaller construction disturbance area, smaller number of residential units to be built, no commercial uses, and a shorter construction period. Alternative 1's operational air emissions would also be less than the proposed project because of less residential and commercial development and a reduced number of vehicle trips, which would result in lower air emissions. While agricultural uses may have $PM_{10}$ and $PM_{2.5}$ emissions (dust) during plowing and cultivation operations, the greatest emissions of $PM_{10}$ and $PM_{2.5}$ come from mobile sources (i.e., vehicles). The proposed project would have a much greater amount of vehicle travel, resulting in a much greater PM emissions compared to Alternative 1 including those PM emissions occurring as a result of periodic plowing and cultivation related to agriculture.

### Greenhouse Gases and Climate Change

The proposed project's greenhouse gas emissions were determined through the GHG analysis to be less than significant. Much like air emissions, GHG emissions would be less than with the proposed project because of less residential and commercial development and a reduced number of vehicle trips, which would result in lower air emissions. GHG emissions associated with the proposed project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with new vehicular trips and indirect source emissions, such as electricity usage for lighting. Because Alternative 1 would have less development, which would result in less construction equipment exhaust, vehicular trips, and energy use, GHG emissions from Alternative 1 would produce a smaller amount of GHG emissions when compared to the proposed project.

### Land Use

Alternative 1 would not result in any changes to the General Plan land use designations. However, as with the proposed project, the Vineyard site would have to be rezoned from Commercial to Residential. This rezoning would result in the Vineyard site being consistent with the General Plan land use designation for the site and thereby remove any potential conflicts with existing City of Delano land use policies or regulations. As with the proposed project, development of Alternative 1 would not result in the physical division of an established community or conflict with a habitat conservation plan or natural community conservation plan. Impacts on land use would be similar to those anticipated under the proposed project. No annexation or prezoning of the West Pavilion site by the City would be required with Alternative 1. However, the annexation and prezoning required by the proposed project would not result in any land use impacts. Thus, Alternative 1 would have similar land use impacts to those of the proposed project.

### Noise

The proposed project would cause a substantial permanent increase in ambient noise levels because of increased local traffic volumes, resulting in a significant and unavoidable impact. Also, long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels and would be considered cumulatively considerable and significant and unavoidable.

With the potential for decreased traffic levels to and from the project site under this alternative, traffic noise levels would also be expected to decrease. Decreased development intensity would decrease the duration of construction activities on the project site, which would shorten the period of time that construction noise could occur. Based on the potential for decreased development intensity, it is anticipated that noise levels would be less for Alternative 1 than those of the proposed project.

### Population and Housing

The proposed project is estimated to result in 3,670 new residents in Delano based on an average household size of 4.21 persons, as discussed in Section 4.12. The reduction in the number of housing units for this alternative would also reduce the number of anticipated new residents in Delano. Alternative 1 would have 465 dwelling units (3 single-family and 462 multi-family). This is anticipated to result in 1,958 new residents to Delano (465 dwelling units X 4.21 persons per unit = 1,958).

Because the project's anticipated growth was planned for by the City in its General Plan as well as by the Kern Council of Governments (Kern COG), the proposed project would not result in substantial unexpected population growth or growth for which inadequate planning has taken place. Similar to the proposed project, population growth associated with Alternative 1 would also fall within the population growth expectations defined in the City General Plan and the Kern COG population projections. While Alternative 1 would result in less population growth, it would result in a less than significant impact and therefore be similar to the proposed project. Neither the proposed project nor Alternative 1 would remove housing or displace persons, as there on none on the project site.

### Public Services and Utilities

Implementation of the proposed project would result in less than significant impacts to law enforcement, schools, parks and recreation, and library services. Additionally, the proposed project would result in less than significant impacts to wastewater, stormwater drainage, and solid waste capacity and facilities. However, development of the proposed project would result in the need for additional fire protection facilities and an additional well in order to provide adequate water supply in the city. Mitigation has been implemented in this DEIR to reduce these impacts to a less than significant level. While the majority of the project's impacts would not require new or expanded facilities, the proposed project would increase the demand for all of the public services and utility facilities in the city.

Much of the increase demand for public services is because of an increase in population. Therefore, a project with less population would generally require less fire protection, law enforcement, schools, parks and recreation, and library services to serve the project. However, public utilities are not necessarily based on population. In Delano, calculations used to determine the demand for public utilities are based on use. For example, the City of Delano bases wastewater flow demand projections on "residential equivalents" (RE).[1] Multi-family and commercial demand projections are based on a factor of the RE, as discussed in Subsection 4.13.6.

[1] RE is defined as one single-family home.

The proposed project would have an estimated wastewater flow of 389,730 gallons per day (gpd). Using the wastewater generation factors discussed in Subsection 4.13.6, Alternative 1 would have an estimated wastewater flow of 114,345 gpd (462 dwelling units[2] X 275 gpd of wastewater X 0.9 RE = 114,345 gpd) or about 29 percent of the proposed project's wastewater.

Based on the water demand factors used in the Water Supply Assessment for the proposed project, Alternative 1 would result in a water demand of 89 million gallons per year[3] (462 dwelling units X 3.0 persons per unit X 176 gallons per day per person X 365 days = 89,036,640 gallons per year) or approximately 273 acre-feet per year (af/yr). Those uses located in Kern County jurisdiction (77 acres of agriculture and three single-family homes) would not require City of Delano water. Therefore, Alternative 1 would have a City of Delano water system water demand of 273 af/yr. The proposed project would have a water demand of 639 af/yr and require an additional well to provide this water. As such, Alternative 1 would have less impact to the City's water system than the proposed project. However, this increase in water demand may still require an additional well under Maximum Day Demand multiple dry year conditions.

Alternative 1 would have solid waste produced from the residential uses but not from commercial uses. This would reduce the amount of solid waste. Subsection 4.13.6 also discusses the proposed project's solid waste production. Total solid waste coming from the proposed project is estimated to be approximately 21,313 pounds per day (lbs/day). Using the solid waste generation factors discussed in Subsection 4.14.6, Alternative 1 would produce 5,748 lbs/day (1,916 persons X 3.0 lbs/day/person = 5,748 lbs/day) or about 27 percent of the proposed project's solid waste per day.

Alternative 1 would have less residential development and no commercial development. Therefore, the demand for public services and utilities would be less than with the proposed project and result in a less than significant impact to all of the public services and utilities. However, because the proposed project would also result in less than significant impacts to fire protection, law enforcement, schools, parks and recreation, and library services as well as to water, wastewater, stormwater drainage, and solid waste capacity and facilities, the actual impact determination would be similar, although Alternative 1 would have a reduced physical impact to these services when compared to the proposed project.

### Traffic and Circulation

The proposed project would result in a significant and unavailable impact for the Woollomes Avenue/SR 99 northbound ramps. Additionally, the proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would result in cumulatively considerable and significant and unavoidable impacts to a number of intersections and roadway segments in the project area.

[2] For Alternative 1, wastewater for the three single family homes on the West Pavilion site is not included in this calculation as it is assumed that these units will be on septic systems because they are outside of the City's wastewater service boundaries.

[3] Based on water demand factors of 3 persons per unit and 176 gallons per day per person as shown on page 4 of the WSA. 1 acre foot = 325,851.43 gallons. 89,036,640 gallons per year / 325,851.43 gallons per acre foot = 273.24 acre-feet per year.

The proposed project results in 23,370 daily weekday vehicle trips and 29,116 Saturday vehicle trips. Using the same Institute of Transportation Engineers (ITE) land use code as used for the proposed project for Alternative 1's residential uses (ITE 220; 6.65 trips per dwelling unit for weekday and 6.39 trips per dwelling unit for Saturday) for the 465 residential units of Alternative 1, this alternative would have 3,092 daily weekday trips (465 dwelling units X 6.65 trips per dwelling unit = 3,092 trips) and 2,971 Saturday trips (465 dwelling units X 6.39 trips per dwelling unit = 2,971 trips). The proposed project's traffic is seven to ten times greater than Alternative 1's traffic generation. While it cannot be determined whether Alternative 1's traffic impact would also result in significant and unavoidable impacts to those intersections and roadway segments impacted by the proposed project without a traffic impact study, which is outside of the parameters of this EIR, Alternative 1 would result in fewer traffic- and circulation–related impacts compared to the proposed project.

### Impact Summary

As discussed previously, Alternative 1 consists of 77 acres of agricultural uses with three single-family homes located in Kern County and 33 acres of medium-density residential uses with 462 multi-family housing units in Delano.

If the project site is developed to its General Plan land use designation potential, then all of the potential impacts would be reduced in impact level. This is evidenced by the analysis discussion above. It should be noted that this alternative would only satisfy the project's residential objectives, but would produce only about 60 percent of the residential units. None of the proposed project's commercial objectives would be accomplished with this alternative.

## ALTERNATIVE 2 – REDUCED RESIDENTIAL DENSITY

Alternative 2 would result in 635 multi-family units and 340,000 square feet of commercial area. The residential density would be approximately 10.1 dwelling units per gross acre. Alternative 2 would result in the decrease of residential units by 27 percent over the proposed project.

### Footprint Impacts

While the Reduced Residential Density Alternative would result in a smaller number of residential units than the proposed project, the project site would still be entirely developed, which would require grading and excavation of the entire site. Additionally, Alternative 2, like the proposed project, would result in the conversion of existing vacant undeveloped parcels to fully developed urban uses. Therefore, all anticipated footprint impacts (i.e., agriculture, biological resources, cultural resources, geology, hazards, and hydrology) would be essentially the same as the proposed project.

### Aesthetics

Under the Reduced Residential Density Alternative, the project site would still be developed with residential and commercial uses and would include parking, fencing, landscaping, etc. Visually, Alternative 2 would result in a change to land that is currently vacant to commercial and residential uses. However, while the proposed project would allow more intensive development than Alternative 2, visual impacts under this alternative would be similar to those of the proposed project. Development of the proposed project would result in less than significant impacts to

scenic resources but potential light and glare impacts, which were mitigated to a less than significant level. While Alternative 2 would have less residential development, this alternative would also result in a less than significant impact to scenic resources and light and glare impacts that could be mitigated to a less than significant level.

### Air Quality

As stated previously, project-generated operational air emissions would exceed applicable thresholds, resulting in a significant and unavoidable impact. Additionally, the proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter and result in a cumulatively considerable and significant and unavoidable impact

Alternative 2 would have a decreased development potential and therefore result in less air emissions and a reduced air quality impact. Construction as well as operational air emissions of the Reduced Residential Density Alternative would be less because of a reduced number of residential units from 872 for the proposed project to 635 for this alternative. This reduction would have fewer construction air impacts because of a smaller number of residential units to be built and a shorter construction period. This alternative's operational air emissions would also be less than the proposed project because of less residential development and a reduced number of vehicle trips, which would result in lower air emissions. A preliminary air quality assessment was completed for this alternative using CalEEMod to determine whether this level of development would result in a less than significant air quality impact. As shown in **Table 5.0-3**, Alternative 2 would exceed the San Joaquin Valley Air Pollution Control District (SJVAPCD) air quality thresholds for all but $PM_{2.5}$ and sulfur dioxide. While much of these emissions could be reduced with proper mitigation measures, as with the proposed project, a 33.3 percent reduction of nitrogen oxide ($NO_X$) may not be possible to reduce this pollutant to a level below the air district's $NO_X$ significance threshold for Alternative 2. While Alternative 2 would also result in air quality impacts, these emissions would be lower than those of the proposed project, as shown in **Table 5.0-3**, and therefore would have a reduced impact in this area.

**TABLE 5.0-3**
**ALTERNATIVE 2 LONG-TERM OPERATIONAL EMISSIONS (TONS PER YEAR) – UNMITIGATED**

| Source | Reactive Organic Gases (ROG) | Nitrogen Oxide ($NO_X$) | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) | Carbon Monoxide (CO) | Sulfur Dioxide ($SO_2$) |
|---|---|---|---|---|---|---|
| **Alternative 2** | | | | | | |
| Area Source | 5.28 | 0.12 | 0.74 | 0.74 | 8.96 | 0.01 |
| Energy Use | 0.06 | 0.52 | 0.04 | 0.04 | 0.26 | 0.00 |
| Mobile Source | 13.06 | 37.74 | 16.86 | 5.05 | 168.21 | 0.34 |
| **Total** | **18.39** | **38.39** | **17.64** | **5.83** | **177.44** | **0.35** |
| SJVAPCD Potentially Significant Impact Threshold | 10 tons/year | 10 tons/year | 15 tons/year | 15 tons/year | 100 tons/year | 27 tons/year |
| **Exceed SJVAPCD Threshold?** | **Yes** | **Yes** | **Yes** | **No** | **Yes** | **No** |

| Source | Reactive Organic Gases (ROG) | Nitrogen Oxide ($NO_X$) | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) | Carbon Monoxide (CO) | Sulfur Dioxide ($SO_2$) |
|---|---|---|---|---|---|---|
| **Proposed Project** | | | | | | |
| **Total** | **20.31** | **42.40** | **18.97** | **5.75** | **190.01** | **0.38** |
| **Exceed SJVAPCD Threshold?** | Yes | Yes | Yes | No | Yes | No |

*Source: CalEEMod version 2013.2.2*

## Greenhouse Gases and Climate Change

The proposed project's greenhouse gas emissions were determined through the GHG analysis to be less than significant. Much like air emissions, GHG emissions would be less than the proposed project because of fewer residential units and a reduced number of vehicle trips, which would result in lower air emissions. GHG emissions associated with Alternative 2 would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with new vehicular trips and indirect source emissions, such as electricity usage for lighting. A preliminary GHG assessment was completed for Alternative 2. As shown in **Table 5.0-4**, this alternative could produce 28,308 metric tons of carbon dioxide equivalent ($CO_2e$) annually under business-as-usual (BAU) conditions, primarily from motor vehicles that travel to and from the site. For purposes of this assessment, the total emissions of 28,308 metric tons of $CO_2e$ per year are considered the BAU figure.

**TABLE 5.0-4**
**ESTIMATED GREENHOUSE GAS EMISSIONS UNDER BAU OPERATIONS (METRIC TONS PER YEAR) – UNMITIGATED**

| Emissions Source | $CO_2e$ |
|---|---|
| Construction Amortized Over 30 Years | 232 |
| Area Source (landscaping, hearth) | 386 |
| Energy | 2,015 |
| Mobile | 25,185 |
| Waste | 295 |
| Water | 195 |
| **Total** | **28,308** |
| Proposed Project Total $CO_2e$ Emissions – Unmitigated | 45,449 |

*Source: CalEEMod version 2013.2.2*

As with the proposed project, the GHG emissions from implementation of Alternative 2 are projected to be reduced by 30.3 percent, with implementation of State-led GHG reduction measures such as Pavley, the Low Carbon Fuel Standard, the State Renewables Portfolio Standard, and the California Green Building Standards. This reduction is greater than the 29 percent threshold, so Alternative 2 would be considered consistent with the State of California's ability to meet its GHG reduction goals. While Alternative 2 would also result in GHG impacts, as

shown in **Table 5.0-4**, these emissions would be lower than those of the proposed project and therefore would have a reduced impact in this area.

### Land Use

This alternative would not have different land uses than the proposed project. The Vineyard project site is currently designated in the City of Delano General Plan as Medium Residential and zoned General Commercial (GC). As with the proposed project, approval of Alternative 2 would necessitate a zoning amendment for the Vineyard at Delano site from GC to Multiple-Family Residential (R-3).

The West Pavilion project site is currently under the jurisdiction of Kern County. It is zoned Exclusive Agriculture by the County and has the Kern County General Plan land use designation of Intensive Agriculture. The City's General Plan identifies the West Pavilion site as Medium Residential and Commercial. Approval of Alternative 2 would require annexation of the West Pavilion site by the City and prezoning of the West Pavilion site to GC and R-3.

There would be no impact associated with consistency with adopted land use plans or policies, physical division of an established community, or conflict with a habitat conservation plan or natural community conservation plan. Land use impacts would be similar to those anticipated under the proposed project.

### Noise

Implementation of the proposed project would result in roadway noise level increases of up to 7.4 dBA during weekdays along Woollomes Avenue and 7.9 dBA on Saturdays along Woollomes Avenue. Additionally, Albany Street and Stradley Avenue would experience an increase in roadway noise levels above the 3.0 dB threshold (see **Table 4.11-12** in Section 4.11, Noise). As there is no feasible mitigation available to reduce the increase in roadway noise levels, this impact would be significant and unavoidable. Also, long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels and would be considered cumulatively considerable and significant and unavoidable.

Alternative 2 would have fewer residential units and as such, there would likely be a reduction in traffic. The roadway noise increase due to the commercial portion of Alternative 2 would be similar, as Alternative 2 would have the same amount of commercial development as the proposed project. However, noise levels would still increase over existing conditions. There may be a slight reduction in noise levels when compared to the proposed project because of the reduced number of residential uses and thus traffic noise. However, the increase of 635 dwelling units, 340,000 square feet of commercial uses, and associated traffic noise would likely exceed the City's noise level standard. As with the proposed project, Alternative 2 could result in an increase in ambient noise and cumulative noise levels that could not be reduced to a less than significant impact. As such, Alternative 2 would have similar ambient noise impacts when compared to the proposed project.

Alternative 2's construction-related noise, as with the proposed project, could be reduced to a less than significant level with those mitigation measures identified in Section 4.11. Therefore, this alternative's construction noise impact would be similar to the proposed project.

### Population and Housing

The proposed project is estimated to result in 3,670 new residents in Delano based on an average household size of 4.21 persons, as discussed in Section 4.12. The reduction in the number of housing units for this alternative would also reduce the number of anticipated new residents in Delano. Alternative 2 would have 635 dwelling units. This is anticipated to result in 2,673 new residents to Delano (635 dwelling units X 4.21 persons per unit = 2,673).

Because the project's anticipated growth was planned for by the City in its General Plan as well as by Kern COG, the proposed project would not result in substantial unexpected population growth or growth for which inadequate planning has taken place. Similar to the proposed project, population growth associated with Alternative 2 would also fall within the population growth expectations defined in the City General Plan and the Kern COG population projections. While Alternative 2 would result in less population growth, it would result in a less than significant impact and therefore be similar to the proposed project. Neither the proposed project nor Alternative 2 would remove housing or displace persons, as there on none on the project site.

### Public Services and Utilities

As discussed previously, much of the increase demand for public services is because of an increase in population. Therefore, a project with less population would generally require less fire protection, law enforcement, schools, parks and recreation, and library services to serve the project. However, public utilities are not necessarily based on population. In Delano, calculations used to determine the demand for to public utilities are based on use.

The proposed project would have an estimated wastewater flow of 389,730 gpd. Using the wastewater generation factors discussed in Subsection 4.13.6, Alternative 2 would have an estimated wastewater flow of 331,073 gpd (residential uses: 635 dwelling units X 275 gpd of wastewater X 0.9 RE = 157,163 gpd; commercial uses: 173,910 gpd) or about 85 percent of the proposed project's wastewater.

Based on the water demand factors used in the Water Supply Assessment for the proposed project, Alternative 2 would result in a water demand of 163 million gallons per year or approximately 499 af/yr, as shown in **Table 5.0-5**.

**TABLE 5.0-5**
**ALTERNATIVE 2 WATER DEMAND**

| | Gallons per Day | Gallons per Year | Acre-Feet per Year |
|---|---|---|---|
| Residential Units | 335,280 | 122,377,200 | 376 |
| Commercial Uses | 77,504 | 34,841,440 | 107 |
| Public Facilities/Parks | 14,730 | 5,376,549 | 17 |
| **Total** | **427,514** | **162,595,189** | **499** |

*Notes: Based on water demand factors established in the City of Delano Water Supply Assessment (2014), page 4.*

The proposed project would have a water demand of 639 af/yr and require an additional well to provide this water. As such, Alternative 2 would have less impact to the City's water system

than the proposed project. However, this increase in water demand may still require an additional well under Maximum Day Demand multiple dry year conditions.

Alternative 2 would have solid waste produced from residential uses and commercial uses. The smaller number of residential units for Alternative 2 would reduce the amount of solid waste. Subsection 4.13.6 also discusses the proposed project's solid waste production. Total solid waste coming from the proposed project is estimated to be approximately 21,313 pounds per day (lbs/day). Using the solid waste generation factors discussed in Section 4.14.6, Alternative 2 would produce 18,583 lbs/day (residential uses: 2,673 persons X 3.0 pounds per person per day = 8,019 lbs/day; commercial uses = 10,564 lbs/day) or about 87 percent of the proposed project's solid waste per day.

Alternative 2 would have less residential development, by 237 dwelling units, but the same amount of commercial development as the proposed project. Therefore, the demand for public services and utilities would be less than the proposed project and result in a less than significant impact to all of the public services and utilities. However, because the proposed project would also result in less than significant impacts to fire protection, law enforcement, schools, parks and recreation, and library services, as well as to water, wastewater, stormwater drainage, and solid waste capacity and facilities, the actual impact level determination would be similar, although Alternative 2 would have a reduced physical impact to these services when compared to the proposed project.

### Traffic and Circulation

As discussed previously, the proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would result in cumulatively considerable and significant and unavoidable impacts to a number of intersections and roadway segments in the project area.

The proposed project results in 23,370 daily weekday vehicle trips and 29,116 Saturday vehicle trips. Using the same Institute of Transportation Engineers (ITE) land use code as used for the proposed project for Alternative 2's residential uses (ITE 220; 6.65 trips per dwelling unit for weekday and 6.39 trips per dwelling unit for Saturday) for the 635 residential units of Alternative 2, this alternative's residential units would have 4,223 daily weekday trips (635 dwelling units X 6.65 trips per dwelling unit = 4,223 trips) and 4,058 Saturday trips (635 dwelling units X 6.65 trips per dwelling unit = 4,058 trips). The vehicle trips for the commercial uses would be the same as the proposed project (17,572 for weekday and 23,544 for Saturday; see **Table 4.14-8** in Section 4.14, Traffic and Circulation). Therefore, the Reduced Residential Density Alternative would have 21,795 weekday daily trips (4,223 + 17,572 = 21,795) and 27,602 Saturday trips (4,058 + 23,544 = 27,602). The proposed project's traffic is 7 percent higher on the weekday (23,370 - 21,795/23,370 X 100% = 7%) and 5 percent higher on Saturday (29,116 – 27,602/29,116 X 100% = 5%) than Alternative 2's traffic generation. While it cannot be determined whether this alternative's traffic impact would also result in significant and unavoidable impacts to those intersections and roadway segments impacted by the proposed project without a traffic impact study, which is outside of the parameters of this EIR, Alternative 2 would result in less traffic and therefore potentially fewer traffic- and circulation-related impacts compared to the proposed project because of the smaller amount of residential-related traffic.

### Impact Summary

The Reduced Residential Density Alternative would result in reductions in impacts associated with air quality, climate change and greenhouse gas emissions, and traffic and circulation. Additionally, because this alternative would have a smaller resident population, the public services and utilities demand to serve the residents would be less than the proposed project.

For air quality, total emissions associated with reactive organic gases (ROG), $NO_X$, $PM_{10}$, carbon monoxide (CO), and sulfur dioxide ($SO_2$) would be lower than the proposed project. However, as with the proposed project, Alternative 2's ROG, $NO_x$, $PM_{10}$, CO, and $SO_2$ emissions would exceed the SJVAPCD significance threshold for unmitigated conditions. Under the proposed project, $NO_X$ emissions would be significant and unavoidable, despite mitigation. $NO_X$ emissions under the Reduced Residential Density Alternative would also exceed the SJVAPCD significance threshold, which may not be mitigated to a less than significant level.

For the issue areas of aesthetics, greenhouse gas emissions and climate change, land use, population and housing, and public services and utilities, the Reduced Residential Density Alternative would result in reduced impacts. However, the proposed project did not result in significant and unavoidable impacts for these impact areas. As such, while Alternative 2 had a reduced physical impact in these areas, the level of impact determination was similar to the proposed project.

Impacts associated with increases in traffic levels would be less under Alternative 2 than the proposed project because of the smaller amount of residential units. It cannot be determined with the limited traffic analysis for Alternative 2 whether the reduced number of vehicle trips associated with Alternative 2 would reduce those intersections and roadways that were identified as having a significant and unavoidable impact in the proposed project analysis to a less than significant level. However, the reduced number of trips would likely have fewer traffic impacts than the proposed project.

Overall, the Reduced Residential Density Alternative would satisfy the majority of the project objectives.

## ALTERNATIVE 3 – REDUCED PROJECT DEVELOPMENT

Alternative 3 would result in the decrease of residential units by 50 percent over the proposed project. Alternative 3 would have 436 single-family units and 170,000 square feet of commercial area.

### Footprint Impacts

While the Reduced Project Development Alternative would result in half the number of residential units compared to the proposed project, the project site would still be entirely developed with single-family residences and commercial uses. Alternative 3 would produce half of the commercial square footage and therefore allow for more green space; however, as with the single-family uses, the commercial site may still require grading and excavation of the entire site prior to development and therefore disturb existing biological and cultural resources. Additionally, Alternative 3, like the proposed project, would result in the conversion of existing vacant undeveloped parcels to fully developed urban uses. Therefore, all anticipated footprint

impacts, those that are defined by location (i.e., agriculture, biological resources, cultural resources, geology, hazards, and hydrology) would be essentially the same as with the proposed project.

### Aesthetics

Under the Reduced Project Development Alternative, the project site would still be developed with residential and commercial uses and would include parking, fencing, landscaping, etc. Visually, Alternative 3 would result in a change to land that is currently vacant to commercial and residential uses. However, while the proposed project would allow more intensive development than Alternative 3, visual impacts under this alternative would be similar to those of the proposed project. Development of the proposed project would result in less than significant impacts to scenic resources but potential light and glare impacts, which were mitigated to a less than significant level. While Alternative 3 would have less residential and commercial development, this alternative, like the proposed project, would also result in a less than significant impact to scenic resources and light and glare impacts that could be mitigated to a less than significant level.

### Air Quality

As stated previously, project-generated operational air emissions would exceed applicable thresholds, resulting in a significant and unavoidable impact. Additionally, the proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter and result in a cumulatively considerable and significant and unavoidable impact.

Alternative 3 would have a decreased development potential and therefore result in less air emissions and a reduced air quality impact. Construction as well as operational air emissions of the Reduced Project Development Alternative would be less because of the 50 percent reduction of housing units and commercial square footage. This reduction would have fewer construction air impacts because of a smaller number of residential units, smaller square footage for commercial units, and a shorter construction period. This alternative's operational air emissions would also be less than the proposed project because of less residential and commercial development and a reduced number of vehicle trips, which would result in lower air emissions. A preliminary air quality assessment was completed for this alternative using CalEEMod to determine whether this level of development would result in a less than significant air quality impact. As shown in **Table 5.0-6**, Alternative 3 would exceed the SJVAPCD air quality thresholds for ROG and $NO_x$ only. While these emissions could be reduced with proper mitigation measures, as with the proposed project, a 33.3 percent reduction of $NO_X$ may not be possible to reduce this pollutant to a level below the air district's $NO_X$ significance threshold for Alternative 3. While Alternative 3 would also result in air quality impacts, as shown in **Table 5.0-6**, these emissions would be lower than those of the proposed project and therefore would have a reduced impact in this area.

**TABLE 5.0-6**
**ALTERNATIVE 3 LONG-TERM OPERATIONAL EMISSIONS (TONS PER YEAR) – UNMITIGATED**

| Source | Reactive Organic Gases (ROG) | Nitrogen Oxide ($NO_X$) | Coarse Particulate Matter ($PM_{10}$) | Fine Particulate Matter ($PM_{2.5}$) | Carbon Monoxide (CO) | Sulfur Dioxide ($SO_2$) |
|---|---|---|---|---|---|---|
| Area Source | 3.35 | 0.09 | 0.54 | 0.54 | 6.33 | 0.01 |
| Energy Use | 0.04 | 0.34 | 0.03 | 0.03 | 0.17 | 0.00 |
| Mobile Source | 6.98 | 20.47 | 9.28 | 2.78 | 89.91 | 0.19 |
| **Total** | **10.37** | **20.89** | **9.84** | **3.34** | **96.41** | **0.20** |
| SJVAPCD Potentially Significant Impact Threshold | 10 tons/year | 10 tons/year | 15 tons/year | 15 tons/year | 100 tons/year | 27 tons/year |
| **Exceed SJVAPCD Threshold?** | **Yes** | **Yes** | **No** | **No** | **No** | **No** |
| **Proposed Project** | | | | | | |
| **Total** | **20.31** | **42.40** | **18.97** | **5.75** | **190.01** | **0.38** |
| **Exceed SJVAPCD Threshold?** | Yes | Yes | Yes | No | Yes | No |

*Source: CalEEMod version 2013.2.2*

## Greenhouse Gases and Climate Change

The proposed project's greenhouse gas emissions were determined through the GHG analysis to be less than significant. Much like air emissions, GHG emissions would be less than with the proposed project because of fewer residential units and a reduced number of vehicle trips, which would result in lower air emissions.

GHG emissions associated with the Alternative 3 would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with new vehicular trips and indirect source emissions, such as electricity usage for lighting. A preliminary GHG assessment was completed for Alternative 3. As shown in **Table 5.0-7**, this alternative could produce 15,588 metric tons of $CO_2e$ annually under BAU conditions, primarily from motor vehicles that travel to and from the site. For purposes of this assessment, the total emissions of 15,588 metric tons of $CO_2e$ per year are considered the BAU figure.

**TABLE 5.0-7**
**ESTIMATED GREENHOUSE GAS EMISSIONS UNDER BAU OPERATIONS (METRIC TONS PER YEAR) – UNMITIGATED**

| Emissions Source | $CO_2e$ |
|---|---|
| Construction Amortized Over 30 Years | 116 |
| Area Source (landscaping, hearth) | 269 |
| Energy | 1,200 |

| Emissions Source | $CO_2e$ |
|---|---|
| Mobile | 13,825 |
| Waste | 172 |
| Water | 120 |
| **Total** | **15,588** |
| Proposed Project Total $CO_2e$ Emissions - Unmitigated | 45,449 |

*Source: CalEEMod version 2013.2.2*

As with the proposed project, the GHG emissions from implementation of Alternative 3 are projected to be reduced by 30.3 percent, with implementation of State-led GHG reduction measures such as Pavley, the Low Carbon Fuel Standard, the State Renewables Portfolio Standard, and the California Green Building Standards. This reduction is greater than the 29 percent threshold, so Alternative 3 would be considered consistent with the State of California's ability to meet its GHG reduction goals. While Alternative 3 would also result in GHG impacts, as shown in **Table 5.0-7**, these emissions would be lower than those of the proposed project and therefore would have a reduced impact in this area.

### Land Use

This alternative would not have different land uses than the proposed project. The Vineyard project site is currently designated in the City of Delano General Plan as Medium Residential and zoned General Commercial (GC). As with the proposed project, approval of Alternative 3 would necessitate a zoning amendment for the Vineyard at Delano site from GC to Multiple-Family Residential (R-3).

The West Pavilion project site is currently under the jurisdiction of Kern County. It is zoned Exclusive Agriculture by the County and has the Kern County General Plan land use designation of Intensive Agriculture. The City's General Plan identifies the West Pavilion site as Medium Residential and Commercial. Approval of Alternative 3 would require annexation of the West Pavilion site by the City and prezoning of the West Pavilion site to GC and R-3.

There would be no impact associated with consistency with adopted land use plans or policies, physical division of an established community, or conflict with a habitat conservation plan or natural community conservation plan. Land use impacts would be similar to those anticipated under the proposed project.

### Noise

As previously stated, implementation of the proposed project would result in roadway noise level increases of up to 7.4 dBA during weekdays along Woollomes Avenue and 7.9 dBA on Saturdays along Woollomes Avenue. Additionally, Albany Street and Stradley Avenue would experience an increase in roadway noise levels above the 3.0 dB threshold (see **Table 4.11-12**). Because there is no feasible mitigation available to reduce the increase in roadway noise levels, this impact would be significant and unavoidable. Also, long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels and would be considered cumulatively considerable and significant and unavoidable.

Alternative 3 would have fewer residential units and less commercial square footage and as such, there would likely be a reduction in traffic. However, noise levels would still increase over existing conditions. There would be a reduction in noise levels when compared to the proposed project because of the reduced number of residential uses and less commercial square footage and thus less traffic noise. However, the increase of 436 dwelling units, 170,000 square feet of commercial uses, and associated traffic noise could exceed the City's noise level standard. As with the proposed project, Alternative 3 could result in an increase in ambient noise and cumulative noise levels, which may not be reduced to a less than significant impact. As such, Alternative 3 would have ambient noise impacts. However, with only half of the proposed development potential as compared to the proposed project, Alternative 3 would have a reduced noise impact in comparison to the proposed project.

Alternative 3's construction-related noise, as with the proposed project, could be reduced to a less than significant level with those mitigation measures identified in Section 4.11. Therefore, this alternative's construction noise impact would be similar to the proposed project.

### Population and Housing

The proposed project is estimated to result in 3,670 new residents in Delano based on an average household size of 4.21 persons, as discussed in Section 4.12. The reduction in the number of housing units for this alternative would also reduce the number of anticipated new residents in Delano. Alternative 3 would have 436 dwelling units. This is anticipated to result in 1,836 new residents to Delano (436 dwelling units X 4.21 persons per unit = 1,836).

Because the project's anticipated growth was planned for by the City in its General Plan as well as by Kern COG, the proposed project would not result in substantial unexpected population growth or growth for which inadequate planning has taken place. Similar to the proposed project, population growth associated with Alternative 3 would also fall within the population growth expectations defined in the City General Plan and the Kern COG population projections. While Alternative 3 would result less population growth, it would result in a less than significant impact and therefore be similar to the proposed project. Neither the proposed project nor Alternative 3 would remove housing or displace persons, as there on none on the project site.

### Public Services and Utilities

As discussed previously, much of the increase demand for public services is because of an increase in population. Therefore, a project with less population would generally require less fire protection, law enforcement, schools, parks and recreation, and library services to serve the project. However, public utilities are not necessarily based on population. In Delano, calculations used to determine the demand for to public utilities are based on use.

The proposed project would have an estimated wastewater flow of 389,730 gpd. Using the wastewater generation factors discussed in Subsection 4.13.6, Alternative 3 would have an estimated wastewater flow of 206,855 gpd (residential uses: 436 dwelling units X 275 gpd of wastewater X 1.0 RE = 119,900 gpd; commercial uses: 170,000 square feet/1,000 X 275 gpd of wastewater X 1.86 RE = 86,955 gpd; total: 206,855 gpd) or about 53 percent of the proposed project's wastewater.

Based on the water demand factors used in the Water Supply Assessment for the proposed project, Alternative 3 would result in a water demand of 107 million gallons per year or approximately 329 af/yr, as shown in **Table 5.0-8**.

**TABLE 5.0-8**
**ALTERNATIVE 3 WATER DEMAND**

| | Gallons per Day | Gallons per Year | Acre-Feet per Year |
|---|---|---|---|
| Residential Units | 230,208 | 84,025,920 | 258 |
| Commercial Uses | 47,728 | 17,420,720 | 53 |
| Public Facilities/Parks | 14,730 | 5,376,549 | 17 |
| **Total** | **292,666** | **106,823,189** | **328** |

*Notes: Based on water demand factors established in the City of Delano Water Supply Assessment (2014), page 4.*

The proposed project would have a water demand of 639 af/yr and require an additional well to provide this water. As such, Alternative 3 would have less impact to the City's water system than the proposed project. However, this increase in water demand may still require an additional well under Maximum Day Demand multiple dry year conditions.

Alternative 3 would have solid waste produced from residential uses and commercial uses. The decrease in the number of residential units and commercial square footage for Alternative 3 would reduce the amount of solid waste. Subsection 4.14.6 also discusses the proposed project's solid waste production. Total solid waste coming from the proposed project is estimated to be approximately 21,574 pounds per day (lbs/day). Using the solid waste generation factors discussed in Subsection 4.14.6, Alternative 3 would produce 16,312 lbs/day (residential uses: 1,836 persons X 3.0 pounds per person per day = 5,508 lbs/day; commercial uses 444 employees[4] X 11.9 pounds per employee per day = 5,284 lbs/day; total = 10,792 lbs/day) or about 50 percent of the proposed project's solid waste per day.

Alternative 3 would have about half of the residential and commercial development of the proposed project. Therefore, the demand for public services and utilities would be less than the proposed project and result in a less than significant impact to all of the public services and utilities. However, because the proposed project would also result in less than significant impacts to fire protection, law enforcement, schools, parks and recreation, and library services as well as water, wastewater, stormwater drainage, and solid waste capacity and facilities, the actual impact level determination would be similar, although Alternative 3 would have a reduced physical impact to these services when compared to the proposed project.

### Traffic and Circulation

As discussed previously, the proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects, would result in cumulatively considerable and significant and unavoidable impacts to a number of intersections and roadway segments in the project area.

[4] The number of employees is based on information provided by the USGBC 2008 for Community Retail at 383 square feet per employee. (170,000 sq. ft. / 383 sq. ft. per employee = 444 employees)

The proposed project results in 23,370 daily weekday vehicle trips. A preliminary traffic count for Alternative 3 was completed using the ITE land use code for single-family dwellings (ITE 210) for the 436 single-family uses and the ITE equation factor for shopping centers (ITE 820) for the 170,000 square feet of commercial uses. The residential units were estimated to have 4,173 daily weekday trips (436 dwelling units X 9.57 trips per dwelling unit = 4,173 trips). Additionally, the commercial uses for Alternative 3 would be expected to have approximately 9,588 daily trips for weekday periods. Therefore, the Reduced Project Development Alternative would have 13,761 weekday daily trips. The proposed project's traffic is 41 percent higher on the weekday ((23,370 – 13,761)/23,370 X 100% = 41%) than Alternative 3's weekday traffic generation. While it cannot be determined whether this alternative's traffic impact would also result in significant and unavoidable impacts to those intersections and roadway segments impacted by the proposed project without a traffic impact study, which is outside of the parameters of this EIR, Alternative 3 would result in less traffic and therefore potentially fewer circulation-related impacts compared to the proposed project because of the smaller amount of residential- and commercial-related traffic.

### Impact Summary

The Reduced Project Development Alternative would result in reductions in impacts associated with air quality, climate change and greenhouse gas emissions, and traffic and circulation. Additionally, because this alternative would have approximately 50 percent of the development potential of the proposed project, the public services and utilities demand to serve the residents and commercial uses would be less than the proposed project.

For air quality, total emissions associated with ROG, $NO_x$, $PM_{10}$, $PM_{2.5}$, CO, and $SO_2$ would be lower than with the proposed project. Alternative 3 would only exceed the SJVAPCD significance threshold for ROG and $NO_x$. $PM_{10}$, $PM_{2.5}$, CO, and $SO_2$ emissions would be under the threshold limits and therefore would have a less than significant impact and require no mitigation. Under the proposed project, $NO_x$ emissions would be significant and unavoidable, despite mitigation. $NO_x$ emissions under the Reduced Project Development Alternative would also exceed the SJVAPCD significance threshold, which may not be mitigated to a less than significant level.

For the issue areas of aesthetics, greenhouse gas emissions and climate change, land use, population and housing, and public services and utilities, the Reduced Project Development Alternative would result in reduced impacts. However, the proposed project did not result in significant and unavoidable impacts for these impact areas. As such, while Alternative 3 had a reduced physical impact in these areas, the level of impact determination was similar to the proposed project.

Impacts associated with increases in traffic levels would be less under Alternative 3 than the proposed project. This is due to the smaller amount of residential units and commercial square footage. It cannot be determined with the limited traffic analysis for Alternative 3 whether the reduced number of Alternative 3 vehicle trips would reduce the impact to those intersections and roadways that were identified as having a significant and unavoidable impact in the proposed project analysis to a less than significant level. However, the reduced number of trips would have fewer traffic impacts than the proposed project.

Overall, the Reduced Project Development Alternative would satisfy the majority of the project objectives.

## 5.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

**Table 5.0-9** provides a summary of the potential impacts of the alternatives evaluated in this section, as compared with the potential impacts of the proposed project.

**TABLE 5.0-9**
**COMPARISON OF ALTERNATIVES TO THE PROPOSED PROJECT BY IMPACT**

| Issue | Proposed Project | Alternative 1 No Project | Alternative 2 Reduced Residential Density | Alternative 3 Reduced Project Development |
|---|---|---|---|---|
| Aesthetics | LTS + M, LCC | Similar | Similar | Similar |
| Agriculture and Forestry Resources | LTS, LCC | Reduced | Similar | Similar |
| Air Quality | CC + SU | Reduced | Reduced | Reduced |
| Biological Resources | LTS + M, LCC | Reduced | Similar | Similar |
| Cultural Resources | LTS + M, LCC | Reduced | Similar | Similar |
| Greenhouse Gases and Climate Change | LCC | Reduced | Reduced | Reduced |
| Geology and Soils | LTS + M, LCC | Reduced | Similar | Similar |
| Hazards and Hazardous Materials | LTS + M, LCC | Reduced | Similar | Similar |
| Hydrology and Water Quality | LTS + M, LCC | Reduced | Similar | Similar |
| Land Use | LTS, LCC | Similar | Similar | Similar |
| Noise | CC + SU | Reduced | Similar | Reduced |
| Population and Housing | LST, LCC | Reduced | Reduced | Reduced |
| Public Services and Utilities | LTS + M, LCC | Reduced | Reduced | Reduced |
| Traffic and Circulation | LTS + M, CC + SU | Reduced | Reduced | Reduced |

*Notes: Significance is identified by the following: LTS = less than significant, LTS +M = less than significant with mitigation, SU = significant and unavoidable, LCC = less than cumulatively considerable, CC = cumulatively considerable*

Based on the evaluation in this section, Alternative 1, the No Project Alternative, is considered to be the environmentally superior alternative. Alternative 1 would have fewer adverse environmental impacts than the proposed project and was determined to have the fewest negative impacts on the physical environment. However, Alternative 1 would not meet any of the commercial objectives of the proposed project.

Under CEQA Guidelines Section 15126.6(e)(2), if the environmentally superior alternative is the no project alternative, another environmentally superior alternative must be identified. According

to the analysis above, Alternative 3, Reduced Project Development, would have fewer environmental impacts when compared with the proposed project and still meet the majority of the project's objectives.

## REFERENCES

Delano, City of. 2014. *Water Supply Assessment YK America Project (Vineyard at Delano & Delano West Pavilion).*

USGBC (U.S. Green Building Council). 2008. *Building Area per Employee by Business Type*. Accessed August 14, 2014. http://www.usgbc.org/Docs/Archive/General/Docs4111.pdf.

# 6.0 Other Sections Required by CEQA

This section discusses significant unavoidable impacts, growth-inducing impacts, and significant irreversible environmental changes. The purpose of this Draft Environmental Impact Report (Draft EIR) is to satisfy California Environmental Quality Act (CEQA) requirements by addressing the environmental effects specific to the implementation of the proposed project.

## 6.1 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL EFFECTS

CEQA Guidelines Section 15126.2(b) requires an EIR to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. Section 15093(a) of the CEQA Guidelines allows the decision-making agency to determine whether the benefits of a proposed project outweigh the unavoidable adverse environmental impacts of implementing the project. The City can approve a project with unavoidable adverse impacts if it prepares a Statement of Overriding Considerations setting forth the specific reasons for making such a judgment.

The following impacts of the proposed project have been recognized as significant and unavoidable at the project level or in the cumulative context and are specifically identified in Sections 4.1 through 4.14 of this Draft EIR. The reader is referred to the specific environmental issue area for further details and analysis of these significant and unavoidable impacts.

**Impact 4.3.3** Project-generated operational emissions would exceed applicable significance thresholds. This is considered a significant and unavoidable impact.

**Impact 4.3.8** The proposed project in combination with growth throughout the air basin will exacerbate existing regional problems with ozone and particulate matter. This is a cumulatively considerable and significant and unavoidable impact

**Impact 4.11.4** Operation of the proposed project would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in the project vicinity during both weekday and Saturdays days. Because no feasible mitigation is available to reduce this impact to a less-than-significant level, this impact would be considered significant and unavoidable.

**Impact 4.11.6** Long-term operation of the proposed project would result in a substantial contribution to cumulative noise levels. Because no feasible mitigation is available to reduce this impact to a less-than-significant level, this impact would be considered cumulatively considerable and significant and unavoidable.

**Impact 4.14.1** The proposed project would result in significant increases in level of service at the study intersections. This increase would result in a significant and unavailable impact for the Woollomes Avenue/SR 99 northbound ramps.

**Impact 4.14.6** The proposed project, in combination with past, present, and reasonably foreseeable future development considered in the General Plan, as well as proposed and pending projects would exceed the capacity of the City's roadway network or to exceed LOS standard. The project would result in

cumulatively considerable and significant and unavoidable impacts to the intersections of: Garces Highway/Dover Place; 1st Avenue/Dover Place; Woollomes Avenue/Dover Parkway; and Woollomes Avenue/SR 99 southbound ramps, Additionally, the project cumulatively considerable and significant and unavoidable impacts to the roadway segments of: Woollomes Avenue, Grapevine Driveway to Dover Parkway; Woollomes Avenue, Dover Parkway to Home Depot Driveway East; Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps; and Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps.

## 6.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Sections 21100(b)(2) and 21100.1(a) require that EIRs prepared for the adoption of a plan, policy, or ordinance of a public agency must include a discussion of significant irreversible environmental changes of project implementation. In addition, CEQA Guidelines Section 16126.2(c) describes irreversible environmental changes as:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

Long-term irreversible environmental changes would include the conversion of undeveloped agricultural land to residential uses, a change in the land use and visual character of the site, an increase in local and regional traffic and associated air pollutant emissions and noise level increases, an increase in the volumes of solid waste and wastewater generated in the area, and an increase in water consumption.

Development of the project site would irretrievably commit building materials and energy to the construction and maintenance of buildings and infrastructure proposed. Nonrenewable and limited resources that would likely be consumed as part of project site development would include, but are not limited to, oil, natural gas, gasoline, lumber, sand and gravel, asphalt, water, steel, and similar materials. In addition, the project site would result in an increased demand on public services and utilities (see Section 4.13, Public Services and Utilities).

## 6.3 GROWTH INDUCING IMPACTS

### INTRODUCTION

CEQA Guidelines Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined by the CEQA Guidelines as:

> *The way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove*

> *obstacles to population growth. It is not assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. For example, direct growth inducement potential would result if a project involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities or if it involved a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand (*Napa Citizens for Honest Government v. Napa County Board of Supervisors*). Similarly, a project would indirectly induce growth if it removed an obstacle to additional growth and development, such as removing a constraint on a required public service. For example, a project providing an increased water supply in an area where water service historically limited growth could be considered growth-inducing.

CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with, or accommodated by, the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service.

### COMPONENTS OF GROWTH

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and nonresidential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type, and intensity of growth, it is the primary means of regulating development and growth in California.

### GROWTH EFFECTS OF THE PROJECT

As required by Government Code Section 65300, the General Plan is intended to serve as the overall plan for the physical development of the City of Delano. While the General Plan does not specifically propose any development projects, it does regulate the location and land use type of future development and thus controls future population and economic growth of the city that would result in indirect growth-inducing effects.

The project site is located in an area identified for commercial and residential uses in the Delano General Plan and as such, development of the project site was previously considered as part of the environmental documentation for the General Plan. Therefore the General Plan considered

and accounted for the growth effects for the site. Development of the proposed project would extend water, wastewater and stormwater infrastructure to the site. However, much of this infrastructure already exists in the surrounding roadways to serve adjacent uses. Much of the project site is surrounded by existing urban uses such as the commercial/retail projects to the east, the undeveloped residential projects to the north, the Delano Soccer park to the south and the city's and county's stormwater detention basins to the west. The only area that is not already developed is located to the west of the Vineyards site. This area currently consists of 158 acres of agricultural land that are under Williamson Act contract which limits the potential for urban growth at least for a period of time. These 158 acres consist of three parcels (APNs: 520-150-061, 520-150-079, and 250-150-095) and are outside of Delano city limits and under the jurisdiction of Kern County.

In order to terminate a Williamson Act contract, a landowner must file a notice of nonrenewal. Starting at the next contract anniversary date, the contract winds down over the remaining (usually nine-year) term, with the property taxes gradually rising to the full unrestricted rate at the end of the nonrenewal period. If the land is restricted by a Farmland Security Zone Contract, the contract winds down over the remaining 19 years, with the property taxes gradually rising to the full unrestricted rate at the end of the nonrenewal period. An immediate Williamson Act contract cancellation is an option under limited circumstances and conditions however, this process is very costly to the landowner. Landowners may petition a City Council or Board of Supervisors for Williamson Act contract cancellation. The board/council may grant tentative cancellation only if it makes required statutory findings. If the required findings are met, the landowner is required to pay a cancellation fee equal to 12.5 percent of the cancellation valuation (unrestricted fair market value) of the property. In some cases, the contract specifies a higher cancellation fee and if the land is restricted by a Farmland Security Zone Contract, the cancellation fee is 25 percent. Any potential removal of Williamson Act contacts on these adjacent lands would be controlled to a certain extant because of the period of time or cost of opting out of this program. Furthermore, this land is zoned for agricultural uses currently by Kern County. Changing of this zoning would be subject to the Kern County regulations, as well as approval by the Kern County Board of Supervisors.

If, at some point, land under Williamson Act contract is annexed by the City, this land is subject to the requirements established in Chapter 15.04 Agricultural Preserve Procedures of the Delano Municipal Code. This Chapter identifies the requirements of termination of contacts including the approval of the termination by the City Council.

### Population Growth

Implementation of the proposed project would create jobs that currently do not exist within the project site. The new jobs created by the project would likely include non-technical retail sales jobs. Thus, it is unlikely that the jobs created by the project would require personnel outside the community. Moreover, the unemployment rate of 26.8 percent currently experienced by the city is the highest in the state and is such that the city could easily absorb the retail, restaurant, and office jobs generated from the project. Furthermore, the proposed project would create short-term employment related to design and construction. If workers were to move into the area to fill these positions, additional housing, public services, and utilities would be required to accommodate the new residents and environmental effects would result. However, given the high unemployment rate in the city (26.8 percent), it can be assumed that these positions would

likely be filled by local workers, resulting in a positive effect on the local economy and no additional environmental effects. (See Section 4.12, Population and Housing.)

Implementation of the proposed project would create housing for approximately 1,775 persons. Given the city's current (2014) population of approximately 52,591, this would represent a 6.8 percent increase in the city's population to approximately 56,174. This increase would be within the year 2020 population forecast of 68,000 cited in the City General Plan 2012 Housing Element. Similarly, this increase would be within the year 2020 population forecast (60,100) estimated by Kern COG, as well as the year 2030 population forecast (68,100) estimated by Kern COG. (See Section 4.12, Population and Housing)

### ENVIRONMENTAL EFFECTS OF GROWTH

The proposed project would result in increased population and employment in Delano. This would, in turn, result in increased traffic, air pollutant emissions, operational and traffic noise, increased demand for services, and loss of agricultural lands. Environmental effects of developing the project site include potential effects on special-status species and their habitat, potential destruction or damage to cultural resources, increased erosion and runoff affecting soil stability and water quality, changes to drainage patterns and runoff, potential land use conflicts, increased light and glare, changes to visual character, and loss of agricultural resources. However, these issues are discussed throughout this Draft EIR in Sections 4.1 through 4.14. Mitigation is provided when needed. In addition, development of the project site has already been considered in the General Plan, and the proposed project would not result in any major new impacts associated with growth inducement.

## 6.4 ENERGY CONSERVATION

### INTRODUCTION

Public Resources Code Section 21100(b)(3) and CEQA Guidelines Section 15126.4 require EIRs to describe, where relevant, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. In 1975, largely in response to the oil crisis of the 1970s, the State Legislature adopted Assembly Bill (AB) 1575, which created the California Energy Commission (CEC). The statutory mission of the CEC is to forecast future energy needs, license thermal power plants of 50 megawatts or larger, develop energy technologies and renewable energy resources, plan for and direct State responses to energy emergencies, and—perhaps most importantly—promote energy efficiency through the adoption and enforcement of appliance and building energy efficiency standards. AB 1575 also amended Public Resources Code Section 21100(b)(3) to require EIRs to consider the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Thereafter, the State Resources Agency created Appendix F of the CEQA Guidelines.

CEQA Guidelines Appendix F is an advisory document that assists EIR preparers in determining whether a project will result in the inefficient, wasteful, and unnecessary consumption of energy. For the reasons set forth below, this EIR concludes that the proposed project would not result in the wasteful, inefficient, and unnecessary consumption of energy and therefore would not create a significant impact on energy resources.

## BACKGROUND

Energy usage is typically quantified using the British thermal unit (BTU). As a point of reference, the approximate amounts of energy contained in common energy sources are as follows:

| Energy Source | BTUs |
|---|---|
| Gasoline | 124,000 per gallon |
| Diesel Fuel | 139,000 per gallon |
| Natural Gas (compressed gas) | 1,000 per cubic foot |
| Electricity | 3,414 per kilowatt-hour |

*Sources: USDOE 2013*

Given the nature of the proposed project, the following discussion focuses on the three sources of energy that are most relevant to the project—electricity and natural gas for the proposed facility, and transportation fuel for vehicle trips associated with the project.

Total energy usage in California was 7,858 trillion BTUs in 2011, which equates to an average of 209 million BTUs per capita. Of California's total energy usage, the breakdown by sector is 38.3 percent transportation, 22.8 percent industrial, 19.6 percent commercial, and 19.3 percent residential (the 19.6 percent value of commercial combined with the 19.3 percent value of residential equals 3,056 trillion BTUs). Electricity and natural gas in California are generally consumed by stationary users such as residences and commercial and industrial facilities, whereas petroleum consumption is generally accounted for by transportation-related energy use (EIA 2014). In 2013, taxable gasoline sales (including aviation gasoline) in California accounted for 14,532,944,431 gallons of gasoline (BOE 2014).

### Current Energy Use

The project site is undeveloped. Therefore, current energy use on the project site can be assumed to be zero.

## APPLICABLE REGULATIONS

Federal and state agencies regulate energy use and consumption through various means and programs. At the federal level, the US Department of Transportation, the US Department of Energy, and the US Environmental Protection Agency (EPA) are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence and regulate transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy-related research and development projects, and through funding for transportation infrastructure improvements. At the state level, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are two agencies with authority over different aspects of energy. The CPUC regulates privately owned utilities in the energy, rail, telecommunications, and water fields. The CEC collects and analyzes energy-related data, prepares statewide energy policy recommendations and plans, promotes and funds energy efficiency programs, and adopts and enforces appliance and building energy efficiency standards. California is exempt under federal

law from setting State fuel economy standards for new on-road motor vehicles. Some of the more relevant State energy-related laws and plans are discussed below.

### STATE

#### California Building Energy Efficiency Standards

The California Green Building Standards Code, CALGreen, was adopted as part of the California Building Standards Code (California Code of Regulations, Title 24, Part 11) and became effective January 1, 2011. Part 11 establishes voluntary standards on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

The California Energy Commission recently adopted changes to the 2013 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 11 (collectively referred to here as the standards). The 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction. The standards offer builders better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

#### California Environmental Quality Act Guidelines

CEQA Guidelines Appendix F, Energy Conservation, requires consideration of project impacts on energy and focuses particularly on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (Public Resources Code Section 21100[b][3]). The potentially significant energy implications of a project must be considered in an EIR to the extent relevant and applicable to the project.

### PROJECT ENERGY CONSUMPTION AND CONSERVATION

Construction activities would involve heavy equipment use that would consume fossil fuel for site preparation (e.g., grading, trenching) and electricity as a temporary power source for electric-powered machinery and tools. Although construction activities would be intermittent, they would use energy in ways that could be considered wasteful or inefficient if measures are not in place to reduce energy demand. Occupancy of the new housing units and new commercial buildings would consume energy in the form of fossil fuels, as would vehicles used by project occupants and visitors, administrative and maintenance staff (if on-site), and customers and workers.

As described previously, the proposed project would introduce energy usage on a site that is currently undeveloped and thus uses no energy. The project would consume energy in both the short term during project construction and in the long term during project operation. The analysis of electricity/natural gas usage is based on California Emissions Estimator Model (CalEEMod) air quality and greenhouse gas emissions modeling, which quantifies energy use for construction and occupancy with and without mitigation (CalEEMod construction outputs are coupled with conversion ratios obtained from the California Climate Action Registry (2009). The results of CalEEMod modeling are included in **Appendix 4.3-A** of this Draft EIR. Modeling was based primarily on the default settings in the computer program for Kern County. The amount of fuel use was estimated using the California Air Resources Board's EMFAC2011 computer program,

which also provides assumptions for typical daily fuel usage in Kern County. This impact discussion assumes full growth potential of the project in order to present the maximum energy use.

### Construction Phase

Construction activities would require the use of gasoline, diesel fuel, and other fuels. Energy use during construction typically involves the use of motor vehicles both for transportation of workers and equipment and for direct construction actions such as the use of cranes or lifts. Additional energy would be used for power tools and equipment used on-site, including but not limited to gas generators, air compressors, air handlers and filters, and other typical direct construction energy uses.

Using ratios provided in the Climate Action Registry (2009) General Reporting Protocol Version 3.1, construction associated with the proposed project would require approximately 684,335 gallons of diesel fuel (see **Appendix 6.0-1** for data outputs). This usage would constitute approximately 0.0047 percent (684,335 gallons for project/14,532,944,431 gallons for state = 0.0047 percent) of typical annual fuel usage in the state as reported by the State Board of Equalization and California Energy Commission.

The demand for fuel and other energy resources would not result in the need for new or altered facilities given the temporary nature of construction. Furthermore, construction activities are not anticipated to result in an inefficient use of energy, as construction contractors would purchase their own gasoline and diesel fuel from local suppliers and would conserve the use of their supplies to minimize costs to the individual project. For these reasons and because of the temporary nature of construction activities, this would be less than significant impact.

### Operational Phase

Each residential unit constructed under the proposed project would consume energy. In addition, traffic generated by new development would also consume energy.

*Energy Consumption*

Energy consumption associated with occupancy of all the potential residential units and commercial square footage is summarized in **Table 6.0-1**.

**TABLE 6.0-1**
**PROJECT ENERGY CONSUMPTION FROM PROPOSED RESIDENTIAL UNITS & COMMERCIAL SQUARE FOOTAGE**

| Source | Kilowatt Hours Annually | kBTU Annually | BTU Equivalent Annually |
|---|---|---|---|
| Vineyard at Delano & West Pavilion | 7,233,040 | 14,623,400 | 39,316,998,560 |

*Source: CalEEMod version 2013.2.2. See **Appendix 4.3-A** for emission model outputs.*

The project would be required to comply with Title 24 Building Energy Efficiency Standards, which provide minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building insulation and roofing, and lighting. Implementation of the Title 24 standards significantly reduces energy usage, and it is generally

assumed that compliance with Title 24 ensures projects will not result in the inefficient, wasteful, or unnecessary consumption of energy. Furthermore, the electricity provider for Delano, Southern California Edison (SCE), is subject to California's Renewables Portfolio Standard (RPS). The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. Renewable energy is generally defined as energy that comes from resources that are naturally replenished within a human timescale such as sunlight, wind, tides, waves and geothermal heat. The increase in reliance of such energy resources further ensures projects will not result in the waste of the finite energy resources.

*Vehicle Trips Fuel Consumption*

According to the traffic analysis prepared for the project (Arch Beach Consulting 2014), the proposed project would generate 23,370 average daily weekday trips and 29,116 average daily weekend trips. These additional daily traffic trips in Kern County would result in the consumption of 9,550 gallons of automotive fuel and 420 gallons of diesel fuel daily (see **Appendix 6.0-1**). Per EMFAC2011, it is expected that throughout all of Kern County, 1,509,960 gallons of automotive fuel and 66,330 gallons of diesel fuel will be consumed daily in 2025, the year of anticipated project buildout. Therefore, the increase of fuel usage generated by the proposed project would constitute approximately 0.6 percent (9,970 gallons of automotive and diesel fuel for project/1,576,290 gallons of automotive and diesel fuel for county = 0.6 percent) of typical daily fuel usage in the county, which is not considered substantial. Further, the project would provide a commercial retail shopping center in close proximity to an existing highway, near other commercial services and residential areas which would minimize vehicle travel distances and thus fuel consumption. The project would also provide goods and services at a local site, thereby reducing the number of vehicles trips currently being made to shop for the same goods and services in neighboring cities.

For the reasons described above, the proposed project would not place a substantial demand on regional energy supply or require significant additional capacity, or significantly increase peak and base period electricity demand, or cause wasteful, inefficient, and unnecessary consumption of energy during project construction, operation, and/or maintenance, or preempt future energy development or future energy conservation.

## REFERENCES

Arch Beach Consulting. 2014. *Traffic Impact Study, Vineyard at Delano and Delano West Pavilion Projects.*

BOE (California Board of Equalization). 2014. Net Taxable Gasoline Sales. http://www.boe.ca.gov_Net Gasoline Sales.pdf.

California Climate Action Registry. 2009. *California Climate Action Registry General Reporting Protocol Version 3.1.*

EIA (US Energy Information Administration). 2014. *California State Profile and Energy Estimates*. Accessed November 2014. http://www.eia.gov/state/?sid=CA#tabs-1.

USDOE (US Department of Energy, Alternative Fuels Data Center). 2013. *Alternative Fuels Data Center – Fuel Properties Comparison*. Accessed November 2014. http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf.

# 7.0 REPORT PREPARERS

## 7.1 REPORT PREPARERS

### CITY OF DELANO

Jerome Keene, Interim Planning Director

Roman Dowling, Engineering/Public Works Director

### MICHAEL BAKER INTERNATIONAL, INC.

Bob Stark, AICP, Project Manager

Mike Martin, Assistant Project Manager

Seth Myers, Air Quality/Greenhouse Gas Emissions Specialist

Julian Capata, Noise Analyst

Joyce Hunting, Biological Resources Manager

Summer Pardo, Associate Biologist

### ARCH BEACH CONSULTING

Dennis Pascua, Principal Transportation Planner

### ECORP CONSULTING

Arleen Garcia-Herbst, Senior Archaeologist

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# DRAFT ENVIRONMENTAL IMPACT REPORT
# APPENDICES

FOR THE

# VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

SCH# 2014091039

*PREPARED FOR:*

**CITY OF DELANO**
1015 11th Avenue
Delano, CA 93216

*PREPARED BY:*

Michael Baker INTERNATIONAL
6020 CORNERSTONE COURT WEST, SUITE 260
SAN DIEGO, CA 92121

**AUGUST 2015**

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CITY HALL
1015 ELEVENTH AVENUE
POST OFFICE BOX 3010

DELANO, CALIFORNIA 93216-3010

(661) 721-3300
(661) 721-3317 TDD
www.cityofdelano.org

COUNCIL MEMBERS
Grace Vallejo
MAYOR
Rueben Pascual
MAYOR PRO TEM

Liz Morris
Ricardo Chavez
Joe Aguirre Jr.

CITY MANAGER
Maribel Reyna

# NOTICE OF PREPARATION
# ENVIRONMENTAL IMPACT REPORT

**TO:** **State Agencies**
**Responsible Agencies**
**Local and Public Agencies**
**Trustee Agencies**
**Interested Parties**

**From: City of Delano**
**Planning Department**
**1015 11th Avenue**
**Delano, CA 93216**

**SUBJECT:** **Notice of Preparation - City of Delano "Vineyard at Delano and Delano West Pavilion Projects" Environmental Impact Report Pursuant to the Requirements of the California Environmental Quality Act (CEQA).**

The City of Delano will be the Lead Agency and will prepare an environmental impact report (EIR) for the project described on the attached pages. At this time we are requesting comments and views of your agency as to the scope and content of the environmental information germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may need to use the EIR when considering a permit or other approval for the project.

The project description, location, and the probable/potential environmental effects described on the attached pages are for informational purposes only.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but no later than **October 17, 2014.** Additionally, a public scoping meeting to gather input on the scope and content of the EIR will be held **October 8, 2014** from 2:00 PM to 4:00 PM at Delano City Hall Council Chambers located at 1015 Eleventh Avenue, Delano, CA 93216. All are welcome to attend and participate.

**Where to respond**: Please send your response/ comments to Jerome Keene, Interim Community Development Director, City of Delano, at the address shown above. Please include the name of a contact person at your agency.

**Project Title:** Vineyard at Delano and Delano West Pavilion Projects

**Project Applicant:** Grapevine Villa, LLC, El Monte, California

**Date:** September 12, 2014 **Signature:** _____

Jerome Keene
Interim Community Development Director
Telephone: (661) 720-2236
Fax: (661) 721-3298
Email: cddadmin@CityofDelano.org

**(Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375)**

# NOTICE OF PREPARATION
# ENVIRONMENTAL IMPACT REPORT

## VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

## I. PROJECT LOCATION AND DESCRIPTION

The City of Delano "Vineyard at Delano and Delano West Pavilion Projects" consists of two separate projects to be phased over an estimated 10 year period. The projects to be analyzed in the EIR include the Vineyard at Delano residential project and the Delano West Pavilion residential, commercial, and office project. The project sites are located adjacent to each other on Stradley Avenue/Albany Street and Woollomes Avenue. State Route 99 is located approximately 0.5 miles east of the sites.

Together, the project sites total approximately 110 acres and include parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future. The project includes pre-zoning of this parcel for community retail and residential uses.

### *VINEYARD AT DELANO*

The Vineyard at Delano project site is 33 acres in size and is currently fallow land. This land was used for agricultural purposes in the past, however it is no longer used for that purpose and is in a fallow undeveloped state. The Vineyard at Delano project includes 432 multi-family low-rise apartment units (one- and two-story). Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center. **Table 1** identifies the phasing and unit count for the Vineyard at Delano Project.

**TABLE 1**
**Vineyard at Delano Project**

| Phase | Number of Buildings | Residential Units | | |
|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR |
| I | 9 | 108 | 24 | 84 |
| II | 9 | 108 | 20 | 88 |
| III | 9 | 108 | 20 | 88 |
| IV | 9 | 108 | 20 | 88 |
| **Project Totals** | **36** | **432** | **84** | **348** |

### *DELANO WEST PAVILION*

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past, however it is no longer used for that purpose and is in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of retail and restaurant space as shown in **Table 2**. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

**TABLE 2**
**Delano West Pavilion Project**

| Phase | Number of Buildings | Residential Units | | | Commercial (Sq. Ft.) |
|---|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR | |
| I | 24 | 220 | 48 | 172 | - |
| II | 23 | 220 | 44 | 176 | - |
| III | 12 | - | - | - | 170,000 |
| IV | 9 | - | - | - | 170,000 |
| **Project Totals** | **68** | **440** | **92** | **348** | **340,000** |

## II. POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROJECT

The City of Delano has not prepared an Initial Study for this project and intends for the EIR to address the full spectrum of environmental issues listed in the CEQA Guidelines (Apprendix G Environmental Checklist), which include the following:

- Aesthetics
- Agricultural and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities and Service Systems

All are invited to comment on the scope of any of the potential environmental impact areas. Should additional issues arise in response to this notice, the scope of the Draft EIR would be expanded, as necessary, to accommodate all areas of potential environmental effect. The Draft EIR will also analyze a reasonable range of project alternatives, per CEQA Guidelines Section 15126.6.

### REQUESTS FOR ADDITIONAL INFORMATION

If you need additional information about the Vineyard at Delano and Delano West Pavilion Projects, please contact:

Jerome Keene
Interim Community Development Director
Telephone: (661) 720-2236
Fax: (661) 721-3298
Email: cddadmin@CityofDelano.org

**Attachments:** Figure 1 – Location Map
Figure 2 – Site Plan

T:_GIS\Kern_County\Mxds\Delano\Vineyard & West Pavilion\Fig 1 Project Location B&W.mxd (9/3/2014)

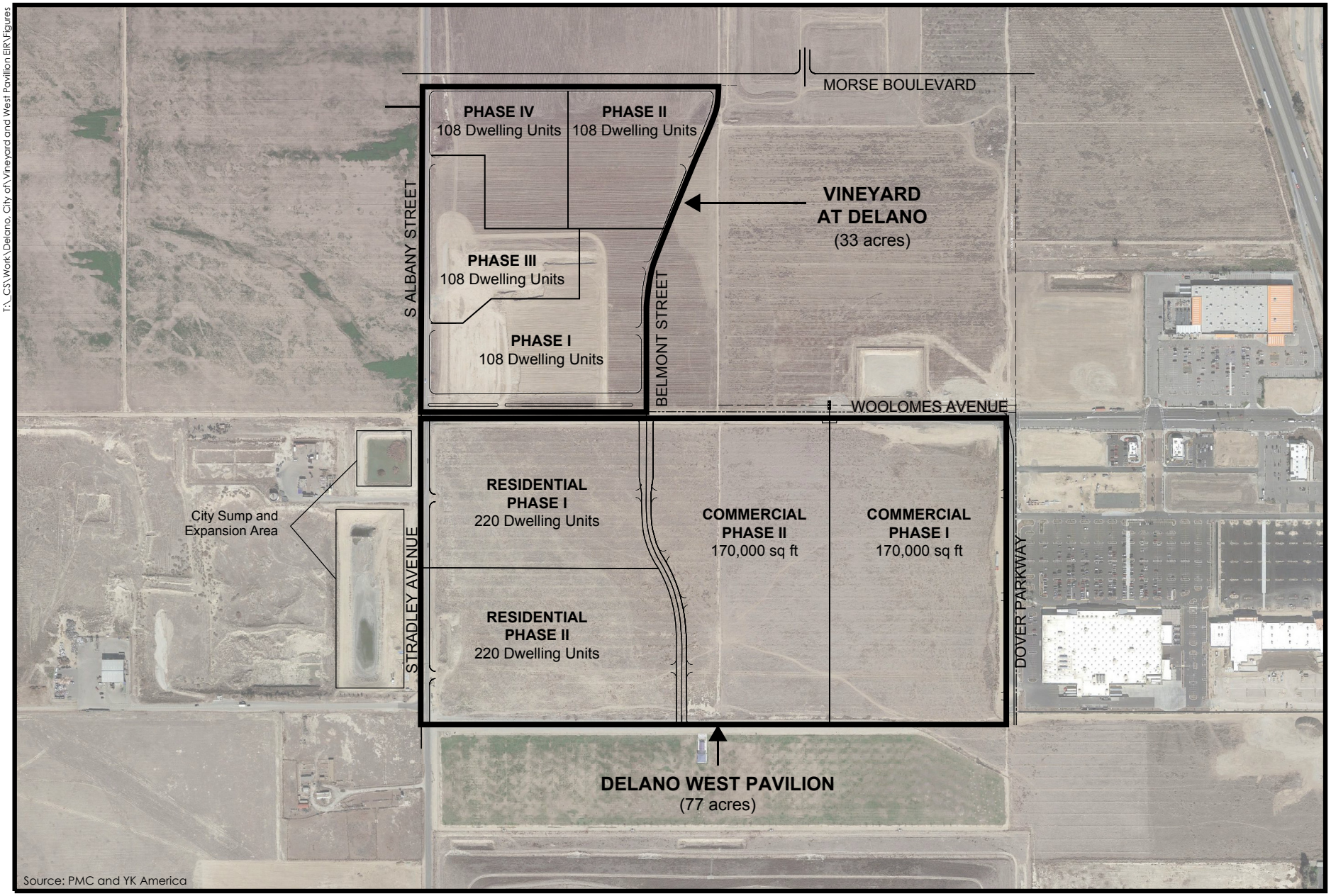
Source: Kern County (2014); ESRI.

N

0 1,000 2,000
FEET

**Figure 1**
Project Location

PMC®




T:_CS\Work\Delano, City of\Vineyard and West Pavillion EIR\Figures

Not to Scale

N

**Figure 2**
Site Plan

PMC®

**From:** Frary, Dayne@DOC [mailto:Dayne.Frary@conservation.ca.gov]
**Sent:** Monday, September 29, 2014 4:55 PM
**To:** cddadmin@cityofdelano.org
**Subject:** Vineyard-Delano West Pavilion Projects

Mr. Keene: The proposed projects are situated in the SW/4 of Section 14 and the NW/4 of Section 23 in T25S, R25E. The sites are not located within the boundaries of any oil field, and no wells are known to have been drilled within the boundaries of either proposed project. The Division of Oil, Gas, and Geothermal Resources has no further comments.

Respectfully,

**Dayne L. Frary, P. G.**

Associate Oil & Gas Engineer

CEQA, Construction Site Review, and Transfers

California DOGGR, Bakersfield Office

(661) 334-4601 Direct Line

STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

Edmond G. Brown, Jr., *Governor*

September 25, 2014

Jerome Keene
City of Delano
1015 Eleventh Avenue
Delano, CA 93216-0939

RE: SCH# 2014091039 Vineyard at Delano and Delano West Pavilion Projects, Kern County.

Dear Mr. Keene,

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5-minute quadrangle name, township, range, and section required**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) Guidelines §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered cultural items that are not burial associated, which are addressed in Public Resources Code (PRC) §5097.98, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, PRC §5097.98, and CEQA Guidelines §15064.5(e), address the process to be followed in the event of an accidental discovery of any human remains and associated grave goods in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

CC: State Clearinghouse

RECEIVED
SEP 29 2014
By

**Native American Contacts**
**Kern County**
**September 25, 2014**

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589 Yokuts
Porterville , CA 93258
chairman@tulerivertribe-nsn.gov
(559) 781-4271
(559) 781-4610 Fax

Tule River Indian Tribe
Kerri Vera, Environmental Department
P.O. Box 589 Yokuts
Porterville , CA 93258
(559) 783-8892
(559) 783-8932 Fax

Kern Valley Indian Council
Julie Turner, Secretary
P.O. Box 1010 Southern Paiute
Lake Isabella, CA 93240 Kawaiisu
(661) 366-0497 Tubatulabal
(661) 340-0032 Cell Koso
Yokuts

Tule River Indian Tribe
Joey Garfield, Tribal Archeological
P.O. Box 589 Yokuts
Porterville , CA 93258
(559) 783-8892
(559) 783-8932 Fax

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct. Foothill Yokuts
Salinas , CA 93906 Mono
kwood8934@aol.com Wuksache
(831) 443-9702

Kern Valley Indian Council
Robert Robinson, Co-Chairperson
P.O. Box 401 Tubatulabal
Weldon , CA 93283 Kawaiisu
brobinson@iwvisp.com Koso
(760) 378-4575 Home Yokuts
(760) 549-2131 Work

**This list is current only as of the date of this document.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code**

**This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH # 2014091039 Vineyard at Delano and Delano West Pavilion Projects, Kern County.**

**DEPARTMENT OF TRANSPORTATION**
1352 WEST OLIVE AVENUE
P.O. BOX 12616
FRESNO, CA 93778-2616
PHONE (559) 488-4325
FAX (559) 445-5875
TTY 711
www.dot.ca.gov

*Serious drought.*
*Help save water!*

October 17, 2014

2135-IGR/CEQA
06-KER 99-54.48
NOP DEIR
Vineyard at Delano &
Delano West Pavilion

Mr. Jerome Keene, Interim Community Development Director
Community Development Department
City of Delano
1005 11th Avenue
P. O. Box 3010
Delano, CA 93215

Dear Mr. Keene:

Thank you for the opportunity to review a Notice of Preparation for a Draft Environmental Impact Report (DEIR) analyzing two separate projects to be phased over 10 years. The Vineyard at Delano project proposes constructing 432 multi-family low-rise apartment units with amenities including a swimming pool, community athletic field, community building and leasing center on a 33-acre site that is currently fallow and undeveloped agricultural land. The Delano West Pavilion project proposes 440 multi-family low-rise apartment units with amenities similar to the Vineyard at Delano project, in addition to approximately 340,000 square feet of retail and restaurant space on a 77-acre site, also currently fallow and undeveloped agricultural land. The project sites are respectively located on the north and south sides of Woollomes Avenue, approximately 0.5 miles west of the State Route (SR) 99/Woollomes Avenue interchange. Caltrans has the following comment:

- Based on the information as submitted in the Notice of Preparation, this project could have significant impacts to the SR 99/Woollomes Avenue Interchange. A Traffic Impact Study (TIS) is needed to assess the project-related impacts to the State Highway system and appropriate mitigation measures. Please have the preparer of the traffic study reference the Caltrans Guide for the Preparation of Traffic Impact Studies, dated December 2002, and send the scope of the TIS to Caltrans before the traffic study is conducted. The Caltrans Guide, while advisory, contains Best Practices and gives insight into Caltrans' expectations when reviewing a traffic study. If the traffic consultant has any issues or concerns regarding the use of the Guide or its interpretation, please contact us so resolution can be reached.

If you have any questions, please contact me at (559) 488-4325.

Sincerely,

ALEC KIMMEL, Transportation Planner
Planning South Branch

1State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, CA 93710
(559) 243-4005
www.wildlife.ca.gov

*EDMUND G. BROWN JR., Governor*
*CHARLTON H. BONHAM, Director*

October 14, 2014

Jerome Keene, Interim Community Development Director
City of Delano
1015 Eleventh Avenue
Delano, California 93216-0939

**SUBJECT: NOTICE OF PREPARATION FOR AN ENVIRONMENTAL IMPACT REPORT VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS SCH# 2014091039**

Dear Mr. Keene:

The California Department of Fish and Wildlife (Department) has reviewed the Notice of Preparation (NOP) for the Vineyard at Delano and Delano West Pavilion Projects (collectively, Project) submitted by the City of Delano (City). The Project consists of two separate projects to be phased over an estimated 10-year period. Together, the project sites total approximately 110 acres and include parcels both within the City of Delano and outside of the southwest boundary of the city in an unincorporated area of Kern County that is intended for annexation into the City of Delano in the near future. The Project includes pre-zoning of this parcel for community retail and residential uses, including the development of 872 medium density residential units and 340,000 square feet of commercial uses. The Project sites are located adjacent to each other on Stradley Avenue/Albany Street and Woollomes Avenue approximately 0.5 miles west of State Route 99.

The Department recognizes that the Lead Agency has determined that implementation of the proposed Project may result in significant impacts to the environment and impacts will be further analyzed in the Environmental Impact Report (EIR) prepared for the Project. This letter is to provide early guidance to assist the City, the Project sponsors, and the Project biologists regarding Department concerns and recommended Project avoidance, minimization, and mitigation measures to be included in the EIR.

The Department has concerns regarding the potential for the Project to impact special status species known to occur in the Project area including, but not limited to, nesting birds; the State threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*); the State threatened Swainson's hawk (*Buteo swainsoni*); and the State Species of Special Concern burrowing owl (*Athene cunicularia*). All these species are known to occur on the Project site or in close proximity to the Project site.

The Project site has appropriate habitat for nesting, denning, or foraging opportunities for the above species; therefore, the Department recommends a reconnaissance-level assessment of the Project site, before EIR circulation, conducted by a qualified wildlife biologist. In the event that burrows, dens, and/or vegetation that could support special-status species are present within or immediately adjacent to the Project site, focused biological surveys conducted by a

qualified biologist is advised during the appropriate survey period(s) and prior to Project approval by the City to determine if these species are present and if they could be impacted by the proposed Project. Survey results can then be used to identify any mitigation, minimization, and avoidance measures to be included in the EIR prepared for this Project and any potential permitting needs. We recommend that our suggested avoidance and minimization measures be included in the EIR as enforceable mitigation measures as appropriate.

The Department has reviewed the Notice of Preparation for an Environmental Impact Report and has the following comments.

**Department Jurisdiction**

**Trustee Agency Authority:** The Department is a Trustee Agency with responsibility under California Environmental Quality Act (CEQA) for commenting on projects that could impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, the Department is responsible for providing, as available, biological expertise to review and comment upon environmental documents and impacts arising from project activities, as those terms are used under CEQA (Division 13 [commencing with Section 21000] of the Public Resources Code).

**Responsible Agency Authority:** The Department has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered, pursuant to Fish and Game Code Section 2081. If the Project could result in the take of any species listed as threatened or endangered under the California Endangered Species Act (CESA), the Department may need to issue an Incidental Take Permit (ITP) for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (sections 21001{c}, 21083, Guidelines sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports Statement of Overriding Consideration (SOC). The CEQA Lead Agency's SOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2080. The Project has the potential to reduce the number or restrict the range of endangered, rare, or threatened species (as defined in Section 15380 of CEQA).

**Bird Protection:** The Department has jurisdiction over actions which may result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Fish and Game Code sections that protect birds, their eggs, and nests include sections 3503 (regarding unlawful take, possession, or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession, or destruction of any birds-of-prey or their nests or eggs) and 3513 (regarding unlawful take or possession of any migratory nongame bird).

**Potential Project Impacts and Recommendations**

**San Joaquin Kit Fox (SJKF):** SJKF has the potential to occur on the Project site. SJKF population sizes are known to fluctuate over time, and absence in any one year does not necessarily indicate species absence. In addition to shrub and grassland habitat features, SJKF are known to den in right of ways, vacant lots, parks, landscaped areas, golf courses, etc., particularly in Kern County, and SJKF may be attracted to the Project site due to the creation of

loose and friable soils as a result of ground disturbance (e.g. residential and community retail development). The Department recommends that the United States Fish and Wildlife Service (USFWS) "*Standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance*" (2011) be followed prior to and during any ground-disturbing activities occurring within the Project area. In the event that this species is detected during surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid take (as defined under Section 86 of the Fish and Game Code), or if avoidance is not feasible, to acquire a State ITP prior to any ground-disturbing activities to comply with CESA.

**Swainson's Hawk (SWHA):** SWHA has the potential to forage on the Project site. To evaluate potential Project-related impacts, the Department recommends that a qualified wildlife biologist conduct surveys for nesting raptors following the survey methodology developed by the Swainson's Hawk Technical Advisory Committee (SWHA TAC, 2000) prior to EIR circulation and again prior to any ground disturbance.

These surveys, the parameters of which were designed to optimize detectability, must be conducted to reasonably assure the Department that take of this species will not occur as a result of disturbance associated with Project related ground disturbing activities. In the event that this species is detected during protocol-level surveys, consultation with the Department is warranted to discuss how to implement the proposed Project and avoid take, or if avoidance is not feasible, to acquire a State ITP prior to any ground disturbing activities to comply with CESA.

The Project will result in a change in land use from agricultural (fallow land) to commercial retail and residential use. The Department recommends compensation for the loss of SWHA foraging habitat to reduce impacts to SWHA foraging habitat to less than significant. The Department's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks* (CDFG, 1994) recommends that mitigation for habitat loss occur within a minimum distance of 10 miles from known nest sites. The Department gives the following recommendations:

- For projects within 1 mile of an active nest tree, a minimum of one acre of habitat management (HM) land for each acre of development is advised.
- For projects within 5 miles of an active nest but greater than 1 mile, a minimum of 0.75 acre of HM land for each acre of urban development is advised.
- For projects within 10 miles of an active nest tree but greater than 5 miles from an active nest tree, a minimum of 0.5 acre of HM land for each acre of urban development is advised.

It is recommended that funding of a sufficient long term endowment for the management of the protected properties be paid by the Project sponsors. In addition to fee title acquisition of grassland habitat, mitigation could occur by the purchase of conservation or suitable agricultural easements. Suitable agricultural easements would include areas limited to production of crops such as alfalfa, dry land and irrigated pasture, and cereal grain crops. Vineyards, orchards, cotton fields, and other dense vegetation do not provide adequate foraging habitat. Additionally, nest trees are an extremely limited resource in the southern San Joaquin Valley; the Department recommends that lands protected as foraging habitat for Swainson's hawks be no more than 10 miles from a Swainson's hawk nest in order to be beneficial to the species.

**Burrowing Owl (BUOW):** BUOW have the potential to occur on the Project site. The Department recommends surveys following the "*California Burrowing Owl Consortium*" (CBOC, 1993) are conducted on the Project site before any ground-disturbing activities begin. In the event that BUOW are found, the Department's Staff Report recommends that impacts to occupied burrows be avoided in accordance with the following table unless a qualified biologist approved by the Department verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

| Location | Time of Year | Level of Disturbance | | |
|---|---|---|---|---|
| | | Low | Med | High |
| Nesting sites | April 1-Aug 15 | 200 m* | 500 m | 500 m |
| Nesting sites | Aug 16-Oct 15 | 200 m | 200 m | 500 m |
| Nesting sites | Oct 16-Mar 31 | 50 m | 100 m | 500 m |

* meters (m)

Failure to implement the recommended buffer zones could cause adult burrowing owls to abandon the nest, cause eggs or young to be directly impacted (crushed), and/or result in reproductive failure, in violation of Fish and Game Code and the Migratory Bird Treaty Act. The Department recommends that the "*Staff Report on Burrowing Owl Mitigation*" (CDFW, 2012) be followed prior to and during any ground-disturbing activities associated with Project implementation.

The Department recommends that the EIR describe all avoidance measures that would be employed in the event that owls are found on the Project site, as well as methods that would be used to evict owls from burrows (including passive relocation during the non-breeding season). We also recommend that the EIR specify how the impact of evicting owls would be mitigated to a less than significant level. The Department's Staff Report recommends that foraging habitat be acquired and permanently protected to offset the loss of foraging and burrow habitat. The Department also recommends replacement of occupied burrows with artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1) as mitigation for the potentially significant impact of evicting a burrowing owl if a biologist knowledgeable with the biology and natural history of the species determines that suitable burrows are a potential limiting factor for BUOW.

**Nesting Birds:** The trees, shrubs, and grasses within, and in the vicinity of, the Project site are likely to provide nesting habitat for songbirds and raptors. The Department encourages Project implementation to occur outside of the bird breeding season. However, if ground-disturbing activities must occur during the breeding season (February through mid-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in any violation of the Migratory Bird Treaty Act or relevant Fish and Game Codes as referenced above. Prior to Project commencement, the Department recommends surveys for active nests be conducted by a qualified wildlife biologist no more than 10 days prior to the start of the Project and that the surveys be conducted in a sufficient area around the work site to identify any nests that are present and to determine their status. A sufficient area means any nest within an area that could potentially be impacted by the Project. In addition to direct impacts, such as nest destruction, nests may be affected by noise, vibration, odors, and movement of workers or equipment. The Department recommends identified nests are continuously

monitored for the first 24 hours prior to any construction-related activities to establish a behavioral baseline. Once Project activities commence, continuous monitoring of all nests to detect any behavioral changes is advised. If behavioral changes are observed, the Department advises that the work causing any change cease and the Department consulted for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, the Department recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around the nests of unlisted raptors until the breeding season has ended, or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. Variance from these no-disturbance buffers may be implemented when there is a compelling biological or ecological reason to do so, such as when the Project area would be concealed from a nest site by topography. Any variance from these buffers is advised to be supported by a qualified wildlife biologist and it is recommended the Department be notified in advance of implementation of a no-disturbance buffer variance.

**Federally Listed Species:** The Department also recommends consulting with the USFWS on potential impacts to the federally listed San Joaquin kit fox. Take under the Federal Endangered Species Act (FESA) is more broadly defined than CESA; take under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding or foraging. Consultation with the USFWS in order to comply with FESA is advised well in advance of any ground-disturbing activities.

More information on survey and monitoring protocols for sensitive species can be found at the Department's website (www.dfg.ca.gov/wildlife/nongame/survey_monitor.html). If you have any questions on these issues, please contact Reagen O'Leary, Environmental Scientist, at the address provided on this letterhead, by telephone at (559) 243-4014, extension 244, or by electronic mail at Reagen.OLeary@wildlife.ca.gov.

Sincerely,

Jeffrey R. Single, Ph.D.
Regional Manager

cc: Thomas Leeman
United States Fish and
Wildlife Service
2800 Cottage Way, Suite W-2605
Sacramento, California 95825

## Literature Cited

CBOC, 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. California Burrowing Owl Consortium, April 1993.

CDFG, 1994. Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo Swainsoni*) in the Central Valley of California. California Department of Fish and Game.

CDFG, 2012. Staff Report on Burrowing Owl Mitigation. California Department of Fish and Game.

SWHA TAC, 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley. Swainson's Hawk Technical Advisory Committee, May 31, 2000.

USFWS, 2011. Standard Recommendations for the Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. United States Fish and Wildlife Service.

# APPENDIX 4.2-A
# LAND EVALUATION SITE ASSESSMENT

NON-IRRIGATED

## Land Evaluation Worksheet

### Land Capability Classification (LCC) and Storie Index Scores

| A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|
| Soil Map Unit | Project Acres | Proportion of Project Area | LCC | LCC Rating | LCC Score | Storie Index | Storie Index Score |
| 156 | 60 | .55 | 7 | 10 | 5.5 | 34 | 18.7 |
| 174 | 40 | .37 | 7 | 10 | 3.7 | 60 | 22.2 |
| 243 | 9 | .08 | 7 | 10 | .8 | 81 | 6.5 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***Totals*** | | (Must Sum to 1.0) | | ***LCC Total Score*** | 10.0 | ***Storie Index Total Score*** | 47.4 |

## Site Assessment Worksheet 1.

### Project Size Score

| | I | J | K |
|---|---|---|---|
| | LCC Class I - II | LCC Class III | LCC Class IV - VIII |
| | | | 5.5 |
| | | | 3.7 |
| | | | .8 |
| | | | |
| | | | |
| | | | |
| ***Total Acres*** | | | 47.4 |
| ***Project Size Scores*** | | | 0 |

***Highest Project Size Score*** 0

**Site Assessment Worksheet 2. - Water Resources Availability**

| A | B | C | D | E |
|---|---|---|---|---|
| Project Portion | Water Source | Proportion of Project Area | Water Availability Score | Weighted Availability Score (C x D) |
| 1 | Well | 100% | 80 | 80 |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| | | (Must Sum to 1.0) | ***Total Water Resource Score*** | 80 |

**Site Assessment Worksheet 3.**
**Surrounding Agricultural Land and Surrounding Protected Resource Land**

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| **Zone of Influence** | | | | | | |
| Total Acres | Acres in Agriculture | Acres of Protected Resource Land | Percent in Agriculture (A/B) | Percent Protected Resource Land (A/C) | Surrounding Agricultural Land Score (From Table) | Surrounding Protected Resource Land Score (From Table) |
| 592 | 158 | 158 | 26.7% | 26.7% | 0 | 0 |

***NOTES***

## Final LESA Score Sheet

**Calculation of the Final LESA Score:**

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

| | Factor Scores | Factor Weight | Weighted Factor Scores |
|---|---|---|---|
| **LE Factors** | | | |
| Land Capability Classification | <1> 10.0 | 0.25 | 2.5 |
| Storie Index | <2> 47.4 | 0.25 | 11.9 |
| *LE Subtotal* | | ***0.50*** | 14.4 |
| **SA Factors** | | | |
| Project Size | <3> 0 | 0.15 | 0 |
| Water Resource Availability | <4> 80 | 0.15 | 12.0 |
| Surrounding Agricultural Land | <5> 0 | 0.15 | 0 |
| Protected Resource Land | <6> 0 | 0.05 | 0 |
| *SA Subtotal* | | ***0.50*** | 12.0 |
| | | **Final LESA Score** | 26.4 |

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

IRRIGATED

## Land Evaluation Worksheet

### Land Capability Classification (LCC) and Storie Index Scores

| A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|
| Soil Map Unit | Project Acres | Proportion of Project Area | LCC | LCC Rating | LCC Score | Storie Index | Storie Index Score |
| 156 | 60 | .55 | 3s | 60 | 33.0 | 34 | 18.7 |
| 174 | 40 | .37 | 1 | 100 | 37.0 | 60 | 22.2 |
| 243 | 9 | .08 | 2s | 80 | 6.4 | 81 | 6.5 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ***Totals*** | 109 | (Must Sum to 1.0) | | ***LCC Total Score*** | 76.4 | ***Storie Index Total Score*** | 47.4 |

## Site Assessment Worksheet 1.

### Project Size Score

| | I | J | K |
|---|---|---|---|
| | LCC Class I - II | LCC Class III | LCC Class IV - VIII |
| | | 33.0 | |
| | 37.0 | | |
| | 6.5 | | |
| | | | |
| | | | |
| | | | |
| ***Total Acres*** | 43.5 | 33.0 | |
| ***Project Size Scores*** | 80 | 30 | |

***Highest Project Size Score*** 80

**Site Assessment Worksheet 2. - Water Resources Availability**

| A | B | C | D | E |
|---|---|---|---|---|
| Project Portion | Water Source | Proportion of Project Area | Water Availability Score | Weighted Availability Score (C x D) |
| 1 | Well | 100% | 80 | 80 |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| | | (Must Sum to 1.0) | ***Total Water Resource Score*** | 80 |

**Site Assessment Worksheet 3.**
**Surrounding Agricultural Land and Surrounding Protected Resource Land**

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| **Zone of Influence** | | | | | | |
| Total Acres | Acres in Agriculture | Acres of Protected Resource Land | Percent in Agriculture (A/B) | Percent Protected Resource Land (A/C) | Surrounding Agricultural Land Score (From Table) | Surrounding Protected Resource Land Score (From Table) |
| 592 | 158 | 158 | 26.7% | 26.7% | 0 | 0 |

***NOTES***

## Final LESA Score Sheet

**Calculation of the Final LESA Score:**

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

| | Factor Scores | Factor Weight | Weighted Factor Scores |
|---|---|---|---|
| **LE Factors** | | | |
| Land Capability Classification | <1> 76.4 | 0.25 | 19.1 |
| Storie Index | <2> 47.4 | 0.25 | 11.9 |
| *LE Subtotal* | | ***0.50*** | 31.0 |
| **SA Factors** | | | |
| Project Size | <3> 80 | 0.15 | 12.0 |
| Water Resource Availability | <4> 80 | 0.15 | 12.0 |
| Surrounding Agricultural Land | <5> 0 | 0.15 | 0 |
| Protected Resource Land | <6> 0 | 0.05 | 0 |
| *SA Subtotal* | | ***0.50*** | 24.0 |
| | | **Final LESA Score** | 55.0 |

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

# APPENDIX 4.3-A
# AIR EMISSIONS

# Vineyard at Delano & West Pavilion - Retention Basin

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Other Non-Asphalt Surfaces | 402.05 | 1000sqft | 9.23 | 402,045.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2015 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Trips and VMT - 24,000 cubic yards to be used for embankments. 50,000 cubic yards to be used at West Pavilion site. 0.3 mile is maximum distance of travel.
Grading -

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD's PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ dust suppressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblGrading | MaterialExported | 0.00 | 74,000.00 |
| tblLandUse | LandUseSquareFeet | 402,050.00 | 402,045.00 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2015 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 0.30 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 0.0930 | 0.5312 | 1.2212 | 4.6000e-004 | 0.0735 | 0.0240 | 0.0975 | 0.0352 | 0.0221 | 0.0573 | 0.0000 | 41.6976 | 41.6976 | 8.8100e-003 | 0.0000 | 41.8827 |
| **Total** | **0.0930** | **0.5312** | **1.2212** | **4.6000e-004** | **0.0735** | **0.0240** | **0.0975** | **0.0352** | **0.0221** | **0.0573** | **0.0000** | **41.6976** | **41.6976** | **8.8100e-003** | **0.0000** | **41.8827** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 0.0619 | 0.2752 | 1.1582 | 4.6000e-004 | 0.0297 | 8.5900e-003 | 0.0383 | 0.0140 | 8.5300e-003 | 0.0226 | 0.0000 | 41.6976 | 41.6976 | 8.8100e-003 | 0.0000 | 41.8827 |
| **Total** | **0.0619** | **0.2752** | **1.1582** | **4.6000e-004** | **0.0297** | **8.5900e-003** | **0.0383** | **0.0140** | **8.5300e-003** | **0.0226** | **0.0000** | **41.6976** | **41.6976** | **8.8100e-003** | **0.0000** | **41.8827** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **33.42** | **48.19** | **5.16** | **0.00** | **59.59** | **64.24** | **60.73** | **60.16** | **61.39** | **60.63** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

## Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Grading | Grading | 2/12/2015 | 3/11/2015 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 10**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)**

## OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Grading | Excavators | 1 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Grading | 6 | 15.00 | 0.00 | 9,250.00 | 10.80 | 7.30 | 0.30 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Grading - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0710 | 0.0000 | 0.0710 | 0.0345 | 0.0000 | 0.0345 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0383 | 0.4042 | 0.2667 | 3.0000e-004 | | 0.0233 | 0.0233 | | 0.0214 | 0.0214 | 0.0000 | 28.3860 | 28.3860 | 8.4700e-003 | 0.0000 | 28.5639 |
| **Total** | **0.0383** | **0.4042** | **0.2667** | **3.0000e-004** | **0.0710** | **0.0233** | **0.0943** | **0.0345** | **0.0214** | **0.0559** | **0.0000** | **28.3860** | **28.3860** | **8.4700e-003** | **0.0000** | **28.5639** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0540 | 0.1263 | 0.9467 | 1.5000e-004 | 1.2900e-003 | 7.3000e-004 | 2.0200e-003 | 3.6000e-004 | 6.6000e-004 | 1.0300e-003 | 0.0000 | 12.1059 | 12.1059 | 2.7000e-004 | 0.0000 | 12.1117 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 7.7000e-004 | 7.7000e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.2057 | 1.2057 | 7.0000e-005 | 0.0000 | 1.2071 |
| **Total** | **0.0546** | **0.1270** | **0.9544** | **1.7000e-004** | **2.5000e-003** | **7.4000e-004** | **3.2400e-003** | **6.8000e-004** | **6.7000e-004** | **1.3600e-003** | **0.0000** | **13.3116** | **13.3116** | **3.4000e-004** | **0.0000** | **13.3188** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0277 | 0.0000 | 0.0277 | 0.0135 | 0.0000 | 0.0135 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2500e-003 | 0.1482 | 0.2038 | 3.0000e-004 | | 7.8500e-003 | 7.8500e-003 | | 7.8500e-003 | 7.8500e-003 | 0.0000 | 28.3859 | 28.3859 | 8.4700e-003 | 0.0000 | 28.5639 |
| **Total** | **7.2500e-003** | **0.1482** | **0.2038** | **3.0000e-004** | **0.0277** | **7.8500e-003** | **0.0355** | **0.0135** | **7.8500e-003** | **0.0213** | **0.0000** | **28.3859** | **28.3859** | **8.4700e-003** | **0.0000** | **28.5639** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0540 | 0.1263 | 0.9467 | 1.5000e-004 | 1.0700e-003 | 7.3000e-004 | 1.8000e-003 | 3.1000e-004 | 6.6000e-004 | 9.7000e-004 | 0.0000 | 12.1059 | 12.1059 | 2.7000e-004 | 0.0000 | 12.1117 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 7.7000e-004 | 7.7000e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.2057 | 1.2057 | 7.0000e-005 | 0.0000 | 1.2071 |
| **Total** | **0.0546** | **0.1270** | **0.9544** | **1.7000e-004** | **2.0200e-003** | **7.4000e-004** | **2.7600e-003** | **5.7000e-004** | **6.7000e-004** | **1.2400e-003** | **0.0000** | **13.3116** | **13.3116** | **3.4000e-004** | **0.0000** | **13.3188** |

# Vineyard at Delano Phase 1 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 108.00 | Dwelling Unit | 8.25 | 108,000.00 | 309 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2015 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 1 acreage = 8.25

Construction Phase - Building construction,paving, and painting assumed to occur simultaneously

Trips and VMT -

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD's PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ supressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | PhaseEndDate | 12/14/2016 | 1/27/2016 |
| tblConstructionPhase | PhaseEndDate | 12/14/2016 | 1/27/2016 |
| tblConstructionPhase | PhaseStartDate | 1/28/2016 | 3/12/2015 |
| tblConstructionPhase | PhaseStartDate | 1/28/2016 | 3/12/2015 |
| tblLandUse | LotAcreage | 2.84 | 8.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2015 |
| tblWoodstoves | NumberCatalytic | 8.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 8.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 1.7338 | 6.9914 | 5.0408 | 7.5100e-003 | 0.2588 | 0.4381 | 0.6968 | 0.1108 | 0.4094 | 0.5202 | 0.0000 | 677.3128 | 677.3128 | 0.1544 | 0.0000 | 680.5546 |
| 2016 | 0.1446 | 0.5223 | 0.3981 | 6.3000e-004 | 9.0900e-003 | 0.0328 | 0.0419 | 2.4300e-003 | 0.0307 | 0.0331 | 0.0000 | 55.8678 | 55.8678 | 0.0124 | 0.0000 | 56.1292 |
| **Total** | **1.8784** | **7.5136** | **5.4388** | **8.1400e-003** | **0.2679** | **0.4709** | **0.7387** | **0.1133** | **0.4401** | **0.5534** | **0.0000** | **733.1806** | **733.1806** | **0.1668** | **0.0000** | **736.6837** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2015 | 1.2343 | 3.4053 | 5.0456 | 7.5100e-003 | 0.1417 | 0.2034 | 0.3451 | 0.0546 | 0.2031 | 0.2577 | 0.0000 | 677.3122 | 677.3122 | 0.1544 | 0.0000 | 680.5539 |
| 2016 | 0.1084 | 0.2796 | 0.4161 | 6.3000e-004 | 7.1500e-003 | 0.0168 | 0.0239 | 1.9500e-003 | 0.0167 | 0.0187 | 0.0000 | 55.8678 | 55.8678 | 0.0124 | 0.0000 | 56.1291 |
| **Total** | **1.3427** | **3.6849** | **5.4617** | **8.1400e-003** | **0.1489** | **0.2202** | **0.3690** | **0.0566** | **0.2199** | **0.2764** | **0.0000** | **733.1799** | **733.1799** | **0.1668** | **0.0000** | **736.6830** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **28.52** | **50.96** | **-0.42** | **0.00** | **44.43** | **53.24** | **50.04** | **50.07** | **50.04** | **50.05** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2015 | 2/11/2015 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2015 | 3/11/2015 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 3/12/2015 | 1/27/2016 | 5 | 230 | |
| 4 | Paving | Paving | 3/12/2015 | 1/27/2016 | 5 | 230 | |
| 5 | Architectural Coating | Architectural Coating | 3/12/2015 | 1/27/2016 | 5 | 230 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 10**

**Acres of Paving: 0**

**Residential Indoor: 218,700; Residential Outdoor: 72,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 78.00 | 12.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 16.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0263 | 0.2845 | 0.2132 | 2.0000e-004 | | 0.0154 | 0.0154 | | 0.0142 | 0.0142 | 0.0000 | 18.6506 | 18.6506 | 5.5700e-003 | 0.0000 | 18.7675 |
| **Total** | **0.0263** | **0.2845** | **0.2132** | **2.0000e-004** | **0.0903** | **0.0154** | **0.1058** | **0.0497** | **0.0142** | **0.0639** | **0.0000** | **18.6506** | **18.6506** | **5.5700e-003** | **0.0000** | **18.7675** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 4.6000e-004 | 4.6200e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.7234 | 0.7234 | 4.0000e-005 | 0.0000 | 0.7243 |
| **Total** | **3.7000e-004** | **4.6000e-004** | **4.6200e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.7234** | **0.7234** | **4.0000e-005** | **0.0000** | **0.7243** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 18.6505 | 18.6505 | 5.5700e-003 | 0.0000 | 18.7675 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **18.6505** | **18.6505** | **5.5700e-003** | **0.0000** | **18.7675** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 4.6000e-004 | 4.6200e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 1.0000e-005 | 1.6000e-004 | 0.0000 | 0.7234 | 0.7234 | 4.0000e-005 | 0.0000 | 0.7243 |
| **Total** | **3.7000e-004** | **4.6000e-004** | **4.6200e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **1.0000e-005** | **1.6000e-004** | **0.0000** | **0.7234** | **0.7234** | **4.0000e-005** | **0.0000** | **0.7243** |

## 3.3 Grading - 2015

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0655 | 0.0000 | 0.0655 | 0.0337 | 0.0000 | 0.0337 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0383 | 0.4042 | 0.2667 | 3.0000e-004 | | 0.0233 | 0.0233 | | 0.0214 | 0.0214 | 0.0000 | 28.3860 | 28.3860 | 8.4700e-003 | 0.0000 | 28.5639 |
| **Total** | **0.0383** | **0.4042** | **0.2667** | **3.0000e-004** | **0.0655** | **0.0233** | **0.0888** | **0.0337** | **0.0214** | **0.0551** | **0.0000** | **28.3860** | **28.3860** | **8.4700e-003** | **0.0000** | **28.5639** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 7.7000e-004 | 7.7000e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.2057 | 1.2057 | 7.0000e-005 | 0.0000 | 1.2071 |
| **Total** | **6.2000e-004** | **7.7000e-004** | **7.7000e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.2057** | **1.2057** | **7.0000e-005** | **0.0000** | **1.2071** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0256 | 0.0000 | 0.0256 | 0.0131 | 0.0000 | 0.0131 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2500e-003 | 0.1482 | 0.2038 | 3.0000e-004 | | 7.8500e-003 | 7.8500e-003 | | 7.8500e-003 | 7.8500e-003 | 0.0000 | 28.3859 | 28.3859 | 8.4700e-003 | 0.0000 | 28.5639 |
| **Total** | **7.2500e-003** | **0.1482** | **0.2038** | **3.0000e-004** | **0.0256** | **7.8500e-003** | **0.0334** | **0.0131** | **7.8500e-003** | **0.0210** | **0.0000** | **28.3859** | **28.3859** | **8.4700e-003** | **0.0000** | **28.5639** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.2000e-004 | 7.7000e-004 | 7.7000e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.2057 | 1.2057 | 7.0000e-005 | 0.0000 | 1.2071 |
| **Total** | **6.2000e-004** | **7.7000e-004** | **7.7000e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.2057** | **1.2057** | **7.0000e-005** | **0.0000** | **1.2071** |

## 3.4 Building Construction - 2015

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.3860 | 3.1682 | 1.9776 | 2.8300e-003 | | 0.2233 | 0.2233 | | 0.2100 | 0.2100 | 0.0000 | 257.4140 | 257.4140 | 0.0646 | 0.0000 | 258.7703 |
| **Total** | **0.3860** | **3.1682** | **1.9776** | **2.8300e-003** | | **0.2233** | **0.2233** | | **0.2100** | **0.2100** | **0.0000** | **257.4140** | **257.4140** | **0.0646** | **0.0000** | **258.7703** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0172 | 0.1470 | 0.1998 | 3.0000e-004 | 8.3100e-003 | 2.6600e-003 | 0.0110 | 2.3800e-003 | 2.4500e-003 | 4.8300e-003 | 0.0000 | 27.6153 | 27.6153 | 2.6000e-004 | 0.0000 | 27.6207 |
| Worker | 0.0341 | 0.0423 | 0.4225 | 8.5000e-004 | 0.0663 | 5.5000e-004 | 0.0669 | 0.0176 | 5.0000e-004 | 0.0181 | 0.0000 | 66.1455 | 66.1455 | 3.5900e-003 | 0.0000 | 66.2208 |
| **Total** | **0.0513** | **0.1893** | **0.6223** | **1.1500e-003** | **0.0746** | **3.2100e-003** | **0.0778** | **0.0200** | **2.9500e-003** | **0.0230** | **0.0000** | **93.7608** | **93.7608** | **3.8500e-003** | **0.0000** | **93.8415** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1257 | 1.5140 | 1.9359 | 2.8300e-003 | | 0.1009 | 0.1009 | | 0.1009 | 0.1009 | 0.0000 | 257.4137 | 257.4137 | 0.0646 | 0.0000 | 258.7700 |
| **Total** | **0.1257** | **1.5140** | **1.9359** | **2.8300e-003** | | **0.1009** | **0.1009** | | **0.1009** | **0.1009** | **0.0000** | **257.4137** | **257.4137** | **0.0646** | **0.0000** | **258.7700** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0172 | 0.1470 | 0.1998 | 3.0000e-004 | 6.8200e-003 | 2.6600e-003 | 9.4800e-003 | 2.0100e-003 | 2.4500e-003 | 4.4600e-003 | 0.0000 | 27.6153 | 27.6153 | 2.6000e-004 | 0.0000 | 27.6207 |
| Worker | 0.0341 | 0.0423 | 0.4225 | 8.5000e-004 | 0.0520 | 5.5000e-004 | 0.0525 | 0.0141 | 5.0000e-004 | 0.0146 | 0.0000 | 66.1455 | 66.1455 | 3.5900e-003 | 0.0000 | 66.2208 |
| **Total** | **0.0513** | **0.1893** | **0.6223** | **1.1500e-003** | **0.0588** | **3.2100e-003** | **0.0620** | **0.0161** | **2.9500e-003** | **0.0191** | **0.0000** | **93.7608** | **93.7608** | **3.8500e-003** | **0.0000** | **93.8415** |

## 3.4 Building Construction - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0324 | 0.2708 | 0.1758 | 2.5000e-004 | | 0.0187 | 0.0187 | | 0.0176 | 0.0176 | 0.0000 | 23.0046 | 23.0046 | 5.7100e-003 | 0.0000 | 23.1244 |
| **Total** | **0.0324** | **0.2708** | **0.1758** | **2.5000e-004** | | **0.0187** | **0.0187** | | **0.0176** | **0.0176** | **0.0000** | **23.0046** | **23.0046** | **5.7100e-003** | **0.0000** | **23.1244** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.3800e-003 | 0.0115 | 0.0167 | 3.0000e-005 | 7.5000e-004 | 2.0000e-004 | 9.5000e-004 | 2.1000e-004 | 1.9000e-004 | 4.0000e-004 | 0.0000 | 2.4571 | 2.4571 | 2.0000e-005 | 0.0000 | 2.4575 |
| Worker | 2.7200e-003 | 3.3900e-003 | 0.0336 | 8.0000e-005 | 5.9700e-003 | 5.0000e-005 | 6.0200e-003 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 0.0000 | 5.7373 | 5.7373 | 2.9000e-004 | 0.0000 | 5.7434 |
| **Total** | **4.1000e-003** | **0.0149** | **0.0503** | **1.1000e-004** | **6.7200e-003** | **2.5000e-004** | **6.9700e-003** | **1.8000e-003** | **2.3000e-004** | **2.0300e-003** | **0.0000** | **8.1943** | **8.1943** | **3.1000e-004** | **0.0000** | **8.2009** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0107 | 0.1357 | 0.1737 | 2.5000e-004 | | 8.9400e-003 | 8.9400e-003 | | 8.9400e-003 | 8.9400e-003 | 0.0000 | 23.0046 | 23.0046 | 5.7100e-003 | 0.0000 | 23.1244 |
| **Total** | **0.0107** | **0.1357** | **0.1737** | **2.5000e-004** | | **8.9400e-003** | **8.9400e-003** | | **8.9400e-003** | **8.9400e-003** | **0.0000** | **23.0046** | **23.0046** | **5.7100e-003** | **0.0000** | **23.1244** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.3800e-003 | 0.0115 | 0.0167 | 3.0000e-005 | 6.1000e-004 | 2.0000e-004 | 8.2000e-004 | 1.8000e-004 | 1.9000e-004 | 3.7000e-004 | 0.0000 | 2.4571 | 2.4571 | 2.0000e-005 | 0.0000 | 2.4575 |
| Worker | 2.7200e-003 | 3.3900e-003 | 0.0336 | 8.0000e-005 | 4.6800e-003 | 5.0000e-005 | 4.7200e-003 | 1.2700e-003 | 4.0000e-005 | 1.3100e-003 | 0.0000 | 5.7373 | 5.7373 | 2.9000e-004 | 0.0000 | 5.7434 |
| **Total** | **4.1000e-003** | **0.0149** | **0.0503** | **1.1000e-004** | **5.2900e-003** | **2.5000e-004** | **5.5400e-003** | **1.4500e-003** | **2.3000e-004** | **1.6800e-003** | **0.0000** | **8.1943** | **8.1943** | **3.1000e-004** | **0.0000** | **8.2009** |

## 3.5 Paving - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2445 | 2.6561 | 1.5802 | 2.3500e-003 | | 0.1493 | 0.1493 | | 0.1373 | 0.1373 | 0.0000 | 223.9470 | 223.9470 | 0.0669 | 0.0000 | 225.3510 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.2445** | **2.6561** | **1.5802** | **2.3500e-003** | | **0.1493** | **0.1493** | | **0.1373** | **0.1373** | **0.0000** | **223.9470** | **223.9470** | **0.0669** | **0.0000** | **225.3510** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.5500e-003 | 8.1400e-003 | 0.0812 | 1.6000e-004 | 0.0128 | 1.1000e-004 | 0.0129 | 3.3900e-003 | 1.0000e-004 | 3.4800e-003 | 0.0000 | 12.7203 | 12.7203 | 6.9000e-004 | 0.0000 | 12.7348 |
| **Total** | **6.5500e-003** | **8.1400e-003** | **0.0812** | **1.6000e-004** | **0.0128** | **1.1000e-004** | **0.0129** | **3.3900e-003** | **1.0000e-004** | **3.4800e-003** | **0.0000** | **12.7203** | **12.7203** | **6.9000e-004** | **0.0000** | **12.7348** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0579 | 1.1673 | 1.7859 | 2.3500e-003 | | 0.0631 | 0.0631 | | 0.0631 | 0.0631 | 0.0000 | 223.9467 | 223.9467 | 0.0669 | 0.0000 | 225.3507 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0579** | **1.1673** | **1.7859** | **2.3500e-003** | | **0.0631** | **0.0631** | | **0.0631** | **0.0631** | **0.0000** | **223.9467** | **223.9467** | **0.0669** | **0.0000** | **225.3507** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.5500e-003 | 8.1400e-003 | 0.0812 | 1.6000e-004 | 9.9900e-003 | 1.1000e-004 | 0.0101 | 2.7100e-003 | 1.0000e-004 | 2.8100e-003 | 0.0000 | 12.7203 | 12.7203 | 6.9000e-004 | 0.0000 | 12.7348 |
| **Total** | **6.5500e-003** | **8.1400e-003** | **0.0812** | **1.6000e-004** | **9.9900e-003** | **1.1000e-004** | **0.0101** | **2.7100e-003** | **1.0000e-004** | **2.8100e-003** | **0.0000** | **12.7203** | **12.7203** | **6.9000e-004** | **0.0000** | **12.7348** |

## 3.5 Paving - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0199 | 0.2127 | 0.1408 | 2.1000e-004 | | 0.0120 | 0.0120 | | 0.0110 | 0.0110 | 0.0000 | 19.9631 | 19.9631 | 6.0200e-003 | 0.0000 | 20.0896 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0199** | **0.2127** | **0.1408** | **2.1000e-004** | | **0.0120** | **0.0120** | | **0.0110** | **0.0110** | **0.0000** | **19.9631** | **19.9631** | **6.0200e-003** | **0.0000** | **20.0896** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.2000e-004 | 6.5000e-004 | 6.4600e-003 | 1.0000e-005 | 1.1500e-003 | 1.0000e-005 | 1.1600e-003 | 3.1000e-004 | 1.0000e-005 | 3.1000e-004 | 0.0000 | 1.1033 | 1.1033 | 6.0000e-005 | 0.0000 | 1.1045 |
| **Total** | **5.2000e-004** | **6.5000e-004** | **6.4600e-003** | **1.0000e-005** | **1.1500e-003** | **1.0000e-005** | **1.1600e-003** | **3.1000e-004** | **1.0000e-005** | **3.1000e-004** | **0.0000** | **1.1033** | **1.1033** | **6.0000e-005** | **0.0000** | **1.1045** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.2200e-003 | 0.1051 | 0.1608 | 2.1000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | 0.0000 | 19.9631 | 19.9631 | 6.0200e-003 | 0.0000 | 20.0896 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **5.2200e-003** | **0.1051** | **0.1608** | **2.1000e-004** | | **5.6800e-003** | **5.6800e-003** | | **5.6800e-003** | **5.6800e-003** | **0.0000** | **19.9631** | **19.9631** | **6.0200e-003** | **0.0000** | **20.0896** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.2000e-004 | 6.5000e-004 | 6.4600e-003 | 1.0000e-005 | 9.0000e-004 | 1.0000e-005 | 9.1000e-004 | 2.4000e-004 | 1.0000e-005 | 2.5000e-004 | 0.0000 | 1.1033 | 1.1033 | 6.0000e-005 | 0.0000 | 1.1045 |
| **Total** | **5.2000e-004** | **6.5000e-004** | **6.4600e-003** | **1.0000e-005** | **9.0000e-004** | **1.0000e-005** | **9.1000e-004** | **2.4000e-004** | **1.0000e-005** | **2.5000e-004** | **0.0000** | **1.1033** | **1.1033** | **6.0000e-005** | **0.0000** | **1.1045** |

## 3.6 Architectural Coating - 2015

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9299 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0429 | 0.2712 | 0.2006 | 3.1000e-004 | | 0.0233 | 0.0233 | | 0.0233 | 0.0233 | 0.0000 | 26.9368 | 26.9368 | 3.5100e-003 | 0.0000 | 27.0105 |
| **Total** | **0.9728** | **0.2712** | **0.2006** | **3.1000e-004** | | **0.0233** | **0.0233** | | **0.0233** | **0.0233** | **0.0000** | **26.9368** | **26.9368** | **3.5100e-003** | **0.0000** | **27.0105** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.9900e-003 | 8.6800e-003 | 0.0867 | 1.8000e-004 | 0.0136 | 1.1000e-004 | 0.0137 | 3.6100e-003 | 1.0000e-004 | 3.7200e-003 | 0.0000 | 13.5683 | 13.5683 | 7.4000e-004 | 0.0000 | 13.5838 |
| **Total** | **6.9900e-003** | **8.6800e-003** | **0.0867** | **1.8000e-004** | **0.0136** | **1.1000e-004** | **0.0137** | **3.6100e-003** | **1.0000e-004** | **3.7200e-003** | **0.0000** | **13.5683** | **13.5683** | **7.4000e-004** | **0.0000** | **13.5838** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9299 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0429 | 0.2712 | 0.2006 | 3.1000e-004 | | 0.0233 | 0.0233 | | 0.0233 | 0.0233 | 0.0000 | 26.9368 | 26.9368 | 3.5100e-003 | 0.0000 | 27.0105 |
| **Total** | **0.9728** | **0.2712** | **0.2006** | **3.1000e-004** | | **0.0233** | **0.0233** | | **0.0233** | **0.0233** | **0.0000** | **26.9368** | **26.9368** | **3.5100e-003** | **0.0000** | **27.0105** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.9900e-003 | 8.6800e-003 | 0.0867 | 1.8000e-004 | 0.0107 | 1.1000e-004 | 0.0108 | 2.8900e-003 | 1.0000e-004 | 2.9900e-003 | 0.0000 | 13.5683 | 13.5683 | 7.4000e-004 | 0.0000 | 13.5838 |
| **Total** | **6.9900e-003** | **8.6800e-003** | **0.0867** | **1.8000e-004** | **0.0107** | **1.1000e-004** | **0.0108** | **2.8900e-003** | **1.0000e-004** | **2.9900e-003** | **0.0000** | **13.5683** | **13.5683** | **7.4000e-004** | **0.0000** | **13.5838** |

## 3.6 Architectural Coating - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0837 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.5000e-003 | 0.0225 | 0.0179 | 3.0000e-005 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | 0.0000 | 2.4256 | 2.4256 | 2.9000e-004 | 0.0000 | 2.4316 |
| **Total** | **0.0872** | **0.0225** | **0.0179** | **3.0000e-005** | | **1.8700e-003** | **1.8700e-003** | | **1.8700e-003** | **1.8700e-003** | **0.0000** | **2.4256** | **2.4256** | **2.9000e-004** | **0.0000** | **2.4316** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.6000e-004 | 6.9000e-004 | 6.8900e-003 | 2.0000e-005 | 1.2200e-003 | 1.0000e-005 | 1.2300e-003 | 3.3000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.1769 | 1.1769 | 6.0000e-005 | 0.0000 | 1.1781 |
| **Total** | **5.6000e-004** | **6.9000e-004** | **6.8900e-003** | **2.0000e-005** | **1.2200e-003** | **1.0000e-005** | **1.2300e-003** | **3.3000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.1769** | **1.1769** | **6.0000e-005** | **0.0000** | **1.1781** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0837 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.5000e-003 | 0.0225 | 0.0179 | 3.0000e-005 | | 1.8700e-003 | 1.8700e-003 | | 1.8700e-003 | 1.8700e-003 | 0.0000 | 2.4256 | 2.4256 | 2.9000e-004 | 0.0000 | 2.4316 |
| **Total** | **0.0872** | **0.0225** | **0.0179** | **3.0000e-005** | | **1.8700e-003** | **1.8700e-003** | | **1.8700e-003** | **1.8700e-003** | **0.0000** | **2.4256** | **2.4256** | **2.9000e-004** | **0.0000** | **2.4316** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.6000e-004 | 6.9000e-004 | 6.8900e-003 | 2.0000e-005 | 9.6000e-004 | 1.0000e-005 | 9.7000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.1769 | 1.1769 | 6.0000e-005 | 0.0000 | 1.1781 |
| **Total** | **5.6000e-004** | **6.9000e-004** | **6.8900e-003** | **2.0000e-005** | **9.6000e-004** | **1.0000e-005** | **9.7000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.1769** | **1.1769** | **6.0000e-005** | **0.0000** | **1.1781** |

# Vineyard at Delano - Phase 2 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 108.00 | Dwelling Unit | 8.25 | 108,000.00 | 309 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2016 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 2 acreage = 8.25

Construction Phase - Building construction, paving, painting assumed to occur simultaneously

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD's PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ supressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | PhaseEndDate | 12/15/2017 | 1/27/2017 |
| tblConstructionPhase | PhaseEndDate | 1/26/2017 | 1/27/2017 |
| tblConstructionPhase | PhaseEndDate | 12/15/2017 | 1/27/2017 |
| tblConstructionPhase | PhaseStartDate | 1/28/2017 | 3/12/2016 |
| tblConstructionPhase | PhaseStartDate | 3/11/2016 | 3/12/2016 |
| tblConstructionPhase | PhaseStartDate | 1/28/2017 | 3/12/2016 |
| tblLandUse | LotAcreage | 2.84 | 8.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2016 |
| tblWoodstoves | NumberCatalytic | 8.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 8.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2016 | 1.6615 | 6.4309 | 4.8772 | 7.4700e-003 | 0.2583 | 0.3993 | 0.6576 | 0.1107 | 0.3730 | 0.4837 | 0.0000 | 665.8494 | 665.8494 | 0.1517 | 0.0000 | 669.0345 |
| 2017 | 0.1464 | 0.5040 | 0.4069 | 6.6000e-004 | 9.5700e-003 | 0.0312 | 0.0408 | 2.5600e-003 | 0.0292 | 0.0317 | 0.0000 | 57.8411 | 57.8411 | 0.0129 | 0.0000 | 58.1124 |
| **Total** | **1.8079** | **6.9349** | **5.2841** | **8.1300e-003** | **0.2679** | **0.4304** | **0.6983** | **0.1133** | **0.4022** | **0.5155** | **0.0000** | **723.6905** | **723.6905** | **0.1646** | **0.0000** | **727.1469** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2016 | 1.2104 | 3.3368 | 4.9303 | 7.4700e-003 | 0.1413 | 0.1979 | 0.3393 | 0.0545 | 0.1977 | 0.2522 | 0.0000 | 665.8488 | 665.8488 | 0.1517 | 0.0000 | 669.0339 |
| 2017 | 0.1124 | 0.2898 | 0.4299 | 6.6000e-004 | 7.5300e-003 | 0.0172 | 0.0248 | 2.0600e-003 | 0.0172 | 0.0193 | 0.0000 | 57.8411 | 57.8411 | 0.0129 | 0.0000 | 58.1124 |
| **Total** | **1.3228** | **3.6267** | **5.3602** | **8.1300e-003** | **0.1489** | **0.2152** | **0.3640** | **0.0566** | **0.2149** | **0.2715** | **0.0000** | **723.6898** | **723.6898** | **0.1646** | **0.0000** | **727.1462** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **26.83** | **47.70** | **-1.44** | **0.00** | **44.43** | **50.01** | **47.87** | **50.06** | **46.57** | **47.33** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2016 | 2/11/2016 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2016 | 3/10/2016 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 3/12/2016 | 1/27/2017 | 5 | 230 | |
| 4 | Paving | Paving | 3/12/2016 | 1/27/2017 | 5 | 230 | |
| 5 | Architectural Coating | Architectural Coating | 3/12/2016 | 1/27/2017 | 5 | 230 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 10**

**Acres of Paving: 0**

**Residential Indoor: 218,700; Residential Outdoor: 72,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 78.00 | 12.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 16.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2016

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0254 | 0.2732 | 0.2055 | 2.0000e-004 | | 0.0147 | 0.0147 | | 0.0135 | 0.0135 | 0.0000 | 18.4386 | 18.4386 | 5.5600e-003 | 0.0000 | 18.5554 |
| **Total** | **0.0254** | **0.2732** | **0.2055** | **2.0000e-004** | **0.0903** | **0.0147** | **0.1050** | **0.0497** | **0.0135** | **0.0632** | **0.0000** | **18.4386** | **18.4386** | **5.5600e-003** | **0.0000** | **18.5554** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.3000e-004 | 4.1000e-004 | 4.0800e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6968 | 0.6968 | 4.0000e-005 | 0.0000 | 0.6976 |
| **Total** | **3.3000e-004** | **4.1000e-004** | **4.0800e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6968** | **0.6968** | **4.0000e-005** | **0.0000** | **0.6976** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 18.4385 | 18.4385 | 5.5600e-003 | 0.0000 | 18.5553 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **18.4385** | **18.4385** | **5.5600e-003** | **0.0000** | **18.5553** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.3000e-004 | 4.1000e-004 | 4.0800e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 1.0000e-005 | 1.6000e-004 | 0.0000 | 0.6968 | 0.6968 | 4.0000e-005 | 0.0000 | 0.6976 |
| **Total** | **3.3000e-004** | **4.1000e-004** | **4.0800e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **1.0000e-005** | **1.6000e-004** | **0.0000** | **0.6968** | **0.6968** | **4.0000e-005** | **0.0000** | **0.6976** |

## 3.3 Grading - 2016

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0655 | 0.0000 | 0.0655 | 0.0337 | 0.0000 | 0.0337 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0367 | 0.3845 | 0.2608 | 3.0000e-004 | | 0.0220 | 0.0220 | | 0.0202 | 0.0202 | 0.0000 | 28.0664 | 28.0664 | 8.4700e-003 | 0.0000 | 28.2442 |
| **Total** | **0.0367** | **0.3845** | **0.2608** | **3.0000e-004** | **0.0655** | **0.0220** | **0.0875** | **0.0337** | **0.0202** | **0.0539** | **0.0000** | **28.0664** | **28.0664** | **8.4700e-003** | **0.0000** | **28.2442** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.5000e-004 | 6.9000e-004 | 6.8000e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.1614 | 1.1614 | 6.0000e-005 | 0.0000 | 1.1626 |
| **Total** | **5.5000e-004** | **6.9000e-004** | **6.8000e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.1614** | **1.1614** | **6.0000e-005** | **0.0000** | **1.1626** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0256 | 0.0000 | 0.0256 | 0.0131 | 0.0000 | 0.0131 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2500e-003 | 0.1482 | 0.2038 | 3.0000e-004 | | 7.8500e-003 | 7.8500e-003 | | 7.8500e-003 | 7.8500e-003 | 0.0000 | 28.0664 | 28.0664 | 8.4700e-003 | 0.0000 | 28.2441 |
| **Total** | **7.2500e-003** | **0.1482** | **0.2038** | **3.0000e-004** | **0.0256** | **7.8500e-003** | **0.0334** | **0.0131** | **7.8500e-003** | **0.0210** | **0.0000** | **28.0664** | **28.0664** | **8.4700e-003** | **0.0000** | **28.2441** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.5000e-004 | 6.9000e-004 | 6.8000e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.1614 | 1.1614 | 6.0000e-005 | 0.0000 | 1.1626 |
| **Total** | **5.5000e-004** | **6.9000e-004** | **6.8000e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.1614** | **1.1614** | **6.0000e-005** | **0.0000** | **1.1626** |

# 3.4 Building Construction - 2016

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.3577 | 2.9932 | 1.9432 | 2.8200e-003 | | 0.2066 | 0.2066 | | 0.1941 | 0.1941 | 0.0000 | 254.2613 | 254.2613 | 0.0631 | 0.0000 | 255.5856 |
| **Total** | **0.3577** | **2.9932** | **1.9432** | **2.8200e-003** | | **0.2066** | **0.2066** | | **0.1941** | **0.1941** | **0.0000** | **254.2613** | **254.2613** | **0.0631** | **0.0000** | **255.5856** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0153 | 0.1271 | 0.1841 | 3.0000e-004 | 8.2700e-003 | 2.2300e-003 | 0.0105 | 2.3700e-003 | 2.0500e-003 | 4.4200e-003 | 0.0000 | 27.1569 | 27.1569 | 2.3000e-004 | 0.0000 | 27.1618 |
| Worker | 0.0301 | 0.0374 | 0.3714 | 8.5000e-004 | 0.0660 | 5.2000e-004 | 0.0665 | 0.0175 | 4.8000e-004 | 0.0180 | 0.0000 | 63.4118 | 63.4118 | 3.2500e-003 | 0.0000 | 63.4799 |
| **Total** | **0.0453** | **0.1646** | **0.5555** | **1.1500e-003** | **0.0743** | **2.7500e-003** | **0.0770** | **0.0199** | **2.5300e-003** | **0.0224** | **0.0000** | **90.5687** | **90.5687** | **3.4800e-003** | **0.0000** | **90.6418** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1184 | 1.5000 | 1.9203 | 2.8200e-003 | | 0.0988 | 0.0988 | | 0.0988 | 0.0988 | 0.0000 | 254.2610 | 254.2610 | 0.0631 | 0.0000 | 255.5853 |
| **Total** | **0.1184** | **1.5000** | **1.9203** | **2.8200e-003** | | **0.0988** | **0.0988** | | **0.0988** | **0.0988** | **0.0000** | **254.2610** | **254.2610** | **0.0631** | **0.0000** | **255.5853** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0153 | 0.1271 | 0.1841 | 3.0000e-004 | 6.7800e-003 | 2.2300e-003 | 9.0200e-003 | 2.0000e-003 | 2.0500e-003 | 4.0600e-003 | 0.0000 | 27.1569 | 27.1569 | 2.3000e-004 | 0.0000 | 27.1618 |
| Worker | 0.0301 | 0.0374 | 0.3714 | 8.5000e-004 | 0.0517 | 5.2000e-004 | 0.0522 | 0.0140 | 4.8000e-004 | 0.0145 | 0.0000 | 63.4118 | 63.4118 | 3.2500e-003 | 0.0000 | 63.4799 |
| **Total** | **0.0453** | **0.1646** | **0.5555** | **1.1500e-003** | **0.0585** | **2.7500e-003** | **0.0612** | **0.0160** | **2.5300e-003** | **0.0186** | **0.0000** | **90.5687** | **90.5687** | **3.4800e-003** | **0.0000** | **90.6418** |

## 3.4 Building Construction - 2017

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0310 | 0.2641 | 0.1813 | 2.7000e-004 | | 0.0178 | 0.0178 | | 0.0167 | 0.0167 | 0.0000 | 23.9479 | 23.9479 | 5.8900e-003 | 0.0000 | 24.0717 |
| **Total** | **0.0310** | **0.2641** | **0.1813** | **2.7000e-004** | | **0.0178** | **0.0178** | | **0.0167** | **0.0167** | **0.0000** | **23.9479** | **23.9479** | **5.8900e-003** | **0.0000** | **24.0717** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.2900e-003 | 0.0107 | 0.0163 | 3.0000e-005 | 7.9000e-004 | 1.8000e-004 | 9.7000e-004 | 2.3000e-004 | 1.6000e-004 | 3.9000e-004 | 0.0000 | 2.5424 | 2.5424 | 2.0000e-005 | 0.0000 | 2.5428 |
| Worker | 2.5100e-003 | 3.1700e-003 | 0.0310 | 8.0000e-005 | 6.2900e-003 | 5.0000e-005 | 6.3300e-003 | 1.6700e-003 | 4.0000e-005 | 1.7100e-003 | 0.0000 | 5.7993 | 5.7993 | 2.8000e-004 | 0.0000 | 5.8052 |
| **Total** | **3.8000e-003** | **0.0139** | **0.0473** | **1.1000e-004** | **7.0800e-003** | **2.3000e-004** | **7.3000e-003** | **1.9000e-003** | **2.0000e-004** | **2.1000e-003** | **0.0000** | **8.3417** | **8.3417** | **3.0000e-004** | **0.0000** | **8.3480** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0107 | 0.1423 | 0.1823 | 2.7000e-004 | | 9.2700e-003 | 9.2700e-003 | | 9.2700e-003 | 9.2700e-003 | 0.0000 | 23.9479 | 23.9479 | 5.8900e-003 | 0.0000 | 24.0717 |
| **Total** | **0.0107** | **0.1423** | **0.1823** | **2.7000e-004** | | **9.2700e-003** | **9.2700e-003** | | **9.2700e-003** | **9.2700e-003** | **0.0000** | **23.9479** | **23.9479** | **5.8900e-003** | **0.0000** | **24.0717** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.2900e-003 | 0.0107 | 0.0163 | 3.0000e-005 | 6.5000e-004 | 1.8000e-004 | 8.2000e-004 | 1.9000e-004 | 1.6000e-004 | 3.6000e-004 | 0.0000 | 2.5424 | 2.5424 | 2.0000e-005 | 0.0000 | 2.5428 |
| Worker | 2.5100e-003 | 3.1700e-003 | 0.0310 | 8.0000e-005 | 4.9200e-003 | 5.0000e-005 | 4.9700e-003 | 1.3400e-003 | 4.0000e-005 | 1.3800e-003 | 0.0000 | 5.7993 | 5.7993 | 2.8000e-004 | 0.0000 | 5.8052 |
| **Total** | **3.8000e-003** | **0.0139** | **0.0473** | **1.1000e-004** | **5.5700e-003** | **2.3000e-004** | **5.7900e-003** | **1.5300e-003** | **2.0000e-004** | **1.7400e-003** | **0.0000** | **8.3417** | **8.3417** | **3.0000e-004** | **0.0000** | **8.3480** |

# 3.5 Paving - 2016

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2194 | 2.3505 | 1.5559 | 2.3400e-003 | | 0.1324 | 0.1324 | | 0.1218 | 0.1218 | 0.0000 | 220.6451 | 220.6451 | 0.0666 | 0.0000 | 222.0427 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.2194** | **2.3505** | **1.5559** | **2.3400e-003** | | **0.1324** | **0.1324** | | **0.1218** | **0.1218** | **0.0000** | **220.6451** | **220.6451** | **0.0666** | **0.0000** | **222.0427** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.7800e-003 | 7.2000e-003 | 0.0714 | 1.6000e-004 | 0.0127 | 1.0000e-004 | 0.0128 | 3.3700e-003 | 9.0000e-005 | 3.4600e-003 | 0.0000 | 12.1946 | 12.1946 | 6.2000e-004 | 0.0000 | 12.2077 |
| **Total** | **5.7800e-003** | **7.2000e-003** | **0.0714** | **1.6000e-004** | **0.0127** | **1.0000e-004** | **0.0128** | **3.3700e-003** | **9.0000e-005** | **3.4600e-003** | **0.0000** | **12.1946** | **12.1946** | **6.2000e-004** | **0.0000** | **12.2077** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0577 | 1.1618 | 1.7774 | 2.3400e-003 | | 0.0628 | 0.0628 | | 0.0628 | 0.0628 | 0.0000 | 220.6448 | 220.6448 | 0.0666 | 0.0000 | 222.0425 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0577** | **1.1618** | **1.7774** | **2.3400e-003** | | **0.0628** | **0.0628** | | **0.0628** | **0.0628** | **0.0000** | **220.6448** | **220.6448** | **0.0666** | **0.0000** | **222.0425** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.7800e-003 | 7.2000e-003 | 0.0714 | 1.6000e-004 | 9.9400e-003 | 1.0000e-004 | 0.0100 | 2.7000e-003 | 9.0000e-005 | 2.7900e-003 | 0.0000 | 12.1946 | 12.1946 | 6.2000e-004 | 0.0000 | 12.2077 |
| **Total** | **5.7800e-003** | **7.2000e-003** | **0.0714** | **1.6000e-004** | **9.9400e-003** | **1.0000e-004** | **0.0100** | **2.7000e-003** | **9.0000e-005** | **2.7900e-003** | **0.0000** | **12.1946** | **12.1946** | **6.2000e-004** | **0.0000** | **12.2077** |

## 3.5 Paving - 2017

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0191 | 0.2030 | 0.1473 | 2.2000e-004 | | 0.0114 | 0.0114 | | 0.0105 | 0.0105 | 0.0000 | 20.6934 | 20.6934 | 6.3400e-003 | 0.0000 | 20.8266 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0191** | **0.2030** | **0.1473** | **2.2000e-004** | | **0.0114** | **0.0114** | | **0.0105** | **0.0105** | **0.0000** | **20.6934** | **20.6934** | **6.3400e-003** | **0.0000** | **20.8266** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.8000e-004 | 6.1000e-004 | 5.9700e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.1153 | 1.1153 | 5.0000e-005 | 0.0000 | 1.1164 |
| **Total** | **4.8000e-004** | **6.1000e-004** | **5.9700e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.1153** | **1.1153** | **5.0000e-005** | **0.0000** | **1.1164** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.4900e-003 | 0.1106 | 0.1693 | 2.2000e-004 | | 5.9800e-003 | 5.9800e-003 | | 5.9800e-003 | 5.9800e-003 | 0.0000 | 20.6934 | 20.6934 | 6.3400e-003 | 0.0000 | 20.8265 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **5.4900e-003** | **0.1106** | **0.1693** | **2.2000e-004** | | **5.9800e-003** | **5.9800e-003** | | **5.9800e-003** | **5.9800e-003** | **0.0000** | **20.6934** | **20.6934** | **6.3400e-003** | **0.0000** | **20.8265** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.8000e-004 | 6.1000e-004 | 5.9700e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.1153 | 1.1153 | 5.0000e-005 | 0.0000 | 1.1164 |
| **Total** | **4.8000e-004** | **6.1000e-004** | **5.9700e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.1153** | **1.1153** | **5.0000e-005** | **0.0000** | **1.1164** |

## 3.6 Architectural Coating - 2016

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9255 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0387 | 0.2491 | 0.1978 | 3.1000e-004 | | 0.0206 | 0.0206 | | 0.0206 | 0.0206 | 0.0000 | 26.8092 | 26.8092 | 3.1600e-003 | 0.0000 | 26.8755 |
| **Total** | **0.9642** | **0.2491** | **0.1978** | **3.1000e-004** | | **0.0206** | **0.0206** | | **0.0206** | **0.0206** | **0.0000** | **26.8092** | **26.8092** | **3.1600e-003** | **0.0000** | **26.8755** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.1700e-003 | 7.6800e-003 | 0.0762 | 1.7000e-004 | 0.0135 | 1.1000e-004 | 0.0136 | 3.6000e-003 | 1.0000e-004 | 3.6900e-003 | 0.0000 | 13.0075 | 13.0075 | 6.7000e-004 | 0.0000 | 13.0215 |
| **Total** | **6.1700e-003** | **7.6800e-003** | **0.0762** | **1.7000e-004** | **0.0135** | **1.1000e-004** | **0.0136** | **3.6000e-003** | **1.0000e-004** | **3.6900e-003** | **0.0000** | **13.0075** | **13.0075** | **6.7000e-004** | **0.0000** | **13.0215** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9255 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0387 | 0.2491 | 0.1978 | 3.1000e-004 | | 0.0206 | 0.0206 | | 0.0206 | 0.0206 | 0.0000 | 26.8091 | 26.8091 | 3.1600e-003 | 0.0000 | 26.8755 |
| **Total** | **0.9642** | **0.2491** | **0.1978** | **3.1000e-004** | | **0.0206** | **0.0206** | | **0.0206** | **0.0206** | **0.0000** | **26.8091** | **26.8091** | **3.1600e-003** | **0.0000** | **26.8755** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.1700e-003 | 7.6800e-003 | 0.0762 | 1.7000e-004 | 0.0106 | 1.1000e-004 | 0.0107 | 2.8800e-003 | 1.0000e-004 | 2.9700e-003 | 0.0000 | 13.0075 | 13.0075 | 6.7000e-004 | 0.0000 | 13.0215 |
| **Total** | **6.1700e-003** | **7.6800e-003** | **0.0762** | **1.7000e-004** | **0.0106** | **1.1000e-004** | **0.0107** | **2.8800e-003** | **1.0000e-004** | **2.9700e-003** | **0.0000** | **13.0075** | **13.0075** | **6.7000e-004** | **0.0000** | **13.0215** |

# 3.6 Architectural Coating - 2017

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0882 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.3200e-003 | 0.0219 | 0.0187 | 3.0000e-005 | | 1.7300e-003 | 1.7300e-003 | | 1.7300e-003 | 1.7300e-003 | 0.0000 | 2.5533 | 2.5533 | 2.7000e-004 | 0.0000 | 2.5589 |
| **Total** | **0.0915** | **0.0219** | **0.0187** | **3.0000e-005** | | **1.7300e-003** | **1.7300e-003** | | **1.7300e-003** | **1.7300e-003** | **0.0000** | **2.5533** | **2.5533** | **2.7000e-004** | **0.0000** | **2.5589** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.2000e-004 | 6.5000e-004 | 6.3700e-003 | 2.0000e-005 | 1.2900e-003 | 1.0000e-005 | 1.3000e-003 | 3.4000e-004 | 1.0000e-005 | 3.5000e-004 | 0.0000 | 1.1896 | 1.1896 | 6.0000e-005 | 0.0000 | 1.1908 |
| **Total** | **5.2000e-004** | **6.5000e-004** | **6.3700e-003** | **2.0000e-005** | **1.2900e-003** | **1.0000e-005** | **1.3000e-003** | **3.4000e-004** | **1.0000e-005** | **3.5000e-004** | **0.0000** | **1.1896** | **1.1896** | **6.0000e-005** | **0.0000** | **1.1908** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0882 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.3200e-003 | 0.0219 | 0.0187 | 3.0000e-005 | | 1.7300e-003 | 1.7300e-003 | | 1.7300e-003 | 1.7300e-003 | 0.0000 | 2.5533 | 2.5533 | 2.7000e-004 | 0.0000 | 2.5589 |
| **Total** | **0.0915** | **0.0219** | **0.0187** | **3.0000e-005** | | **1.7300e-003** | **1.7300e-003** | | **1.7300e-003** | **1.7300e-003** | **0.0000** | **2.5533** | **2.5533** | **2.7000e-004** | **0.0000** | **2.5589** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.2000e-004 | 6.5000e-004 | 6.3700e-003 | 2.0000e-005 | 1.0100e-003 | 1.0000e-005 | 1.0200e-003 | 2.7000e-004 | 1.0000e-005 | 2.8000e-004 | 0.0000 | 1.1896 | 1.1896 | 6.0000e-005 | 0.0000 | 1.1908 |
| **Total** | **5.2000e-004** | **6.5000e-004** | **6.3700e-003** | **2.0000e-005** | **1.0100e-003** | **1.0000e-005** | **1.0200e-003** | **2.7000e-004** | **1.0000e-005** | **2.8000e-004** | **0.0000** | **1.1896** | **1.1896** | **6.0000e-005** | **0.0000** | **1.1908** |

# Vineyard at Delano - Phase 3 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 108.00 | Dwelling Unit | 8.25 | 108,000.00 | 309 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2017 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 3 acreage = 8.25

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM Reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD PM2.5 Working Group. PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ suppressant per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | PhaseEndDate | 12/14/2018 | 1/26/2018 |
| tblConstructionPhase | PhaseEndDate | 12/14/2018 | 1/26/2018 |
| tblConstructionPhase | PhaseStartDate | 1/27/2018 | 3/12/2017 |
| tblConstructionPhase | PhaseStartDate | 3/11/2017 | 3/12/2017 |
| tblConstructionPhase | PhaseStartDate | 2/11/2017 | 2/12/2017 |
| tblConstructionPhase | PhaseStartDate | 1/27/2018 | 3/12/2017 |
| tblLandUse | LotAcreage | 2.84 | 8.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2017 |
| tblWoodstoves | NumberCatalytic | 8.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 8.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2017 | 1.5963 | 5.9113 | 4.7327 | 7.4700e-003 | 0.2583 | 0.3615 | 0.6198 | 0.1107 | 0.3376 | 0.4484 | 0.0000 | 654.8854 | 654.8854 | 0.1498 | 0.0000 | 658.0303 |
| 2018 | 0.1382 | 0.4378 | 0.3925 | 6.6000e-004 | 9.5700e-003 | 0.0261 | 0.0356 | 2.5600e-003 | 0.0244 | 0.0270 | 0.0000 | 56.8711 | 56.8711 | 0.0128 | 0.0000 | 57.1391 |
| **Total** | **1.7345** | **6.3491** | **5.1252** | **8.1300e-003** | **0.2679** | **0.3876** | **0.6554** | **0.1133** | **0.3620** | **0.4753** | **0.0000** | **711.7565** | **711.7565** | **0.1625** | **0.0000** | **715.1694** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2017 | 1.1932 | 3.2898 | 4.8445 | 7.4700e-003 | 0.1413 | 0.1936 | 0.3349 | 0.0545 | 0.1934 | 0.2479 | 0.0000 | 654.8848 | 654.8848 | 0.1498 | 0.0000 | 658.0297 |
| 2018 | 0.1110 | 0.2859 | 0.4233 | 6.6000e-004 | 7.5300e-003 | 0.0169 | 0.0244 | 2.0600e-003 | 0.0168 | 0.0189 | 0.0000 | 56.8711 | 56.8711 | 0.0128 | 0.0000 | 57.1390 |
| **Total** | **1.3041** | **3.5757** | **5.2678** | **8.1300e-003** | **0.1489** | **0.2105** | **0.3593** | **0.0566** | **0.2102** | **0.2668** | **0.0000** | **711.7558** | **711.7558** | **0.1625** | **0.0000** | **715.1687** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **24.81** | **43.68** | **-2.78** | **0.00** | **44.43** | **45.70** | **45.18** | **50.06** | **41.93** | **43.87** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2017 | 2/10/2017 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2017 | 3/10/2017 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 3/12/2017 | 1/26/2018 | 5 | 230 | |
| 4 | Paving | Paving | 3/12/2017 | 1/26/2018 | 5 | 230 | |
| 5 | Architectural Coating | Architectural Coating | 3/12/2017 | 1/26/2018 | 5 | 230 | |

**Acres of Grading (Site Preparation Phase): 0**
**Acres of Grading (Grading Phase): 10**
**Acres of Paving: 0**
**Residential Indoor: 218,700; Residential Outdoor: 72,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 78.00 | 12.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 16.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2017

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0242 | 0.2588 | 0.1970 | 2.0000e-004 | | 0.0138 | 0.0138 | | 0.0127 | 0.0127 | 0.0000 | 18.1577 | 18.1577 | 5.5600e-003 | 0.0000 | 18.2745 |
| **Total** | **0.0242** | **0.2588** | **0.1970** | **2.0000e-004** | **0.0903** | **0.0138** | **0.1041** | **0.0497** | **0.0127** | **0.0623** | **0.0000** | **18.1577** | **18.1577** | **5.5600e-003** | **0.0000** | **18.2745** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 3.7000e-004 | 3.5800e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 1.0000e-005 | 2.0000e-004 | 0.0000 | 0.6692 | 0.6692 | 3.0000e-005 | 0.0000 | 0.6698 |
| **Total** | **2.9000e-004** | **3.7000e-004** | **3.5800e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **1.0000e-005** | **2.0000e-004** | **0.0000** | **0.6692** | **0.6692** | **3.0000e-005** | **0.0000** | **0.6698** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 18.1577 | 18.1577 | 5.5600e-003 | 0.0000 | 18.2745 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **18.1577** | **18.1577** | **5.5600e-003** | **0.0000** | **18.2745** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 3.7000e-004 | 3.5800e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 1.0000e-005 | 1.6000e-004 | 0.0000 | 0.6692 | 0.6692 | 3.0000e-005 | 0.0000 | 0.6698 |
| **Total** | **2.9000e-004** | **3.7000e-004** | **3.5800e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **1.0000e-005** | **1.6000e-004** | **0.0000** | **0.6692** | **0.6692** | **3.0000e-005** | **0.0000** | **0.6698** |

## 3.3 Grading - 2017

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0655 | 0.0000 | 0.0655 | 0.0337 | 0.0000 | 0.0337 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0346 | 0.3598 | 0.2538 | 3.0000e-004 | | 0.0204 | 0.0204 | | 0.0188 | 0.0188 | 0.0000 | 27.6117 | 27.6117 | 8.4600e-003 | 0.0000 | 27.7893 |
| **Total** | **0.0346** | **0.3598** | **0.2538** | **3.0000e-004** | **0.0655** | **0.0204** | **0.0859** | **0.0337** | **0.0188** | **0.0524** | **0.0000** | **27.6117** | **27.6117** | **8.4600e-003** | **0.0000** | **27.7893** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.8000e-004 | 6.1000e-004 | 5.9700e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.1153 | 1.1153 | 5.0000e-005 | 0.0000 | 1.1164 |
| **Total** | **4.8000e-004** | **6.1000e-004** | **5.9700e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.1153** | **1.1153** | **5.0000e-005** | **0.0000** | **1.1164** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0256 | 0.0000 | 0.0256 | 0.0131 | 0.0000 | 0.0131 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2500e-003 | 0.1482 | 0.2038 | 3.0000e-004 | | 7.8500e-003 | 7.8500e-003 | | 7.8500e-003 | 7.8500e-003 | 0.0000 | 27.6117 | 27.6117 | 8.4600e-003 | 0.0000 | 27.7893 |
| **Total** | **7.2500e-003** | **0.1482** | **0.2038** | **3.0000e-004** | **0.0256** | **7.8500e-003** | **0.0334** | **0.0131** | **7.8500e-003** | **0.0210** | **0.0000** | **27.6117** | **27.6117** | **8.4600e-003** | **0.0000** | **27.7893** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.8000e-004 | 6.1000e-004 | 5.9700e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.1153 | 1.1153 | 5.0000e-005 | 0.0000 | 1.1164 |
| **Total** | **4.8000e-004** | **6.1000e-004** | **5.9700e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.1153** | **1.1153** | **5.0000e-005** | **0.0000** | **1.1164** |

# 3.4 Building Construction - 2017

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.3258 | 2.7726 | 1.9036 | 2.8100e-003 | | 0.1870 | 0.1870 | | 0.1757 | 0.1757 | 0.0000 | 251.4531 | 251.4531 | 0.0619 | 0.0000 | 252.7527 |
| **Total** | **0.3258** | **2.7726** | **1.9036** | **2.8100e-003** | | **0.1870** | **0.1870** | | **0.1757** | **0.1757** | **0.0000** | **251.4531** | **251.4531** | **0.0619** | **0.0000** | **252.7527** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0135 | 0.1121 | 0.1709 | 3.0000e-004 | 8.2700e-003 | 1.8700e-003 | 0.0102 | 2.3700e-003 | 1.7200e-003 | 4.0900e-003 | 0.0000 | 26.6952 | 26.6952 | 2.2000e-004 | 0.0000 | 26.6998 |
| Worker | 0.0264 | 0.0333 | 0.3259 | 8.5000e-004 | 0.0660 | 5.0000e-004 | 0.0665 | 0.0175 | 4.6000e-004 | 0.0180 | 0.0000 | 60.8925 | 60.8925 | 2.9600e-003 | 0.0000 | 60.9546 |
| **Total** | **0.0399** | **0.1454** | **0.4968** | **1.1500e-003** | **0.0743** | **2.3700e-003** | **0.0767** | **0.0199** | **2.1800e-003** | **0.0221** | **0.0000** | **87.5877** | **87.5877** | **3.1800e-003** | **0.0000** | **87.6544** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1120 | 1.4936 | 1.9143 | 2.8100e-003 | | 0.0974 | 0.0974 | | 0.0974 | 0.0974 | 0.0000 | 251.4528 | 251.4528 | 0.0619 | 0.0000 | 252.7524 |
| **Total** | **0.1120** | **1.4936** | **1.9143** | **2.8100e-003** | | **0.0974** | **0.0974** | | **0.0974** | **0.0974** | **0.0000** | **251.4528** | **251.4528** | **0.0619** | **0.0000** | **252.7524** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0135 | 0.1121 | 0.1709 | 3.0000e-004 | 6.7900e-003 | 1.8700e-003 | 8.6600e-003 | 2.0000e-003 | 1.7200e-003 | 3.7300e-003 | 0.0000 | 26.6952 | 26.6952 | 2.2000e-004 | 0.0000 | 26.6998 |
| Worker | 0.0264 | 0.0333 | 0.3259 | 8.5000e-004 | 0.0517 | 5.0000e-004 | 0.0522 | 0.0140 | 4.6000e-004 | 0.0145 | 0.0000 | 60.8925 | 60.8925 | 2.9600e-003 | 0.0000 | 60.9546 |
| **Total** | **0.0399** | **0.1454** | **0.4968** | **1.1500e-003** | **0.0585** | **2.3700e-003** | **0.0609** | **0.0160** | **2.1800e-003** | **0.0182** | **0.0000** | **87.5877** | **87.5877** | **3.1800e-003** | **0.0000** | **87.6544** |

# 3.4 Building Construction - 2018

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0267 | 0.2326 | 0.1753 | 2.7000e-004 | | 0.0149 | 0.0149 | | 0.0141 | 0.0141 | 0.0000 | 23.6770 | 23.6770 | 5.7900e-003 | 0.0000 | 23.7987 |
| **Total** | **0.0267** | **0.2326** | **0.1753** | **2.7000e-004** | | **0.0149** | **0.0149** | | **0.0141** | **0.0141** | **0.0000** | **23.6770** | **23.6770** | **5.7900e-003** | **0.0000** | **23.7987** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.1900e-003 | 9.5800e-003 | 0.0154 | 3.0000e-005 | 7.9000e-004 | 1.6000e-004 | 9.5000e-004 | 2.3000e-004 | 1.5000e-004 | 3.8000e-004 | 0.0000 | 2.4980 | 2.4980 | 2.0000e-005 | 0.0000 | 2.4984 |
| Worker | 2.2100e-003 | 2.8300e-003 | 0.0274 | 8.0000e-005 | 6.2900e-003 | 5.0000e-005 | 6.3300e-003 | 1.6700e-003 | 4.0000e-005 | 1.7100e-003 | 0.0000 | 5.5631 | 5.5631 | 2.6000e-004 | 0.0000 | 5.5686 |
| **Total** | **3.4000e-003** | **0.0124** | **0.0428** | **1.1000e-004** | **7.0800e-003** | **2.1000e-004** | **7.2800e-003** | **1.9000e-003** | **1.9000e-004** | **2.0900e-003** | **0.0000** | **8.0612** | **8.0612** | **2.8000e-004** | **0.0000** | **8.0670** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0101 | 0.1417 | 0.1818 | 2.7000e-004 | | 9.1300e-003 | 9.1300e-003 | | 9.1300e-003 | 9.1300e-003 | 0.0000 | 23.6769 | 23.6769 | 5.7900e-003 | 0.0000 | 23.7986 |
| **Total** | **0.0101** | **0.1417** | **0.1818** | **2.7000e-004** | | **9.1300e-003** | **9.1300e-003** | | **9.1300e-003** | **9.1300e-003** | **0.0000** | **23.6769** | **23.6769** | **5.7900e-003** | **0.0000** | **23.7986** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.1900e-003 | 9.5800e-003 | 0.0154 | 3.0000e-005 | 6.5000e-004 | 1.6000e-004 | 8.1000e-004 | 1.9000e-004 | 1.5000e-004 | 3.4000e-004 | 0.0000 | 2.4980 | 2.4980 | 2.0000e-005 | 0.0000 | 2.4984 |
| Worker | 2.2100e-003 | 2.8300e-003 | 0.0274 | 8.0000e-005 | 4.9200e-003 | 5.0000e-005 | 4.9700e-003 | 1.3400e-003 | 4.0000e-005 | 1.3800e-003 | 0.0000 | 5.5631 | 5.5631 | 2.6000e-004 | 0.0000 | 5.5686 |
| **Total** | **3.4000e-003** | **0.0124** | **0.0428** | **1.1000e-004** | **5.5700e-003** | **2.1000e-004** | **5.7800e-003** | **1.5300e-003** | **1.9000e-004** | **1.7200e-003** | **0.0000** | **8.0612** | **8.0612** | **2.8000e-004** | **0.0000** | **8.0670** |

## 3.5 Paving - 2017

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2003 | 2.1311 | 1.5463 | 2.3400e-003 | | 0.1195 | 0.1195 | | 0.1100 | 0.1100 | 0.0000 | 217.2809 | 217.2809 | 0.0666 | 0.0000 | 218.6790 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.2003** | **2.1311** | **1.5463** | **2.3400e-003** | | **0.1195** | **0.1195** | | **0.1100** | **0.1100** | **0.0000** | **217.2809** | **217.2809** | **0.0666** | **0.0000** | **218.6790** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.0700e-003 | 6.4000e-003 | 0.0627 | 1.6000e-004 | 0.0127 | 1.0000e-004 | 0.0128 | 3.3700e-003 | 9.0000e-005 | 3.4600e-003 | 0.0000 | 11.7101 | 11.7101 | 5.7000e-004 | 0.0000 | 11.7220 |
| **Total** | **5.0700e-003** | **6.4000e-003** | **0.0627** | **1.6000e-004** | **0.0127** | **1.0000e-004** | **0.0128** | **3.3700e-003** | **9.0000e-005** | **3.4600e-003** | **0.0000** | **11.7101** | **11.7101** | **5.7000e-004** | **0.0000** | **11.7220** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0577 | 1.1618 | 1.7774 | 2.3400e-003 | | 0.0628 | 0.0628 | | 0.0628 | 0.0628 | 0.0000 | 217.2806 | 217.2806 | 0.0666 | 0.0000 | 218.6787 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0577** | **1.1618** | **1.7774** | **2.3400e-003** | | **0.0628** | **0.0628** | | **0.0628** | **0.0628** | **0.0000** | **217.2806** | **217.2806** | **0.0666** | **0.0000** | **218.6787** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.0700e-003 | 6.4000e-003 | 0.0627 | 1.6000e-004 | 9.9400e-003 | 1.0000e-004 | 0.0100 | 2.7000e-003 | 9.0000e-005 | 2.7900e-003 | 0.0000 | 11.7101 | 11.7101 | 5.7000e-004 | 0.0000 | 11.7220 |
| **Total** | **5.0700e-003** | **6.4000e-003** | **0.0627** | **1.6000e-004** | **9.9400e-003** | **1.0000e-004** | **0.0100** | **2.7000e-003** | **9.0000e-005** | **2.7900e-003** | **0.0000** | **11.7101** | **11.7101** | **5.7000e-004** | **0.0000** | **11.7220** |

# 3.5 Paving - 2018

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0161 | 0.1716 | 0.1449 | 2.2000e-004 | | 9.3900e-003 | 9.3900e-003 | | 8.6400e-003 | 8.6400e-003 | 0.0000 | 20.3687 | 20.3687 | 6.3400e-003 | 0.0000 | 20.5019 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0161** | **0.1716** | **0.1449** | **2.2000e-004** | | **9.3900e-003** | **9.3900e-003** | | **8.6400e-003** | **8.6400e-003** | **0.0000** | **20.3687** | **20.3687** | **6.3400e-003** | **0.0000** | **20.5019** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3000e-004 | 5.4000e-004 | 5.2700e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.0698 | 1.0698 | 5.0000e-005 | 0.0000 | 1.0709 |
| **Total** | **4.3000e-004** | **5.4000e-004** | **5.2700e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.0698** | **1.0698** | **5.0000e-005** | **0.0000** | **1.0709** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.4900e-003 | 0.1106 | 0.1693 | 2.2000e-004 | | 5.9800e-003 | 5.9800e-003 | | 5.9800e-003 | 5.9800e-003 | 0.0000 | 20.3687 | 20.3687 | 6.3400e-003 | 0.0000 | 20.5019 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **5.4900e-003** | **0.1106** | **0.1693** | **2.2000e-004** | | **5.9800e-003** | **5.9800e-003** | | **5.9800e-003** | **5.9800e-003** | **0.0000** | **20.3687** | **20.3687** | **6.3400e-003** | **0.0000** | **20.5019** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3000e-004 | 5.4000e-004 | 5.2700e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.0698 | 1.0698 | 5.0000e-005 | 0.0000 | 1.0709 |
| **Total** | **4.3000e-004** | **5.4000e-004** | **5.2700e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.0698** | **1.0698** | **5.0000e-005** | **0.0000** | **1.0709** |

# 3.6 Architectural Coating - 2017

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9255 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0349 | 0.2294 | 0.1962 | 3.1000e-004 | | 0.0182 | 0.0182 | | 0.0182 | 0.0182 | 0.0000 | 26.8092 | 26.8092 | 2.8300e-003 | 0.0000 | 26.8686 |
| **Total** | **0.9604** | **0.2294** | **0.1962** | **3.1000e-004** | | **0.0182** | **0.0182** | | **0.0182** | **0.0182** | **0.0000** | **26.8092** | **26.8092** | **2.8300e-003** | **0.0000** | **26.8686** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.4100e-003 | 6.8200e-003 | 0.0669 | 1.7000e-004 | 0.0135 | 1.0000e-004 | 0.0136 | 3.6000e-003 | 9.0000e-005 | 3.6900e-003 | 0.0000 | 12.4908 | 12.4908 | 6.1000e-004 | 0.0000 | 12.5035 |
| **Total** | **5.4100e-003** | **6.8200e-003** | **0.0669** | **1.7000e-004** | **0.0135** | **1.0000e-004** | **0.0136** | **3.6000e-003** | **9.0000e-005** | **3.6900e-003** | **0.0000** | **12.4908** | **12.4908** | **6.1000e-004** | **0.0000** | **12.5035** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9255 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0349 | 0.2294 | 0.1962 | 3.1000e-004 | | 0.0182 | 0.0182 | | 0.0182 | 0.0182 | 0.0000 | 26.8091 | 26.8091 | 2.8300e-003 | 0.0000 | 26.8686 |
| **Total** | **0.9604** | **0.2294** | **0.1962** | **3.1000e-004** | | **0.0182** | **0.0182** | | **0.0182** | **0.0182** | **0.0000** | **26.8091** | **26.8091** | **2.8300e-003** | **0.0000** | **26.8686** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.4100e-003 | 6.8200e-003 | 0.0669 | 1.7000e-004 | 0.0106 | 1.0000e-004 | 0.0107 | 2.8800e-003 | 9.0000e-005 | 2.9700e-003 | 0.0000 | 12.4908 | 12.4908 | 6.1000e-004 | 0.0000 | 12.5035 |
| **Total** | **5.4100e-003** | **6.8200e-003** | **0.0669** | **1.7000e-004** | **0.0106** | **1.0000e-004** | **0.0107** | **2.8800e-003** | **9.0000e-005** | **2.9700e-003** | **0.0000** | **12.4908** | **12.4908** | **6.1000e-004** | **0.0000** | **12.5035** |

## 3.6 Architectural Coating - 2018

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0882 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.9900e-003 | 0.0201 | 0.0185 | 3.0000e-005 | | 1.5100e-003 | 1.5100e-003 | | 1.5100e-003 | 1.5100e-003 | 0.0000 | 2.5533 | 2.5533 | 2.4000e-004 | 0.0000 | 2.5584 |
| **Total** | **0.0911** | **0.0201** | **0.0185** | **3.0000e-005** | | **1.5100e-003** | **1.5100e-003** | | **1.5100e-003** | **1.5100e-003** | **0.0000** | **2.5533** | **2.5533** | **2.4000e-004** | **0.0000** | **2.5584** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.5000e-004 | 5.8000e-004 | 5.6200e-003 | 2.0000e-005 | 1.2900e-003 | 1.0000e-005 | 1.3000e-003 | 3.4000e-004 | 1.0000e-005 | 3.5000e-004 | 0.0000 | 1.1412 | 1.1412 | 5.0000e-005 | 0.0000 | 1.1423 |
| **Total** | **4.5000e-004** | **5.8000e-004** | **5.6200e-003** | **2.0000e-005** | **1.2900e-003** | **1.0000e-005** | **1.3000e-003** | **3.4000e-004** | **1.0000e-005** | **3.5000e-004** | **0.0000** | **1.1412** | **1.1412** | **5.0000e-005** | **0.0000** | **1.1423** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0882 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.9900e-003 | 0.0201 | 0.0185 | 3.0000e-005 | | 1.5100e-003 | 1.5100e-003 | | 1.5100e-003 | 1.5100e-003 | 0.0000 | 2.5533 | 2.5533 | 2.4000e-004 | 0.0000 | 2.5584 |
| **Total** | **0.0911** | **0.0201** | **0.0185** | **3.0000e-005** | | **1.5100e-003** | **1.5100e-003** | | **1.5100e-003** | **1.5100e-003** | **0.0000** | **2.5533** | **2.5533** | **2.4000e-004** | **0.0000** | **2.5584** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.5000e-004 | 5.8000e-004 | 5.6200e-003 | 2.0000e-005 | 1.0100e-003 | 1.0000e-005 | 1.0200e-003 | 2.7000e-004 | 1.0000e-005 | 2.8000e-004 | 0.0000 | 1.1412 | 1.1412 | 5.0000e-005 | 0.0000 | 1.1423 |
| **Total** | **4.5000e-004** | **5.8000e-004** | **5.6200e-003** | **2.0000e-005** | **1.0100e-003** | **1.0000e-005** | **1.0200e-003** | **2.7000e-004** | **1.0000e-005** | **2.8000e-004** | **0.0000** | **1.1412** | **1.1412** | **5.0000e-005** | **0.0000** | **1.1423** |

# Vineyard at Delano - Phase 4 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 108.00 | Dwelling Unit | 8.25 | 108,000.00 | 309 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2018 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 4 acreage = 8.25

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Vehicle Trips -

Construction Off-road Equipment Mitigation - Tier 3 Enigine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD's CEQA Handbook (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ suppressant per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 10.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | NumDays | 20.00 | 230.00 |
| tblConstructionPhase | PhaseEndDate | 12/13/2019 | 1/25/2019 |
| tblConstructionPhase | PhaseEndDate | 12/13/2019 | 1/25/2019 |
| tblConstructionPhase | PhaseStartDate | 1/26/2019 | 3/12/2018 |
| tblConstructionPhase | PhaseStartDate | 3/10/2018 | 3/12/2018 |
| tblConstructionPhase | PhaseStartDate | 2/10/2018 | 2/12/2018 |
| tblConstructionPhase | PhaseStartDate | 1/26/2019 | 3/12/2018 |
| tblLandUse | LotAcreage | 2.84 | 8.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2018 |
| tblWoodstoves | NumberCatalytic | 8.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 8.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2018 | 1.5103 | 5.1587 | 4.5704 | 7.5000e-003 | 0.2588 | 0.3040 | 0.5628 | 0.1108 | 0.2841 | 0.3950 | 0.0000 | 646.7253 | 646.7253 | 0.1487 | 0.0000 | 649.8481 |
| 2019 | 0.1258 | 0.3701 | 0.3632 | 6.3000e-004 | 9.0900e-003 | 0.0213 | 0.0304 | 2.4300e-003 | 0.0200 | 0.0224 | 0.0000 | 53.1533 | 53.1533 | 0.0120 | 0.0000 | 53.4049 |
| **Total** | **1.6362** | **5.5288** | **4.9336** | **8.1300e-003** | **0.2679** | **0.3253** | **0.5932** | **0.1133** | **0.3041** | **0.4174** | **0.0000** | **699.8787** | **699.8787** | **0.1607** | **0.0000** | **703.2530** |

## Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2018 | 1.1835 | 3.2625 | 4.7948 | 7.5000e-003 | 0.1417 | 0.1904 | 0.3321 | 0.0546 | 0.1902 | 0.2448 | 0.0000 | 646.7247 | 646.7247 | 0.1487 | 0.0000 | 649.8475 |
| 2019 | 0.1042 | 0.2682 | 0.3971 | 6.3000e-004 | 7.1500e-003 | 0.0157 | 0.0228 | 1.9500e-003 | 0.0156 | 0.0176 | 0.0000 | 53.1533 | 53.1533 | 0.0120 | 0.0000 | 53.4048 |
| **Total** | **1.2877** | **3.5307** | **5.1918** | **8.1300e-003** | **0.1489** | **0.2060** | **0.3549** | **0.0566** | **0.2058** | **0.2624** | **0.0000** | **699.8780** | **699.8780** | **0.1607** | **0.0000** | **703.2523** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **21.30** | **36.14** | **-5.23** | **0.00** | **44.43** | **36.67** | **40.17** | **50.07** | **32.31** | **37.13** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

# 3.0 Construction Detail

## Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2018 | 2/9/2018 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2018 | 3/9/2018 | 5 | 20 | |
| 3 | Building Construction | Building Construction | 3/12/2018 | 1/25/2019 | 5 | 230 | |
| 4 | Paving | Paving | 3/12/2018 | 1/25/2019 | 5 | 230 | |
| 5 | Architectural Coating | Architectural Coating | 3/12/2018 | 1/25/2019 | 5 | 230 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 10**

**Acres of Paving: 0**

**Residential Indoor: 218,700; Residential Outdoor: 72,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 1 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 78.00 | 12.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 16.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2018

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0215 | 0.2280 | 0.1812 | 2.0000e-004 | | 0.0118 | 0.0118 | | 0.0109 | 0.0109 | 0.0000 | 17.8705 | 17.8705 | 5.5600e-003 | 0.0000 | 17.9873 |
| **Total** | **0.0215** | **0.2280** | **0.1812** | **2.0000e-004** | **0.0903** | **0.0118** | **0.1022** | **0.0497** | **0.0109** | **0.0605** | **0.0000** | **17.8705** | **17.8705** | **5.5600e-003** | **0.0000** | **17.9873** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.6000e-004 | 3.3000e-004 | 3.1600e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.6419 | 0.6419 | 3.0000e-005 | 0.0000 | 0.6425 |
| **Total** | **2.6000e-004** | **3.3000e-004** | **3.1600e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **0.6419** | **0.6419** | **3.0000e-005** | **0.0000** | **0.6425** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 17.8705 | 17.8705 | 5.5600e-003 | 0.0000 | 17.9873 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **17.8705** | **17.8705** | **5.5600e-003** | **0.0000** | **17.9873** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.6000e-004 | 3.3000e-004 | 3.1600e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.6419 | 0.6419 | 3.0000e-005 | 0.0000 | 0.6425 |
| **Total** | **2.6000e-004** | **3.3000e-004** | **3.1600e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.6419** | **0.6419** | **3.0000e-005** | **0.0000** | **0.6425** |

# 3.3 Grading - 2018

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0655 | 0.0000 | 0.0655 | 0.0337 | 0.0000 | 0.0337 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0300 | 0.3107 | 0.2400 | 3.0000e-004 | | 0.0172 | 0.0172 | | 0.0158 | 0.0158 | 0.0000 | 27.1530 | 27.1530 | 8.4500e-003 | 0.0000 | 27.3305 |
| **Total** | **0.0300** | **0.3107** | **0.2400** | **3.0000e-004** | **0.0655** | **0.0172** | **0.0827** | **0.0337** | **0.0158** | **0.0495** | **0.0000** | **27.1530** | **27.1530** | **8.4500e-003** | **0.0000** | **27.3305** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3000e-004 | 5.4000e-004 | 5.2700e-003 | 2.0000e-005 | 1.2100e-003 | 1.0000e-005 | 1.2200e-003 | 3.2000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.0698 | 1.0698 | 5.0000e-005 | 0.0000 | 1.0709 |
| **Total** | **4.3000e-004** | **5.4000e-004** | **5.2700e-003** | **2.0000e-005** | **1.2100e-003** | **1.0000e-005** | **1.2200e-003** | **3.2000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.0698** | **1.0698** | **5.0000e-005** | **0.0000** | **1.0709** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0256 | 0.0000 | 0.0256 | 0.0131 | 0.0000 | 0.0131 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 7.2500e-003 | 0.1482 | 0.2038 | 3.0000e-004 | | 7.8500e-003 | 7.8500e-003 | | 7.8500e-003 | 7.8500e-003 | 0.0000 | 27.1529 | 27.1529 | 8.4500e-003 | 0.0000 | 27.3304 |
| **Total** | **7.2500e-003** | **0.1482** | **0.2038** | **3.0000e-004** | **0.0256** | **7.8500e-003** | **0.0334** | **0.0131** | **7.8500e-003** | **0.0210** | **0.0000** | **27.1529** | **27.1529** | **8.4500e-003** | **0.0000** | **27.3304** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3000e-004 | 5.4000e-004 | 5.2700e-003 | 2.0000e-005 | 9.5000e-004 | 1.0000e-005 | 9.6000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.0698 | 1.0698 | 5.0000e-005 | 0.0000 | 1.0709 |
| **Total** | **4.3000e-004** | **5.4000e-004** | **5.2700e-003** | **2.0000e-005** | **9.5000e-004** | **1.0000e-005** | **9.6000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.0698** | **1.0698** | **5.0000e-005** | **0.0000** | **1.0709** |

## 3.4 Building Construction - 2018

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2816 | 2.4540 | 1.8497 | 2.8300e-003 | | 0.1577 | 0.1577 | | 0.1482 | 0.1482 | 0.0000 | 249.7920 | 249.7920 | 0.0611 | 0.0000 | 251.0757 |
| **Total** | **0.2816** | **2.4540** | **1.8497** | **2.8300e-003** | | **0.1577** | **0.1577** | | **0.1482** | **0.1482** | **0.0000** | **249.7920** | **249.7920** | **0.0611** | **0.0000** | **251.0757** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0125 | 0.1011 | 0.1624 | 3.0000e-004 | 8.3100e-003 | 1.7300e-003 | 0.0100 | 2.3800e-003 | 1.5900e-003 | 3.9700e-003 | 0.0000 | 26.3541 | 26.3541 | 2.1000e-004 | 0.0000 | 26.3586 |
| Worker | 0.0234 | 0.0298 | 0.2891 | 8.5000e-004 | 0.0663 | 4.9000e-004 | 0.0668 | 0.0176 | 4.5000e-004 | 0.0181 | 0.0000 | 58.6910 | 58.6910 | 2.7300e-003 | 0.0000 | 58.7483 |
| **Total** | **0.0359** | **0.1309** | **0.4515** | **1.1500e-003** | **0.0746** | **2.2200e-003** | **0.0768** | **0.0200** | **2.0400e-003** | **0.0220** | **0.0000** | **85.0451** | **85.0451** | **2.9400e-003** | **0.0000** | **85.1068** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1063 | 1.4945 | 1.9178 | 2.8300e-003 | | 0.0963 | 0.0963 | | 0.0963 | 0.0963 | 0.0000 | 249.7917 | 249.7917 | 0.0611 | 0.0000 | 251.0754 |
| **Total** | **0.1063** | **1.4945** | **1.9178** | **2.8300e-003** | | **0.0963** | **0.0963** | | **0.0963** | **0.0963** | **0.0000** | **249.7917** | **249.7917** | **0.0611** | **0.0000** | **251.0754** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0125 | 0.1011 | 0.1624 | 3.0000e-004 | 6.8200e-003 | 1.7300e-003 | 8.5400e-003 | 2.0100e-003 | 1.5900e-003 | 3.6000e-003 | 0.0000 | 26.3541 | 26.3541 | 2.1000e-004 | 0.0000 | 26.3586 |
| Worker | 0.0234 | 0.0298 | 0.2891 | 8.5000e-004 | 0.0520 | 4.9000e-004 | 0.0524 | 0.0141 | 4.5000e-004 | 0.0145 | 0.0000 | 58.6910 | 58.6910 | 2.7300e-003 | 0.0000 | 58.7483 |
| **Total** | **0.0359** | **0.1309** | **0.4515** | **1.1500e-003** | **0.0588** | **2.2200e-003** | **0.0610** | **0.0161** | **2.0400e-003** | **0.0181** | **0.0000** | **85.0451** | **85.0451** | **2.9400e-003** | **0.0000** | **85.1068** |

## 3.4 Building Construction - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0223 | 0.1992 | 0.1626 | 2.5000e-004 | | 0.0122 | 0.0122 | | 0.0115 | 0.0115 | 0.0000 | 22.2417 | 22.2417 | 5.4100e-003 | 0.0000 | 22.3553 |
| **Total** | **0.0223** | **0.1992** | **0.1626** | **2.5000e-004** | | **0.0122** | **0.0122** | | **0.0115** | **0.0115** | **0.0000** | **22.2417** | **22.2417** | **5.4100e-003** | **0.0000** | **22.3553** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.0100e-003 | 8.2400e-003 | 0.0137 | 3.0000e-005 | 7.5000e-004 | 1.4000e-004 | 8.9000e-004 | 2.1000e-004 | 1.3000e-004 | 3.5000e-004 | 0.0000 | 2.3321 | 2.3321 | 2.0000e-005 | 0.0000 | 2.3325 |
| Worker | 1.9100e-003 | 2.4400e-003 | 0.0235 | 8.0000e-005 | 5.9700e-003 | 4.0000e-005 | 6.0200e-003 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 0.0000 | 5.0925 | 5.0925 | 2.3000e-004 | 0.0000 | 5.0973 |
| **Total** | **2.9200e-003** | **0.0107** | **0.0372** | **1.1000e-004** | **6.7200e-003** | **1.8000e-004** | **6.9100e-003** | **1.8000e-003** | **1.7000e-004** | **1.9800e-003** | **0.0000** | **7.4246** | **7.4246** | **2.5000e-004** | **0.0000** | **7.4298** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 9.0300e-003 | 0.1340 | 0.1722 | 2.5000e-004 | | 8.5400e-003 | 8.5400e-003 | | 8.5400e-003 | 8.5400e-003 | 0.0000 | 22.2416 | 22.2416 | 5.4100e-003 | 0.0000 | 22.3553 |
| **Total** | **9.0300e-003** | **0.1340** | **0.1722** | **2.5000e-004** | | **8.5400e-003** | **8.5400e-003** | | **8.5400e-003** | **8.5400e-003** | **0.0000** | **22.2416** | **22.2416** | **5.4100e-003** | **0.0000** | **22.3553** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 1.0100e-003 | 8.2400e-003 | 0.0137 | 3.0000e-005 | 6.1000e-004 | 1.4000e-004 | 7.6000e-004 | 1.8000e-004 | 1.3000e-004 | 3.1000e-004 | 0.0000 | 2.3321 | 2.3321 | 2.0000e-005 | 0.0000 | 2.3325 |
| Worker | 1.9100e-003 | 2.4400e-003 | 0.0235 | 8.0000e-005 | 4.6800e-003 | 4.0000e-005 | 4.7200e-003 | 1.2700e-003 | 4.0000e-005 | 1.3100e-003 | 0.0000 | 5.0925 | 5.0925 | 2.3000e-004 | 0.0000 | 5.0973 |
| **Total** | **2.9200e-003** | **0.0107** | **0.0372** | **1.1000e-004** | **5.2900e-003** | **1.8000e-004** | **5.4800e-003** | **1.4500e-003** | **1.7000e-004** | **1.6200e-003** | **0.0000** | **7.4246** | **7.4246** | **2.5000e-004** | **0.0000** | **7.4298** |

# 3.5 Paving - 2018

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1700 | 1.8107 | 1.5292 | 2.3500e-003 | | 0.0990 | 0.0990 | | 0.0911 | 0.0911 | 0.0000 | 214.8902 | 214.8902 | 0.0669 | 0.0000 | 216.2951 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.1700** | **1.8107** | **1.5292** | **2.3500e-003** | | **0.0990** | **0.0990** | | **0.0911** | **0.0911** | **0.0000** | **214.8902** | **214.8902** | **0.0669** | **0.0000** | **216.2951** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4900e-003 | 5.7400e-003 | 0.0556 | 1.6000e-004 | 0.0128 | 9.0000e-005 | 0.0129 | 3.3900e-003 | 9.0000e-005 | 3.4700e-003 | 0.0000 | 11.2867 | 11.2867 | 5.2000e-004 | 0.0000 | 11.2977 |
| **Total** | **4.4900e-003** | **5.7400e-003** | **0.0556** | **1.6000e-004** | **0.0128** | **9.0000e-005** | **0.0129** | **3.3900e-003** | **9.0000e-005** | **3.4700e-003** | **0.0000** | **11.2867** | **11.2867** | **5.2000e-004** | **0.0000** | **11.2977** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0579 | 1.1673 | 1.7859 | 2.3500e-003 | | 0.0631 | 0.0631 | | 0.0631 | 0.0631 | 0.0000 | 214.8900 | 214.8900 | 0.0669 | 0.0000 | 216.2948 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0579** | **1.1673** | **1.7859** | **2.3500e-003** | | **0.0631** | **0.0631** | | **0.0631** | **0.0631** | **0.0000** | **214.8900** | **214.8900** | **0.0669** | **0.0000** | **216.2948** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.4900e-003 | 5.7400e-003 | 0.0556 | 1.6000e-004 | 9.9900e-003 | 9.0000e-005 | 0.0101 | 2.7100e-003 | 9.0000e-005 | 2.8000e-003 | 0.0000 | 11.2867 | 11.2867 | 5.2000e-004 | 0.0000 | 11.2977 |
| **Total** | **4.4900e-003** | **5.7400e-003** | **0.0556** | **1.6000e-004** | **9.9900e-003** | **9.0000e-005** | **0.0101** | **2.7100e-003** | **9.0000e-005** | **2.8000e-003** | **0.0000** | **11.2867** | **11.2867** | **5.2000e-004** | **0.0000** | **11.2977** |

## 3.5 Paving - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0136 | 0.1419 | 0.1365 | 2.1000e-004 | | 7.6900e-003 | 7.6900e-003 | | 7.0700e-003 | 7.0700e-003 | 0.0000 | 19.0375 | 19.0375 | 6.0200e-003 | 0.0000 | 19.1640 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0136** | **0.1419** | **0.1365** | **2.1000e-004** | | **7.6900e-003** | **7.6900e-003** | | **7.0700e-003** | **7.0700e-003** | **0.0000** | **19.0375** | **19.0375** | **6.0200e-003** | **0.0000** | **19.1640** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 4.7000e-004 | 4.5300e-003 | 1.0000e-005 | 1.1500e-003 | 1.0000e-005 | 1.1600e-003 | 3.1000e-004 | 1.0000e-005 | 3.1000e-004 | 0.0000 | 0.9793 | 0.9793 | 4.0000e-005 | 0.0000 | 0.9803 |
| **Total** | **3.7000e-004** | **4.7000e-004** | **4.5300e-003** | **1.0000e-005** | **1.1500e-003** | **1.0000e-005** | **1.1600e-003** | **3.1000e-004** | **1.0000e-005** | **3.1000e-004** | **0.0000** | **0.9793** | **0.9793** | **4.0000e-005** | **0.0000** | **0.9803** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.2200e-003 | 0.1051 | 0.1608 | 2.1000e-004 | | 5.6800e-003 | 5.6800e-003 | | 5.6800e-003 | 5.6800e-003 | 0.0000 | 19.0375 | 19.0375 | 6.0200e-003 | 0.0000 | 19.1640 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **5.2200e-003** | **0.1051** | **0.1608** | **2.1000e-004** | | **5.6800e-003** | **5.6800e-003** | | **5.6800e-003** | **5.6800e-003** | **0.0000** | **19.0375** | **19.0375** | **6.0200e-003** | **0.0000** | **19.1640** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7000e-004 | 4.7000e-004 | 4.5300e-003 | 1.0000e-005 | 9.0000e-004 | 1.0000e-005 | 9.1000e-004 | 2.4000e-004 | 1.0000e-005 | 2.5000e-004 | 0.0000 | 0.9793 | 0.9793 | 4.0000e-005 | 0.0000 | 0.9803 |
| **Total** | **3.7000e-004** | **4.7000e-004** | **4.5300e-003** | **1.0000e-005** | **9.0000e-004** | **1.0000e-005** | **9.1000e-004** | **2.4000e-004** | **1.0000e-005** | **2.5000e-004** | **0.0000** | **0.9793** | **0.9793** | **4.0000e-005** | **0.0000** | **0.9803** |

# 3.6 Architectural Coating - 2018

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9299 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0315 | 0.2116 | 0.1956 | 3.1000e-004 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 26.9369 | 26.9369 | 2.5600e-003 | 0.0000 | 26.9906 |
| **Total** | **0.9615** | **0.2116** | **0.1956** | **3.1000e-004** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **26.9369** | **26.9369** | **2.5600e-003** | **0.0000** | **26.9906** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.7900e-003 | 6.1200e-003 | 0.0593 | 1.7000e-004 | 0.0136 | 1.0000e-004 | 0.0137 | 3.6100e-003 | 9.0000e-005 | 3.7100e-003 | 0.0000 | 12.0392 | 12.0392 | 5.6000e-004 | 0.0000 | 12.0509 |
| **Total** | **4.7900e-003** | **6.1200e-003** | **0.0593** | **1.7000e-004** | **0.0136** | **1.0000e-004** | **0.0137** | **3.6100e-003** | **9.0000e-005** | **3.7100e-003** | **0.0000** | **12.0392** | **12.0392** | **5.6000e-004** | **0.0000** | **12.0509** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.9299 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0315 | 0.2116 | 0.1956 | 3.1000e-004 | | 0.0159 | 0.0159 | | 0.0159 | 0.0159 | 0.0000 | 26.9368 | 26.9368 | 2.5600e-003 | 0.0000 | 26.9906 |
| **Total** | **0.9615** | **0.2116** | **0.1956** | **3.1000e-004** | | **0.0159** | **0.0159** | | **0.0159** | **0.0159** | **0.0000** | **26.9368** | **26.9368** | **2.5600e-003** | **0.0000** | **26.9906** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.7900e-003 | 6.1200e-003 | 0.0593 | 1.7000e-004 | 0.0107 | 1.0000e-004 | 0.0108 | 2.8900e-003 | 9.0000e-005 | 2.9800e-003 | 0.0000 | 12.0392 | 12.0392 | 5.6000e-004 | 0.0000 | 12.0509 |
| **Total** | **4.7900e-003** | **6.1200e-003** | **0.0593** | **1.7000e-004** | **0.0107** | **1.0000e-004** | **0.0108** | **2.8900e-003** | **9.0000e-005** | **2.9800e-003** | **0.0000** | **12.0392** | **12.0392** | **5.6000e-004** | **0.0000** | **12.0509** |

## 3.6 Architectural Coating - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0837 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.5300e-003 | 0.0174 | 0.0175 | 3.0000e-005 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 2.4256 | 2.4256 | 2.0000e-004 | 0.0000 | 2.4299 |
| **Total** | **0.0863** | **0.0174** | **0.0175** | **3.0000e-005** | | **1.2200e-003** | **1.2200e-003** | | **1.2200e-003** | **1.2200e-003** | **0.0000** | **2.4256** | **2.4256** | **2.0000e-004** | **0.0000** | **2.4299** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.9000e-004 | 5.0000e-004 | 4.8300e-003 | 2.0000e-005 | 1.2200e-003 | 1.0000e-005 | 1.2300e-003 | 3.3000e-004 | 1.0000e-005 | 3.3000e-004 | 0.0000 | 1.0446 | 1.0446 | 5.0000e-005 | 0.0000 | 1.0456 |
| **Total** | **3.9000e-004** | **5.0000e-004** | **4.8300e-003** | **2.0000e-005** | **1.2200e-003** | **1.0000e-005** | **1.2300e-003** | **3.3000e-004** | **1.0000e-005** | **3.3000e-004** | **0.0000** | **1.0446** | **1.0446** | **5.0000e-005** | **0.0000** | **1.0456** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.0837 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.5300e-003 | 0.0174 | 0.0175 | 3.0000e-005 | | 1.2200e-003 | 1.2200e-003 | | 1.2200e-003 | 1.2200e-003 | 0.0000 | 2.4256 | 2.4256 | 2.0000e-004 | 0.0000 | 2.4299 |
| **Total** | **0.0863** | **0.0174** | **0.0175** | **3.0000e-005** | | **1.2200e-003** | **1.2200e-003** | | **1.2200e-003** | **1.2200e-003** | **0.0000** | **2.4256** | **2.4256** | **2.0000e-004** | **0.0000** | **2.4299** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.9000e-004 | 5.0000e-004 | 4.8300e-003 | 2.0000e-005 | 9.6000e-004 | 1.0000e-005 | 9.7000e-004 | 2.6000e-004 | 1.0000e-005 | 2.7000e-004 | 0.0000 | 1.0446 | 1.0446 | 5.0000e-005 | 0.0000 | 1.0456 |
| **Total** | **3.9000e-004** | **5.0000e-004** | **4.8300e-003** | **2.0000e-005** | **9.6000e-004** | **1.0000e-005** | **9.7000e-004** | **2.6000e-004** | **1.0000e-005** | **2.7000e-004** | **0.0000** | **1.0446** | **1.0446** | **5.0000e-005** | **0.0000** | **1.0456** |

# West Pavilion - Phase 1 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 220.00 | Dwelling Unit | 19.25 | 220,000.00 | 629 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2019 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 1 acreage = 19.25

Construction Phase - Building construction, paving, & painting assumed to occur simultaneously

Grading - Site disturbance = 19.25

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads with suppressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 9.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | PhaseEndDate | 7/12/2021 | 5/18/2020 |
| tblConstructionPhase | PhaseEndDate | 7/12/2021 | 5/18/2020 |
| tblConstructionPhase | PhaseStartDate | 5/19/2020 | 3/26/2019 |
| tblConstructionPhase | PhaseStartDate | 5/19/2020 | 3/26/2019 |
| tblGrading | AcresOfGrading | 75.00 | 19.25 |
| tblLandUse | LotAcreage | 5.79 | 19.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2019 |
| tblWoodstoves | NumberCatalytic | 19.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 19.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 1.9587 | 5.0615 | 5.0836 | 9.1000e-003 | 0.3759 | 0.2760 | 0.6519 | 0.1499 | 0.2576 | 0.4075 | 0.0000 | 756.7097 | 756.7097 | 0.1619 | 0.0000 | 760.1093 |
| 2020 | 0.8974 | 1.8135 | 2.0650 | 3.9100e-003 | 0.0896 | 0.0991 | 0.1886 | 0.0240 | 0.0927 | 0.1167 | 0.0000 | 314.5212 | 314.5212 | 0.0633 | 0.0000 | 315.8509 |
| **Total** | **2.8561** | **6.8750** | **7.1486** | **0.0130** | **0.4654** | **0.3751** | **0.8405** | **0.1738** | **0.3503** | **0.5241** | **0.0000** | **1,071.2309** | **1,071.2309** | **0.2252** | **0.0000** | **1,075.9602** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 1.6637 | 3.5018 | 5.3500 | 9.1000e-003 | 0.2199 | 0.1923 | 0.4123 | 0.0789 | 0.1920 | 0.2709 | 0.0000 | 756.7090 | 756.7090 | 0.1619 | 0.0000 | 760.1086 |
| 2020 | 0.7992 | 1.4300 | 2.2557 | 3.9100e-003 | 0.0705 | 0.0809 | 0.1513 | 0.0193 | 0.0807 | 0.1000 | 0.0000 | 314.5209 | 314.5209 | 0.0633 | 0.0000 | 315.8506 |
| **Total** | **2.4629** | **4.9318** | **7.6057** | **0.0130** | **0.2904** | **0.2732** | **0.5636** | **0.0982** | **0.2727** | **0.3709** | **0.0000** | **1,071.2299** | **1,071.2299** | **0.2252** | **0.0000** | **1,075.9593** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **13.77** | **28.27** | **-6.39** | **0.00** | **37.61** | **27.16** | **32.95** | **43.51** | **22.15** | **29.23** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2019 | 2/11/2019 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2019 | 3/25/2019 | 5 | 30 | |
| 3 | Building Construction | Building Construction | 3/26/2019 | 5/18/2020 | 5 | 300 | |
| 4 | Paving | Paving | 3/26/2019 | 5/18/2020 | 5 | 300 | |
| 5 | Architectural Coating | Architectural Coating | 3/26/2019 | 5/18/2020 | 5 | 300 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 19.25**

**Acres of Paving: 0**

**Residential Indoor: 445,500; Residential Outdoor: 148,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 361 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 158.00 | 24.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 32.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0201 | 0.2125 | 0.1740 | 2.0000e-004 | | 0.0108 | 0.0108 | | 9.8900e-003 | 9.8900e-003 | 0.0000 | 17.5845 | 17.5845 | 5.5600e-003 | 0.0000 | 17.7014 |
| **Total** | **0.0201** | **0.2125** | **0.1740** | **2.0000e-004** | **0.0903** | **0.0108** | **0.1011** | **0.0497** | **9.8900e-003** | **0.0595** | **0.0000** | **17.5845** | **17.5845** | **5.5600e-003** | **0.0000** | **17.7014** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.3000e-004 | 3.0000e-004 | 2.8600e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.6185 | 0.6185 | 3.0000e-005 | 0.0000 | 0.6191 |
| **Total** | **2.3000e-004** | **3.0000e-004** | **2.8600e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **0.6185** | **0.6185** | **3.0000e-005** | **0.0000** | **0.6191** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 17.5845 | 17.5845 | 5.5600e-003 | 0.0000 | 17.7013 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **17.5845** | **17.5845** | **5.5600e-003** | **0.0000** | **17.7013** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.3000e-004 | 3.0000e-004 | 2.8600e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.6185 | 0.6185 | 3.0000e-005 | 0.0000 | 0.6191 |
| **Total** | **2.3000e-004** | **3.0000e-004** | **2.8600e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.6185** | **0.6185** | **3.0000e-005** | **0.0000** | **0.6191** |

## 3.3 Grading - 2019

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1005 | 0.0000 | 0.1005 | 0.0508 | 0.0000 | 0.0508 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0734 | 0.8130 | 0.6043 | 9.3000e-004 | | 0.0376 | 0.0376 | | 0.0346 | 0.0346 | 0.0000 | 83.1613 | 83.1613 | 0.0263 | 0.0000 | 83.7139 |
| **Total** | **0.0734** | **0.8130** | **0.6043** | **9.3000e-004** | **0.1005** | **0.0376** | **0.1381** | **0.0508** | **0.0346** | **0.0853** | **0.0000** | **83.1613** | **83.1613** | **0.0263** | **0.0000** | **83.7139** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 9.9000e-004 | 9.5300e-003 | 3.0000e-005 | 2.4200e-003 | 2.0000e-005 | 2.4400e-003 | 6.4000e-004 | 2.0000e-005 | 6.6000e-004 | 0.0000 | 2.0618 | 2.0618 | 9.0000e-005 | 0.0000 | 2.0637 |
| **Total** | **7.7000e-004** | **9.9000e-004** | **9.5300e-003** | **3.0000e-005** | **2.4200e-003** | **2.0000e-005** | **2.4400e-003** | **6.4000e-004** | **2.0000e-005** | **6.6000e-004** | **0.0000** | **2.0618** | **2.0618** | **9.0000e-005** | **0.0000** | **2.0637** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0392 | 0.0000 | 0.0392 | 0.0198 | 0.0000 | 0.0198 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0227 | 0.4467 | 0.5692 | 9.3000e-004 | | 0.0199 | 0.0199 | | 0.0199 | 0.0199 | 0.0000 | 83.1612 | 83.1612 | 0.0263 | 0.0000 | 83.7138 |
| **Total** | **0.0227** | **0.4467** | **0.5692** | **9.3000e-004** | **0.0392** | **0.0199** | **0.0591** | **0.0198** | **0.0199** | **0.0396** | **0.0000** | **83.1612** | **83.1612** | **0.0263** | **0.0000** | **83.7138** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.7000e-004 | 9.9000e-004 | 9.5300e-003 | 3.0000e-005 | 1.8900e-003 | 2.0000e-005 | 1.9100e-003 | 5.1000e-004 | 2.0000e-005 | 5.3000e-004 | 0.0000 | 2.0618 | 2.0618 | 9.0000e-005 | 0.0000 | 2.0637 |
| **Total** | **7.7000e-004** | **9.9000e-004** | **9.5300e-003** | **3.0000e-005** | **1.8900e-003** | **2.0000e-005** | **1.9100e-003** | **5.1000e-004** | **2.0000e-005** | **5.3000e-004** | **0.0000** | **2.0618** | **2.0618** | **9.0000e-005** | **0.0000** | **2.0637** |

# 3.4 Building Construction - 2019

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2363 | 2.1070 | 1.7206 | 2.6900e-003 | | 0.1292 | 0.1292 | | 0.1214 | 0.1214 | 0.0000 | 235.2934 | 235.2934 | 0.0573 | 0.0000 | 236.4956 |
| **Total** | **0.2363** | **2.1070** | **1.7206** | **2.6900e-003** | | **0.1292** | **0.1292** | | **0.1214** | **0.1214** | **0.0000** | **235.2934** | **235.2934** | **0.0573** | **0.0000** | **236.4956** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0213 | 0.1743 | 0.2890 | 5.7000e-004 | 0.0158 | 3.0200e-003 | 0.0189 | 4.5400e-003 | 2.7800e-003 | 7.3200e-003 | 0.0000 | 49.3424 | 49.3424 | 3.9000e-004 | 0.0000 | 49.3506 |
| Worker | 0.0409 | 0.0524 | 0.5045 | 1.6400e-003 | 0.1280 | 9.4000e-004 | 0.1289 | 0.0340 | 8.7000e-004 | 0.0349 | 0.0000 | 109.1286 | 109.1286 | 4.9100e-003 | 0.0000 | 109.2317 |
| **Total** | **0.0622** | **0.2267** | **0.7935** | **2.2100e-003** | **0.1438** | **3.9600e-003** | **0.1478** | **0.0385** | **3.6500e-003** | **0.0422** | **0.0000** | **158.4710** | **158.4710** | **5.3000e-003** | **0.0000** | **158.5822** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0955 | 1.4179 | 1.8217 | 2.6900e-003 | | 0.0904 | 0.0904 | | 0.0904 | 0.0904 | 0.0000 | 235.2931 | 235.2931 | 0.0573 | 0.0000 | 236.4953 |
| **Total** | **0.0955** | **1.4179** | **1.8217** | **2.6900e-003** | | **0.0904** | **0.0904** | | **0.0904** | **0.0904** | **0.0000** | **235.2931** | **235.2931** | **0.0573** | **0.0000** | **236.4953** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0213 | 0.1743 | 0.2890 | 5.7000e-004 | 0.0130 | 3.0200e-003 | 0.0160 | 3.8400e-003 | 2.7800e-003 | 6.6200e-003 | 0.0000 | 49.3424 | 49.3424 | 3.9000e-004 | 0.0000 | 49.3506 |
| Worker | 0.0409 | 0.0524 | 0.5045 | 1.6400e-003 | 0.1002 | 9.4000e-004 | 0.1012 | 0.0272 | 8.7000e-004 | 0.0281 | 0.0000 | 109.1286 | 109.1286 | 4.9100e-003 | 0.0000 | 109.2317 |
| **Total** | **0.0622** | **0.2267** | **0.7935** | **2.2100e-003** | **0.1132** | **3.9600e-003** | **0.1172** | **0.0310** | **3.6500e-003** | **0.0347** | **0.0000** | **158.4710** | **158.4710** | **5.3000e-003** | **0.0000** | **158.5822** |

## 3.4 Building Construction - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1045 | 0.9447 | 0.8320 | 1.3300e-003 | | 0.0551 | 0.0551 | | 0.0518 | 0.0518 | 0.0000 | 114.1717 | 114.1717 | 0.0278 | 0.0000 | 114.7558 |
| **Total** | **0.1045** | **0.9447** | **0.8320** | **1.3300e-003** | | **0.0551** | **0.0551** | | **0.0518** | **0.0518** | **0.0000** | **114.1717** | **114.1717** | **0.0278** | **0.0000** | **114.7558** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 9.5100e-003 | 0.0724 | 0.1352 | 2.8000e-004 | 7.8000e-003 | 1.3100e-003 | 9.1100e-003 | 2.2300e-003 | 1.2000e-003 | 3.4400e-003 | 0.0000 | 23.7426 | 23.7426 | 1.8000e-004 | 0.0000 | 23.7465 |
| Worker | 0.0186 | 0.0237 | 0.2287 | 8.1000e-004 | 0.0630 | 4.6000e-004 | 0.0635 | 0.0167 | 4.3000e-004 | 0.0172 | 0.0000 | 51.5913 | 51.5913 | 2.2800e-003 | 0.0000 | 51.6392 |
| **Total** | **0.0282** | **0.0961** | **0.3639** | **1.0900e-003** | **0.0708** | **1.7700e-003** | **0.0726** | **0.0190** | **1.6300e-003** | **0.0206** | **0.0000** | **75.3339** | **75.3339** | **2.4600e-003** | **0.0000** | **75.3857** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0449 | 0.6957 | 0.8952 | 1.3300e-003 | | 0.0439 | 0.0439 | | 0.0439 | 0.0439 | 0.0000 | 114.1716 | 114.1716 | 0.0278 | 0.0000 | 114.7557 |
| **Total** | **0.0449** | **0.6957** | **0.8952** | **1.3300e-003** | | **0.0439** | **0.0439** | | **0.0439** | **0.0439** | **0.0000** | **114.1716** | **114.1716** | **0.0278** | **0.0000** | **114.7557** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 9.5100e-003 | 0.0724 | 0.1352 | 2.8000e-004 | 6.4000e-003 | 1.3100e-003 | 7.7000e-003 | 1.8900e-003 | 1.2000e-003 | 3.0900e-003 | 0.0000 | 23.7426 | 23.7426 | 1.8000e-004 | 0.0000 | 23.7465 |
| Worker | 0.0186 | 0.0237 | 0.2287 | 8.1000e-004 | 0.0494 | 4.6000e-004 | 0.0498 | 0.0134 | 4.3000e-004 | 0.0138 | 0.0000 | 51.5913 | 51.5913 | 2.2800e-003 | 0.0000 | 51.6392 |
| **Total** | **0.0282** | **0.0961** | **0.3639** | **1.0900e-003** | **0.0558** | **1.7700e-003** | **0.0575** | **0.0153** | **1.6300e-003** | **0.0169** | **0.0000** | **75.3339** | **75.3339** | **2.4600e-003** | **0.0000** | **75.3857** |

# 3.5 Paving - 2019

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1433 | 1.5010 | 1.4437 | 2.2400e-003 | | 0.0814 | 0.0814 | | 0.0748 | 0.0748 | 0.0000 | 201.3967 | 201.3967 | 0.0637 | 0.0000 | 202.7348 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.1433** | **1.5010** | **1.4437** | **2.2400e-003** | | **0.0814** | **0.0814** | | **0.0748** | **0.0748** | **0.0000** | **201.3967** | **201.3967** | **0.0637** | **0.0000** | **202.7348** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.8800e-003 | 4.9700e-003 | 0.0479 | 1.6000e-004 | 0.0122 | 9.0000e-005 | 0.0122 | 3.2300e-003 | 8.0000e-005 | 3.3100e-003 | 0.0000 | 10.3603 | 10.3603 | 4.7000e-004 | 0.0000 | 10.3701 |
| **Total** | **3.8800e-003** | **4.9700e-003** | **0.0479** | **1.6000e-004** | **0.0122** | **9.0000e-005** | **0.0122** | **3.2300e-003** | **8.0000e-005** | **3.3100e-003** | **0.0000** | **10.3603** | **10.3603** | **4.7000e-004** | **0.0000** | **10.3701** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0552 | 1.1120 | 1.7012 | 2.2400e-003 | | 0.0601 | 0.0601 | | 0.0601 | 0.0601 | 0.0000 | 201.3964 | 201.3964 | 0.0637 | 0.0000 | 202.7345 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0552** | **1.1120** | **1.7012** | **2.2400e-003** | | **0.0601** | **0.0601** | | **0.0601** | **0.0601** | **0.0000** | **201.3964** | **201.3964** | **0.0637** | **0.0000** | **202.7345** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.8800e-003 | 4.9700e-003 | 0.0479 | 1.6000e-004 | 9.5200e-003 | 9.0000e-005 | 9.6100e-003 | 2.5800e-003 | 8.0000e-005 | 2.6600e-003 | 0.0000 | 10.3603 | 10.3603 | 4.7000e-004 | 0.0000 | 10.3701 |
| **Total** | **3.8800e-003** | **4.9700e-003** | **0.0479** | **1.6000e-004** | **9.5200e-003** | **9.0000e-005** | **9.6100e-003** | **2.5800e-003** | **8.0000e-005** | **2.6600e-003** | **0.0000** | **10.3603** | **10.3603** | **4.7000e-004** | **0.0000** | **10.3701** |

# 3.5 Paving - 2020

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0658 | 0.6823 | 0.7104 | 1.1000e-003 | | 0.0366 | 0.0366 | | 0.0337 | 0.0337 | 0.0000 | 97.0302 | 97.0302 | 0.0314 | 0.0000 | 97.6892 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0658** | **0.6823** | **0.7104** | **1.1000e-003** | | **0.0366** | **0.0366** | | **0.0337** | **0.0337** | **0.0000** | **97.0302** | **97.0302** | **0.0314** | **0.0000** | **97.6892** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.7700e-003 | 2.2500e-003 | 0.0217 | 8.0000e-005 | 5.9800e-003 | 4.0000e-005 | 6.0300e-003 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 0.0000 | 4.8979 | 4.8979 | 2.2000e-004 | 0.0000 | 4.9025 |
| **Total** | **1.7700e-003** | **2.2500e-003** | **0.0217** | **8.0000e-005** | **5.9800e-003** | **4.0000e-005** | **6.0300e-003** | **1.5900e-003** | **4.0000e-005** | **1.6300e-003** | **0.0000** | **4.8979** | **4.8979** | **2.2000e-004** | **0.0000** | **4.9025** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0272 | 0.5477 | 0.8379 | 1.1000e-003 | | 0.0296 | 0.0296 | | 0.0296 | 0.0296 | 0.0000 | 97.0301 | 97.0301 | 0.0314 | 0.0000 | 97.6891 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0272** | **0.5477** | **0.8379** | **1.1000e-003** | | **0.0296** | **0.0296** | | **0.0296** | **0.0296** | **0.0000** | **97.0301** | **97.0301** | **0.0314** | **0.0000** | **97.6891** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.7700e-003 | 2.2500e-003 | 0.0217 | 8.0000e-005 | 4.6900e-003 | 4.0000e-005 | 4.7300e-003 | 1.2700e-003 | 4.0000e-005 | 1.3100e-003 | 0.0000 | 4.8979 | 4.8979 | 2.2000e-004 | 0.0000 | 4.9025 |
| **Total** | **1.7700e-003** | **2.2500e-003** | **0.0217** | **8.0000e-005** | **4.6900e-003** | **4.0000e-005** | **4.7300e-003** | **1.2700e-003** | **4.0000e-005** | **1.3100e-003** | **0.0000** | **4.8979** | **4.8979** | **2.2000e-004** | **0.0000** | **4.9025** |

## 3.6 Architectural Coating - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 1.3835 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0268 | 0.1845 | 0.1851 | 3.0000e-004 | | 0.0129 | 0.0129 | | 0.0129 | 0.0129 | 0.0000 | 25.6602 | 25.6602 | 2.1700e-003 | 0.0000 | 25.7057 |
| **Total** | **1.4103** | **0.1845** | **0.1851** | **3.0000e-004** | | **0.0129** | **0.0129** | | **0.0129** | **0.0129** | **0.0000** | **25.6602** | **25.6602** | **2.1700e-003** | **0.0000** | **25.7057** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 8.2800e-003 | 0.0106 | 0.1022 | 3.3000e-004 | 0.0259 | 1.9000e-004 | 0.0261 | 6.8800e-003 | 1.8000e-004 | 7.0600e-003 | 0.0000 | 22.1020 | 22.1020 | 9.9000e-004 | 0.0000 | 22.1229 |
| **Total** | **8.2800e-003** | **0.0106** | **0.1022** | **3.3000e-004** | **0.0259** | **1.9000e-004** | **0.0261** | **6.8800e-003** | **1.8000e-004** | **7.0600e-003** | **0.0000** | **22.1020** | **22.1020** | **9.9000e-004** | **0.0000** | **22.1229** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 1.3835 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0268 | 0.1845 | 0.1851 | 3.0000e-004 | | 0.0129 | 0.0129 | | 0.0129 | 0.0129 | 0.0000 | 25.6602 | 25.6602 | 2.1700e-003 | 0.0000 | 25.7057 |
| **Total** | **1.4103** | **0.1845** | **0.1851** | **3.0000e-004** | | **0.0129** | **0.0129** | | **0.0129** | **0.0129** | **0.0000** | **25.6602** | **25.6602** | **2.1700e-003** | **0.0000** | **25.7057** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 8.2800e-003 | 0.0106 | 0.1022 | 3.3000e-004 | 0.0203 | 1.9000e-004 | 0.0205 | 5.5100e-003 | 1.8000e-004 | 5.6800e-003 | 0.0000 | 22.1020 | 22.1020 | 9.9000e-004 | 0.0000 | 22.1229 |
| **Total** | **8.2800e-003** | **0.0106** | **0.1022** | **3.3000e-004** | **0.0203** | **1.9000e-004** | **0.0205** | **5.5100e-003** | **1.8000e-004** | **5.6800e-003** | **0.0000** | **22.1020** | **22.1020** | **9.9000e-004** | **0.0000** | **22.1229** |

# 3.6 Architectural Coating - 2020

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.6814 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0120 | 0.0834 | 0.0907 | 1.5000e-004 | | 5.4900e-003 | 5.4900e-003 | | 5.4900e-003 | 5.4900e-003 | 0.0000 | 12.6386 | 12.6386 | 9.8000e-004 | 0.0000 | 12.6592 |
| **Total** | **0.6934** | **0.0834** | **0.0907** | **1.5000e-004** | | **5.4900e-003** | **5.4900e-003** | | **5.4900e-003** | **5.4900e-003** | **0.0000** | **12.6386** | **12.6386** | **9.8000e-004** | **0.0000** | **12.6592** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7800e-003 | 4.8100e-003 | 0.0463 | 1.6000e-004 | 0.0128 | 9.0000e-005 | 0.0129 | 3.3900e-003 | 9.0000e-005 | 3.4800e-003 | 0.0000 | 10.4489 | 10.4489 | 4.6000e-004 | 0.0000 | 10.4586 |
| **Total** | **3.7800e-003** | **4.8100e-003** | **0.0463** | **1.6000e-004** | **0.0128** | **9.0000e-005** | **0.0129** | **3.3900e-003** | **9.0000e-005** | **3.4800e-003** | **0.0000** | **10.4489** | **10.4489** | **4.6000e-004** | **0.0000** | **10.4586** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.6814 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0120 | 0.0834 | 0.0907 | 1.5000e-004 | | 5.4900e-003 | 5.4900e-003 | | 5.4900e-003 | 5.4900e-003 | 0.0000 | 12.6386 | 12.6386 | 9.8000e-004 | 0.0000 | 12.6591 |
| **Total** | **0.6934** | **0.0834** | **0.0907** | **1.5000e-004** | | **5.4900e-003** | **5.4900e-003** | | **5.4900e-003** | **5.4900e-003** | **0.0000** | **12.6386** | **12.6386** | **9.8000e-004** | **0.0000** | **12.6591** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.7800e-003 | 4.8100e-003 | 0.0463 | 1.6000e-004 | 0.0100 | 9.0000e-005 | 0.0101 | 2.7100e-003 | 9.0000e-005 | 2.8000e-003 | 0.0000 | 10.4489 | 10.4489 | 4.6000e-004 | 0.0000 | 10.4586 |
| **Total** | **3.7800e-003** | **4.8100e-003** | **0.0463** | **1.6000e-004** | **0.0100** | **9.0000e-005** | **0.0101** | **2.7100e-003** | **9.0000e-005** | **2.8000e-003** | **0.0000** | **10.4489** | **10.4489** | **4.6000e-004** | **0.0000** | **10.4586** |

# West Pavilion - Phase 2 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 220.00 | Dwelling Unit | 19.25 | 220,000.00 | 629 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2020 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 2 acreage = 19.25

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Grading - Phase 2 acreage = 19.25

Construction Off-road Equipment Mitigation - Tier 3 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads with suppressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 9.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | PhaseEndDate | 11/11/2022 | 9/17/2021 |
| tblConstructionPhase | PhaseEndDate | 9/16/2021 | 9/17/2021 |
| tblConstructionPhase | PhaseEndDate | 11/11/2022 | 9/17/2021 |
| tblConstructionPhase | PhaseStartDate | 9/18/2021 | 7/26/2020 |
| tblConstructionPhase | PhaseStartDate | 7/24/2020 | 7/26/2020 |
| tblConstructionPhase | PhaseStartDate | 9/18/2021 | 7/26/2020 |
| tblGrading | AcresOfGrading | 75.00 | 19.25 |
| tblLandUse | LotAcreage | 5.79 | 19.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2020 |
| tblWoodstoves | NumberCatalytic | 19.25 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 19.25 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2020 | 1.1212 | 3.0246 | 3.1303 | 5.6600e-003 | 0.2972 | 0.1577 | 0.4548 | 0.1288 | 0.1469 | 0.2757 | 0.0000 | 463.2934 | 463.2934 | 0.1049 | 0.0000 | 465.4962 |
| 2021 | 1.6510 | 3.0963 | 3.8102 | 7.3400e-003 | 0.1683 | 0.1627 | 0.3310 | 0.0450 | 0.1522 | 0.1972 | 0.0000 | 588.6522 | 588.6522 | 0.1179 | 0.0000 | 591.1282 |
| **Total** | **2.7722** | **6.1209** | **6.9405** | **0.0130** | **0.4654** | **0.3204** | **0.7858** | **0.1738** | **0.2991** | **0.4729** | **0.0000** | **1,051.9456** | **1,051.9456** | **0.2228** | **0.0000** | **1,056.6244** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2020 | 0.9487 | 2.1918 | 3.2950 | 5.6600e-003 | 0.1580 | 0.1178 | 0.2758 | 0.0620 | 0.1176 | 0.1797 | 0.0000 | 463.2929 | 463.2929 | 0.1049 | 0.0000 | 465.4958 |
| 2021 | 1.4922 | 2.6366 | 4.1891 | 7.3400e-003 | 0.1324 | 0.1489 | 0.2813 | 0.0362 | 0.1487 | 0.1848 | 0.0000 | 588.6517 | 588.6517 | 0.1179 | 0.0000 | 591.1277 |
| **Total** | **2.4409** | **4.8284** | **7.4841** | **0.0130** | **0.2904** | **0.2667** | **0.5571** | **0.0982** | **0.2663** | **0.3645** | **0.0000** | **1,051.9447** | **1,051.9447** | **0.2228** | **0.0000** | **1,056.6235** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **11.95** | **21.12** | **-7.83** | **0.00** | **37.61** | **16.75** | **29.10** | **43.51** | **10.96** | **22.93** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 5/29/2020 | 6/11/2020 | 5 | 10 | |
| 2 | Grading | Grading | 6/12/2020 | 7/23/2020 | 5 | 30 | |
| 3 | Building Construction | Building Construction | 7/26/2020 | 9/17/2021 | 5 | 300 | |
| 4 | Paving | Paving | 7/26/2020 | 9/17/2021 | 5 | 300 | |
| 5 | Architectural Coating | Architectural Coating | 7/26/2020 | 9/17/2021 | 5 | 300 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 19.25**

**Acres of Paving: 0**

**Residential Indoor: 445,500; Residential Outdoor: 148,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 361 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 158.00 | 24.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 32.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0186 | 0.1943 | 0.1646 | 2.0000e-004 | | 9.6500e-003 | 9.6500e-003 | | 8.8800e-003 | 8.8800e-003 | 0.0000 | 17.2015 | 17.2015 | 5.5600e-003 | 0.0000 | 17.3183 |
| **Total** | **0.0186** | **0.1943** | **0.1646** | **2.0000e-004** | **0.0903** | **9.6500e-003** | **0.1000** | **0.0497** | **8.8800e-003** | **0.0585** | **0.0000** | **17.2015** | **17.2015** | **5.5600e-003** | **0.0000** | **17.3183** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 2.7000e-004 | 2.6300e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.5937 | 0.5937 | 3.0000e-005 | 0.0000 | 0.5942 |
| **Total** | **2.1000e-004** | **2.7000e-004** | **2.6300e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **0.5937** | **0.5937** | **3.0000e-005** | **0.0000** | **0.5942** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.7600e-003 | 0.0973 | 0.1170 | 2.0000e-004 | | 4.8100e-003 | 4.8100e-003 | | 4.8100e-003 | 4.8100e-003 | 0.0000 | 17.2015 | 17.2015 | 5.5600e-003 | 0.0000 | 17.3183 |
| **Total** | **4.7600e-003** | **0.0973** | **0.1170** | **2.0000e-004** | **0.0352** | **4.8100e-003** | **0.0400** | **0.0194** | **4.8100e-003** | **0.0242** | **0.0000** | **17.2015** | **17.2015** | **5.5600e-003** | **0.0000** | **17.3183** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.1000e-004 | 2.7000e-004 | 2.6300e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5937 | 0.5937 | 3.0000e-005 | 0.0000 | 0.5942 |
| **Total** | **2.1000e-004** | **2.7000e-004** | **2.6300e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.5937** | **0.5937** | **3.0000e-005** | **0.0000** | **0.5942** |

## 3.3 Grading - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1005 | 0.0000 | 0.1005 | 0.0508 | 0.0000 | 0.0508 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0683 | 0.7408 | 0.5764 | 9.3000e-004 | | 0.0339 | 0.0339 | | 0.0312 | 0.0312 | 0.0000 | 81.3433 | 81.3433 | 0.0263 | 0.0000 | 81.8958 |
| **Total** | **0.0683** | **0.7408** | **0.5764** | **9.3000e-004** | **0.1005** | **0.0339** | **0.1345** | **0.0508** | **0.0312** | **0.0820** | **0.0000** | **81.3433** | **81.3433** | **0.0263** | **0.0000** | **81.8958** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 9.1000e-004 | 8.7700e-003 | 3.0000e-005 | 2.4200e-003 | 2.0000e-005 | 2.4400e-003 | 6.4000e-004 | 2.0000e-005 | 6.6000e-004 | 0.0000 | 1.9790 | 1.9790 | 9.0000e-005 | 0.0000 | 1.9808 |
| **Total** | **7.2000e-004** | **9.1000e-004** | **8.7700e-003** | **3.0000e-005** | **2.4200e-003** | **2.0000e-005** | **2.4400e-003** | **6.4000e-004** | **2.0000e-005** | **6.6000e-004** | **0.0000** | **1.9790** | **1.9790** | **9.0000e-005** | **0.0000** | **1.9808** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0392 | 0.0000 | 0.0392 | 0.0198 | 0.0000 | 0.0198 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0227 | 0.4467 | 0.5692 | 9.3000e-004 | | 0.0199 | 0.0199 | | 0.0199 | 0.0199 | 0.0000 | 81.3432 | 81.3432 | 0.0263 | 0.0000 | 81.8957 |
| **Total** | **0.0227** | **0.4467** | **0.5692** | **9.3000e-004** | **0.0392** | **0.0199** | **0.0591** | **0.0198** | **0.0199** | **0.0396** | **0.0000** | **81.3432** | **81.3432** | **0.0263** | **0.0000** | **81.8957** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 7.2000e-004 | 9.1000e-004 | 8.7700e-003 | 3.0000e-005 | 1.8900e-003 | 2.0000e-005 | 1.9100e-003 | 5.1000e-004 | 2.0000e-005 | 5.3000e-004 | 0.0000 | 1.9790 | 1.9790 | 9.0000e-005 | 0.0000 | 1.9808 |
| **Total** | **7.2000e-004** | **9.1000e-004** | **8.7700e-003** | **3.0000e-005** | **1.8900e-003** | **2.0000e-005** | **1.9100e-003** | **5.1000e-004** | **2.0000e-005** | **5.3000e-004** | **0.0000** | **1.9790** | **1.9790** | **9.0000e-005** | **0.0000** | **1.9808** |

# 3.4 Building Construction - 2020

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1203 | 1.0878 | 0.9581 | 1.5300e-003 | | 0.0634 | 0.0634 | | 0.0597 | 0.0597 | 0.0000 | 131.4704 | 131.4704 | 0.0320 | 0.0000 | 132.1431 |
| **Total** | **0.1203** | **1.0878** | **0.9581** | **1.5300e-003** | | **0.0634** | **0.0634** | | **0.0597** | **0.0597** | **0.0000** | **131.4704** | **131.4704** | **0.0320** | **0.0000** | **132.1431** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0110 | 0.0834 | 0.1557 | 3.2000e-004 | 8.9800e-003 | 1.5000e-003 | 0.0105 | 2.5700e-003 | 1.3800e-003 | 3.9600e-003 | 0.0000 | 27.3400 | 27.3400 | 2.1000e-004 | 0.0000 | 27.3444 |
| Worker | 0.0215 | 0.0273 | 0.2633 | 9.3000e-004 | 0.0726 | 5.3000e-004 | 0.0731 | 0.0193 | 4.9000e-004 | 0.0198 | 0.0000 | 59.4082 | 59.4082 | 2.6300e-003 | 0.0000 | 59.4633 |
| **Total** | **0.0324** | **0.1107** | **0.4190** | **1.2500e-003** | **0.0816** | **2.0300e-003** | **0.0836** | **0.0219** | **1.8700e-003** | **0.0237** | **0.0000** | **86.7482** | **86.7482** | **2.8400e-003** | **0.0000** | **86.8078** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0517 | 0.8011 | 1.0309 | 1.5300e-003 | | 0.0505 | 0.0505 | | 0.0505 | 0.0505 | 0.0000 | 131.4703 | 131.4703 | 0.0320 | 0.0000 | 132.1429 |
| **Total** | **0.0517** | **0.8011** | **1.0309** | **1.5300e-003** | | **0.0505** | **0.0505** | | **0.0505** | **0.0505** | **0.0000** | **131.4703** | **131.4703** | **0.0320** | **0.0000** | **132.1429** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0110 | 0.0834 | 0.1557 | 3.2000e-004 | 7.3700e-003 | 1.5000e-003 | 8.8700e-003 | 2.1800e-003 | 1.3800e-003 | 3.5600e-003 | 0.0000 | 27.3400 | 27.3400 | 2.1000e-004 | 0.0000 | 27.3444 |
| Worker | 0.0215 | 0.0273 | 0.2633 | 9.3000e-004 | 0.0569 | 5.3000e-004 | 0.0574 | 0.0154 | 4.9000e-004 | 0.0159 | 0.0000 | 59.4082 | 59.4082 | 2.6300e-003 | 0.0000 | 59.4633 |
| **Total** | **0.0324** | **0.1107** | **0.4190** | **1.2500e-003** | **0.0642** | **2.0300e-003** | **0.0663** | **0.0176** | **1.8700e-003** | **0.0195** | **0.0000** | **86.7482** | **86.7482** | **2.8400e-003** | **0.0000** | **86.8078** |

# 3.4 Building Construction - 2021

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1761 | 1.6126 | 1.5380 | 2.4900e-003 | | 0.0888 | 0.0888 | | 0.0835 | 0.0835 | 0.0000 | 214.5299 | 214.5299 | 0.0517 | 0.0000 | 215.6152 |
| **Total** | **0.1761** | **1.6126** | **1.5380** | **2.4900e-003** | | **0.0888** | **0.0888** | | **0.0835** | **0.0835** | **0.0000** | **214.5299** | **214.5299** | **0.0517** | **0.0000** | **215.6152** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0171 | 0.1103 | 0.2474 | 5.2000e-004 | 0.0147 | 2.1600e-003 | 0.0168 | 4.2000e-003 | 1.9900e-003 | 6.1800e-003 | 0.0000 | 44.5331 | 44.5331 | 3.4000e-004 | 0.0000 | 44.5402 |
| Worker | 0.0330 | 0.0416 | 0.4015 | 1.5200e-003 | 0.1184 | 8.7000e-004 | 0.1193 | 0.0315 | 8.1000e-004 | 0.0323 | 0.0000 | 95.2528 | 95.2528 | 4.0900e-003 | 0.0000 | 95.3386 |
| **Total** | **0.0501** | **0.1519** | **0.6489** | **2.0400e-003** | **0.1331** | **3.0300e-003** | **0.1361** | **0.0357** | **2.8000e-003** | **0.0384** | **0.0000** | **139.7858** | **139.7858** | **4.4300e-003** | **0.0000** | **139.8788** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0807 | 1.3013 | 1.6775 | 2.4900e-003 | | 0.0812 | 0.0812 | | 0.0812 | 0.0812 | 0.0000 | 214.5296 | 214.5296 | 0.0517 | 0.0000 | 215.6150 |
| **Total** | **0.0807** | **1.3013** | **1.6775** | **2.4900e-003** | | **0.0812** | **0.0812** | | **0.0812** | **0.0812** | **0.0000** | **214.5296** | **214.5296** | **0.0517** | **0.0000** | **215.6150** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0171 | 0.1103 | 0.2474 | 5.2000e-004 | 0.0120 | 2.1600e-003 | 0.0142 | 3.5500e-003 | 1.9900e-003 | 5.5400e-003 | 0.0000 | 44.5331 | 44.5331 | 3.4000e-004 | 0.0000 | 44.5402 |
| Worker | 0.0330 | 0.0416 | 0.4015 | 1.5200e-003 | 0.0928 | 8.7000e-004 | 0.0936 | 0.0252 | 8.1000e-004 | 0.0260 | 0.0000 | 95.2528 | 95.2528 | 4.0900e-003 | 0.0000 | 95.3386 |
| **Total** | **0.0501** | **0.1519** | **0.6489** | **2.0400e-003** | **0.1048** | **3.0300e-003** | **0.1078** | **0.0287** | **2.8000e-003** | **0.0315** | **0.0000** | **139.7858** | **139.7858** | **4.4300e-003** | **0.0000** | **139.8788** |

## 3.5 Paving - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0758 | 0.7857 | 0.8181 | 1.2700e-003 | | 0.0421 | 0.0421 | | 0.0388 | 0.0388 | 0.0000 | 111.7317 | 111.7317 | 0.0361 | 0.0000 | 112.4906 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0758** | **0.7857** | **0.8181** | **1.2700e-003** | | **0.0421** | **0.0421** | | **0.0388** | **0.0388** | **0.0000** | **111.7317** | **111.7317** | **0.0361** | **0.0000** | **112.4906** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0400e-003 | 2.6000e-003 | 0.0250 | 9.0000e-005 | 6.8900e-003 | 5.0000e-005 | 6.9400e-003 | 1.8300e-003 | 5.0000e-005 | 1.8800e-003 | 0.0000 | 5.6400 | 5.6400 | 2.5000e-004 | 0.0000 | 5.6453 |
| **Total** | **2.0400e-003** | **2.6000e-003** | **0.0250** | **9.0000e-005** | **6.8900e-003** | **5.0000e-005** | **6.9400e-003** | **1.8300e-003** | **5.0000e-005** | **1.8800e-003** | **0.0000** | **5.6400** | **5.6400** | **2.5000e-004** | **0.0000** | **5.6453** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0313 | 0.6307 | 0.9649 | 1.2700e-003 | | 0.0341 | 0.0341 | | 0.0341 | 0.0341 | 0.0000 | 111.7316 | 111.7316 | 0.0361 | 0.0000 | 112.4905 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0313** | **0.6307** | **0.9649** | **1.2700e-003** | | **0.0341** | **0.0341** | | **0.0341** | **0.0341** | **0.0000** | **111.7316** | **111.7316** | **0.0361** | **0.0000** | **112.4905** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0400e-003 | 2.6000e-003 | 0.0250 | 9.0000e-005 | 5.4000e-003 | 5.0000e-005 | 5.4500e-003 | 1.4600e-003 | 5.0000e-005 | 1.5100e-003 | 0.0000 | 5.6400 | 5.6400 | 2.5000e-004 | 0.0000 | 5.6453 |
| **Total** | **2.0400e-003** | **2.6000e-003** | **0.0250** | **9.0000e-005** | **5.4000e-003** | **5.0000e-005** | **5.4500e-003** | **1.4600e-003** | **5.0000e-005** | **1.5100e-003** | **0.0000** | **5.6400** | **5.6400** | **2.5000e-004** | **0.0000** | **5.6453** |

# 3.5 Paving - 2021

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1145 | 1.1774 | 1.3348 | 2.0700e-003 | | 0.0619 | 0.0619 | | 0.0569 | 0.0569 | 0.0000 | 182.2566 | 182.2566 | 0.0590 | 0.0000 | 183.4945 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.1145** | **1.1774** | **1.3348** | **2.0700e-003** | | **0.0619** | **0.0619** | | **0.0569** | **0.0569** | **0.0000** | **182.2566** | **182.2566** | **0.0590** | **0.0000** | **183.4945** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.1300e-003 | 3.9500e-003 | 0.0381 | 1.4000e-004 | 0.0112 | 8.0000e-005 | 0.0113 | 2.9900e-003 | 8.0000e-005 | 3.0600e-003 | 0.0000 | 9.0430 | 9.0430 | 3.9000e-004 | 0.0000 | 9.0511 |
| **Total** | **3.1300e-003** | **3.9500e-003** | **0.0381** | **1.4000e-004** | **0.0112** | **8.0000e-005** | **0.0113** | **2.9900e-003** | **8.0000e-005** | **3.0600e-003** | **0.0000** | **9.0430** | **9.0430** | **3.9000e-004** | **0.0000** | **9.0511** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0511 | 1.0290 | 1.5743 | 2.0700e-003 | | 0.0556 | 0.0556 | | 0.0556 | 0.0556 | 0.0000 | 182.2564 | 182.2564 | 0.0590 | 0.0000 | 183.4943 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0511** | **1.0290** | **1.5743** | **2.0700e-003** | | **0.0556** | **0.0556** | | **0.0556** | **0.0556** | **0.0000** | **182.2564** | **182.2564** | **0.0590** | **0.0000** | **183.4943** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.1300e-003 | 3.9500e-003 | 0.0381 | 1.4000e-004 | 8.8100e-003 | 8.0000e-005 | 8.8900e-003 | 2.3900e-003 | 8.0000e-005 | 2.4700e-003 | 0.0000 | 9.0430 | 9.0430 | 3.9000e-004 | 0.0000 | 9.0511 |
| **Total** | **3.1300e-003** | **3.9500e-003** | **0.0381** | **1.4000e-004** | **8.8100e-003** | **8.0000e-005** | **8.8900e-003** | **2.3900e-003** | **8.0000e-005** | **2.4700e-003** | **0.0000** | **9.0430** | **9.0430** | **3.9000e-004** | **0.0000** | **9.0511** |

# 3.6 Architectural Coating - 2020

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7847 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0138 | 0.0960 | 0.1044 | 1.7000e-004 | | 6.3200e-003 | 6.3200e-003 | | 6.3200e-003 | 6.3200e-003 | 0.0000 | 14.5536 | 14.5536 | 1.1300e-003 | 0.0000 | 14.5772 |
| **Total** | **0.7985** | **0.0960** | **0.1044** | **1.7000e-004** | | **6.3200e-003** | **6.3200e-003** | | **6.3200e-003** | **6.3200e-003** | **0.0000** | **14.5536** | **14.5536** | **1.1300e-003** | **0.0000** | **14.5772** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3500e-003 | 5.5400e-003 | 0.0533 | 1.9000e-004 | 0.0147 | 1.1000e-004 | 0.0148 | 3.9000e-003 | 1.0000e-004 | 4.0000e-003 | 0.0000 | 12.0320 | 12.0320 | 5.3000e-004 | 0.0000 | 12.0432 |
| **Total** | **4.3500e-003** | **5.5400e-003** | **0.0533** | **1.9000e-004** | **0.0147** | **1.1000e-004** | **0.0148** | **3.9000e-003** | **1.0000e-004** | **4.0000e-003** | **0.0000** | **12.0320** | **12.0320** | **5.3000e-004** | **0.0000** | **12.0432** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7847 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0138 | 0.0960 | 0.1044 | 1.7000e-004 | | 6.3200e-003 | 6.3200e-003 | | 6.3200e-003 | 6.3200e-003 | 0.0000 | 14.5535 | 14.5535 | 1.1300e-003 | 0.0000 | 14.5772 |
| **Total** | **0.7985** | **0.0960** | **0.1044** | **1.7000e-004** | | **6.3200e-003** | **6.3200e-003** | | **6.3200e-003** | **6.3200e-003** | **0.0000** | **14.5535** | **14.5535** | **1.1300e-003** | **0.0000** | **14.5772** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 4.3500e-003 | 5.5400e-003 | 0.0533 | 1.9000e-004 | 0.0115 | 1.1000e-004 | 0.0116 | 3.1200e-003 | 1.0000e-004 | 3.2200e-003 | 0.0000 | 12.0320 | 12.0320 | 5.3000e-004 | 0.0000 | 12.0432 |
| **Total** | **4.3500e-003** | **5.5400e-003** | **0.0533** | **1.9000e-004** | **0.0115** | **1.1000e-004** | **0.0116** | **3.1200e-003** | **1.0000e-004** | **3.2200e-003** | **0.0000** | **12.0320** | **12.0320** | **5.3000e-004** | **0.0000** | **12.0432** |

# 3.6 Architectural Coating - 2021

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 1.2802 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0204 | 0.1420 | 0.1690 | 2.8000e-004 | | 8.7500e-003 | 8.7500e-003 | | 8.7500e-003 | 8.7500e-003 | 0.0000 | 23.7453 | 23.7453 | 1.6300e-003 | 0.0000 | 23.7795 |
| **Total** | **1.3006** | **0.1420** | **0.1690** | **2.8000e-004** | | **8.7500e-003** | **8.7500e-003** | | **8.7500e-003** | **8.7500e-003** | **0.0000** | **23.7453** | **23.7453** | **1.6300e-003** | **0.0000** | **23.7795** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.6700e-003 | 8.4300e-003 | 0.0813 | 3.1000e-004 | 0.0240 | 1.8000e-004 | 0.0242 | 6.3700e-003 | 1.6000e-004 | 6.5300e-003 | 0.0000 | 19.2917 | 19.2917 | 8.3000e-004 | 0.0000 | 19.3091 |
| **Total** | **6.6700e-003** | **8.4300e-003** | **0.0813** | **3.1000e-004** | **0.0240** | **1.8000e-004** | **0.0242** | **6.3700e-003** | **1.6000e-004** | **6.5300e-003** | **0.0000** | **19.2917** | **19.2917** | **8.3000e-004** | **0.0000** | **19.3091** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 1.2802 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0204 | 0.1420 | 0.1690 | 2.8000e-004 | | 8.7500e-003 | 8.7500e-003 | | 8.7500e-003 | 8.7500e-003 | 0.0000 | 23.7452 | 23.7452 | 1.6300e-003 | 0.0000 | 23.7795 |
| **Total** | **1.3006** | **0.1420** | **0.1690** | **2.8000e-004** | | **8.7500e-003** | **8.7500e-003** | | **8.7500e-003** | **8.7500e-003** | **0.0000** | **23.7452** | **23.7452** | **1.6300e-003** | **0.0000** | **23.7795** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.6700e-003 | 8.4300e-003 | 0.0813 | 3.1000e-004 | 0.0188 | 1.8000e-004 | 0.0190 | 5.1000e-003 | 1.6000e-004 | 5.2600e-003 | 0.0000 | 19.2917 | 19.2917 | 8.3000e-004 | 0.0000 | 19.3091 |
| **Total** | **6.6700e-003** | **8.4300e-003** | **0.0813** | **3.1000e-004** | **0.0188** | **1.8000e-004** | **0.0190** | **5.1000e-003** | **1.6000e-004** | **5.2600e-003** | **0.0000** | **19.2917** | **19.2917** | **8.3000e-004** | **0.0000** | **19.3091** |

# West Pavilion - Phase 3 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Strip Mall | 170.00 | 1000sqft | 19.25 | 170,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2021 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 3 acreage = 19.25

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Grading - Phase 3 acreage = 19.25

Construction Off-road Equipment Mitigation - Tier 4 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ suppressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 9.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | PhaseEndDate | 7/13/2023 | 5/19/2022 |
| tblConstructionPhase | PhaseEndDate | 7/13/2023 | 5/19/2022 |
| tblConstructionPhase | PhaseStartDate | 5/20/2022 | 3/26/2021 |
| tblConstructionPhase | PhaseStartDate | 5/20/2022 | 3/26/2021 |
| tblGrading | AcresOfGrading | 75.00 | 19.25 |
| tblLandUse | LotAcreage | 3.90 | 19.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2021 |

## 2.0 Emissions Summary

### 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 1.2483 | 4.1739 | 4.5350 | 7.8900e-003 | 0.2773 | 0.2142 | 0.4915 | 0.1238 | 0.1998 | 0.3235 | 0.0000 | 663.7851 | 663.7851 | 0.1560 | 0.0000 | 667.0602 |
| 2022 | 0.5564 | 1.4498 | 1.8534 | 3.3100e-003 | 0.0410 | 0.0731 | 0.1141 | 0.0111 | 0.0684 | 0.0795 | 0.0000 | 276.7932 | 276.7932 | 0.0608 | 0.0000 | 278.0700 |
| **Total** | **1.8047** | **5.6237** | **6.3884** | **0.0112** | **0.3183** | **0.2873** | **0.6056** | **0.1348** | **0.2682** | **0.4030** | **0.0000** | **940.5783** | **940.5783** | **0.2168** | **0.0000** | **945.1301** |

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.9557 | 0.8090 | 4.8262 | 7.8900e-003 | 0.1428 | 0.0314 | 0.1742 | 0.0581 | 0.0311 | 0.0892 | 0.0000 | 663.7844 | 663.7844 | 0.1560 | 0.0000 | 667.0595 |
| 2022 | 0.4600 | 0.3326 | 2.0478 | 3.3100e-003 | 0.0325 | 0.0124 | 0.0449 | 8.9800e-003 | 0.0123 | 0.0213 | 0.0000 | 276.7929 | 276.7929 | 0.0608 | 0.0000 | 278.0697 |
| **Total** | **1.4157** | **1.1416** | **6.8740** | **0.0112** | **0.1753** | **0.0438** | **0.2191** | **0.0671** | **0.0434** | **0.1105** | **0.0000** | **940.5774** | **940.5774** | **0.2168** | **0.0000** | **945.1292** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **21.56** | **79.70** | **-7.60** | **0.00** | **44.93** | **84.75** | **63.82** | **50.27** | **83.80** | **72.58** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 1/29/2021 | 2/11/2021 | 5 | 10 | |
| 2 | Grading | Grading | 2/12/2021 | 3/25/2021 | 5 | 30 | |
| 3 | Building Construction | Building Construction | 3/26/2021 | 5/19/2022 | 5 | 300 | |
| 4 | Paving | Paving | 3/26/2021 | 5/19/2022 | 5 | 300 | |
| 5 | Architectural Coating | Architectural Coating | 3/26/2021 | 5/19/2022 | 5 | 300 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 19.25**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 255,000; Non-Residential Outdoor: 85,000 (Architectural Coating –**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 361 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 54.00 | 28.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 11.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0170 | 0.1750 | 0.1543 | 2.0000e-004 | | 8.5000e-003 | 8.5000e-003 | | 7.8200e-003 | 7.8200e-003 | 0.0000 | 17.1850 | 17.1850 | 5.5600e-003 | 0.0000 | 17.3018 |
| **Total** | **0.0170** | **0.1750** | **0.1543** | **2.0000e-004** | **0.0903** | **8.5000e-003** | **0.0988** | **0.0497** | **7.8200e-003** | **0.0575** | **0.0000** | **17.1850** | **17.1850** | **5.5600e-003** | **0.0000** | **17.3018** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-004 | 2.5000e-004 | 2.4600e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.5834 | 0.5834 | 3.0000e-005 | 0.0000 | 0.5839 |
| **Total** | **2.0000e-004** | **2.5000e-004** | **2.4600e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **0.5834** | **0.5834** | **3.0000e-005** | **0.0000** | **0.5839** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.3800e-003 | 0.0103 | 0.1062 | 2.0000e-004 | | 3.2000e-004 | 3.2000e-004 | | 3.2000e-004 | 3.2000e-004 | 0.0000 | 17.1850 | 17.1850 | 5.5600e-003 | 0.0000 | 17.3017 |
| **Total** | **2.3800e-003** | **0.0103** | **0.1062** | **2.0000e-004** | **0.0352** | **3.2000e-004** | **0.0356** | **0.0194** | **3.2000e-004** | **0.0197** | **0.0000** | **17.1850** | **17.1850** | **5.5600e-003** | **0.0000** | **17.3017** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-004 | 2.5000e-004 | 2.4600e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5834 | 0.5834 | 3.0000e-005 | 0.0000 | 0.5839 |
| **Total** | **2.0000e-004** | **2.5000e-004** | **2.4600e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.5834** | **0.5834** | **3.0000e-005** | **0.0000** | **0.5839** |

## 3.3 Grading - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1005 | 0.0000 | 0.1005 | 0.0508 | 0.0000 | 0.0508 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0629 | 0.6674 | 0.5514 | 9.3000e-004 | | 0.0302 | 0.0302 | | 0.0278 | 0.0278 | 0.0000 | 81.3624 | 81.3624 | 0.0263 | 0.0000 | 81.9150 |
| **Total** | **0.0629** | **0.6674** | **0.5514** | **9.3000e-004** | **0.1005** | **0.0302** | **0.1308** | **0.0508** | **0.0278** | **0.0786** | **0.0000** | **81.3624** | **81.3624** | **0.0263** | **0.0000** | **81.9150** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.7000e-004 | 8.5000e-004 | 8.2000e-003 | 3.0000e-005 | 2.4200e-003 | 2.0000e-005 | 2.4400e-003 | 6.4000e-004 | 2.0000e-005 | 6.6000e-004 | 0.0000 | 1.9447 | 1.9447 | 8.0000e-005 | 0.0000 | 1.9465 |
| **Total** | **6.7000e-004** | **8.5000e-004** | **8.2000e-003** | **3.0000e-005** | **2.4200e-003** | **2.0000e-005** | **2.4400e-003** | **6.4000e-004** | **2.0000e-005** | **6.6000e-004** | **0.0000** | **1.9447** | **1.9447** | **8.0000e-005** | **0.0000** | **1.9465** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0392 | 0.0000 | 0.0392 | 0.0198 | 0.0000 | 0.0198 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0125 | 0.0881 | 0.5217 | 9.3000e-004 | | 3.4800e-003 | 3.4800e-003 | | 3.4800e-003 | 3.4800e-003 | 0.0000 | 81.3623 | 81.3623 | 0.0263 | 0.0000 | 81.9149 |
| **Total** | **0.0125** | **0.0881** | **0.5217** | **9.3000e-004** | **0.0392** | **3.4800e-003** | **0.0427** | **0.0198** | **3.4800e-003** | **0.0233** | **0.0000** | **81.3623** | **81.3623** | **0.0263** | **0.0000** | **81.9149** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.7000e-004 | 8.5000e-004 | 8.2000e-003 | 3.0000e-005 | 1.8900e-003 | 2.0000e-005 | 1.9100e-003 | 5.1000e-004 | 2.0000e-005 | 5.3000e-004 | 0.0000 | 1.9447 | 1.9447 | 8.0000e-005 | 0.0000 | 1.9465 |
| **Total** | **6.7000e-004** | **8.5000e-004** | **8.2000e-003** | **3.0000e-005** | **1.8900e-003** | **2.0000e-005** | **1.9100e-003** | **5.1000e-004** | **2.0000e-005** | **5.3000e-004** | **0.0000** | **1.9447** | **1.9447** | **8.0000e-005** | **0.0000** | **1.9465** |

## 3.4 Building Construction - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1903 | 1.7427 | 1.6620 | 2.6900e-003 | | 0.0960 | 0.0960 | | 0.0902 | 0.0902 | 0.0000 | 231.8307 | 231.8307 | 0.0559 | 0.0000 | 233.0035 |
| **Total** | **0.1903** | **1.7427** | **1.6620** | **2.6900e-003** | | **0.0960** | **0.0960** | | **0.0902** | **0.0902** | **0.0000** | **231.8307** | **231.8307** | **0.0559** | **0.0000** | **233.0035** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0216 | 0.1390 | 0.3119 | 6.6000e-004 | 0.0185 | 2.7200e-003 | 0.0212 | 5.2900e-003 | 2.5000e-003 | 7.8000e-003 | 0.0000 | 56.1452 | 56.1452 | 4.3000e-004 | 0.0000 | 56.1541 |
| Worker | 0.0122 | 0.0154 | 0.1483 | 5.6000e-004 | 0.0437 | 3.2000e-004 | 0.0441 | 0.0116 | 3.0000e-004 | 0.0119 | 0.0000 | 35.1801 | 35.1801 | 1.5100e-003 | 0.0000 | 35.2118 |
| **Total** | **0.0338** | **0.1544** | **0.4602** | **1.2200e-003** | **0.0622** | **3.0400e-003** | **0.0653** | **0.0169** | **2.8000e-003** | **0.0197** | **0.0000** | **91.3253** | **91.3253** | **1.9400e-003** | **0.0000** | **91.3660** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0588 | 0.2748 | 1.7721 | 2.6900e-003 | | 0.0112 | 0.0112 | | 0.0112 | 0.0112 | 0.0000 | 231.8304 | 231.8304 | 0.0559 | 0.0000 | 233.0033 |
| **Total** | **0.0588** | **0.2748** | **1.7721** | **2.6900e-003** | | **0.0112** | **0.0112** | | **0.0112** | **0.0112** | **0.0000** | **231.8304** | **231.8304** | **0.0559** | **0.0000** | **233.0033** |

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0216 | 0.1390 | 0.3119 | 6.6000e-004 | 0.0152 | 2.7200e-003 | 0.0179 | 4.4800e-003 | 2.5000e-003 | 6.9800e-003 | 0.0000 | 56.1452 | 56.1452 | 4.3000e-004 | 0.0000 | 56.1541 |
| Worker | 0.0122 | 0.0154 | 0.1483 | 5.6000e-004 | 0.0343 | 3.2000e-004 | 0.0346 | 9.2900e-003 | 3.0000e-004 | 9.5900e-003 | 0.0000 | 35.1801 | 35.1801 | 1.5100e-003 | 0.0000 | 35.2118 |
| **Total** | **0.0338** | **0.1544** | **0.4602** | **1.2200e-003** | **0.0494** | **3.0400e-003** | **0.0525** | **0.0138** | **2.8000e-003** | **0.0166** | **0.0000** | **91.3253** | **91.3253** | **1.9400e-003** | **0.0000** | **91.3660** |

## 3.4 Building Construction - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0841 | 0.7691 | 0.8082 | 1.3300e-003 | | 0.0399 | 0.0399 | | 0.0375 | 0.0375 | 0.0000 | 114.2287 | 114.2287 | 0.0273 | 0.0000 | 114.8026 |
| **Total** | **0.0841** | **0.7691** | **0.8082** | **1.3300e-003** | | **0.0399** | **0.0399** | | **0.0375** | **0.0375** | **0.0000** | **114.2287** | **114.2287** | **0.0273** | **0.0000** | **114.8026** |

**Unmitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0102 | 0.0605 | 0.1470 | 3.3000e-004 | 9.1000e-003 | 1.3100e-003 | 0.0104 | 2.6100e-003 | 1.2100e-003 | 3.8100e-003 | 0.0000 | 27.6225 | 27.6225 | 2.1000e-004 | 0.0000 | 27.6270 |
| Worker | 5.6600e-003 | 7.1000e-003 | 0.0685 | 2.8000e-004 | 0.0215 | 1.6000e-004 | 0.0217 | 5.7200e-003 | 1.5000e-004 | 5.8700e-003 | 0.0000 | 17.0615 | 17.0615 | 7.1000e-004 | 0.0000 | 17.0765 |
| **Total** | **0.0159** | **0.0676** | **0.2155** | **6.1000e-004** | **0.0306** | **1.4700e-003** | **0.0321** | **8.3300e-003** | **1.3600e-003** | **9.6800e-003** | **0.0000** | **44.6840** | **44.6840** | **9.2000e-004** | **0.0000** | **44.7035** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0277 | 0.1331 | 0.8717 | 1.3300e-003 | | 5.0300e-003 | 5.0300e-003 | | 5.0300e-003 | 5.0300e-003 | 0.0000 | 114.2286 | 114.2286 | 0.0273 | 0.0000 | 114.8024 |
| **Total** | **0.0277** | **0.1331** | **0.8717** | **1.3300e-003** | | **5.0300e-003** | **5.0300e-003** | | **5.0300e-003** | **5.0300e-003** | **0.0000** | **114.2286** | **114.2286** | **0.0273** | **0.0000** | **114.8024** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0102 | 0.0605 | 0.1470 | 3.3000e-004 | 7.4600e-003 | 1.3100e-003 | 8.7800e-003 | 2.2000e-003 | 1.2100e-003 | 3.4100e-003 | 0.0000 | 27.6225 | 27.6225 | 2.1000e-004 | 0.0000 | 27.6270 |
| Worker | 5.6600e-003 | 7.1000e-003 | 0.0685 | 2.8000e-004 | 0.0169 | 1.6000e-004 | 0.0170 | 4.5800e-003 | 1.5000e-004 | 4.7200e-003 | 0.0000 | 17.0615 | 17.0615 | 7.1000e-004 | 0.0000 | 17.0765 |
| **Total** | **0.0159** | **0.0676** | **0.2155** | **6.1000e-004** | **0.0243** | **1.4700e-003** | **0.0258** | **6.7800e-003** | **1.3600e-003** | **8.1300e-003** | **0.0000** | **44.6840** | **44.6840** | **9.2000e-004** | **0.0000** | **44.7035** |

## 3.5 Paving - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1237 | 1.2724 | 1.4425 | 2.2400e-003 | | 0.0669 | 0.0669 | | 0.0615 | 0.0615 | 0.0000 | 196.9547 | 196.9547 | 0.0637 | 0.0000 | 198.2924 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.1237** | **1.2724** | **1.4425** | **2.2400e-003** | | **0.0669** | **0.0669** | | **0.0615** | **0.0615** | **0.0000** | **196.9547** | **196.9547** | **0.0637** | **0.0000** | **198.2924** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.3800e-003 | 4.2700e-003 | 0.0412 | 1.6000e-004 | 0.0122 | 9.0000e-005 | 0.0122 | 3.2300e-003 | 8.0000e-005 | 3.3100e-003 | 0.0000 | 9.7723 | 9.7723 | 4.2000e-004 | 0.0000 | 9.7811 |
| **Total** | **3.3800e-003** | **4.2700e-003** | **0.0412** | **1.6000e-004** | **0.0122** | **9.0000e-005** | **0.0122** | **3.2300e-003** | **8.0000e-005** | **3.3100e-003** | **0.0000** | **9.7723** | **9.7723** | **4.2000e-004** | **0.0000** | **9.7811** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0276 | 0.1196 | 1.7012 | 2.2400e-003 | | 3.6800e-003 | 3.6800e-003 | | 3.6800e-003 | 3.6800e-003 | 0.0000 | 196.9545 | 196.9545 | 0.0637 | 0.0000 | 198.2922 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0276** | **0.1196** | **1.7012** | **2.2400e-003** | | **3.6800e-003** | **3.6800e-003** | | **3.6800e-003** | **3.6800e-003** | **0.0000** | **196.9545** | **196.9545** | **0.0637** | **0.0000** | **198.2922** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.3800e-003 | 4.2700e-003 | 0.0412 | 1.6000e-004 | 9.5200e-003 | 9.0000e-005 | 9.6100e-003 | 2.5800e-003 | 8.0000e-005 | 2.6600e-003 | 0.0000 | 9.7723 | 9.7723 | 4.2000e-004 | 0.0000 | 9.7811 |
| **Total** | **3.3800e-003** | **4.2700e-003** | **0.0412** | **1.6000e-004** | **9.5200e-003** | **9.0000e-005** | **9.6100e-003** | **2.5800e-003** | **8.0000e-005** | **2.6600e-003** | **0.0000** | **9.7723** | **9.7723** | **4.2000e-004** | **0.0000** | **9.7811** |

# 3.5 Paving - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0535 | 0.5401 | 0.7069 | 1.1000e-003 | | 0.0276 | 0.0276 | | 0.0254 | 0.0254 | 0.0000 | 97.0270 | 97.0270 | 0.0314 | 0.0000 | 97.6860 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0535** | **0.5401** | **0.7069** | **1.1000e-003** | | **0.0276** | **0.0276** | | **0.0254** | **0.0254** | **0.0000** | **97.0270** | **97.0270** | **0.0314** | **0.0000** | **97.6860** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.5700e-003 | 1.9700e-003 | 0.0190 | 8.0000e-005 | 5.9800e-003 | 4.0000e-005 | 6.0300e-003 | 1.5900e-003 | 4.0000e-005 | 1.6300e-003 | 0.0000 | 4.7393 | 4.7393 | 2.0000e-004 | 0.0000 | 4.7435 |
| **Total** | **1.5700e-003** | **1.9700e-003** | **0.0190** | **8.0000e-005** | **5.9800e-003** | **4.0000e-005** | **6.0300e-003** | **1.5900e-003** | **4.0000e-005** | **1.6300e-003** | **0.0000** | **4.7393** | **4.7393** | **2.0000e-004** | **0.0000** | **4.7435** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0136 | 0.0589 | 0.8379 | 1.1000e-003 | | 1.8100e-003 | 1.8100e-003 | | 1.8100e-003 | 1.8100e-003 | 0.0000 | 97.0269 | 97.0269 | 0.0314 | 0.0000 | 97.6859 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0136** | **0.0589** | **0.8379** | **1.1000e-003** | | **1.8100e-003** | **1.8100e-003** | | **1.8100e-003** | **1.8100e-003** | **0.0000** | **97.0269** | **97.0269** | **0.0314** | **0.0000** | **97.6859** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.5700e-003 | 1.9700e-003 | 0.0190 | 8.0000e-005 | 4.6900e-003 | 4.0000e-005 | 4.7300e-003 | 1.2700e-003 | 4.0000e-005 | 1.3100e-003 | 0.0000 | 4.7393 | 4.7393 | 2.0000e-004 | 0.0000 | 4.7435 |
| **Total** | **1.5700e-003** | **1.9700e-003** | **0.0190** | **8.0000e-005** | **4.6900e-003** | **4.0000e-005** | **4.7300e-003** | **1.2700e-003** | **4.0000e-005** | **1.3100e-003** | **0.0000** | **4.7393** | **4.7393** | **2.0000e-004** | **0.0000** | **4.7435** |

## 3.6 Architectural Coating - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7919 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0220 | 0.1535 | 0.1827 | 3.0000e-004 | | 9.4600e-003 | 9.4600e-003 | | 9.4600e-003 | 9.4600e-003 | 0.0000 | 25.6602 | 25.6602 | 1.7600e-003 | 0.0000 | 25.6972 |
| **Total** | **0.8139** | **0.1535** | **0.1827** | **3.0000e-004** | | **9.4600e-003** | **9.4600e-003** | | **9.4600e-003** | **9.4600e-003** | **0.0000** | **25.6602** | **25.6602** | **1.7600e-003** | **0.0000** | **25.6972** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.4800e-003 | 3.1300e-003 | 0.0302 | 1.1000e-004 | 8.9100e-003 | 7.0000e-005 | 8.9700e-003 | 2.3700e-003 | 6.0000e-005 | 2.4300e-003 | 0.0000 | 7.1663 | 7.1663 | 3.1000e-004 | 0.0000 | 7.1728 |
| **Total** | **2.4800e-003** | **3.1300e-003** | **0.0302** | **1.1000e-004** | **8.9100e-003** | **7.0000e-005** | **8.9700e-003** | **2.3700e-003** | **6.0000e-005** | **2.4300e-003** | **0.0000** | **7.1663** | **7.1663** | **3.1000e-004** | **0.0000** | **7.1728** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7919 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0220 | 0.1535 | 0.1827 | 3.0000e-004 | | 9.4600e-003 | 9.4600e-003 | | 9.4600e-003 | 9.4600e-003 | 0.0000 | 25.6602 | 25.6602 | 1.7600e-003 | 0.0000 | 25.6972 |
| **Total** | **0.8139** | **0.1535** | **0.1827** | **3.0000e-004** | | **9.4600e-003** | **9.4600e-003** | | **9.4600e-003** | **9.4600e-003** | **0.0000** | **25.6602** | **25.6602** | **1.7600e-003** | **0.0000** | **25.6972** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.4800e-003 | 3.1300e-003 | 0.0302 | 1.1000e-004 | 6.9800e-003 | 7.0000e-005 | 7.0400e-003 | 1.8900e-003 | 6.0000e-005 | 1.9500e-003 | 0.0000 | 7.1663 | 7.1663 | 3.1000e-004 | 0.0000 | 7.1728 |
| **Total** | **2.4800e-003** | **3.1300e-003** | **0.0302** | **1.1000e-004** | **6.9800e-003** | **7.0000e-005** | **7.0400e-003** | **1.8900e-003** | **6.0000e-005** | **1.9500e-003** | **0.0000** | **7.1663** | **7.1663** | **3.1000e-004** | **0.0000** | **7.1728** |

# 3.6 Architectural Coating - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.3900 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0101 | 0.0697 | 0.0898 | 1.5000e-004 | | 4.0400e-003 | 4.0400e-003 | | 4.0400e-003 | 4.0400e-003 | 0.0000 | 12.6386 | 12.6386 | 8.2000e-004 | 0.0000 | 12.6559 |
| **Total** | **0.4002** | **0.0697** | **0.0898** | **1.5000e-004** | | **4.0400e-003** | **4.0400e-003** | | **4.0400e-003** | **4.0400e-003** | **0.0000** | **12.6386** | **12.6386** | **8.2000e-004** | **0.0000** | **12.6559** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.1500e-003 | 1.4500e-003 | 0.0140 | 6.0000e-005 | 4.3900e-003 | 3.0000e-005 | 4.4200e-003 | 1.1700e-003 | 3.0000e-005 | 1.2000e-003 | 0.0000 | 3.4755 | 3.4755 | 1.5000e-004 | 0.0000 | 3.4785 |
| **Total** | **1.1500e-003** | **1.4500e-003** | **0.0140** | **6.0000e-005** | **4.3900e-003** | **3.0000e-005** | **4.4200e-003** | **1.1700e-003** | **3.0000e-005** | **1.2000e-003** | **0.0000** | **3.4755** | **3.4755** | **1.5000e-004** | **0.0000** | **3.4785** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.3900 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0101 | 0.0697 | 0.0898 | 1.5000e-004 | | 4.0400e-003 | 4.0400e-003 | | 4.0400e-003 | 4.0400e-003 | 0.0000 | 12.6386 | 12.6386 | 8.2000e-004 | 0.0000 | 12.6559 |
| **Total** | **0.4002** | **0.0697** | **0.0898** | **1.5000e-004** | | **4.0400e-003** | **4.0400e-003** | | **4.0400e-003** | **4.0400e-003** | **0.0000** | **12.6386** | **12.6386** | **8.2000e-004** | **0.0000** | **12.6559** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.1500e-003 | 1.4500e-003 | 0.0140 | 6.0000e-005 | 3.4400e-003 | 3.0000e-005 | 3.4700e-003 | 9.3000e-004 | 3.0000e-005 | 9.6000e-004 | 0.0000 | 3.4755 | 3.4755 | 1.5000e-004 | 0.0000 | 3.4785 |
| **Total** | **1.1500e-003** | **1.4500e-003** | **0.0140** | **6.0000e-005** | **3.4400e-003** | **3.0000e-005** | **3.4700e-003** | **9.3000e-004** | **3.0000e-005** | **9.6000e-004** | **0.0000** | **3.4755** | **3.4755** | **1.5000e-004** | **0.0000** | **3.4785** |

# West Pavilion - Phase 4 Construction

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Strip Mall | 170.00 | 1000sqft | 19.25 | 170,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2022 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase 4 acreage = 19.25

Construction Phase - Building construction, paving, and painting assumed to occur simultaneously

Grading - Phase 4 acreage = 19.25

Construction Off-road Equipment Mitigation - Tier 4 Engine mitigation applied. PM reduction from SJVAPCD Reg VIII requirement to clean paved roads daily per SCAQMD PM2.5 Working Group (1993). PM reduction from SJVAPCD Reg VIII requirement to stabilize unpaved roads w/ suppressants per WRAP's Fugitive Dust Handbook (2006).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 25 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 9.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | NumDays | 20.00 | 300.00 |
| tblConstructionPhase | PhaseEndDate | 11/11/2024 | 9/18/2023 |
| tblConstructionPhase | PhaseEndDate | 9/15/2023 | 9/18/2023 |
| tblConstructionPhase | PhaseEndDate | 11/11/2024 | 9/18/2023 |
| tblConstructionPhase | PhaseStartDate | 9/19/2023 | 7/26/2022 |
| tblConstructionPhase | PhaseStartDate | 7/23/2022 | 7/26/2022 |
| tblConstructionPhase | PhaseStartDate | 6/11/2022 | 6/12/2022 |
| tblConstructionPhase | PhaseStartDate | 9/19/2023 | 7/26/2022 |
| tblGrading | AcresOfGrading | 75.00 | 19.25 |
| tblLandUse | LotAcreage | 3.90 | 19.25 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2022 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2022 | 0.7141 | 2.4102 | 2.8205 | 4.9800e-003 | 0.2412 | 0.1178 | 0.3591 | 0.1140 | 0.1097 | 0.2237 | 0.0000 | 419.8591 | 419.8591 | 0.1020 | 0.0000 | 422.0014 |
| 2023 | 1.0234 | 2.4988 | 3.4504 | 6.2300e-003 | 0.0771 | 0.1207 | 0.1978 | 0.0208 | 0.1130 | 0.1338 | 0.0000 | 519.3365 | 519.3365 | 0.1137 | 0.0000 | 521.7232 |
| **Total** | **1.7375** | **4.9090** | **6.2709** | **0.0112** | **0.3183** | **0.2386** | **0.5568** | **0.1348** | **0.2227** | **0.3575** | **0.0000** | **939.1956** | **939.1956** | **0.2157** | **0.0000** | **943.7246** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2022 | 0.5443 | 0.4435 | 2.9960 | 4.9800e-003 | 0.1143 | 0.0162 | 0.1305 | 0.0502 | 0.0160 | 0.0662 | 0.0000 | 419.8586 | 419.8586 | 0.1020 | 0.0000 | 422.0010 |
| 2023 | 0.8591 | 0.5945 | 3.8248 | 6.2300e-003 | 0.0610 | 0.0214 | 0.0824 | 0.0169 | 0.0212 | 0.0380 | 0.0000 | 519.3360 | 519.3360 | 0.1137 | 0.0000 | 521.7227 |
| **Total** | **1.4034** | **1.0380** | **6.8208** | **0.0112** | **0.1753** | **0.0375** | **0.2128** | **0.0671** | **0.0372** | **0.1042** | **0.0000** | **939.1947** | **939.1947** | **0.2157** | **0.0000** | **943.7237** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **19.23** | **78.85** | **-8.77** | **0.00** | **44.93** | **84.26** | **61.78** | **50.27** | **83.30** | **70.85** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 5/29/2022 | 6/10/2022 | 5 | 10 | |
| 2 | Grading | Grading | 6/12/2022 | 7/22/2022 | 5 | 30 | |
| 3 | Building Construction | Building Construction | 7/26/2022 | 9/18/2023 | 5 | 300 | |
| 4 | Paving | Paving | 7/26/2022 | 9/18/2023 | 5 | 300 | |
| 5 | Architectural Coating | Architectural Coating | 7/26/2022 | 9/18/2023 | 5 | 300 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 19.25**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 255,000; Non-Residential Outdoor: 85,000 (Architectural Coating –**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 3 | 8.00 | 255 | 0.40 |
| Site Preparation | Tractors/Loaders/Backhoes | 4 | 8.00 | 97 | 0.37 |
| Grading | Excavators | 2 | 8.00 | 162 | 0.38 |
| Grading | Graders | 1 | 8.00 | 174 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 255 | 0.40 |
| Grading | Scrapers | 2 | 8.00 | 361 | 0.48 |
| Grading | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Building Construction | Cranes | 1 | 7.00 | 226 | 0.29 |
| Building Construction | Forklifts | 3 | 8.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 3 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 1 | 8.00 | 46 | 0.45 |
| Paving | Pavers | 2 | 8.00 | 125 | 0.42 |
| Paving | Paving Equipment | 2 | 8.00 | 130 | 0.36 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 9 | 54.00 | 28.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 6 | 15.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 11.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## 3.2 Site Preparation - 2022

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0903 | 0.0000 | 0.0903 | 0.0497 | 0.0000 | 0.0497 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0161 | 0.1633 | 0.1499 | 2.0000e-004 | | 7.7400e-003 | 7.7400e-003 | | 7.1200e-003 | 7.1200e-003 | 0.0000 | 17.1991 | 17.1991 | 5.5600e-003 | 0.0000 | 17.3159 |
| **Total** | **0.0161** | **0.1633** | **0.1499** | **2.0000e-004** | **0.0903** | **7.7400e-003** | **0.0981** | **0.0497** | **7.1200e-003** | **0.0568** | **0.0000** | **17.1991** | **17.1991** | **5.5600e-003** | **0.0000** | **17.3159** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.9000e-004 | 2.4000e-004 | 2.3100e-003 | 1.0000e-005 | 7.3000e-004 | 1.0000e-005 | 7.3000e-004 | 1.9000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.5745 | 0.5745 | 2.0000e-005 | 0.0000 | 0.5750 |
| **Total** | **1.9000e-004** | **2.4000e-004** | **2.3100e-003** | **1.0000e-005** | **7.3000e-004** | **1.0000e-005** | **7.3000e-004** | **1.9000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **0.5745** | **0.5745** | **2.0000e-005** | **0.0000** | **0.5750** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0352 | 0.0000 | 0.0352 | 0.0194 | 0.0000 | 0.0194 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.3800e-003 | 0.0103 | 0.1062 | 2.0000e-004 | | 3.2000e-004 | 3.2000e-004 | | 3.2000e-004 | 3.2000e-004 | 0.0000 | 17.1991 | 17.1991 | 5.5600e-003 | 0.0000 | 17.3159 |
| **Total** | **2.3800e-003** | **0.0103** | **0.1062** | **2.0000e-004** | **0.0352** | **3.2000e-004** | **0.0356** | **0.0194** | **3.2000e-004** | **0.0197** | **0.0000** | **17.1991** | **17.1991** | **5.5600e-003** | **0.0000** | **17.3159** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.9000e-004 | 2.4000e-004 | 2.3100e-003 | 1.0000e-005 | 5.7000e-004 | 1.0000e-005 | 5.7000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.5745 | 0.5745 | 2.0000e-005 | 0.0000 | 0.5750 |
| **Total** | **1.9000e-004** | **2.4000e-004** | **2.3100e-003** | **1.0000e-005** | **5.7000e-004** | **1.0000e-005** | **5.7000e-004** | **1.5000e-004** | **0.0000** | **1.6000e-004** | **0.0000** | **0.5745** | **0.5745** | **2.0000e-005** | **0.0000** | **0.5750** |

## 3.3 Grading - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.1005 | 0.0000 | 0.1005 | 0.0508 | 0.0000 | 0.0508 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0565 | 0.5764 | 0.5264 | 9.3000e-004 | | 0.0259 | 0.0259 | | 0.0238 | 0.0238 | 0.0000 | 81.4391 | 81.4391 | 0.0263 | 0.0000 | 81.9922 |
| **Total** | **0.0565** | **0.5764** | **0.5264** | **9.3000e-004** | **0.1005** | **0.0259** | **0.1265** | **0.0508** | **0.0238** | **0.0746** | **0.0000** | **81.4391** | **81.4391** | **0.0263** | **0.0000** | **81.9922** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.4000e-004 | 8.0000e-004 | 7.6900e-003 | 3.0000e-005 | 2.4200e-003 | 2.0000e-005 | 2.4400e-003 | 6.4000e-004 | 2.0000e-005 | 6.6000e-004 | 0.0000 | 1.9149 | 1.9149 | 8.0000e-005 | 0.0000 | 1.9166 |
| **Total** | **6.4000e-004** | **8.0000e-004** | **7.6900e-003** | **3.0000e-005** | **2.4200e-003** | **2.0000e-005** | **2.4400e-003** | **6.4000e-004** | **2.0000e-005** | **6.6000e-004** | **0.0000** | **1.9149** | **1.9149** | **8.0000e-005** | **0.0000** | **1.9166** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0392 | 0.0000 | 0.0392 | 0.0198 | 0.0000 | 0.0198 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0114 | 0.0492 | 0.5217 | 9.3000e-004 | | 1.5100e-003 | 1.5100e-003 | | 1.5100e-003 | 1.5100e-003 | 0.0000 | 81.4390 | 81.4390 | 0.0263 | 0.0000 | 81.9921 |
| **Total** | **0.0114** | **0.0492** | **0.5217** | **9.3000e-004** | **0.0392** | **1.5100e-003** | **0.0407** | **0.0198** | **1.5100e-003** | **0.0213** | **0.0000** | **81.4390** | **81.4390** | **0.0263** | **0.0000** | **81.9921** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 6.4000e-004 | 8.0000e-004 | 7.6900e-003 | 3.0000e-005 | 1.8900e-003 | 2.0000e-005 | 1.9100e-003 | 5.1000e-004 | 2.0000e-005 | 5.3000e-004 | 0.0000 | 1.9149 | 1.9149 | 8.0000e-005 | 0.0000 | 1.9166 |
| **Total** | **6.4000e-004** | **8.0000e-004** | **7.6900e-003** | **3.0000e-005** | **1.8900e-003** | **2.0000e-005** | **1.9100e-003** | **5.1000e-004** | **2.0000e-005** | **5.3000e-004** | **0.0000** | **1.9149** | **1.9149** | **8.0000e-005** | **0.0000** | **1.9166** |

# 3.4 Building Construction - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0969 | 0.8856 | 0.9307 | 1.5300e-003 | | 0.0459 | 0.0459 | | 0.0432 | 0.0432 | 0.0000 | 131.5361 | 131.5361 | 0.0315 | 0.0000 | 132.1969 |
| **Total** | **0.0969** | **0.8856** | **0.9307** | **1.5300e-003** | | **0.0459** | **0.0459** | | **0.0432** | **0.0432** | **0.0000** | **131.5361** | **131.5361** | **0.0315** | **0.0000** | **132.1969** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0118 | 0.0696 | 0.1692 | 3.7000e-004 | 0.0105 | 1.5100e-003 | 0.0120 | 3.0000e-003 | 1.3900e-003 | 4.3900e-003 | 0.0000 | 31.8078 | 31.8078 | 2.5000e-004 | 0.0000 | 31.8129 |
| Worker | 6.5200e-003 | 8.1700e-003 | 0.0789 | 3.2000e-004 | 0.0248 | 1.8000e-004 | 0.0250 | 6.5900e-003 | 1.7000e-004 | 6.7600e-003 | 0.0000 | 19.6466 | 19.6466 | 8.2000e-004 | 0.0000 | 19.6638 |
| **Total** | **0.0183** | **0.0778** | **0.2481** | **6.9000e-004** | **0.0353** | **1.6900e-003** | **0.0370** | **9.5900e-003** | **1.5600e-003** | **0.0112** | **0.0000** | **51.4543** | **51.4543** | **1.0700e-003** | **0.0000** | **51.4767** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0319 | 0.1532 | 1.0038 | 1.5300e-003 | | 5.7900e-003 | 5.7900e-003 | | 5.7900e-003 | 5.7900e-003 | 0.0000 | 131.5359 | 131.5359 | 0.0315 | 0.0000 | 132.1967 |
| **Total** | **0.0319** | **0.1532** | **1.0038** | **1.5300e-003** | | **5.7900e-003** | **5.7900e-003** | | **5.7900e-003** | **5.7900e-003** | **0.0000** | **131.5359** | **131.5359** | **0.0315** | **0.0000** | **132.1967** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0118 | 0.0696 | 0.1692 | 3.7000e-004 | 8.5900e-003 | 1.5100e-003 | 0.0101 | 2.5400e-003 | 1.3900e-003 | 3.9300e-003 | 0.0000 | 31.8078 | 31.8078 | 2.5000e-004 | 0.0000 | 31.8129 |
| Worker | 6.5200e-003 | 8.1700e-003 | 0.0789 | 3.2000e-004 | 0.0194 | 1.8000e-004 | 0.0196 | 5.2700e-003 | 1.7000e-004 | 5.4400e-003 | 0.0000 | 19.6466 | 19.6466 | 8.2000e-004 | 0.0000 | 19.6638 |
| **Total** | **0.0183** | **0.0778** | **0.2481** | **6.9000e-004** | **0.0280** | **1.6900e-003** | **0.0297** | **7.8100e-003** | **1.5600e-003** | **9.3700e-003** | **0.0000** | **51.4543** | **51.4543** | **1.0700e-003** | **0.0000** | **51.4767** |

## 3.4 Building Construction - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1457 | 1.3311 | 1.5075 | 2.5000e-003 | | 0.0648 | 0.0648 | | 0.0610 | 0.0610 | 0.0000 | 214.6855 | 214.6855 | 0.0510 | 0.0000 | 215.7564 |
| **Total** | **0.1457** | **1.3311** | **1.5075** | **2.5000e-003** | | **0.0648** | **0.0648** | | **0.0610** | **0.0610** | **0.0000** | **214.6855** | **214.6855** | **0.0510** | **0.0000** | **215.7564** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0181 | 0.0981 | 0.2666 | 6.1000e-004 | 0.0171 | 2.3000e-003 | 0.0194 | 4.9000e-003 | 2.1100e-003 | 7.0100e-003 | 0.0000 | 51.7905 | 51.7905 | 3.7000e-004 | 0.0000 | 51.7982 |
| Worker | 0.0101 | 0.0126 | 0.1211 | 5.2000e-004 | 0.0405 | 3.0000e-004 | 0.0408 | 0.0108 | 2.8000e-004 | 0.0110 | 0.0000 | 31.6091 | 31.6091 | 1.2900e-003 | 0.0000 | 31.6362 |
| **Total** | **0.0281** | **0.1106** | **0.3877** | **1.1300e-003** | **0.0576** | **2.6000e-003** | **0.0602** | **0.0157** | **2.3900e-003** | **0.0180** | **0.0000** | **83.3995** | **83.3995** | **1.6600e-003** | **0.0000** | **83.4344** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0500 | 0.2460 | 1.6361 | 2.5000e-003 | | 8.6300e-003 | 8.6300e-003 | | 8.6300e-003 | 8.6300e-003 | 0.0000 | 214.6852 | 214.6852 | 0.0510 | 0.0000 | 215.7561 |
| **Total** | **0.0500** | **0.2460** | **1.6361** | **2.5000e-003** | | **8.6300e-003** | **8.6300e-003** | | **8.6300e-003** | **8.6300e-003** | **0.0000** | **214.6852** | **214.6852** | **0.0510** | **0.0000** | **215.7561** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0181 | 0.0981 | 0.2666 | 6.1000e-004 | 0.0140 | 2.3000e-003 | 0.0163 | 4.1400e-003 | 2.1100e-003 | 6.2500e-003 | 0.0000 | 51.7905 | 51.7905 | 3.7000e-004 | 0.0000 | 51.7982 |
| Worker | 0.0101 | 0.0126 | 0.1211 | 5.2000e-004 | 0.0317 | 3.0000e-004 | 0.0320 | 8.6000e-003 | 2.8000e-004 | 8.8800e-003 | 0.0000 | 31.6091 | 31.6091 | 1.2900e-003 | 0.0000 | 31.6362 |
| **Total** | **0.0281** | **0.1106** | **0.3877** | **1.1300e-003** | **0.0457** | **2.6000e-003** | **0.0483** | **0.0127** | **2.3900e-003** | **0.0151** | **0.0000** | **83.3995** | **83.3995** | **1.6600e-003** | **0.0000** | **83.4344** |

# 3.5 Paving - 2022

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0617 | 0.6219 | 0.8141 | 1.2700e-003 | | 0.0318 | 0.0318 | | 0.0292 | 0.0292 | 0.0000 | 111.7281 | 111.7281 | 0.0361 | 0.0000 | 112.4869 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0617** | **0.6219** | **0.8141** | **1.2700e-003** | | **0.0318** | **0.0318** | | **0.0292** | **0.0292** | **0.0000** | **111.7281** | **111.7281** | **0.0361** | **0.0000** | **112.4869** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.8100e-003 | 2.2700e-003 | 0.0219 | 9.0000e-005 | 6.8900e-003 | 5.0000e-005 | 6.9400e-003 | 1.8300e-003 | 5.0000e-005 | 1.8800e-003 | 0.0000 | 5.4574 | 5.4574 | 2.3000e-004 | 0.0000 | 5.4622 |
| **Total** | **1.8100e-003** | **2.2700e-003** | **0.0219** | **9.0000e-005** | **6.8900e-003** | **5.0000e-005** | **6.9400e-003** | **1.8300e-003** | **5.0000e-005** | **1.8800e-003** | **0.0000** | **5.4574** | **5.4574** | **2.3000e-004** | **0.0000** | **5.4622** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0157 | 0.0678 | 0.9649 | 1.2700e-003 | | 2.0900e-003 | 2.0900e-003 | | 2.0900e-003 | 2.0900e-003 | 0.0000 | 111.7280 | 111.7280 | 0.0361 | 0.0000 | 112.4868 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0157** | **0.0678** | **0.9649** | **1.2700e-003** | | **2.0900e-003** | **2.0900e-003** | | **2.0900e-003** | **2.0900e-003** | **0.0000** | **111.7280** | **111.7280** | **0.0361** | **0.0000** | **112.4868** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.8100e-003 | 2.2700e-003 | 0.0219 | 9.0000e-005 | 5.4000e-003 | 5.0000e-005 | 5.4500e-003 | 1.4600e-003 | 5.0000e-005 | 1.5100e-003 | 0.0000 | 5.4574 | 5.4574 | 2.3000e-004 | 0.0000 | 5.4622 |
| **Total** | **1.8100e-003** | **2.2700e-003** | **0.0219** | **9.0000e-005** | **5.4000e-003** | **5.0000e-005** | **5.4500e-003** | **1.4600e-003** | **5.0000e-005** | **1.5100e-003** | **0.0000** | **5.4574** | **5.4574** | **2.3000e-004** | **0.0000** | **5.4622** |

# 3.5 Paving - 2023

## Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0942 | 0.9298 | 1.3285 | 2.0800e-003 | | 0.0466 | 0.0466 | | 0.0429 | 0.0429 | 0.0000 | 182.2871 | 182.2871 | 0.0590 | 0.0000 | 183.5251 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0942** | **0.9298** | **1.3285** | **2.0800e-003** | | **0.0466** | **0.0466** | | **0.0429** | **0.0429** | **0.0000** | **182.2871** | **182.2871** | **0.0590** | **0.0000** | **183.5251** |

## Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-003 | 3.4900e-003 | 0.0336 | 1.4000e-004 | 0.0112 | 8.0000e-005 | 0.0113 | 2.9900e-003 | 8.0000e-005 | 3.0600e-003 | 0.0000 | 8.7803 | 8.7803 | 3.6000e-004 | 0.0000 | 8.7878 |
| **Total** | **2.8000e-003** | **3.4900e-003** | **0.0336** | **1.4000e-004** | **0.0112** | **8.0000e-005** | **0.0113** | **2.9900e-003** | **8.0000e-005** | **3.0600e-003** | **0.0000** | **8.7803** | **8.7803** | **3.6000e-004** | **0.0000** | **8.7878** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0255 | 0.1106 | 1.5743 | 2.0800e-003 | | 3.4000e-003 | 3.4000e-003 | | 3.4000e-003 | 3.4000e-003 | 0.0000 | 182.2869 | 182.2869 | 0.0590 | 0.0000 | 183.5249 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0255** | **0.1106** | **1.5743** | **2.0800e-003** | | **3.4000e-003** | **3.4000e-003** | | **3.4000e-003** | **3.4000e-003** | **0.0000** | **182.2869** | **182.2869** | **0.0590** | **0.0000** | **183.5249** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.8000e-003 | 3.4900e-003 | 0.0336 | 1.4000e-004 | 8.8100e-003 | 8.0000e-005 | 8.8900e-003 | 2.3900e-003 | 8.0000e-005 | 2.4700e-003 | 0.0000 | 8.7803 | 8.7803 | 3.6000e-004 | 0.0000 | 8.7878 |
| **Total** | **2.8000e-003** | **3.4900e-003** | **0.0336** | **1.4000e-004** | **8.8100e-003** | **8.0000e-005** | **8.8900e-003** | **2.3900e-003** | **8.0000e-005** | **2.4700e-003** | **0.0000** | **8.7803** | **8.7803** | **3.6000e-004** | **0.0000** | **8.7878** |

## 3.6 Architectural Coating - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.4491 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0117 | 0.0803 | 0.1034 | 1.7000e-004 | | 4.6600e-003 | 4.6600e-003 | | 4.6600e-003 | 4.6600e-003 | 0.0000 | 14.5536 | 14.5536 | 9.5000e-004 | 0.0000 | 14.5734 |
| **Total** | **0.4608** | **0.0803** | **0.1034** | **1.7000e-004** | | **4.6600e-003** | **4.6600e-003** | | **4.6600e-003** | **4.6600e-003** | **0.0000** | **14.5536** | **14.5536** | **9.5000e-004** | **0.0000** | **14.5734** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3300e-003 | 1.6600e-003 | 0.0161 | 6.0000e-005 | 5.0500e-003 | 4.0000e-005 | 5.0900e-003 | 1.3400e-003 | 3.0000e-005 | 1.3800e-003 | 0.0000 | 4.0021 | 4.0021 | 1.7000e-004 | 0.0000 | 4.0056 |
| **Total** | **1.3300e-003** | **1.6600e-003** | **0.0161** | **6.0000e-005** | **5.0500e-003** | **4.0000e-005** | **5.0900e-003** | **1.3400e-003** | **3.0000e-005** | **1.3800e-003** | **0.0000** | **4.0021** | **4.0021** | **1.7000e-004** | **0.0000** | **4.0056** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.4491 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0117 | 0.0803 | 0.1034 | 1.7000e-004 | | 4.6600e-003 | 4.6600e-003 | | 4.6600e-003 | 4.6600e-003 | 0.0000 | 14.5535 | 14.5535 | 9.5000e-004 | 0.0000 | 14.5734 |
| **Total** | **0.4608** | **0.0803** | **0.1034** | **1.7000e-004** | | **4.6600e-003** | **4.6600e-003** | | **4.6600e-003** | **4.6600e-003** | **0.0000** | **14.5535** | **14.5535** | **9.5000e-004** | **0.0000** | **14.5734** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3300e-003 | 1.6600e-003 | 0.0161 | 6.0000e-005 | 3.9600e-003 | 4.0000e-005 | 4.0000e-003 | 1.0700e-003 | 3.0000e-005 | 1.1100e-003 | 0.0000 | 4.0021 | 4.0021 | 1.7000e-004 | 0.0000 | 4.0056 |
| **Total** | **1.3300e-003** | **1.6600e-003** | **0.0161** | **6.0000e-005** | **3.9600e-003** | **4.0000e-005** | **4.0000e-003** | **1.0700e-003** | **3.0000e-005** | **1.1100e-003** | **0.0000** | **4.0021** | **4.0021** | **1.7000e-004** | **0.0000** | **4.0056** |

## 3.6 Architectural Coating - 2023

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7328 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0178 | 0.1212 | 0.1684 | 2.8000e-004 | | 6.5900e-003 | 6.5900e-003 | | 6.5900e-003 | 6.5900e-003 | 0.0000 | 23.7453 | 23.7453 | 1.4200e-003 | 0.0000 | 23.7751 |
| **Total** | **0.7506** | **0.1212** | **0.1684** | **2.8000e-004** | | **6.5900e-003** | **6.5900e-003** | | **6.5900e-003** | **6.5900e-003** | **0.0000** | **23.7453** | **23.7453** | **1.4200e-003** | **0.0000** | **23.7751** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0500e-003 | 2.5600e-003 | 0.0247 | 1.1000e-004 | 8.2400e-003 | 6.0000e-005 | 8.3100e-003 | 2.1900e-003 | 6.0000e-005 | 2.2500e-003 | 0.0000 | 6.4389 | 6.4389 | 2.6000e-004 | 0.0000 | 6.4444 |
| **Total** | **2.0500e-003** | **2.5600e-003** | **0.0247** | **1.1000e-004** | **8.2400e-003** | **6.0000e-005** | **8.3100e-003** | **2.1900e-003** | **6.0000e-005** | **2.2500e-003** | **0.0000** | **6.4389** | **6.4389** | **2.6000e-004** | **0.0000** | **6.4444** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.7328 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0178 | 0.1212 | 0.1684 | 2.8000e-004 | | 6.5900e-003 | 6.5900e-003 | | 6.5900e-003 | 6.5900e-003 | 0.0000 | 23.7452 | 23.7452 | 1.4200e-003 | 0.0000 | 23.7751 |
| **Total** | **0.7506** | **0.1212** | **0.1684** | **2.8000e-004** | | **6.5900e-003** | **6.5900e-003** | | **6.5900e-003** | **6.5900e-003** | **0.0000** | **23.7452** | **23.7452** | **1.4200e-003** | **0.0000** | **23.7751** |

## Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0500e-003 | 2.5600e-003 | 0.0247 | 1.1000e-004 | 6.4600e-003 | 6.0000e-005 | 6.5200e-003 | 1.7500e-003 | 6.0000e-005 | 1.8100e-003 | 0.0000 | 6.4389 | 6.4389 | 2.6000e-004 | 0.0000 | 6.4444 |
| **Total** | **2.0500e-003** | **2.5600e-003** | **0.0247** | **1.1000e-004** | **6.4600e-003** | **6.0000e-005** | **6.5200e-003** | **1.7500e-003** | **6.0000e-005** | **1.8100e-003** | **0.0000** | **6.4389** | **6.4389** | **2.6000e-004** | **0.0000** | **6.4444** |

# Vineyard at Delano & West Pavilion Buildout

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 872.00 | Dwelling Unit | 22.95 | 872,000.00 | 2494 |
| Strip Mall | 340.00 | 1000sqft | 7.81 | 340,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2025 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 490.64 | **CH4 Intensity (lb/MWhr)** | 0.021 | **N2O Intensity (lb/MWhr)** | 0.005 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2025 Emission Intensity Factor per UCSB Utility & Energy Services (2012)

Land Use - Buildout = 872 apartment units & 340,000 square feet of non-residential

Construction Phase -

Vehicle Trips - Trip generation per Traffic Impact Analysis (2014)

Area Mitigation -

Water Mitigation - Accounts for CalGreen

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblProjectCharacteristics | CH4IntensityFactor | 0.029 | 0.021 |
| tblProjectCharacteristics | CO2IntensityFactor | 630.89 | 490.64 |
| tblProjectCharacteristics | N2OIntensityFactor | 0.006 | 0.005 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2025 |
| tblVehicleTrips | ST_TR | 7.16 | 6.39 |
| tblVehicleTrips | ST_TR | 42.04 | 69.24 |
| tblVehicleTrips | SU_TR | 6.07 | 6.39 |
| tblVehicleTrips | SU_TR | 20.43 | 69.24 |
| tblVehicleTrips | WD_TR | 6.59 | 6.65 |
| tblVehicleTrips | WD_TR | 44.32 | 51.70 |
| tblWoodstoves | NumberCatalytic | 22.95 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 22.95 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 6.0210 | 0.0745 | 6.4738 | 3.4000e-004 | | 0.0623 | 0.0623 | | 0.0620 | 0.0620 | 0.0000 | 388.3392 | 388.3392 | 0.0174 | 6.9300e-003 | 390.8512 |
| Energy | 0.0789 | 0.6798 | 0.3307 | 4.3000e-003 | | 0.0545 | 0.0545 | | 0.0545 | 0.0545 | 0.0000 | 2,390.0794 | 2,390.0794 | 0.0839 | 0.0307 | 2,401.3608 |
| Mobile | 14.2144 | 41.6529 | 183.2087 | 0.3821 | 17.9941 | 0.8622 | 18.8563 | 4.8484 | 0.7941 | 5.6425 | 0.0000 | 28,096.0003 | 28,096.0003 | 0.5997 | 0.0000 | 28,108.5948 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 153.8915 | 0.0000 | 153.8915 | 9.0947 | 0.0000 | 344.8808 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 26.0145 | 138.6676 | 164.6821 | 2.6779 | 0.0645 | 240.9135 |
| **Total** | **20.3142** | **42.4073** | **190.0132** | **0.3868** | **17.9941** | **0.9790** | **18.9731** | **4.8484** | **0.9106** | **5.7590** | **179.9060** | **31,013.0866** | **31,192.9926** | **12.4736** | **0.1021** | **31,486.6010** |

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 5.9828 | 0.0745 | 6.4717 | 3.4000e-004 | | 0.0359 | 0.0359 | | 0.0359 | 0.0359 | 0.0000 | 10.5824 | 10.5824 | 0.0101 | 0.0000 | 10.7954 |
| Energy | 0.0789 | 0.6798 | 0.3307 | 4.3000e-003 | | 0.0545 | 0.0545 | | 0.0545 | 0.0545 | 0.0000 | 2,390.0794 | 2,390.0794 | 0.0839 | 0.0307 | 2,401.3608 |
| Mobile | 14.2144 | 41.6529 | 183.2087 | 0.3821 | 17.9941 | 0.8622 | 18.8563 | 4.8484 | 0.7941 | 5.6425 | 0.0000 | 28,096.0003 | 28,096.0003 | 0.5997 | 0.0000 | 28,108.5948 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 153.8915 | 0.0000 | 153.8915 | 9.0947 | 0.0000 | 344.8808 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 20.8116 | 118.9186 | 139.7302 | 2.1424 | 0.0516 | 200.7209 |
| **Total** | **20.2761** | **42.4073** | **190.0111** | **0.3868** | **17.9941** | **0.9526** | **18.9467** | **4.8484** | **0.8845** | **5.7329** | **174.7031** | **30,615.5807** | **30,790.2838** | **11.9308** | **0.0823** | **31,066.3527** |

| | **ROG** | **NOx** | **CO** | **SO2** | **Fugitive PM10** | **Exhaust PM10** | **PM10 Total** | **Fugitive PM2.5** | **Exhaust PM2.5** | **PM2.5 Total** | **Bio- CO2** | **NBio-CO2** | **Total CO2** | **CH4** | **N20** | **CO2e** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.19** | **0.00** | **0.00** | **0.00** | **0.00** | **2.69** | **0.14** | **0.00** | **2.87** | **0.45** | **2.89** | **1.28** | **1.29** | **4.35** | **19.39** | **1.33** |

# 3.0 Operational Detail - Mobile

## 3.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 14.2144 | 41.6529 | 183.2087 | 0.3821 | 17.9941 | 0.8622 | 18.8563 | 4.8484 | 0.7941 | 5.6425 | 0.0000 | 28,096.0003 | 28,096.0003 | 0.5997 | 0.0000 | 28,108.5948 |
| Unmitigated | 14.2144 | 41.6529 | 183.2087 | 0.3821 | 17.9941 | 0.8622 | 18.8563 | 4.8484 | 0.7941 | 5.6425 | 0.0000 | 28,096.0003 | 28,096.0003 | 0.5997 | 0.0000 | 28,108.5948 |

## 3.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Mid Rise | 5,798.80 | 5,572.08 | 5572.08 | 16,674,683 | 16,674,683 |
| Strip Mall | 17,578.00 | 23,541.94 | 23541.94 | 29,694,891 | 29,694,891 |
| Total | 23,376.80 | 29,114.02 | 29,114.02 | 46,369,573 | 46,369,573 |

## 3.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Mid Rise | 10.80 | 7.30 | 7.50 | 46.40 | 16.40 | 37.20 | 86 | 11 | 3 |
| Strip Mall | 9.50 | 7.30 | 7.30 | 16.60 | 64.40 | 19.00 | 45 | 40 | 15 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.354417 | 0.053979 | 0.135300 | 0.180782 | 0.057193 | 0.010470 | 0.023391 | 0.171508 | 0.001499 | 0.001851 | 0.006071 | 0.001001 | 0.002538 |

# 4.0 Energy Detail

Historical Energy Use: N

## 4.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1,609.7165 | 1,609.7165 | 0.0689 | 0.0164 | 1,616.2487 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 1,609.7165 | 1,609.7165 | 0.0689 | 0.0164 | 1,616.2487 |
| NaturalGas Mitigated | 0.0789 | 0.6798 | 0.3307 | 4.3000e-003 | | 0.0545 | 0.0545 | | 0.0545 | 0.0545 | 0.0000 | 780.3629 | 780.3629 | 0.0150 | 0.0143 | 785.1121 |
| NaturalGas Unmitigated | 0.0789 | 0.6798 | 0.3307 | 4.3000e-003 | | 0.0545 | 0.0545 | | 0.0545 | 0.0545 | 0.0000 | 780.3629 | 780.3629 | 0.0150 | 0.0143 | 785.1121 |

## 4.2 Energy by Land Use - NaturalGas

### Unmitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Mid Rise | 1.25834e+007 | 0.0679 | 0.5798 | 0.2467 | 3.7000e-003 | | 0.0469 | 0.0469 | | 0.0469 | 0.0469 | 0.0000 | 671.5007 | 671.5007 | 0.0129 | 0.0123 | 675.5874 |
| Strip Mall | 2.04e+006 | 0.0110 | 0.1000 | 0.0840 | 6.0000e-004 | | 7.6000e-003 | 7.6000e-003 | | 7.6000e-003 | 7.6000e-003 | 0.0000 | 108.8622 | 108.8622 | 2.0900e-003 | 2.0000e-003 | 109.5247 |
| **Total** | | **0.0789** | **0.6798** | **0.3307** | **4.3000e-003** | | **0.0545** | **0.0545** | | **0.0545** | **0.0545** | **0.0000** | **780.3629** | **780.3629** | **0.0150** | **0.0143** | **785.1121** |

### Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Mid Rise | 1.25834e+007 | 0.0679 | 0.5798 | 0.2467 | 3.7000e-003 | | 0.0469 | 0.0469 | | 0.0469 | 0.0469 | 0.0000 | 671.5007 | 671.5007 | 0.0129 | 0.0123 | 675.5874 |
| Strip Mall | 2.04e+006 | 0.0110 | 0.1000 | 0.0840 | 6.0000e-004 | | 7.6000e-003 | 7.6000e-003 | | 7.6000e-003 | 7.6000e-003 | 0.0000 | 108.8622 | 108.8622 | 2.0900e-003 | 2.0000e-003 | 109.5247 |
| **Total** | | **0.0789** | **0.6798** | **0.3307** | **4.3000e-003** | | **0.0545** | **0.0545** | | **0.0545** | **0.0545** | **0.0000** | **780.3629** | **780.3629** | **0.0150** | **0.0143** | **785.1121** |

## 4.3 Energy by Land Use - Electricity

### Unmitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Mid Rise | 3.33324e+006 | 741.8139 | 0.0318 | 7.5600e-003 | 744.8241 |
| Strip Mall | 3.8998e+006 | 867.9027 | 0.0372 | 8.8400e-003 | 871.4246 |
| **Total** | | **1,609.7165** | **0.0689** | **0.0164** | **1,616.2487** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Mid Rise | 3.33324e+006 | 741.8139 | 0.0318 | 7.5600e-003 | 744.8241 |
| Strip Mall | 3.8998e+006 | 867.9027 | 0.0372 | 8.8400e-003 | 871.4246 |
| **Total** | | **1,609.7165** | **0.0689** | **0.0164** | **1,616.2487** |

# 5.0 Area Detail

## 5.1 Mitigation Measures Area

No Hearths Installed

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 5.9828 | 0.0745 | 6.4717 | 3.4000e-004 | | 0.0359 | 0.0359 | | 0.0359 | 0.0359 | 0.0000 | 10.5824 | 10.5824 | 0.0101 | 0.0000 | 10.7954 |
| Unmitigated | 6.0210 | 0.0745 | 6.4738 | 3.4000e-004 | | 0.0623 | 0.0623 | | 0.0620 | 0.0620 | 0.0000 | 388.3392 | 388.3392 | 0.0174 | 6.9300e-003 | 390.8512 |

## 5.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 1.0548 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.7335 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0382 | 0.0000 | 2.0800e-003 | 0.0000 | | 0.0264 | 0.0264 | | 0.0261 | 0.0261 | 0.0000 | 377.7569 | 377.7569 | 7.2400e-003 | 6.9300e-003 | 380.0558 |
| Landscaping | 0.1945 | 0.0745 | 6.4717 | 3.4000e-004 | | 0.0359 | 0.0359 | | 0.0359 | 0.0359 | 0.0000 | 10.5824 | 10.5824 | 0.0101 | 0.0000 | 10.7954 |
| **Total** | **6.0210** | **0.0745** | **6.4738** | **3.4000e-004** | | **0.0623** | **0.0623** | | **0.0620** | **0.0620** | **0.0000** | **388.3392** | **388.3392** | **0.0174** | **6.9300e-003** | **390.8512** |

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 1.0548 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 4.7335 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.1945 | 0.0745 | 6.4717 | 3.4000e-004 | | 0.0359 | 0.0359 | | 0.0359 | 0.0359 | 0.0000 | 10.5824 | 10.5824 | 0.0101 | 0.0000 | 10.7954 |
| **Total** | **5.9828** | **0.0745** | **6.4717** | **3.4000e-004** | | **0.0359** | **0.0359** | | **0.0359** | **0.0359** | **0.0000** | **10.5824** | **10.5824** | **0.0101** | **0.0000** | **10.7954** |

## 6.0 Water Detail

### 6.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 139.7302 | 2.1424 | 0.0516 | 200.7209 |
| Unmitigated | 164.6821 | 2.6779 | 0.0645 | 240.9135 |

## 6.2 Water by Land Use

### Unmitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Mid Rise | 56.8143 / 35.8177 | 114.3409 | 1.8554 | 0.0447 | 167.1600 |
| Strip Mall | 25.1847 / 15.4358 | 50.3412 | 0.8225 | 0.0198 | 73.7534 |
| **Total** | | **164.6821** | **2.6779** | **0.0645** | **240.9135** |

### Mitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Mid Rise | 45.4514 / 35.8177 | 97.0526 | 1.4844 | 0.0358 | 139.3120 |
| Strip Mall | 20.1477 / 15.4358 | 42.6776 | 0.6580 | 0.0159 | 61.4089 |
| **Total** | | **139.7302** | **2.1424** | **0.0516** | **200.7209** |

# 7.0 Waste Detail

## 7.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Unmitigated | 153.8915 | 9.0947 | 0.0000 | 344.8808 |
| Mitigated | 153.8915 | 9.0947 | 0.0000 | 344.8808 |

## 7.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Mid Rise | 401.12 | 81.4237 | 4.8120 | 0.0000 | 182.4758 |
| Strip Mall | 357 | 72.4678 | 4.2827 | 0.0000 | 162.4050 |
| **Total** | | **153.8915** | **9.0947** | **0.0000** | **344.8808** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Mid Rise | 401.12 | 81.4237 | 4.8120 | 0.0000 | 182.4758 |
| Strip Mall | 357 | 72.4678 | 4.2827 | 0.0000 | 162.4050 |
| **Total** | | **153.8915** | **9.0947** | **0.0000** | **344.8808** |

# Vineyard at Delano & West Pavilion Buildout - Business As Usual

**Kern-San Joaquin County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Apartments Mid Rise | 872.00 | Dwelling Unit | 22.95 | 872,000.00 | 2494 |
| Strip Mall | 340.00 | 1000sqft | 7.81 | 340,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.7 | **Precipitation Freq (Days)** | 32 |
| **Climate Zone** | 7 | | | **Operational Year** | 2005 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 654.19 | **CH4 Intensity (lb/MWhr)** | 0.028 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2005 Emission Intensity Factor per UCSB Utility & Energy Services (2012)

Land Use - Buildout = 872 apartment units & 340,000 square feet of non-residential

Construction Phase -

Vehicle Trips - Trip generation per Traffic Impact Analysis (2014)

Water Mitigation - Accounts for CalGreen

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 250 | 150 |
| tblAreaMitigation | UseLowVOCPaintNonresidentialInteriorValue | 250 | 150 |
| tblAreaMitigation | UseLowVOCPaintResidentialExteriorValue | 250 | 150 |
| tblAreaMitigation | UseLowVOCPaintResidentialInteriorValue | 250 | 150 |
| tblProjectCharacteristics | CH4IntensityFactor | 0.029 | 0.028 |
| tblProjectCharacteristics | CO2IntensityFactor | 630.89 | 654.19 |
| tblProjectCharacteristics | OperationalYear | 2014 | 2005 |
| tblVehicleTrips | ST_TR | 7.16 | 6.39 |
| tblVehicleTrips | ST_TR | 42.04 | 69.24 |
| tblVehicleTrips | SU_TR | 6.07 | 6.39 |
| tblVehicleTrips | SU_TR | 20.43 | 69.24 |
| tblVehicleTrips | WD_TR | 6.59 | 6.65 |
| tblVehicleTrips | WD_TR | 44.32 | 51.70 |
| tblWoodstoves | NumberCatalytic | 22.95 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 22.95 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | | | | | | | | | | | 0.0000 | 388.3392 | 388.3392 | 0.0242 | 6.9300e-003 | 390.9945 |
| Energy | | | | | | | | | | | 0.0000 | 2,926.6625 | 2,926.6625 | 0.1068 | 0.0340 | 2,939.4432 |
| Mobile | | | | | | | | | | | 0.0000 | 41,189.4582 | 41,189.4582 | 3.1268 | 0.0000 | 41,255.1213 |
| Waste | | | | | | | | | | | 153.8915 | 0.0000 | 153.8915 | 9.0947 | 0.0000 | 344.8808 |
| Water | | | | | | | | | | | 26.0145 | 184.8911 | 210.9056 | 2.6799 | 0.0648 | 287.2661 |
| **Total** | | | | | | | | | | | **179.9060** | **44,689.3511** | **44,869.2571** | **15.0324** | **0.1057** | **45,217.7059** |

## 3.0 Operational Detail - Mobile

### 3.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Unmitigated | | | | | | | | | | | 0.0000 | 41,189.4582 | 41,189.4582 | 3.1268 | 0.0000 | 41,255.1213 |

### 3.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Mid Rise | 5,798.80 | 5,572.08 | 5572.08 | 16,674,683 | 16,674,683 |
| Strip Mall | 17,578.00 | 23,541.60 | 23541.60 | 29,694,741 | 29,694,741 |
| Total | 23,376.80 | 29,113.68 | 29,113.68 | 46,369,424 | 46,369,424 |

### 3.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Mid Rise | 10.80 | 7.30 | 7.50 | 46.40 | 16.40 | 37.20 | 86 | 11 | 3 |
| Strip Mall | 9.50 | 7.30 | 7.30 | 16.60 | 64.40 | 19.00 | 45 | 40 | 15 |

| LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.324160 | 0.091760 | 0.174273 | 0.118138 | 0.030243 | 0.008768 | 0.022172 | 0.215130 | 0.000795 | 0.001076 | 0.008692 | 0.002032 | 0.002761 |

## 4.0 Energy Detail

Historical Energy Use: N

### 4.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Unmitigated | | | | | | | | | | | 0.0000 | 2,146.2997 | 2,146.2997 | 0.0919 | 0.0197 | 2,154.3312 |
| NaturalGas Unmitigated | | | | | | | | | | | 0.0000 | 780.3629 | 780.3629 | 0.0150 | 0.0143 | 785.1121 |

### 4.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Mid Rise | 1.25834e+007 | | | | | | | | | | | 0.0000 | 671.5007 | 671.5007 | 0.0129 | 0.0123 | 675.5874 |
| Strip Mall | 2.04e+006 | | | | | | | | | | | 0.0000 | 108.8622 | 108.8622 | 2.0900e-003 | 2.0000e-003 | 109.5247 |
| **Total** | | | | | | | | | | | | **0.0000** | **780.3629** | **780.3629** | **0.0150** | **0.0143** | **785.1121** |

### 4.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Mid Rise | 3.33324e+006 | 989.0902 | 0.0423 | 9.0700e-003 | 992.7914 |
| Strip Mall | 3.8998e+006 | 1,157.2095 | 0.0495 | 0.0106 | 1,161.5398 |
| **Total** | | **2,146.2997** | **0.0919** | **0.0197** | **2,154.3312** |

# 5.0 Area Detail

## 5.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Unmitigated | | | | | | | | | | | 0.0000 | 388.3392 | 388.3392 | 0.0242 | 6.9300e-003 | 390.9945 |

## 5.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | | | | | | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | | | | | | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | | | | | | | | | | | 0.0000 | 377.7569 | 377.7569 | 7.2400e-003 | 6.9300e-003 | 380.0558 |
| Landscaping | | | | | | | | | | | 0.0000 | 10.5824 | 10.5824 | 0.0170 | 0.0000 | 10.9387 |
| **Total** | | | | | | | | | | | **0.0000** | **388.3392** | **388.3392** | **0.0242** | **6.9300e-003** | **390.9945** |

# 6.0 Water Detail

## 6.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Unmitigated | 210.9056 | 2.6799 | 0.0648 | 287.2661 |

## 6.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Mid Rise | 56.8143 / 35.8177 | 146.4471 | 1.8568 | 0.0449 | 199.3559 |
| Strip Mall | 25.1847 / 15.4358 | 64.4585 | 0.8231 | 0.0199 | 87.9102 |
| **Total** | | **210.9056** | **2.6799** | **0.0648** | **287.2661** |

# 7.0 Waste Detail

## 7.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Unmitigated | 153.8915 | 9.0947 | 0.0000 | 344.8808 |

## 7.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Mid Rise | 401.12 | 81.4237 | 4.8120 | 0.0000 | 182.4758 |
| Strip Mall | 357 | 72.4678 | 4.2827 | 0.0000 | 162.4050 |
| **Total** | | **153.8915** | **9.0947** | **0.0000** | **344.8808** |

# APPENDIX 4.3-B
## CARBON MONOXIDE HOTSPOTS

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Garces HW - Albany St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 91.4 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (M) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (M) | W (M) |
|---|---|---|---|---|---|---|---|---|---|
| A. Garces Hwy | * -15 | 2 | 15 | 2 | * AG | 502 | 2.9 | 0.0 | 25.8 |
| B. Albany St | * -2 | 15 | -2 | -15 | * AG | 1126 | 2.9 | 0.0 | 25.8 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (M) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * -1 | 15 | 1.8 |
| 2. Recpt 2 | * -1 | 12 | 1.8 |
| 3. Recpt 3 | * -1 | 9 | 1.8 |
| 4. Recpt 4 | * -1 | 6 | 0.5 |
| 5. Recpt 5 | * -1 | 3 | 0.5 |
| 6. Recpt 6 | * -1 | 0 | 0.5 |
| 7. Recpt 7 | * -1 | -3 | 0.5 |
| 8. Recpt 8 | * -1 | -6 | 0.5 |
| 9. Recpt 9 | * -1 | -9 | 0.5 |
| 10. Recpt 10 | * -1 | -12 | 0.5 |
| 11. Recpt 11 | * -1 | -15 | 0.5 |
| 12. Recpt 12 | * -12 | 2 | 0.5 |
| 13. Recpt 13 | * -9 | 2 | 0.5 |
| 14. Recpt 14 | * -6 | 2 | 0.5 |
| 15. Recpt 15 | * -3 | 2 | 0.5 |
| 16. Recpt 16 | * 3 | 2 | 0.5 |
| 17. Recpt 17 | * 6 | 2 | 0.5 |
| 18. Recpt 18 | * 9 | 2 | 0.5 |
| 19. Recpt 19 | * 12 | 2 | 0.5 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Garces HW - Albany St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 201. | 0.2 | 0.1 | 0.2 |
| 2. Recpt 2 | 209. | 0.2 | 0.1 | 0.1 |
| 3. Recpt 3 | 211. | 0.2 | 0.1 | 0.1 |
| 4. Recpt 4 | 215. | 0.2 | 0.1 | 0.1 |
| 5. Recpt 5 | 220. | 0.2 | 0.0 | 0.1 |
| 6. Recpt 6 | 42. | 0.2 | 0.1 | 0.1 |
| 7. Recpt 7 | 321. | 0.2 | 0.1 | 0.1 |
| 8. Recpt 8 | 31. | 0.2 | 0.1 | 0.1 |
| 9. Recpt 9 | 329. | 0.2 | 0.1 | 0.1 |
| 10. Recpt 10 | 333. | 0.2 | 0.1 | 0.2 |
| 11. Recpt 11 | 339. | 0.2 | 0.1 | 0.2 |
| 12. Recpt 12 | 119. | 0.2 | 0.1 | 0.2 |
| 13. Recpt 13 | 121. | 0.2 | 0.1 | 0.2 |
| 14. Recpt 14 | 126. | 0.2 | 0.1 | 0.1 |
| 15. Recpt 15 | 138. | 0.2 | 0.0 | 0.1 |
| 16. Recpt 16 | 229. | 0.2 | 0.1 | 0.1 |
| 17. Recpt 17 | 235. | 0.2 | 0.1 | 0.2 |
| 18. Recpt 18 | 238. | 0.2 | 0.1 | 0.2 |
| 19. Recpt 19 | 241. | 0.3 | 0.1 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Garces HW - Dover Place
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

## I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

## II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Garces Hwy | -50 | 5 | 50 | 5 | AG | 829 | 2.9 | 0.0 | 86.0 |
| B. Dover Place | -5 | 50 | -5 | -50 | AG | 1022 | 2.9 | 0.0 | 86.0 |

## III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | -30 | -1 | 5.9 |
| 2. Recpt 2 | -20 | -1 | 5.9 |
| 3. Recpt 3 | -10 | -1 | 5.9 |
| 4. Recpt 4 | -30 | 8 | 1.8 |
| 5. Recpt 5 | -20 | 8 | 1.8 |
| 6. Recpt 6 | -10 | 8 | 1.8 |
| 7. Recpt 7 | 0 | -1 | 1.8 |
| 8. Recpt 8 | 8 | -1 | 1.8 |
| 9. Recpt 9 | 18 | -1 | 1.8 |
| 10. Recpt 10 | 0 | -15 | 1.8 |
| 11. Recpt 11 | 10 | 15 | 1.8 |
| 12. Recpt 12 | -10 | -10 | 1.8 |
| 13. Recpt 13 | 0 | -10 | 1.8 |
| 14. Recpt 14 | -10 | 30 | 1.8 |
| 15. Recpt 15 | -10 | 20 | 1.8 |
| 16. Recpt 16 | 0 | 8 | 1.8 |
| 17. Recpt 17 | 0 | 15 | 1.8 |
| 18. Recpt 18 | 0 | 20 | 1.8 |
| 19. Recpt 19 | 0 | 30 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Garces HW - Dover Place
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 57. | 0.2 | 0.1 | 0.1 |
| 2. Recpt 2 | 53. | 0.2 | 0.1 | 0.1 |
| 3. Recpt 3 | 48. | 0.2 | 0.1 | 0.1 |
| 4. Recpt 4 | 121. | 0.2 | 0.1 | 0.1 |
| 5. Recpt 5 | 125. | 0.2 | 0.1 | 0.1 |
| 6. Recpt 6 | 138. | 0.2 | 0.1 | 0.1 |
| 7. Recpt 7 | 40. | 0.2 | 0.1 | 0.1 |
| 8. Recpt 8 | 311. | 0.2 | 0.1 | 0.1 |
| 9. Recpt 9 | 307. | 0.2 | 0.1 | 0.1 |
| 10. Recpt 10 | 322. | 0.2 | 0.1 | 0.1 |
| 11. Recpt 11 | 241. | 0.2 | 0.1 | 0.1 |
| 12. Recpt 12 | 42. | 0.2 | 0.1 | 0.1 |
| 13. Recpt 13 | 320. | 0.2 | 0.1 | 0.1 |
| 14. Recpt 14 | 148. | 0.2 | 0.1 | 0.1 |
| 15. Recpt 15 | 144. | 0.2 | 0.1 | 0.1 |
| 16. Recpt 16 | 222. | 0.2 | 0.1 | 0.1 |
| 17. Recpt 17 | 219. | 0.2 | 0.1 | 0.1 |
| 18. Recpt 18 | 216. | 0.2 | 0.1 | 0.1 |
| 19. Recpt 19 | 212. | 0.2 | 0.1 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: 1st Ave - Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

## I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

## II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. 1st Ave | * -50 | 5 | 50 | 5 | * AG | 423 | 2.9 | 0.0 | 86.0 |
| B. Dover | * -5 | 50 | -5 | -50 | * AG | 973 | 2.9 | 0.0 | 86.0 |

## III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * -10 | 50 | 1.8 |
| 2. Recpt 2 | * -10 | 40 | 1.8 |
| 3. Recpt 3 | * -10 | 30 | 1.8 |
| 4. Recpt 4 | * -10 | 20 | 1.8 |
| 5. Recpt 5 | * -10 | 10 | 1.8 |
| 6. Recpt 6 | * 0 | 15 | 1.8 |
| 7. Recpt 7 | * -10 | -10 | 1.8 |
| 8. Recpt 8 | * -10 | -20 | 1.8 |
| 9. Recpt 9 | * -10 | -30 | 1.8 |
| 10. Recpt 10 | * 0 | 20 | 1.8 |
| 11. Recpt 11 | * -40 | 1 | 1.8 |
| 12. Recpt 12 | * -40 | 8 | 1.8 |
| 13. Recpt 13 | * -30 | 8 | 1.8 |
| 14. Recpt 14 | * -20 | 8 | 1.8 |
| 15. Recpt 15 | * 0 | 8 | 1.8 |
| 16. Recpt 16 | * 10 | 8 | 1.8 |
| 17. Recpt 17 | * 20 | 8 | 1.8 |
| 18. Recpt 18 | * -20 | 0 | 1.8 |
| 19. Recpt 19 | * -10 | 0 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: 1st Ave - Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 158. | 0.2 | 0.1 | 0.1 |
| 2. Recpt 2 | 150. | 0.2 | 0.1 | 0.1 |
| 3. Recpt 3 | 148. | 0.2 | 0.1 | 0.1 |
| 4. Recpt 4 | 144. | 0.2 | 0.0 | 0.1 |
| 5. Recpt 5 | 138. | 0.2 | 0.0 | 0.1 |
| 6. Recpt 6 | 219. | 0.2 | 0.0 | 0.1 |
| 7. Recpt 7 | 42. | 0.2 | 0.1 | 0.1 |
| 8. Recpt 8 | 36. | 0.2 | 0.1 | 0.1 |
| 9. Recpt 9 | 32. | 0.2 | 0.1 | 0.1 |
| 10. Recpt 10 | 216. | 0.2 | 0.0 | 0.1 |
| 11. Recpt 11 | 61. | 0.2 | 0.1 | 0.1 |
| 12. Recpt 12 | 119. | 0.2 | 0.1 | 0.1 |
| 13. Recpt 13 | 121. | 0.2 | 0.1 | 0.1 |
| 14. Recpt 14 | 126. | 0.2 | 0.1 | 0.1 |
| 15. Recpt 15 | 222. | 0.2 | 0.0 | 0.1 |
| 16. Recpt 16 | 229. | 0.2 | 0.0 | 0.1 |
| 17. Recpt 17 | 235. | 0.2 | 0.1 | 0.1 |
| 18. Recpt 18 | 53. | 0.2 | 0.1 | 0.1 |
| 19. Recpt 19 | 48. | 0.1 | 0.0 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-AlbanyStrad
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.2 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * -50 | 5 | 50 | 5 | * AG | 1296 | 2.9 | 0.0 | 86.0 |
| B. AlbanyStradl | * -5 | 50 | -5 | -50 | * AG | 1798 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * 0 | 50 | 1.8 |
| 2. Recpt 2 | * 0 | 40 | 1.8 |
| 3. Recpt 3 | * 0 | 30 | 1.8 |
| 4. Recpt 4 | * 0 | 20 | 1.8 |
| 5. Recpt 5 | * 0 | 0 | 1.8 |
| 6. Recpt 6 | * 0 | -5 | 1.8 |
| 7. Recpt 7 | * 0 | -12 | 1.8 |
| 8. Recpt 8 | * 0 | -20 | 1.8 |
| 9. Recpt 9 | * 0 | -30 | 1.8 |
| 10. Recpt 10 | * 10 | 0 | 1.8 |
| 11. Recpt 11 | * 20 | 0 | 1.8 |
| 12. Recpt 12 | * 30 | 0 | 1.8 |
| 13. Recpt 13 | * 0 | 15 | 1.8 |
| 14. Recpt 14 | * 0 | 8 | 1.8 |
| 15. Recpt 15 | * 0 | 8 | 1.8 |
| 16. Recpt 16 | * 10 | 8 | 1.8 |
| 17. Recpt 17 | * 20 | 8 | 1.8 |
| 18. Recpt 18 | * 30 | 8 | 1.8 |
| 19. Recpt 19 | * 40 | 8 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Woollomes-AlbanyStrad
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 203. | 0.5 | 0.2 | 0.3 |
| 2. Recpt 2 | 210. | 0.4 | 0.2 | 0.2 |
| 3. Recpt 3 | 212. | 0.4 | 0.2 | 0.2 |
| 4. Recpt 4 | 216. | 0.4 | 0.2 | 0.2 |
| 5. Recpt 5 | 229. | 0.3 | 0.1 | 0.2 |
| 6. Recpt 6 | 320. | 0.3 | 0.1 | 0.2 |
| 7. Recpt 7 | 321. | 0.4 | 0.2 | 0.2 |
| 8. Recpt 8 | 324. | 0.4 | 0.2 | 0.2 |
| 9. Recpt 9 | 328. | 0.4 | 0.2 | 0.2 |
| 10. Recpt 10 | 309. | 0.4 | 0.1 | 0.2 |
| 11. Recpt 11 | 305. | 0.4 | 0.2 | 0.2 |
| 12. Recpt 12 | 302. | 0.4 | 0.2 | 0.3 |
| 13. Recpt 13 | 219. | 0.4 | 0.1 | 0.2 |
| 14. Recpt 14 | 222. | 0.3 | 0.1 | 0.2 |
| 15. Recpt 15 | 222. | 0.3 | 0.1 | 0.2 |
| 16. Recpt 16 | 229. | 0.4 | 0.1 | 0.2 |
| 17. Recpt 17 | 235. | 0.4 | 0.2 | 0.2 |
| 18. Recpt 18 | 238. | 0.4 | 0.2 | 0.3 |
| 19. Recpt 19 | 241. | 0.5 | 0.2 | 0.3 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Grapevine
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.2 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | -50 | 5 | 50 | 5 | * AG | 4155 | 2.9 | 0.0 | 86.0 |
| B. Grapevine | * | -5 | 50 | -5 | -50 | * AG | 741 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * | COORDINATES (FT) X | Y | Z |
|---|---|---|---|---|
| 1. Recpt 1 | * | 0 | 50 | 1.8 |
| 2. Recpt 2 | * | 0 | 40 | 1.8 |
| 3. Recpt 3 | * | -40 | 50 | 1.8 |
| 4. Recpt 4 | * | -40 | 40 | 1.8 |
| 5. Recpt 5 | * | -40 | 30 | 1.8 |
| 6. Recpt 6 | * | -40 | 20 | 1.8 |
| 7. Recpt 7 | * | -40 | 10 | 1.8 |
| 8. Recpt 8 | * | -40 | 0 | 1.8 |
| 9. Recpt 9 | * | -40 | -10 | 1.8 |
| 10. Recpt 10 | * | -40 | -20 | 1.8 |
| 11. Recpt 11 | * | -40 | -30 | 1.8 |
| 12. Recpt 12 | * | -40 | -40 | 1.8 |

JOB: Woollomes-Grapevine
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 205. | 0.8 | 0.7 | 0.1 |
| 2. Recpt 2 | 210. | 0.7 | 0.6 | 0.1 |
| 3. Recpt 3 | 139. | 0.8 | 0.7 | 0.1 |
| 4. Recpt 4 | 129. | 0.9 | 0.8 | 0.1 |
| 5. Recpt 5 | 128. | 0.8 | 0.7 | 0.1 |
| 6. Recpt 6 | 125. | 0.7 | 0.6 | 0.1 |
| 7. Recpt 7 | 120. | 0.7 | 0.6 | 0.1 |
| 8. Recpt 8 | 60. | 0.7 | 0.6 | 0.1 |
| 9. Recpt 9 | 55. | 0.7 | 0.6 | 0.1 |
| 10. Recpt 10 | 52. | 0.8 | 0.7 | 0.1 |
| 11. Recpt 11 | 51. | 0.9 | 0.8 | 0.1 |
| 12. Recpt 12 | 41. | 0.8 | 0.7 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-SR 99 Ramp
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.9 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * -100 | 5 | 100 | 5 | * AG | 4672 | 2.9 | 0.0 | 86.0 |
| B. 99 SB Ramp | * -5 | 50 | -5 | -50 | * AG | 1576 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * -100 | 50 | 1.8 |
| 2. Recpt 2 | * -100 | 45 | 1.8 |
| 3. Recpt 3 | * -100 | 20 | 1.8 |
| 4. Recpt 4 | * -100 | 10 | 1.8 |
| 5. Recpt 5 | * -100 | 0 | 1.8 |
| 6. Recpt 6 | * -100 | -5 | 1.8 |
| 7. Recpt 7 | * -100 | -10 | 1.8 |
| 8. Recpt 8 | * -100 | -15 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Woollomes-SR 99 Ramp
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 113. | 1.1 | 1.0 | 0.2 |
| 2. Recpt 2 | 111. | 1.2 | 1.0 | 0.2 |
| 3. Recpt 3 | 103. | 1.2 | 1.0 | 0.2 |
| 4. Recpt 4 | 99. | 1.1 | 1.0 | 0.2 |
| 5. Recpt 5 | 81. | 1.1 | 1.0 | 0.2 |
| 6. Recpt 6 | 78. | 1.2 | 1.0 | 0.2 |
| 7. Recpt 7 | 77. | 1.2 | 1.0 | 0.2 |
| 8. Recpt 8 | 82. | 1.1 | 1.0 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Garces HW - Albany St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 91.4 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Garces Hwy | * -50 | 5 | 50 | 5 | * AG | 351 | 2.9 | 0.0 | 86.0 |
| B. Albany St | * -5 | 50 | -5 | -50 | * AG | 1132 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * -2 | 50 | 5.9 |
| 2. Recpt 2 | * -2 | 40 | 5.9 |
| 3. Recpt 3 | * -2 | 30 | 5.9 |
| 4. Recpt 4 | * -2 | 20 | 1.8 |
| 5. Recpt 5 | * -2 | 10 | 1.8 |
| 6. Recpt 6 | * -2 | 0 | 1.8 |
| 7. Recpt 7 | * -2 | -10 | 1.8 |
| 8. Recpt 8 | * -2 | -20 | 1.8 |
| 9. Recpt 9 | * -2 | -30 | 1.8 |
| 10. Recpt 10 | * -2 | -40 | 1.8 |
| 11. Recpt 11 | * -2 | -50 | 1.8 |
| 12. Recpt 12 | * -40 | 8 | 1.8 |
| 13. Recpt 13 | * -30 | 8 | 1.8 |
| 14. Recpt 14 | * -20 | 8 | 1.8 |
| 15. Recpt 15 | * -10 | 8 | 1.8 |
| 16. Recpt 16 | * 10 | 8 | 1.8 |
| 17. Recpt 17 | * 20 | 8 | 1.8 |
| 18. Recpt 18 | * 30 | 8 | 1.8 |
| 19. Recpt 19 | * 40 | 8 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Garces HW - Albany St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 200. | 0.2 | 0.1 | 0.2 |
| 2. Recpt 2 | 209. | 0.2 | 0.0 | 0.1 |
| 3. Recpt 3 | 211. | 0.2 | 0.0 | 0.1 |
| 4. Recpt 4 | 215. | 0.2 | 0.0 | 0.1 |
| 5. Recpt 5 | 220. | 0.2 | 0.0 | 0.1 |
| 6. Recpt 6 | 42. | 0.1 | 0.0 | 0.1 |
| 7. Recpt 7 | 321. | 0.2 | 0.0 | 0.1 |
| 8. Recpt 8 | 31. | 0.2 | 0.0 | 0.1 |
| 9. Recpt 9 | 329. | 0.2 | 0.1 | 0.1 |
| 10. Recpt 10 | 333. | 0.2 | 0.1 | 0.2 |
| 11. Recpt 11 | 340. | 0.2 | 0.1 | 0.2 |
| 12. Recpt 12 | 119. | 0.2 | 0.0 | 0.2 |
| 13. Recpt 13 | 121. | 0.2 | 0.0 | 0.2 |
| 14. Recpt 14 | 127. | 0.2 | 0.0 | 0.1 |
| 15. Recpt 15 | 138. | 0.2 | 0.0 | 0.1 |
| 16. Recpt 16 | 229. | 0.2 | 0.0 | 0.1 |
| 17. Recpt 17 | 235. | 0.2 | 0.0 | 0.2 |
| 18. Recpt 18 | 238. | 0.2 | 0.0 | 0.2 |
| 19. Recpt 19 | 240. | 0.2 | 0.0 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Garces HW - Dover Place
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

## I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

## II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Garces Hwy | -50 | 5 | 50 | 5 | AG | 689 | 2.9 | 0.0 | 86.0 |
| B. Dover Place | -5 | 50 | -5 | -50 | AG | 1159 | 2.9 | 0.0 | 86.0 |

## III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | -30 | -1 | 5.9 |
| 2. Recpt 2 | -20 | -1 | 5.9 |
| 3. Recpt 3 | -10 | -1 | 5.9 |
| 4. Recpt 4 | -30 | 8 | 1.8 |
| 5. Recpt 5 | -20 | 8 | 1.8 |
| 6. Recpt 6 | -10 | 8 | 1.8 |
| 7. Recpt 7 | 0 | -1 | 1.8 |
| 8. Recpt 8 | 8 | -1 | 1.8 |
| 9. Recpt 9 | 18 | -1 | 1.8 |
| 10. Recpt 10 | 0 | -15 | 1.8 |
| 11. Recpt 11 | 10 | 15 | 1.8 |
| 12. Recpt 12 | -10 | -10 | 1.8 |
| 13. Recpt 13 | 0 | -10 | 1.8 |
| 14. Recpt 14 | -10 | 30 | 1.8 |
| 15. Recpt 15 | -10 | 20 | 1.8 |
| 16. Recpt 16 | 0 | 8 | 1.8 |
| 17. Recpt 17 | 0 | 15 | 1.8 |
| 18. Recpt 18 | 0 | 20 | 1.8 |
| 19. Recpt 19 | 0 | 30 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Garces HW - Dover Place
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 57. | 0.2 | 0.1 | 0.1 |
| 2. Recpt 2 | 53. | 0.2 | 0.1 | 0.1 |
| 3. Recpt 3 | 48. | 0.2 | 0.1 | 0.1 |
| 4. Recpt 4 | 121. | 0.2 | 0.1 | 0.2 |
| 5. Recpt 5 | 125. | 0.2 | 0.1 | 0.1 |
| 6. Recpt 6 | 138. | 0.2 | 0.1 | 0.1 |
| 7. Recpt 7 | 230. | 0.2 | 0.1 | 0.1 |
| 8. Recpt 8 | 311. | 0.2 | 0.1 | 0.1 |
| 9. Recpt 9 | 306. | 0.2 | 0.1 | 0.2 |
| 10. Recpt 10 | 322. | 0.2 | 0.1 | 0.1 |
| 11. Recpt 11 | 242. | 0.2 | 0.1 | 0.1 |
| 12. Recpt 12 | 42. | 0.2 | 0.1 | 0.1 |
| 13. Recpt 13 | 320. | 0.2 | 0.1 | 0.1 |
| 14. Recpt 14 | 148. | 0.2 | 0.1 | 0.2 |
| 15. Recpt 15 | 144. | 0.2 | 0.1 | 0.1 |
| 16. Recpt 16 | 222. | 0.2 | 0.1 | 0.1 |
| 17. Recpt 17 | 219. | 0.2 | 0.1 | 0.1 |
| 18. Recpt 18 | 216. | 0.2 | 0.1 | 0.1 |
| 19. Recpt 19 | 212. | 0.2 | 0.1 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: 1st Ave - Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. 1st Ave | * -50 | 5 | 50 | 5 | * AG | 391 | 2.9 | 0.0 | 86.0 |
| B. Dover | * -5 | 50 | -5 | -50 | * AG | 1173 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | * -10 | 50 | 1.8 |
| 2. Recpt 2 | * -10 | 40 | 1.8 |
| 3. Recpt 3 | * -10 | 30 | 1.8 |
| 4. Recpt 4 | * -10 | 20 | 1.8 |
| 5. Recpt 5 | * -10 | 10 | 1.8 |
| 6. Recpt 6 | * 0 | 15 | 1.8 |
| 7. Recpt 7 | * -10 | -10 | 1.8 |
| 8. Recpt 8 | * -10 | -20 | 1.8 |
| 9. Recpt 9 | * -10 | -30 | 1.8 |
| 10. Recpt 10 | * 0 | 20 | 1.8 |
| 11. Recpt 11 | * -40 | 1 | 1.8 |
| 12. Recpt 12 | * -40 | 8 | 1.8 |
| 13. Recpt 13 | * -30 | 8 | 1.8 |
| 14. Recpt 14 | * -20 | 8 | 1.8 |
| 15. Recpt 15 | * 0 | 8 | 1.8 |
| 16. Recpt 16 | * 10 | 8 | 1.8 |
| 17. Recpt 17 | * 20 | 8 | 1.8 |
| 18. Recpt 18 | * -20 | 0 | 1.8 |
| 19. Recpt 19 | * -10 | 0 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: 1st Ave - Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 158. | 0.2 | 0.1 | 0.2 |
| 2. Recpt 2 | 150. | 0.2 | 0.1 | 0.2 |
| 3. Recpt 3 | 148. | 0.2 | 0.1 | 0.2 |
| 4. Recpt 4 | 144. | 0.2 | 0.0 | 0.1 |
| 5. Recpt 5 | 138. | 0.2 | 0.0 | 0.1 |
| 6. Recpt 6 | 219. | 0.2 | 0.0 | 0.1 |
| 7. Recpt 7 | 41. | 0.2 | 0.0 | 0.1 |
| 8. Recpt 8 | 36. | 0.2 | 0.1 | 0.1 |
| 9. Recpt 9 | 32. | 0.2 | 0.1 | 0.2 |
| 10. Recpt 10 | 216. | 0.2 | 0.0 | 0.1 |
| 11. Recpt 11 | 61. | 0.2 | 0.1 | 0.2 |
| 12. Recpt 12 | 119. | 0.2 | 0.1 | 0.2 |
| 13. Recpt 13 | 121. | 0.2 | 0.1 | 0.2 |
| 14. Recpt 14 | 127. | 0.2 | 0.0 | 0.1 |
| 15. Recpt 15 | 222. | 0.2 | 0.0 | 0.1 |
| 16. Recpt 16 | 229. | 0.2 | 0.0 | 0.1 |
| 17. Recpt 17 | 235. | 0.2 | 0.0 | 0.2 |
| 18. Recpt 18 | 53. | 0.2 | 0.0 | 0.1 |
| 19. Recpt 19 | 48. | 0.2 | 0.0 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-AlbanyStrad
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.2 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | -50 | 5 | 50 | 5 | * AG | 1128 | 2.9 | 0.0 | 86.0 |
| B. AlbanyStradl | * | -5 | 50 | -5 | -50 | * AG | 852 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * | COORDINATES (FT) X | Y | Z |
|---|---|---|---|---|
| 1. Recpt 1 | * | 0 | 50 | 1.8 |
| 2. Recpt 2 | * | 0 | 40 | 1.8 |
| 3. Recpt 3 | * | 0 | 30 | 1.8 |
| 4. Recpt 4 | * | 0 | 20 | 1.8 |
| 5. Recpt 5 | * | 0 | 0 | 1.8 |
| 6. Recpt 6 | * | 0 | -5 | 1.8 |
| 7. Recpt 7 | * | 0 | -12 | 1.8 |
| 8. Recpt 8 | * | 0 | -20 | 1.8 |
| 9. Recpt 9 | * | 0 | -30 | 1.8 |
| 10. Recpt 10 | * | 10 | 0 | 1.8 |
| 11. Recpt 11 | * | 20 | 0 | 1.8 |
| 12. Recpt 12 | * | 30 | 0 | 1.8 |
| 13. Recpt 13 | * | 0 | 15 | 1.8 |
| 14. Recpt 14 | * | 0 | 8 | 1.8 |
| 15. Recpt 15 | * | 0 | 8 | 1.8 |
| 16. Recpt 16 | * | 10 | 8 | 1.8 |
| 17. Recpt 17 | * | 20 | 8 | 1.8 |
| 18. Recpt 18 | * | 30 | 8 | 1.8 |
| 19. Recpt 19 | * | 40 | 8 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Woollomes-AlbanyStrad
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 203. | 0.3 | 0.2 | 0.1 |
| 2. Recpt 2 | 210. | 0.3 | 0.2 | 0.1 |
| 3. Recpt 3 | 212. | 0.3 | 0.2 | 0.1 |
| 4. Recpt 4 | 216. | 0.2 | 0.1 | 0.1 |
| 5. Recpt 5 | 41. | 0.2 | 0.1 | 0.1 |
| 6. Recpt 6 | 320. | 0.2 | 0.1 | 0.1 |
| 7. Recpt 7 | 322. | 0.2 | 0.1 | 0.1 |
| 8. Recpt 8 | 325. | 0.3 | 0.2 | 0.1 |
| 9. Recpt 9 | 328. | 0.3 | 0.2 | 0.1 |
| 10. Recpt 10 | 310. | 0.2 | 0.1 | 0.1 |
| 11. Recpt 11 | 306. | 0.3 | 0.1 | 0.1 |
| 12. Recpt 12 | 302. | 0.3 | 0.1 | 0.1 |
| 13. Recpt 13 | 219. | 0.2 | 0.1 | 0.1 |
| 14. Recpt 14 | 222. | 0.2 | 0.1 | 0.1 |
| 15. Recpt 15 | 222. | 0.2 | 0.1 | 0.1 |
| 16. Recpt 16 | 229. | 0.2 | 0.1 | 0.1 |
| 17. Recpt 17 | 235. | 0.3 | 0.1 | 0.1 |
| 18. Recpt 18 | 239. | 0.3 | 0.1 | 0.1 |
| 19. Recpt 19 | 241. | 0.3 | 0.2 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Belmont
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.8 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * -50 | 5 | 50 | 5 | * AG | 2598 | 2.9 | 0.0 | 86.0 |
| B. Belmont | * -5 | 50 | -5 | -50 | * AG | 570 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * COORDINATES (FT) X | Y | Z |
|---|---|---|---|
| 1. Recpt 1 | -10 | 50 | 1.8 |
| 2. Recpt 2 | -10 | 40 | 1.8 |
| 3. Recpt 3 | -10 | 30 | 1.8 |
| 4. Recpt 4 | -10 | 20 | 1.8 |
| 5. Recpt 5 | -10 | 10 | 1.8 |
| 6. Recpt 6 | -10 | 0 | 1.8 |
| 7. Recpt 7 | -10 | -5 | 1.8 |
| 8. Recpt 8 | -10 | -10 | 1.8 |
| 9. Recpt 9 | -10 | -20 | 1.8 |
| 10. Recpt 10 | -20 | 0 | 1.8 |
| 11. Recpt 11 | -20 | 10 | 1.8 |
| 12. Recpt 12 | -30 | 0 | 1.8 |
| 13. Recpt 13 | -30 | 10 | 1.8 |
| 14. Recpt 14 | -40 | 0 | 1.8 |
| 15. Recpt 15 | -40 | 10 | 1.8 |
| 16. Recpt 16 | -20 | 15 | 1.8 |
| 17. Recpt 17 | -20 | -10 | 1.8 |
| 18. Recpt 18 | -15 | 20 | 1.8 |
| 19. Recpt 19 | -15 | -5 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Woollomes-Belmont
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | CONC (PPM) | PRED CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 149. | 0.5 | 0.4 | 0.1 |
| 2. Recpt 2 | 149. | 0.5 | 0.4 | 0.1 |
| 3. Recpt 3 | 148. | 0.4 | 0.4 | 0.1 |
| 4. Recpt 4 | 139. | 0.4 | 0.3 | 0.1 |
| 5. Recpt 5 | 131. | 0.4 | 0.3 | 0.1 |
| 6. Recpt 6 | 49. | 0.4 | 0.3 | 0.1 |
| 7. Recpt 7 | 51. | 0.3 | 0.3 | 0.1 |
| 8. Recpt 8 | 42. | 0.4 | 0.3 | 0.1 |
| 9. Recpt 9 | 35. | 0.4 | 0.4 | 0.1 |
| 10. Recpt 10 | 54. | 0.4 | 0.3 | 0.1 |
| 11. Recpt 11 | 126. | 0.4 | 0.3 | 0.1 |
| 12. Recpt 12 | 58. | 0.4 | 0.3 | 0.1 |
| 13. Recpt 13 | 122. | 0.4 | 0.3 | 0.1 |
| 14. Recpt 14 | 60. | 0.4 | 0.4 | 0.1 |
| 15. Recpt 15 | 120. | 0.4 | 0.4 | 0.1 |
| 16. Recpt 16 | 129. | 0.4 | 0.3 | 0.1 |
| 17. Recpt 17 | 48. | 0.4 | 0.4 | 0.1 |
| 18. Recpt 18 | 152. | 0.4 | 0.3 | 0.1 |
| 19. Recpt 19 | 49. | 0.4 | 0.3 | 0.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Grapevine
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.2 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | -50 | 5 | 50 | 5 | * AG | 3788 | 2.9 | 0.0 | 86.0 |
| B. Grapevine | * | -5 | 50 | -5 | -50 | * AG | 981 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * | COORDINATES (FT) X | Y | Z |
|---|---|---|---|---|
| 1. Recpt 1 | * | 0 | 50 | 1.8 |
| 2. Recpt 2 | * | 0 | 40 | 1.8 |
| 3. Recpt 3 | * | -40 | 50 | 1.8 |
| 4. Recpt 4 | * | -40 | 40 | 1.8 |
| 5. Recpt 5 | * | -40 | 30 | 1.8 |
| 6. Recpt 6 | * | -40 | 20 | 1.8 |
| 7. Recpt 7 | * | -40 | 10 | 1.8 |
| 8. Recpt 8 | * | -40 | 0 | 1.8 |
| 9. Recpt 9 | * | -40 | -10 | 1.8 |
| 10. Recpt 10 | * | -40 | -20 | 1.8 |
| 11. Recpt 11 | * | -40 | -30 | 1.8 |
| 12. Recpt 12 | * | -40 | -40 | 1.8 |

JOB: Woollomes-Grapevine
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 205. | 0.8 | 0.6 | 0.1 |
| 2. Recpt 2 | 210. | 0.7 | 0.6 | 0.1 |
| 3. Recpt 3 | 141. | 0.8 | 0.6 | 0.2 |
| 4. Recpt 4 | 129. | 0.9 | 0.7 | 0.2 |
| 5. Recpt 5 | 128. | 0.8 | 0.7 | 0.2 |
| 6. Recpt 6 | 125. | 0.7 | 0.6 | 0.2 |
| 7. Recpt 7 | 120. | 0.7 | 0.5 | 0.2 |
| 8. Recpt 8 | 60. | 0.7 | 0.5 | 0.1 |
| 9. Recpt 9 | 55. | 0.7 | 0.6 | 0.2 |
| 10. Recpt 10 | 52. | 0.8 | 0.7 | 0.2 |
| 11. Recpt 11 | 51. | 0.9 | 0.7 | 0.2 |
| 12. Recpt 12 | 41. | 0.8 | 0.6 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 90.2 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | -75 | 5 | 50 | 5 | * AG | 4509 | 2.9 | 0.0 | 86.0 |
| B. Dover | * | -5 | 50 | -5 | -50 | * AG | 1324 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * | COORDINATES (FT) X | Y | Z |
|---|---|---|---|---|
| 1. Recpt 1 | * | -10 | 50 | 1.8 |
| 2. Recpt 2 | * | -10 | 40 | 1.8 |
| 3. Recpt 3 | * | -65 | 50 | 1.8 |
| 4. Recpt 4 | * | -65 | 40 | 1.8 |
| 5. Recpt 5 | * | -65 | 30 | 1.8 |
| 6. Recpt 6 | * | -65 | 20 | 1.8 |
| 7. Recpt 7 | * | -65 | 10 | 1.8 |
| 8. Recpt 8 | * | -65 | 0 | 1.8 |
| 9. Recpt 9 | * | -65 | -10 | 1.8 |
| 10. Recpt 10 | * | -65 | -20 | 1.8 |
| 11. Recpt 11 | * | -65 | -30 | 1.8 |
| 12. Recpt 12 | * | -65 | -40 | 1.8 |

JOB: Woollomes-Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 149. | 0.9 | 0.8 | 0.2 |
| 2. Recpt 2 | 149. | 0.9 | 0.7 | 0.2 |
| 3. Recpt 3 | 128. | 1.0 | 0.8 | 0.2 |
| 4. Recpt 4 | 124. | 1.1 | 0.9 | 0.2 |
| 5. Recpt 5 | 120. | 1.0 | 0.9 | 0.2 |
| 6. Recpt 6 | 115. | 0.9 | 0.8 | 0.2 |
| 7. Recpt 7 | 109. | 0.9 | 0.7 | 0.2 |
| 8. Recpt 8 | 71. | 0.9 | 0.7 | 0.2 |
| 9. Recpt 9 | 65. | 0.9 | 0.8 | 0.2 |
| 10. Recpt 10 | 60. | 1.0 | 0.9 | 0.2 |
| 11. Recpt 11 | 56. | 1.1 | 0.9 | 0.2 |
| 12. Recpt 12 | 52. | 1.0 | 0.8 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-SR 99 Ramp
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.9 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * | TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | -100 | 5 | 100 | 5 | * | AG | 6970 | 2.9 | 0.0 | 86.0 |
| B. 99 SB Ramp | * | -5 | 50 | -5 | -50 | * | AG | 2003 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS

| RECEPTOR | * | COORDINATES (FT) X | Y | Z |
|---|---|---|---|---|
| 1. Recpt 1 | * | -100 | 50 | 1.8 |
| 2. Recpt 2 | * | -100 | 45 | 1.8 |
| 3. Recpt 3 | * | -100 | 20 | 1.8 |
| 4. Recpt 4 | * | -100 | 10 | 1.8 |
| 5. Recpt 5 | * | -100 | 0 | 1.8 |
| 6. Recpt 6 | * | -100 | -5 | 1.8 |
| 7. Recpt 7 | * | -100 | -10 | 1.8 |
| 8. Recpt 8 | * | -100 | -15 | 1.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Woollomes-SR 99 Ramp
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE )

| RECEPTOR | BRG (DEG) | PRED CONC (PPM) | CONC/LINK (PPM) A | B |
|---|---|---|---|---|
| 1. Recpt 1 | 113. | 1.6 | 1.4 | 0.2 |
| 2. Recpt 2 | 111. | 1.7 | 1.5 | 0.2 |
| 3. Recpt 3 | 103. | 1.7 | 1.5 | 0.2 |
| 4. Recpt 4 | 99. | 1.6 | 1.5 | 0.2 |
| 5. Recpt 5 | 81. | 1.6 | 1.5 | 0.2 |
| 6. Recpt 6 | 78. | 1.7 | 1.5 | 0.2 |
| 7. Recpt 7 | 77. | 1.7 | 1.5 | 0.2 |
| 8. Recpt 8 | 82. | 1.6 | 1.5 | 0.2 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Stradley to Belmont
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 91.4 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * LINK COORDINATES (FT) * X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * 400 | 0 | -400 | 0 | * AG | 2167 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | * COORDINATES (FT) X | Y | Z | * PRED BRG (DEG) | * CONC (PPM) |
|---|---|---|---|---|---|
| 1. Recpt 1 | -400 | 2 | 1.8 | 92. | 0.9 |
| 2. Recpt 2 | -400 | -2 | 1.8 | 88. | 0.9 |
| 3. Recpt 3 | -350 | 2 | 1.8 | 92. | 0.9 |
| 4. Recpt 4 | -350 | -2 | 1.8 | 88. | 0.9 |
| 5. Recpt 5 | -300 | 2 | 1.8 | 92. | 0.8 |
| 6. Recpt 6 | -300 | -2 | 1.8 | 88. | 0.8 |
| 7. Recpt 7 | -250 | 2 | 1.8 | 92. | 0.8 |
| 8. Recpt 8 | -250 | -2 | 1.8 | 88. | 0.8 |
| 9. Recpt 9 | -200 | 2 | 1.8 | 92. | 0.8 |
| 10. Recpt 10 | -200 | -2 | 1.8 | 88. | 0.8 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Belmont to Grapevin
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 91.4 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | 400 | 0 | -400 | 0 | AG | 2757 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | COORDINATES (FT) X | Y | Z | PRED BRG (DEG) | CONC (PPM) |
|---|---|---|---|---|---|
| 1. Recpt 1 | -400 | 0 | 1.8 | 90. | 1.1 |
| 2. Recpt 2 | -400 | 0 | 1.8 | 90. | 1.1 |
| 3. Recpt 3 | -400 | 1 | 1.8 | 92. | 1.1 |
| 4. Recpt 4 | -400 | -1 | 1.8 | 88. | 1.1 |
| 5. Recpt 5 | -400 | 2 | 1.8 | 92. | 1.1 |
| 6. Recpt 6 | -400 | -2 | 1.8 | 88. | 1.1 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Grapevine to Dover
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 91.4 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | * | LINK COORDINATES (FT) X1 | Y1 | X2 | Y2 | * TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | * | 450 | 0 | -450 | 0 | * AG | 3490 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | * | COORDINATES (FT) X | Y | Z | * PRED BRG (DEG) | * CONC (PPM) |
|---|---|---|---|---|---|---|
| 1. Recpt 1 | * | -450 | 0 | 1.8 | * 90. | * 1.4 |
| 2. Recpt 2 | * | -450 | 0 | 1.8 | * 90. | * 1.4 |
| 3. Recpt 3 | * | -450 | 1 | 1.8 | * 92. | * 1.4 |
| 4. Recpt 4 | * | -450 | -1 | 1.8 | * 88. | * 1.4 |
| 5. Recpt 5 | * | -450 | 2 | 1.8 | * 92. | * 1.4 |
| 6. Recpt 6 | * | -450 | -2 | 1.8 | * 88. | * 1.4 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Dover to Home Depot
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 92.7 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | 475 | 0 | -475 | 0 | AG | 4461 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | COORDINATES (FT) X | Y | Z | PRED BRG (DEG) | CONC (PPM) |
|---|---|---|---|---|---|
| 1. Recpt 1 | -450 | 0 | 1.8 | 90. | 1.8 |
| 2. Recpt 2 | -450 | 0 | 1.8 | 90. | 1.8 |
| 3. Recpt 3 | -450 | 1 | 1.8 | 92. | 1.7 |
| 4. Recpt 4 | -450 | -1 | 1.8 | 88. | 1.7 |
| 5. Recpt 5 | -450 | 2 | 1.8 | 92. | 1.7 |
| 6. Recpt 6 | -450 | -2 | 1.8 | 88. | 1.7 |
| 7. Recpt 7 | -350 | 10 | 1.8 | 92. | 1.7 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-Home Depot to SR 99 SB
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | -500 | 0 | 500 | 0 | AG | 4819 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | COORDINATES (FT) X | Y | Z | BRG (DEG) | PRED CONC (PPM) |
|---|---|---|---|---|---|
| 1. Recpt 1 | -490 | 5 | 1.8 | 92. | 1.9 |
| 2. Recpt 2 | -400 | 30 | 1.8 | 93. | 1.9 |
| 3. Recpt 3 | -490 | 10 | 1.8 | 92. | 1.9 |
| 4. Recpt 4 | -490 | -2 | 1.8 | 88. | 1.9 |
| 5. Recpt 5 | -490 | -6 | 1.8 | 88. | 1.9 |
| 6. Recpt 6 | -490 | -10 | 1.8 | 88. | 1.9 |
| 7. Recpt 7 | -490 | 2 | 1.8 | 92. | 1.9 |

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Woollomes-SR 99 SB to SR 99 NB
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 0.5 M/S Z0= 100. CM ALT= 93.6 (M)
BRG= WORST CASE VD= 0.0 CM/S
CLAS= 7 (G) VS= 0.0 CM/S
MIXH= 300. M AMB= 0.0 PPM
SIGTH= 5. DEGREES TEMP= 8.0 DEGREE (C)

II. LINK VARIABLES

| LINK DESCRIPTION | X1 | Y1 | X2 | Y2 | TYPE | VPH | EF (G/MI) | H (FT) | W (FT) |
|---|---|---|---|---|---|---|---|---|---|
| A. Woollomes | -520 | 0 | 10 | 0 | AG | 3799 | 2.9 | 0.0 | 86.0 |

III. RECEPTOR LOCATIONS AND MODEL RESULTS (WORST CASE WIND ANGLE)

| RECEPTOR | COORDINATES (FT) X | Y | Z | BRG (DEG) | PRED CONC (PPM) |
|---|---|---|---|---|---|
| 1. Recpt 1 | -500 | 5 | 1.8 | 92. | 1.3 |
| 2. Recpt 2 | -350 | 15 | 1.8 | 94. | 1.1 |
| 3. Recpt 3 | -500 | 10 | 1.8 | 92. | 1.3 |
| 4. Recpt 4 | -500 | -2 | 1.8 | 88. | 1.3 |
| 5. Recpt 5 | -500 | -6 | 1.8 | 88. | 1.3 |
| 6. Recpt 6 | -500 | -10 | 1.8 | 88. | 1.3 |
| 7. Recpt 7 | -500 | 2 | 1.8 | 92. | 1.3 |

# APPENDIX 4.3-C
# MALL MODEL SPREADSHEETS FOR HEALTH RISK

# Truck Idling & TRU's

Date : 10/29/2014
Facility Name: West Pavilion
Facility Location: Delano, CA
Facility ID #:

**Calculate Risk**

**Receptor Quad**

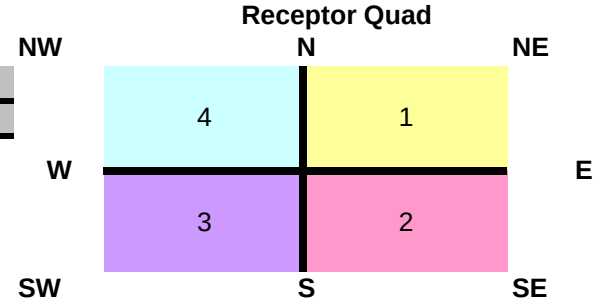
| NW | N | NE |
|---|---|---|
| 4 | 1 | |
| W | | E |
| 3 | 2 | |
| SW | S | SE |

| Unit # | Unit Type<br>T = TRU<br>HH = High Horizontal<br>HV = High Vertical<br>LL = Low Level | Operational Time / Event (Hour) | PM10 g/hr | Events/ Year | Receptor Distance (m) | Quad | Load % | Emissions Lb / Yr | **Location**<br>U=Urban<br>UB=Urban Near Building<br>R=Rural<br>RB=Rural Near Building | Unit Risk |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | hh | 0.25 | 2.57 | 13050 | 20 | 3 | 100 | 1.85E+01 | u | **1.16E-05** |
| 2 | T | 0.25 | 2.57 | 13050 | 20 | 3 | 100 | 1.85E+01 | u | **1.13E-05** |
| 3 | hh | 0.25 | 2.57 | 13050 | 40 | 4 | 100 | 1.85E+01 | u | **1.42E-05** |
| 4 | t | 0.25 | 2.57 | 13050 | 40 | 4 | 100 | 1.85E+01 | u | **1.40E-05** |
| | | | | | | | 100 | 0.00E+00 | **SUM** | **5.11E-05** |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | | | | |

# Truck Travel

Date : 10/29/2014
Facility Name: Vineyard at Delano and West Pavilion
Facility Location: Delano, CA
Facility ID #:

**Calculate Risk**




| Unit # | Segment Direction<br>EW = East-West<br>NS = North-South<br>NWSE = Northwest-Southeast<br>NESW = Northeast-Southwest | # (50m) Segments | PM10 g/mi | Events/ Year | Receptor Distance (m) | Quad | Load % | Emissions Lb / Yr | Location U=Urban R=Rural | Segment Risk |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EW | 2 | 0.252 | 13050 | 987 | 4 | 100 | 4.51E-01 | U | **1.87E-09** |
| 2 | EW | 2 | 0.252 | 13050 | 895 | 4 | 100 | 4.51E-01 | U | **1.87E-09** |
| 3 | EW | 2 | 0.252 | 13050 | 760 | 1 | 100 | 4.51E-01 | U | **1.87E-09** |
| 4 | EW | 2 | 0.252 | 13050 | 756 | 4 | 100 | 4.51E-01 | U | **3.74E-09** |
| 5 | EW | 2 | 0.252 | 13050 | 691 | 1 | 100 | 4.51E-01 | U | **1.87E-09** |
| 6 | EW | 2 | 0.252 | 13050 | 594 | 1 | 100 | 4.51E-01 | U | **1.87E-09** |
| 7 | EW | 2 | 0.252 | 13050 | 549 | 4 | 100 | 4.51E-01 | U | **5.60E-09** |
| 8 | EW | 2 | 0.252 | 13050 | 480 | 1 | 100 | 4.51E-01 | U | **3.74E-09** |
| 9 | EW | 2 | 0.252 | 13050 | 427 | 1 | 100 | 4.51E-01 | U | **3.74E-09** |
| 10 | EW | 2 | 0.252 | 13050 | 400 | 4 | 100 | 4.51E-01 | U | **9.34E-09** |
| 11 | EW | 2 | 0.252 | 13050 | 65 | 4 | 100 | 4.51E-01 | U | **2.32E-07** |
| | | | | | | | 100 | 0.00E+00 | **SUM** | **2.67E-07** |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | | | | |

# Fast Food Restaurants

| District Default Values | | | | | | |
|---|---|---|---|---|---|---|
| Usage | | | Average Lb/week | | | |
| Facility Type | Description | Controls* | Hamburger | Poultry w/ skin | Poultry w/o skin | Pork |
| 1 | CD-Charbroiler | **86%** | **800** | | **265** | |
| 2 | Flat Griddle | **0%** | **360** | | **110** | **110** |
| 3 | UF-Charbroiler | **0%** | **270** | **145** | | |
| 4 | Flat Griddle | **0%** | | | **110** | **110** |
| *w/ District Required Control Equipment | | | | | | |

| Emission Factors | | Lb/Ton of meat | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hamburger | | Poultry w/ skin | | Poultry w/o skin | | Pork | |
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene |
| 1 | CD-Charbroiler | **0.000724** | **0.046** | | | **0.00046** | **0.018** | | |
| 2 | Flat Griddle | **0.000054** | **0.012** | | | **0.000044** | **0.018** | **0.000044** | **0.002** |
| 3 | UF-Charbroiler | **0.000702** | **0.038** | **0.00046** | **0.018** | | | | |
| 4 | Flat Griddle | | | | | **0.000044** | **0.018** | **0.000044** | **0.002** |

| Emission Summary | | Hamburger | | Poultry w/ skin | | Poultry w/o skin | | Pork | |
|---|---|---|---|---|---|---|---|---|---|
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene |
| 1 | CD-Charbroiler | 2.11E-03 | 1.34E-01 | 0.00E+00 | 0.00E+00 | 4.44E-04 | 1.74E-02 | 0.00E+00 | 0.00E+00 |
| 2 | Flat Griddle | 5.05E-04 | 1.12E-01 | 0.00E+00 | 0.00E+00 | 1.26E-04 | 5.15E-02 | 1.26E-04 | 5.72E-03 |
| 3 | UF-Charbroiler | 4.93E-03 | 2.67E-01 | 1.73E-03 | 6.79E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | Flat Griddle | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.26E-04 | 5.15E-02 | 1.26E-04 | 5.72E-03 |

How to us this worksheet:

This worksheet allows the user to enter the proposed quantity for each type of meat cooked by type of operation. If the user is uncertain which type of operation will be used for a single proposed fast food location then the emissions from the highest priority operation with the District's default values should be used.

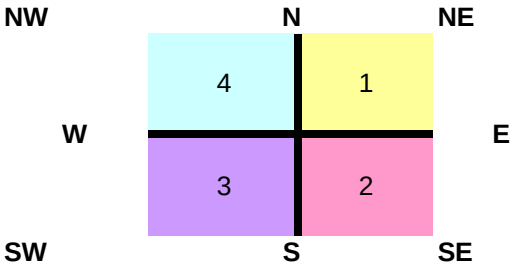
Examples:

1) Proposed site has two fast food locations. The user will use Facility Type 1 and 2.
2) Proposed site has four fast food locations. The user will use Facility Type 1,2,3, and 4.
3) Proposed site has six fast food locations. The user will use Facility Type 1,2,3, and 4 for the first four locations
   For all other locations Facility Type 4 should be used.

Stack Parameters: Height = 5ft above roof height, Temperature = 200 F, Velocity = 1210 ft/min, Diameter = 1 ft

**Receptor Quad**

Facility Name : Vineyard at Delano and West Pavilion
Project #: 1
Date: 10/29/2014
Quad: 3
Receptor Distance: 20
Location: u (U = Urban or R = Rural)




**Calculate Risk**

| **Risk Summary** | | Total (Lb/Yr) | | Total (Lb/Hr) | | Risk | | |
|---|---|---|---|---|---|---|---|---|
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | Total Risk |
| 1 | CD-Charbroiler | 2.55E-03 | 1.51E-01 | 2.91E-07 | 1.73E-05 | 1.2E-06 | 4.89E-08 | 1.25008E-06 |
| 2 | Flat Griddle | 7.57E-04 | 1.70E-01 | 8.64E-08 | 1.94E-05 | 3.56E-07 | 5.48E-08 | 4.11167E-07 |
| 3 | UF-Charbroiler | 6.66E-03 | 3.35E-01 | 7.61E-07 | 3.82E-05 | 3.14E-06 | 1.08E-07 | 3.24392E-06 |
| 4 | Flat Griddle | 2.52E-04 | 5.72E-02 | 2.87E-08 | 6.53E-06 | 1.18E-07 | 1.85E-08 | 1.36953E-07 |
| | | | | | | | **SUM** | 5.04211E-06 |

SUM of all Potential Restaurants (13) = **6.27469E-06**

Total = 5.04E-06+(1.36953E-07*9)

# Truck Idling & TRU's

Date : 10/29/2014
Facility Name: West Pavilion
Facility Location: Delano, CA
Facility ID #:

**Calculate Risk**

**Receptor Quad**

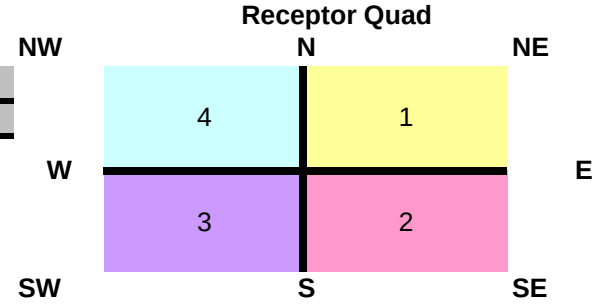
| NW | N | NE |
|---|---|---|
| 4 | 1 | |
| W | | E |
| 3 | 2 | |
| SW | S | SE |

| Unit # | Unit Type<br>T = TRU<br>HH = High Horizontal<br>HV = High Vertical<br>LL = Low Level | Operational Time / Event (Hour) | PM10 g/hr | Events/ Year | Receptor Distance (m) | Quad | Load % | Emissions Lb / Yr | **Location**<br>U=Urban<br>UB=Urban Near Building<br>R=Rural<br>RB=Rural Near Building | Unit Risk |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | hh | 0.25 | 2.57 | 39913 | 20 | 3 | 100 | 5.65E+01 | u | **3.54E-05** |
| 2 | T | 0.25 | 2.57 | 39913 | 20 | 3 | 100 | 5.65E+01 | u | **3.47E-05** |
| 3 | hh | 0.25 | 2.57 | 39913 | 40 | 4 | 100 | 5.65E+01 | u | **4.35E-05** |
| 4 | t | 0.25 | 2.57 | 39913 | 40 | 4 | 100 | 5.65E+01 | u | **4.28E-05** |
| | | | | | | | 100 | 0.00E+00 | **SUM** | **1.56E-04** |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | | | | |

# Truck Travel

Date : 10/29/2014
Facility Name: Vineyard at Delano and West Pavilion
Facility Location: Delano, CA
Facility ID #:

**Calculate Risk**




| Unit # | Segment Direction<br>EW = East-West<br>NS = North-South<br>NWSE = Northwest-Southeast<br>NESW = Northeast-Southwest | # (50m) Segments | PM10 g/mi | Events/ Year | Receptor Distance (m) | Quad | Load % | Emissions Lb / Yr | Location U=Urban R=Rural | Segment Risk |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EW | 2 | 0.252 | 39913 | 987 | 4 | 100 | 1.38E+00 | U | **5.71E-09** |
| 2 | EW | 2 | 0.252 | 39913 | 895 | 4 | 100 | 1.38E+00 | U | **5.71E-09** |
| 3 | EW | 2 | 0.252 | 39913 | 760 | 1 | 100 | 1.38E+00 | U | **5.71E-09** |
| 4 | EW | 2 | 0.252 | 39913 | 756 | 4 | 100 | 1.38E+00 | U | **1.14E-08** |
| 5 | EW | 2 | 0.252 | 39913 | 691 | 1 | 100 | 1.38E+00 | U | **5.71E-09** |
| 6 | EW | 2 | 0.252 | 39913 | 594 | 1 | 100 | 1.38E+00 | U | **5.71E-09** |
| 7 | EW | 2 | 0.252 | 39913 | 549 | 4 | 100 | 1.38E+00 | U | **1.71E-08** |
| 8 | EW | 2 | 0.252 | 39913 | 480 | 1 | 100 | 1.38E+00 | U | **1.14E-08** |
| 9 | EW | 2 | 0.252 | 39913 | 427 | 1 | 100 | 1.38E+00 | U | **1.14E-08** |
| 10 | EW | 2 | 0.252 | 39913 | 400 | 4 | 100 | 1.38E+00 | U | **2.86E-08** |
| 11 | EW | 2 | 0.252 | 39913 | 65 | 4 | 100 | 1.38E+00 | U | **7.08E-07** |
| | | | | | | | 100 | 0.00E+00 | **SUM** | **8.17E-07** |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | 100 | 0.00E+00 | | |
| | | | | | | | | | | |

# Fast Food Restaurants

| District Default Values | | | | | | |
|---|---|---|---|---|---|---|
| Usage | | | Average Lb/week | | | |
| Facility Type | Description | Controls* | Hamburger | Poultry w/ skin | Poultry w/o skin | Pork |
| 1 | CD-Charbroiler | **86%** | **800** | | **265** | |
| 2 | Flat Griddle | **0%** | **360** | | **110** | **110** |
| 3 | UF-Charbroiler | **0%** | **270** | **145** | | |
| 4 | Flat Griddle | **0%** | | | **110** | **110** |
| *w/ District Required Control Equipment | | | | | | |

| Emission Factors | | Lb/Ton of meat | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hamburger | | Poultry w/ skin | | Poultry w/o skin | | Pork | |
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene |
| 1 | CD-Charbroiler | **0.000724** | **0.046** | | | **0.00046** | **0.018** | | |
| 2 | Flat Griddle | **0.000054** | **0.012** | | | **0.000044** | **0.018** | **0.000044** | **0.002** |
| 3 | UF-Charbroiler | **0.000702** | **0.038** | **0.00046** | **0.018** | | | | |
| 4 | Flat Griddle | | | | | **0.000044** | **0.018** | **0.000044** | **0.002** |

| Emission Summary | | Hamburger | | Poultry w/ skin | | Poultry w/o skin | | Pork | |
|---|---|---|---|---|---|---|---|---|---|
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene |
| 1 | CD-Charbroiler | 2.11E-03 | 1.34E-01 | 0.00E+00 | 0.00E+00 | 4.44E-04 | 1.74E-02 | 0.00E+00 | 0.00E+00 |
| 2 | Flat Griddle | 5.05E-04 | 1.12E-01 | 0.00E+00 | 0.00E+00 | 1.26E-04 | 5.15E-02 | 1.26E-04 | 5.72E-03 |
| 3 | UF-Charbroiler | 4.93E-03 | 2.67E-01 | 1.73E-03 | 6.79E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | Flat Griddle | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.26E-04 | 5.15E-02 | 1.26E-04 | 5.72E-03 |

How to us this worksheet:

This worksheet allows the user to enter the proposed quantity for each type of meat cooked by type of operation. If the user is uncertain which type of operation will be used for a single proposed fast food location then the emissions from the highest priority operation with the District's default values should be used.

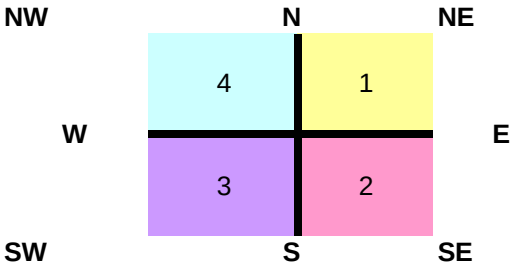
Examples:

1) Proposed site has two fast food locations. The user will use Facility Type 1 and 2.
2) Proposed site has four fast food locations. The user will use Facility Type 1,2,3, and 4.
3) Proposed site has six fast food locations. The user will use Facility Type 1,2,3, and 4 for the first four locations
   For all other locations Facility Type 4 should be used.

Stack Parameters: Height = 5ft above roof height, Temperature = 200 F, Velocity = 1210 ft/min, Diameter = 1 ft

**Receptor Quad**

Facility Name : Vineyard at Delano and West Pavilion (cumulative)
Project #: 1
Date: 10/29/2014
Quad: 3
Receptor Distance: 20
Location: u (U = Urban or R = Rural)




**Calculate Risk**

| **Risk Summary** | | Total (Lb/Yr) | | Total (Lb/Hr) | | Risk | | |
|---|---|---|---|---|---|---|---|---|
| Facility Type | Description | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | PAH wo/Na-phthalene | Naph-thalene | Total Risk |
| 1 | CD-Charbroiler | 2.55E-03 | 1.51E-01 | 2.91E-07 | 1.73E-05 | 1.2E-06 | 4.89E-08 | 1.25008E-06 |
| 2 | Flat Griddle | 7.57E-04 | 1.70E-01 | 8.64E-08 | 1.94E-05 | 3.56E-07 | 5.48E-08 | 4.11167E-07 |
| 3 | UF-Charbroiler | 6.66E-03 | 3.35E-01 | 7.61E-07 | 3.82E-05 | 3.14E-06 | 1.08E-07 | 3.24392E-06 |
| 4 | Flat Griddle | 2.52E-04 | 5.72E-02 | 2.87E-08 | 6.53E-06 | 1.18E-07 | 1.85E-08 | 1.36953E-07 |
| | | | | | | | **SUM** | 5.04211E-06 |

SUM of all Potential Restaurants (26) = **8.05509E-06**

Total = 5.04E-06+(1.36953E-07*22)

# APPENDIX 4.4-A
# BIOLOGICAL RESOURCES DATA

## CNDDB 9-Quad Species List 92 records.

| Element Type | Scientific Name | Common Name | Element Code | Federal Status | State Status | CDFW Status | CA Rare Plant Rank | Quad Code | Quad Name | Data Status | Taxonomic Sort |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Animals - Amphibians | Spea hammondii | western spadefoot | AAABF02020 | None | None | SSC | - | 3511962 | McFarland | Mapped | Animals - Amphibians - Scaphiopodidae - Spea hammondii |
| Animals - Amphibians | Spea hammondii | western spadefoot | AAABF02020 | None | None | SSC | - | 3511972 | Delano East | Mapped | Animals - Amphibians - Scaphiopodidae - Spea hammondii |
| Animals - Amphibians | Spea hammondii | western spadefoot | AAABF02020 | None | None | SSC | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Amphibians - Scaphiopodidae - Spea hammondii |
| Animals - Amphibians | Spea hammondii | western spadefoot | AAABF02020 | None | None | SSC | - | 3511974 | Allensworth | Unprocessed | Animals - Amphibians - Scaphiopodidae - Spea hammondii |
| Animals - Birds | Aquila chrysaetos | golden eagle | ABNKC22010 | None | None | FP , WL | - | 3511973 | Delano West | Unprocessed | Animals - Birds - Accipitridae - Aquila chrysaetos |
| Animals - Birds | Buteo regalis | ferruginous hawk | ABNKC19120 | None | None | WL | - | 3511974 | Allensworth | Unprocessed | Animals - Birds - Accipitridae - Buteo regalis |
| Animals - Birds | Buteo swainsoni | Swainson's hawk | ABNKC19070 | None | Threatened | - | - | 3511953 | Wasco | Mapped | Animals - Birds - Accipitridae - Buteo swainsoni |
| Animals - Birds | Eremophila alpestris actia | California horned lark | ABPAT02011 | None | None | WL | - | 3511973 | Delano West | Unprocessed | Animals - Birds - Alaudidae - Eremophila alpestris actia |
| Animals - Birds | Eremophila alpestris actia | California horned lark | ABPAT02011 | None | None | WL | - | 3511974 | Allensworth | Unprocessed | Animals - Birds - Alaudidae - Eremophila alpestris actia |
| Animals - Birds | Charadrius montanus | mountain plover | ABNNB03100 | None | None | SSC | - | 3511974 | Allensworth | Unprocessed | Animals - Birds - Charadriidae - Charadrius montanus |
| Animals - Birds | Falco columbarius | merlin | ABNKD06030 | None | None | WL | - | 3511974 | Allensworth | Unprocessed | Animals - Birds - Falconidae - Falco columbarius |
| Animals - Birds | Agelaius tricolor | tricolored blackbird | ABPBXB0020 | None | None | SSC | - | 3511974 | Allensworth | Unprocessed | Animals - Birds - Icteridae - Agelaius tricolor |
| Animals - Birds | Agelaius tricolor | tricolored blackbird | ABPBXB0020 | None | None | SSC | - | 3511953 | Wasco | Unprocessed | Animals - Birds - Icteridae - Agelaius tricolor |
| Animals - Birds | Agelaius tricolor | tricolored blackbird | ABPBXB0020 | None | None | SSC | - | 3511963 | Pond | Unprocessed | Animals - Birds - Icteridae - Agelaius tricolor |
| Animals - Birds | Agelaius tricolor | tricolored blackbird | ABPBXB0020 | None | None | SSC | - | 3511964 | Wasco NW | Unprocessed | Animals - Birds - Icteridae - Agelaius tricolor |
| Animals - Birds | Lanius ludovicianus | loggerhead shrike | ABPBR01030 | None | None | SSC | - | 3511964 | Wasco NW | Unprocessed | Animals - Birds - Laniidae - Lanius ludovicianus |
| Animals - Birds | Toxostoma lecontei | Le Conte's thrasher | ABPBK06100 | None | None | SSC | - | 3511954 | Wasco SW | Mapped | Animals - Birds - Mimidae - Toxostoma lecontei |
| Animals - Birds | Athene cunicularia | burrowing owl | ABNSB10010 | None | None | SSC | - | 3511964 | Wasco NW | Mapped | Animals - Birds - Strigidae - Athene cunicularia |
| Animals - Birds | Athene cunicularia | burrowing owl | ABNSB10010 | None | None | SSC | - | 3511963 | Pond | Mapped | Animals - Birds - Strigidae - Athene cunicularia |
| Animals - Birds | Athene cunicularia | burrowing owl | ABNSB10010 | None | None | SSC | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Birds - Strigidae - Athene cunicularia |
| Animals - Birds | Athene cunicularia | burrowing owl | ABNSB10010 | None | None | SSC | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Birds - Strigidae - Athene cunicularia |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Animals - Fish | Entosphenus hubbsi | Kern brook lamprey | AFBAA02040 | None | None | SSC | - | 3511972 | Delano East | Mapped | Animals - Fish - Petromyzontidae - Entosphenus hubbsi |
| Animals - Insects | Lytta hoppingi | Hopping's blister beetle | IICOL4C010 | None | None | - | - | 3511972 | Delano East | Mapped | Animals - Insects - Meloidae - Lytta hoppingi |
| Animals - Insects | Lytta hoppingi | Hopping's blister beetle | IICOL4C010 | None | None | - | - | 3511973 | Delano West | Mapped | Animals - Insects - Meloidae - Lytta hoppingi |
| Animals - Insects | Lytta molesta | molestan blister beetle | IICOL4C030 | None | None | - | - | 3511973 | Delano West | Mapped | Animals - Insects - Meloidae - Lytta molesta |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511972 | Delano East | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511964 | Wasco NW | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511963 | Pond | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511952 | Famoso | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511962 | McFarland | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511954 | Wasco SW | Mapped | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Vulpes macrotis mutica | San Joaquin kit fox | AMAJA03041 | Endangered | Threatened | - | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Mammals - Canidae - Vulpes macrotis mutica |
| Animals - Mammals | Chaetodipus californicus femoralis | Dulzura pocket mouse | AMAFD05021 | None | None | SSC | - | 3511973 | Delano West | Mapped | Animals - Mammals - Heteromyidae - Chaetodipus californicus femoralis |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511964 | Wasco NW | Mapped | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511962 | McFarland | Mapped | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511954 | Wasco SW | Mapped | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511952 | Famoso | Mapped | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511963 | Pond | Mapped | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |
| Animals - Mammals | Dipodomys nitratoides nitratoides | Tipton kangaroo rat | AMAFD03152 | Endangered | Endangered | - | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Mammals - Heteromyidae - Dipodomys nitratoides nitratoides |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Animals - Mammals | Perognathus inornatus inornatus | San Joaquin pocket mouse | AMAFD01061 | None | None | - | - | 3511974 | Allensworth | Unprocessed | Animals - Mammals - Heteromyidae - Perognathus inornatus inornatus |
| Animals - Mammals | Perognathus inornatus inornatus | San Joaquin pocket mouse | AMAFD01061 | None | None | - | - | 3511964 | Wasco NW | Mapped and Unprocessed | Animals - Mammals - Heteromyidae - Perognathus inornatus inornatus |
| Animals - Mammals | Perognathus inornatus inornatus | San Joaquin pocket mouse | AMAFD01061 | None | None | - | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Mammals - Heteromyidae - Perognathus inornatus inornatus |
| Animals - Mammals | Taxidea taxus | American badger | AMAJF04010 | None | None | SSC | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Mammals - Mustelidae - Taxidea taxus |
| Animals - Mammals | Taxidea taxus | American badger | AMAJF04010 | None | None | SSC | - | 3511974 | Allensworth | Unprocessed | Animals - Mammals - Mustelidae - Taxidea taxus |
| Animals - Mammals | Ammospermophilus nelsoni | Nelson's antelope squirrel | AMAFB04040 | None | Threatened | - | - | 3511974 | Allensworth | Mapped | Animals - Mammals - Sciuridae - Ammospermophilus nelsoni |
| Animals - Mammals | Ammospermophilus nelsoni | Nelson's antelope squirrel | AMAFB04040 | None | Threatened | - | - | 3511964 | Wasco NW | Mapped and Unprocessed | Animals - Mammals - Sciuridae - Ammospermophilus nelsoni |
| Animals - Reptiles | Masticophis flagellum ruddocki | San Joaquin whipsnake | ARADB21021 | None | None | SSC | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Reptiles - Colubridae - Masticophis flagellum ruddocki |
| Animals - Reptiles | Masticophis flagellum ruddocki | San Joaquin whipsnake | ARADB21021 | None | None | SSC | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Reptiles - Colubridae - Masticophis flagellum ruddocki |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511964 | Wasco NW | Mapped | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511963 | Pond | Mapped | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511962 | McFarland | Mapped | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Gambelia sila | blunt-nosed leopard lizard | ARACF07010 | Endangered | Endangered | FP | - | 3511954 | Wasco SW | Mapped | Animals - Reptiles - Crotophytidae - Gambelia sila |
| Animals - Reptiles | Phrynosoma blainvillii | coast horned lizard | ARACF12100 | None | None | SSC | - | 3511963 | Pond | Mapped | Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii |
| Animals - Reptiles | Phrynosoma blainvillii | coast horned lizard | ARACF12100 | None | None | SSC | - | 3511973 | Delano West | Mapped and Unprocessed | Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii |
| Animals - Reptiles | Phrynosoma blainvillii | coast horned lizard | ARACF12100 | None | None | SSC | - | 3511974 | Allensworth | Mapped and Unprocessed | Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii |
| Community - Terrestrial | Valley Saltbush Scrub | Valley Saltbush Scrub | CTT36220CA | None | None | - | - | 3511974 | Allensworth | Mapped | Community - Terrestrial - Valley Saltbush Scrub |
| Community - Terrestrial | Valley Saltbush Scrub | Valley Saltbush Scrub | CTT36220CA | None | None | - | - | 3511973 | Delano West | Mapped | Community - Terrestrial - Valley Saltbush Scrub |
| Community - Terrestrial | Valley Saltbush Scrub | Valley Saltbush Scrub | CTT36220CA | None | None | - | - | 3511963 | Pond | Mapped | Community - Terrestrial - Valley Saltbush Scrub |
| Community - Terrestrial | Valley Sink Scrub | Valley Sink Scrub | CTT36210CA | None | None | - | - | 3511973 | Delano West | Mapped | Community - Terrestrial - Valley Sink Scrub |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Community - Terrestrial | Valley Sink Scrub | Valley Sink Scrub | CTT36210CA | None | None | - | - | 3511974 | Allensworth | Mapped | Community - Terrestrial - Valley Sink Scrub |
| Plants - Vascular | Eryngium spinosepalum | spiny-sepaled button-celery | PDAPI0Z0Y0 | None | None | - | 1B.2 | 3511972 | Delano East | Mapped | Plants - Vascular - Apiaceae - Eryngium spinosepalum |
| Plants - Vascular | Eryngium spinosepalum | spiny-sepaled button-celery | PDAPI0Z0Y0 | None | None | - | 1B.2 | 3511962 | McFarland | Mapped | Plants - Vascular - Apiaceae - Eryngium spinosepalum |
| Plants - Vascular | Cirsium crassicaule | slough thistle | PDAST2E0U0 | None | None | - | 1B.1 | 3511954 | Wasco SW | Mapped | Plants - Vascular - Asteraceae - Cirsium crassicaule |
| Plants - Vascular | Layia munzii | Munz's tidy-tips | PDAST5N0B0 | None | None | - | 1B.2 | 3511963 | Pond | Mapped | Plants - Vascular - Asteraceae - Layia munzii |
| Plants - Vascular | Monolopia congdonii | San Joaquin woollythreads | PDASTA8010 | Endangered | None | - | 1B.2 | 3511952 | Famoso | Mapped | Plants - Vascular - Asteraceae - Monolopia congdonii |
| Plants - Vascular | Caulanthus californicus | California jewelflower | PDBRA31010 | Endangered | Endangered | - | 1B.1 | 3511953 | Wasco | Mapped | Plants - Vascular - Brassicaceae - Caulanthus californicus |
| Plants - Vascular | Caulanthus californicus | California jewelflower | PDBRA31010 | Endangered | Endangered | - | 1B.1 | 3511963 | Pond | Mapped | Plants - Vascular - Brassicaceae - Caulanthus californicus |
| Plants - Vascular | Caulanthus californicus | California jewelflower | PDBRA31010 | Endangered | Endangered | - | 1B.1 | 3511972 | Delano East | Mapped | Plants - Vascular - Brassicaceae - Caulanthus californicus |
| Plants - Vascular | Caulanthus californicus | California jewelflower | PDBRA31010 | Endangered | Endangered | - | 1B.1 | 3511973 | Delano West | Mapped | Plants - Vascular - Brassicaceae - Caulanthus californicus |
| Plants - Vascular | Atriplex cordulata var. erecticaulis | Earlimart orache | PDCHE042V0 | None | None | - | 1B.2 | 3511973 | Delano West | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex cordulata var. erecticaulis |
| Plants - Vascular | Atriplex cordulata var. erecticaulis | Earlimart orache | PDCHE042V0 | None | None | - | 1B.2 | 3511972 | Delano East | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex cordulata var. erecticaulis |
| Plants - Vascular | Atriplex cordulata var. erecticaulis | Earlimart orache | PDCHE042V0 | None | None | - | 1B.2 | 3511964 | Wasco NW | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex cordulata var. erecticaulis |
| Plants - Vascular | Atriplex cordulata var. erecticaulis | Earlimart orache | PDCHE042V0 | None | None | - | 1B.2 | 3511963 | Pond | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex cordulata var. erecticaulis |
| Plants - Vascular | Atriplex cordulata var. erecticaulis | Earlimart orache | PDCHE042V0 | None | None | - | 1B.2 | 3511974 | Allensworth | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex cordulata var. erecticaulis |
| Plants - Vascular | Atriplex coronata var. coronata | crownscale | PDCHE040C3 | None | None | - | 4.2 | 3511974 | Allensworth | Unprocessed | Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata |
| Plants - Vascular | Atriplex coronata var. coronata | crownscale | PDCHE040C3 | None | None | - | 4.2 | 3511964 | Wasco NW | Unprocessed | Plants - Vascular - Chenopodiaceae - Atriplex coronata var. coronata |
| Plants - Vascular | Atriplex coronata var. vallicola | Lost Hills crownscale | PDCHE04250 | None | None | - | 1B.2 | 3511964 | Wasco NW | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex coronata var. vallicola |
| Plants - Vascular | Atriplex depressa | brittlescale | PDCHE042L0 | None | None | - | 1B.2 | 3511974 | Allensworth | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex depressa |
| Plants - Vascular | Atriplex minuscula | lesser saltscale | PDCHE042M0 | None | None | - | 1B.1 | 3511954 | Wasco SW | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex minuscula |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plants - Vascular | Atriplex subtilis | subtle orache | PDCHE042T0 | None | None | - | 1B.2 | 3511954 | Wasco SW | Mapped | Plants - Vascular - Chenopodiaceae - Atriplex subtilis |
| Plants - Vascular | Calochortus striatus | alkali mariposa-lily | PMLIL0D190 | None | None | - | 1B.2 | 3511973 | Delano West | Mapped | Plants - Vascular - Liliaceae - Calochortus striatus |
| Plants - Vascular | Eriastrum hooveri | Hoover's eriastrum | PDPLM03070 | Delisted | None | - | 4.2 | 3511952 | Famoso | Mapped | Plants - Vascular - Polemoniaceae - Eriastrum hooveri |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511953 | Wasco | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511963 | Pond | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511973 | Delano West | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511964 | Wasco NW | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511972 | Delano East | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |
| Plants - Vascular | Delphinium recurvatum | recurved larkspur | PDRAN0B1J0 | None | None | - | 1B.2 | 3511974 | Allensworth | Mapped | Plants - Vascular - Ranunculaceae - Delphinium recurvatum |

CNPS California Native Plant Rare and Endangered Plant Inventory

# Plant List

**13** matches found. *Click on scientific name for details*

**Search Criteria**

Found in 9 Quads around 35119F3

| Scientific Name | Common Name | Family | Lifeform | Rare Plant Rank | State Rank | Global Rank |
|---|---|---|---|---|---|---|
| Atriplex cordulata var. cordulata | heartscale | Chenopodiaceae | annual herb | 1B.2 | S2 | G3T2 |
| Atriplex cordulata var. erecticaulis | Earlimart orache | Chenopodiaceae | annual herb | 1B.2 | S1 | G3T1 |
| Atriplex coronata var. coronata | crownscale | Chenopodiaceae | annual herb | 4.2 | S3.2 | G4T3 |
| Atriplex coronata var. vallicola | Lost Hills crownscale | Chenopodiaceae | annual herb | 1B.2 | S2 | G4T2 |
| Atriplex depressa | brittlescale | Chenopodiaceae | annual herb | 1B.2 | S2 | G2 |
| Atriplex minuscula | lesser saltscale | Chenopodiaceae | annual herb | 1B.1 | S2 | G2 |
| Atriplex subtilis | subtle orache | Chenopodiaceae | annual herb | 1B.2 | S1 | G1 |
| Calochortus striatus | alkali mariposa lily | Liliaceae | perennial bulbiferous herb | 1B.2 | S2 | G2 |
| Caulanthus californicus | California jewel-flower | Brassicaceae | annual herb | 1B.1 | S1 | G1 |
| Cirsium crassicaule | slough thistle | Asteraceae | annual / perennial herb | 1B.1 | S2 | G2 |
| Delphinium recurvatum | recurved larkspur | Ranunculaceae | perennial herb | 1B.2 | S3 | G3 |
| Eryngium spinosepalum | spiny-sepaled button-celery | Apiaceae | annual / perennial herb | 1B.2 | S2 | G2 |
| Layia munzii | Munz's tidy-tips | Asteraceae | annual herb | 1B.2 | S1 | G1 |

**Suggested Citation**

CNPS, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 25 August 2014].

Join CNPS

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U.S. Fish and Wildlife Service

# Trust Resources List

**This resource list is to be used for planning purposes only — it is not an official species list.**

**Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:**

**Ventura Fish and Wildlife Office**
2493 PORTOLA ROAD, SUITE B
VENTURA, CA 93003
(805) 644-1766

**Endangered Species Act species list information for your project is NOT available online for the following FWS Field Offices:**

**Sacramento Fish and Wildlife Office**
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

## *Project Name:*

Delano Vineyard

U.S. Fish and Wildlife Service

# Trust Resources List

## *Project Location Map:*

## *Project Counties:*

Kern, CA

## *Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):*

MULTIPOLYGON (((-119.2584317 35.7504995, -119.2540114 35.7505178, -119.2540114 35.7468955, -119.2496126 35.7468781, -119.2495697 35.742977, -119.2584103 35.7428891, -119.2584317 35.7504995)))

## *Project Type:*

Development

U.S. Fish and Wildlife Service

# Trust Resources List

## *Endangered Species Act Species List (USFWS Endangered Species Program).*

There are a total of **2** threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

**Species that should be considered in an effects analysis for your project:**

| Birds | Status | | Has Critical Habitat | Contact |
|---|---|---|---|---|
| Least Bell's vireo (*Vireo bellii pusillus*) Population: Entire | Endangered | species info | Final designated critical habitat | Ventura Fish And Wildlife Office |
| Southwestern Willow flycatcher (*Empidonax traillii extimus*) Population: Entire | Endangered | species info | Final designated critical habitat | Ventura Fish And Wildlife Office |

**Critical habitats within your project area:**

*There are no critical habitats within your project area.*

## *FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).*

*There are no refuges found within the vicinity of your project.*

## *FWS Migratory Birds (USFWS Migratory Bird Program).*

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential

or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

**Migratory birds of concern that may be affected by your project:**

There are **8** birds on your Migratory birds of concern list. The Division of Migratory Bird Management is in the process of populating migratory bird data with an estimated completion time of Fall 2014; therefore, the list below may not include all the migratory birds of concern in your project area at this time. While this information is being populated, please contact the Field Office for information about migratory birds in your project area.

| Species Name | Bird of Conservation Concern (BCC) | Species Profile | Seasonal Occurrence in Project Area |
|---|---|---|---|
| Bald eagle (*Haliaeetus leucocephalus*) | Yes | species info | Wintering |
| Brewer's Sparrow (*Spizella breweri*) | Yes | species info | Year-round |
| Burrowing Owl (*Athene cunicularia*) | Yes | species info | Year-round |
| California Spotted owl (*Strix occidentalis occidentalis*) | Yes | species info | Year-round |
| Costa's Hummingbird (*Calypte costae*) | Yes | species info | Breeding |
| Marbled Godwit (*Limosa fedoa*) | Yes | species info | Wintering |
| Mountain plover (*Charadrius montanus*) | Yes | species info | Wintering |
| Sage Thrasher (*Oreoscoptes montanus*) | Yes | species info | Wintering |

## *NWI Wetlands (USFWS National Wetlands Inventory).*

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered

in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

**Data Limitations, Exclusions and Precautions**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

**Exclusions** - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Precautions** - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

**The following wetland types intersect your project area in one or more locations:**

U.S. Fish and Wildlife Service

# Trust Resources List

| Wetland Types | NWI Classification Code | Total Acres |
|---|---|---|
| Freshwater Emergent Wetland | PEMCx | 0.4377 |
| Freshwater Pond | PUBFx | 0.4019 |

# U.S. Fish & Wildlife Service

# Sacramento Fish & Wildlife Office

**Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested**

Document Number: 140826035440

Current as of: August 26, 2014

---

## Quad Lists

### Listed Species

#### Invertebrates

*Branchinecta conservatio*
Conservancy fairy shrimp (E)

*Branchinecta lynchi*
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

#### Fish

*Hypomesus transpacificus*
delta smelt (T)

#### Amphibians

*Rana draytonii*
California red-legged frog (T)

#### Reptiles

*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

#### Mammals

*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

#### Plants

*Caulanthus californicus*
California jewelflower (E)

*Eremalche kernensis*
Kern mallow (E)

*Monolopia congdonii (=Lembertia congdonii)*
San Joaquin woolly-threads (E)

### Quads Containing Listed, Proposed or Candidate Species:

MCFARLAND (263B)

FAMOSO (263C)

POND (264A)

WASCO NW (264B)
WASCO SW (264C)
WASCO (264D)
DELANO EAST (287C)
ALLENSWORTH (288C)
DELANO WEST (288D)

---

# County Lists

## Kern County

### Listed Species

#### Invertebrates

*Branchinecta conservatio*
Conservancy fairy shrimp (E)

*Branchinecta longiantenna*
Critical habitat, longhorn fairy shrimp (X)
longhorn fairy shrimp (E)

*Branchinecta lynchi*
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

*Desmocerus californicus dimorphus*
valley elderberry longhorn beetle (T)

*Euproserpinus euterpe*
Kern primrose sphinx moth (T)

#### Fish

*Hypomesus transpacificus*
delta smelt (T)

#### Amphibians

*Ambystoma californiense*
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

*Rana draytonii*
California red-legged frog (T)
Critical habitat, California red-legged frog (X)

#### Reptiles

*Gambelia (=Crotaphytus) sila*
blunt-nosed leopard lizard (E)

*Thamnophis gigas*
giant garter snake (T)

#### Birds

*Charadrius alexandrinus nivosus*

western snowy plover (T)

*Empidonax traillii extimus*
Critical habitat, southwestern willow flycatcher (X)
southwestern willow flycatcher (E)

*Gymnogyps californianus*
California condor (E)
Critical habitat, California condor (X)

*Vireo bellii pusillus*
Least Bell's vireo (E)

## Mammals

*Dipodomys ingens*
giant kangaroo rat (E)

*Dipodomys nitratoides nitratoides*
Tipton kangaroo rat (E)

*Ovis canadensis californiana*
Sierra Nevada (=California) bighorn sheep (E)

*Sorex ornatus relictus*
Buena Vista Lake shrew (E)
Critical habitat, Buena Vista Lake shrew (X)

*Vulpes macrotis mutica*
San Joaquin kit fox (E)

## Plants

*Caulanthus californicus*
California jewelflower (E)

*Eremalche kernensis*
Kern mallow (E)

*Monolopia congdonii (=Lembertia congdonii)*
San Joaquin woolly-threads (E)

*Opuntia treleasei*
Bakersfield cactus (E)

*Pseudobahia peirsonii*
San Joaquin adobe sunburst (T)

*Sidalcea keckii*
Critical habitat, Keck's checker-mallow (X)
Keck's checker-mallow (=checkerbloom) (E)

## Candidate Species

### Amphibians

*Rana muscosa*
mountain yellow-legged frog (C)

### Birds

*Coccyzus americanus occidentalis*
Western yellow-billed cuckoo (C)

### Mammals

*Martes pennanti*
fisher (C)

## Key:

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
*Critical Habitat* - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

## Important Information About Your Species List

### How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

### Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

### Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

## Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

## Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

## Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

## Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

## Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

## Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

## Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be November 24, 2014.

# APPENDIX 4.7-A
## WEB SOIL SURVEY

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Kern County, California, Northwestern Part

May 20, 2014

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

**Special Point Features**

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Kern County, California, Northwestern Part (CA666) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | 42.4 | 38.0% |
| 243 | Wasco sandy loam | 9.0 | 8.1% |
| **Totals for Area of Interest** | | **111.5** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Kern County, California, Northwestern Part

## 156—Garces silt loam

### Map Unit Setting

*Elevation:* 200 to 400 feet
*Mean annual precipitation:* 5 to 8 inches
*Mean annual air temperature:* 63 to 64 degrees F
*Frost-free period:* 250 to 300 days

### Map Unit Composition

*Garces and similar soils:* 85 percent
*Minor components:* 15 percent

### Description of Garces

#### Setting

*Landform:* Rims on basin floors
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*A - 0 to 2 inches:* strongly alkaline, silt loam
*Bt - 2 to 9 inches:* strongly alkaline, clay loam
*Btk - 9 to 23 inches:* strongly alkaline, sandy clay loam
*Ck - 23 to 37 inches:* strongly alkaline, loam
*C - 37 to 60 inches:* strongly alkaline, stratified sandy loam to clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
*Sodium adsorption ratio, maximum in profile:* 200.0
*Available water storage in profile:* Moderate (about 6.2 inches)

#### Interpretive groups

*Farmland classification:* Farmland of statewide importance
*Land capability classification (irrigated):* 3s
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* D
*Ecological site:* LOAMY SALINE ALKALI (R017XG045CA)

### Minor Components

#### Kimberlina

*Percent of map unit:* 4 percent

**Panoche**
*Percent of map unit:* 3 percent

**Wasco**
*Percent of map unit:* 3 percent

**Milham**
*Percent of map unit:* 3 percent

**Playas**
*Percent of map unit:* 1 percent
*Landform:* Playas

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Depressions

## 174—Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17

### Map Unit Setting
*Elevation:* 120 to 1,160 feet
*Mean annual precipitation:* 4 to 8 inches
*Mean annual air temperature:* 63 to 64 degrees F
*Frost-free period:* 240 to 300 days

### Map Unit Composition
*Kimberlina and similar soils:* 85 percent
*Minor components:* 15 percent

### Description of Kimberlina

#### Setting
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from igneous and sedimentary rock

#### Typical profile
*Ap - 0 to 9 inches:* moderately alkaline, fine sandy loam
*C - 9 to 45 inches:* moderately alkaline, fine sandy loam
*2C - 45 to 71 inches:* moderately alkaline, silt loam

#### Properties and qualities
*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare

*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.3 to 4.0 mmhos/cm)
*Sodium adsorption ratio, maximum in profile:* 4.0
*Available water storage in profile:* Moderate (about 8.7 inches)

**Interpretive groups**
*Farmland classification:* Prime farmland if irrigated
*Land capability classification (irrigated):* 1
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* A

**Minor Components**

**Wasco**
*Percent of map unit:* 7 percent
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear

**Milham**
*Percent of map unit:* 6 percent
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear

**Unnamed**
*Percent of map unit:* 2 percent
*Landform:* Flood plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear

## 243—Wasco sandy loam

**Map Unit Setting**
*Elevation:* 250 to 3,700 feet
*Mean annual precipitation:* 4 to 7 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 210 to 275 days

**Map Unit Composition**
*Wasco and similar soils:* 85 percent

### Description of Wasco

#### Setting

*Landform:* Flood plains, alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*Ap - 0 to 15 inches:* neutral, sandy loam
*C - 15 to 60 inches:* slightly alkaline, sandy loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 5 percent
*Salinity, maximum in profile:* Nonsaline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 6.4 inches)

#### Interpretive groups

*Farmland classification:* Prime farmland if irrigated
*Land capability classification (irrigated):* 2s
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* A

# Soil Information for All Uses

## Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

## Building Site Development

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

### Dwellings Without Basements

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification of the soil. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not

limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—Dwellings Without Basements

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Very limited

Somewhat limited

Not limited

Not rated or not available

**Soil Rating Lines**

Very limited

Somewhat limited

Not limited

Not rated or not available

**Soil Rating Points**

Very limited

Somewhat limited

Not limited

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Tables—Dwellings Without Basements

| Dwellings Without Basements— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | | | |
|---|---|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Component name (percent)** | **Rating reasons (numeric values)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Very limited | Garces (85%) | Flooding (1.00) | 60.1 | 53.9% |
| | | | | Shrink-swell (0.35) | | |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Very limited | Kimberlina (85%) | Flooding (1.00) | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Very limited | Wasco (85%) | Flooding (1.00) | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | | | **111.5** | **100.0%** |

| Dwellings Without Basements— Summary by Rating Value | | |
|---|---|---|
| **Rating** | **Acres in AOI** | **Percent of AOI** |
| Very limited | 111.5 | 100.0% |
| **Totals for Area of Interest** | **111.5** | **100.0%** |

### Rating Options—Dwellings Without Basements

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

## Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

# MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

**Soil Rating Lines**

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

**Soil Rating Points**

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

**Water Features**

## MAP INFORMATION

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—Farmland Classification

| Farmland Classification— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Farmland of statewide importance | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Prime farmland if irrigated | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Prime farmland if irrigated | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—Farmland Classification

*Aggregation Method:* No Aggregation Necessary

*Tie-break Rule:* Lower

## California Revised Storie Index (CA)

The Storie Index is a soil rating based on soil properties that govern a soil's potential for cultivated agriculture in California.

The Storie Index assesses the productivity of a soil from the following four characteristics: Factor A, degree of soil profile development; factor B, texture of the surface layer; factor C, slope; and factor X, manageable features, including drainage, microrelief, fertility, acidity, erosion, and salt content. A score ranging from 0 to 100 percent is determined for each factor, and the scores are then multiplied together to derive an index rating.

For simplification, Storie Index ratings have been combined into six grade classes as follows: Grade 1 (excellent), 100 to 80; grade 2 (good), 79 to 60; grade 3 (fair), 59 to 40; grade 4 (poor), 39 to 20; grade 5 (very poor), 19 to 10; and grade 6 (nonagricultural), less than 10.

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from

the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—California Revised Storie Index (CA)

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Grade One - Excellent

Grade Two - Good

Grade Three - Fair

Grade Four - Poor

Grade Five - Very Poor

Grade Six - Nonagricultural

Not rated

Not rated or not available

**Soil Rating Lines**

Grade One - Excellent

Grade Two - Good

Grade Three - Fair

Grade Four - Poor

Grade Five - Very Poor

Grade Six - Nonagricultural

Not rated

Not rated or not available

**Soil Rating Points**

Grade One - Excellent

Grade Two - Good

Grade Three - Fair

Grade Four - Poor

Grade Five - Very Poor

Grade Six - Nonagricultural

Not rated

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—California Revised Storie Index (CA)

| California Revised Storie Index (CA)— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | | |
|---|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Component name (percent)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Grade Four - Poor | Garces (85%) | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Grade Two - Good | Kimberlina (85%) | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Grade Two - Good | Wasco (85%) | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | | **111.5** | **100.0%** |

### Rating Options—California Revised Storie Index (CA)

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Lower

# Land Management

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

## Erosion Hazard (Road, Trail)

The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

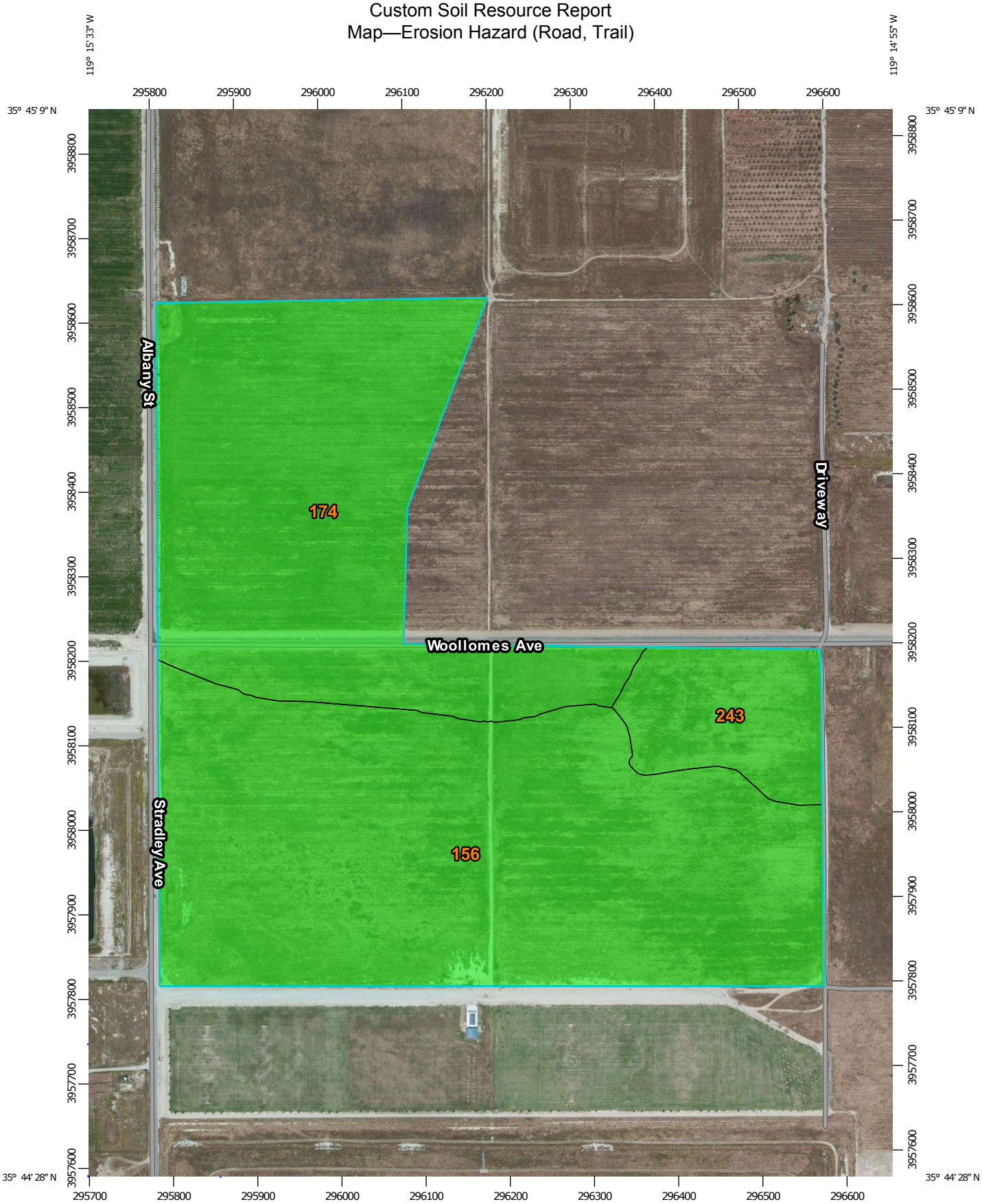
The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," or "severe." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and "severe" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—Erosion Hazard (Road, Trail)




Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

**Soil Rating Lines**

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

**Soil Rating Points**

- Very severe
- Severe
- Moderate
- Slight
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Tables—Erosion Hazard (Road, Trail)

| Erosion Hazard (Road, Trail)— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | | | |
|---|---|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Component name (percent)** | **Rating reasons (numeric values)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Slight | Garces (85%) | | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Slight | Kimberlina (85%) | | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Slight | Wasco (85%) | | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | | | **111.5** | **100.0%** |

| Erosion Hazard (Road, Trail)— Summary by Rating Value | | |
|---|---|---|
| **Rating** | **Acres in AOI** | **Percent of AOI** |
| Slight | 111.5 | 100.0% |
| **Totals for Area of Interest** | **111.5** | **100.0%** |

### Rating Options—Erosion Hazard (Road, Trail)

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

## Erosion Hazard (Off-Road, Off-Trail)

The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both verbal and numerical. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

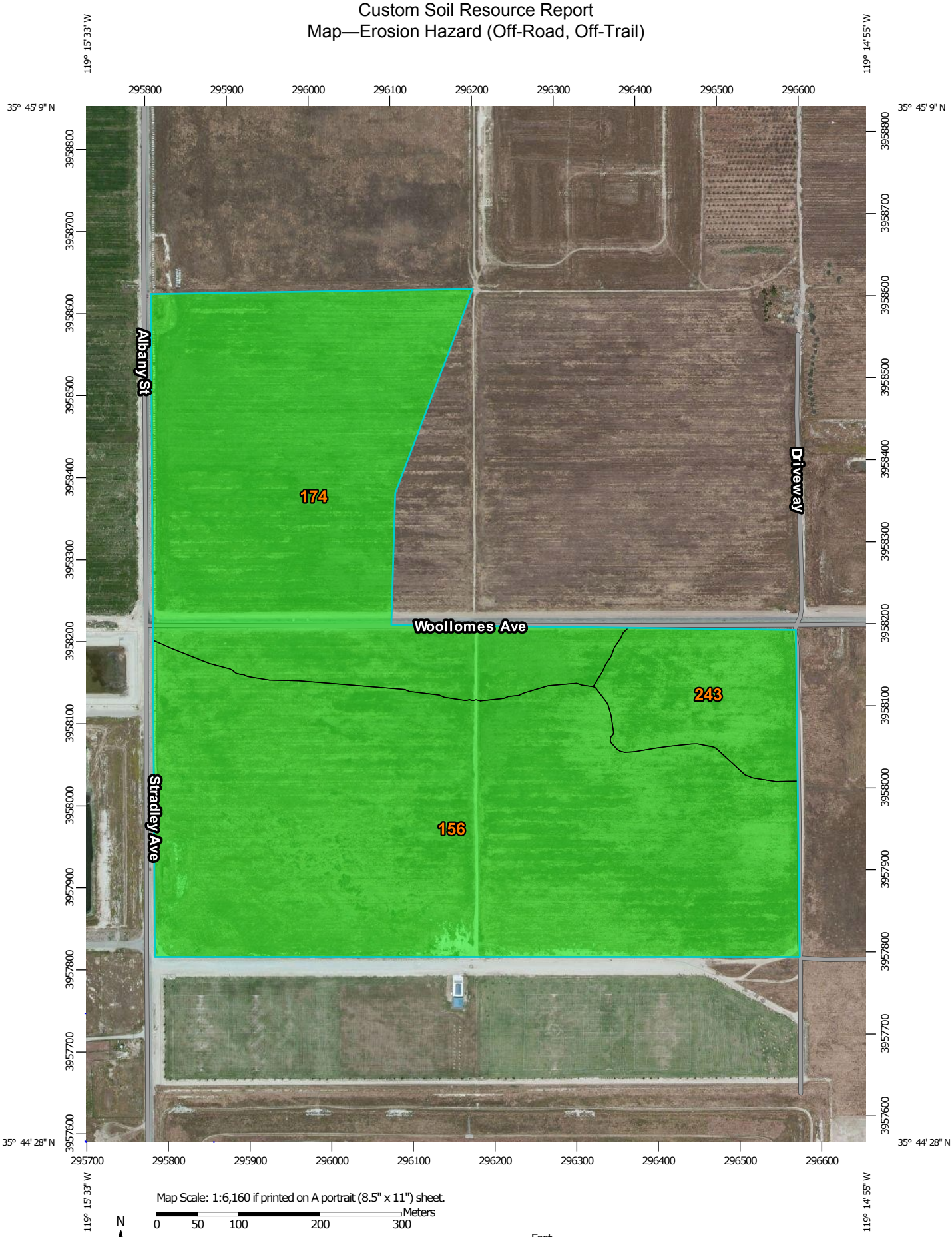
Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect

of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Map—Erosion Hazard (Off-Road, Off-Trail)




Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Very severe

Severe

Moderate

Slight

Not rated or not available

**Soil Rating Lines**

Very severe

Severe

Moderate

Slight

Not rated or not available

**Soil Rating Points**

Very severe

Severe

Moderate

Slight

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Tables—Erosion Hazard (Off-Road, Off-Trail)

| Erosion Hazard (Off-Road, Off-Trail)— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | | | |
|---|---|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Component name (percent)** | **Rating reasons (numeric values)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Slight | Garces (85%) | | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Slight | Kimberlina (85%) | | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Slight | Wasco (85%) | | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | | | **111.5** | **100.0%** |

| Erosion Hazard (Off-Road, Off-Trail)— Summary by Rating Value | | |
|---|---|---|
| **Rating** | **Acres in AOI** | **Percent of AOI** |
| Slight | 111.5 | 100.0% |
| **Totals for Area of Interest** | **111.5** | **100.0%** |

## Rating Options—Erosion Hazard (Off-Road, Off-Trail)

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Erosion Factors

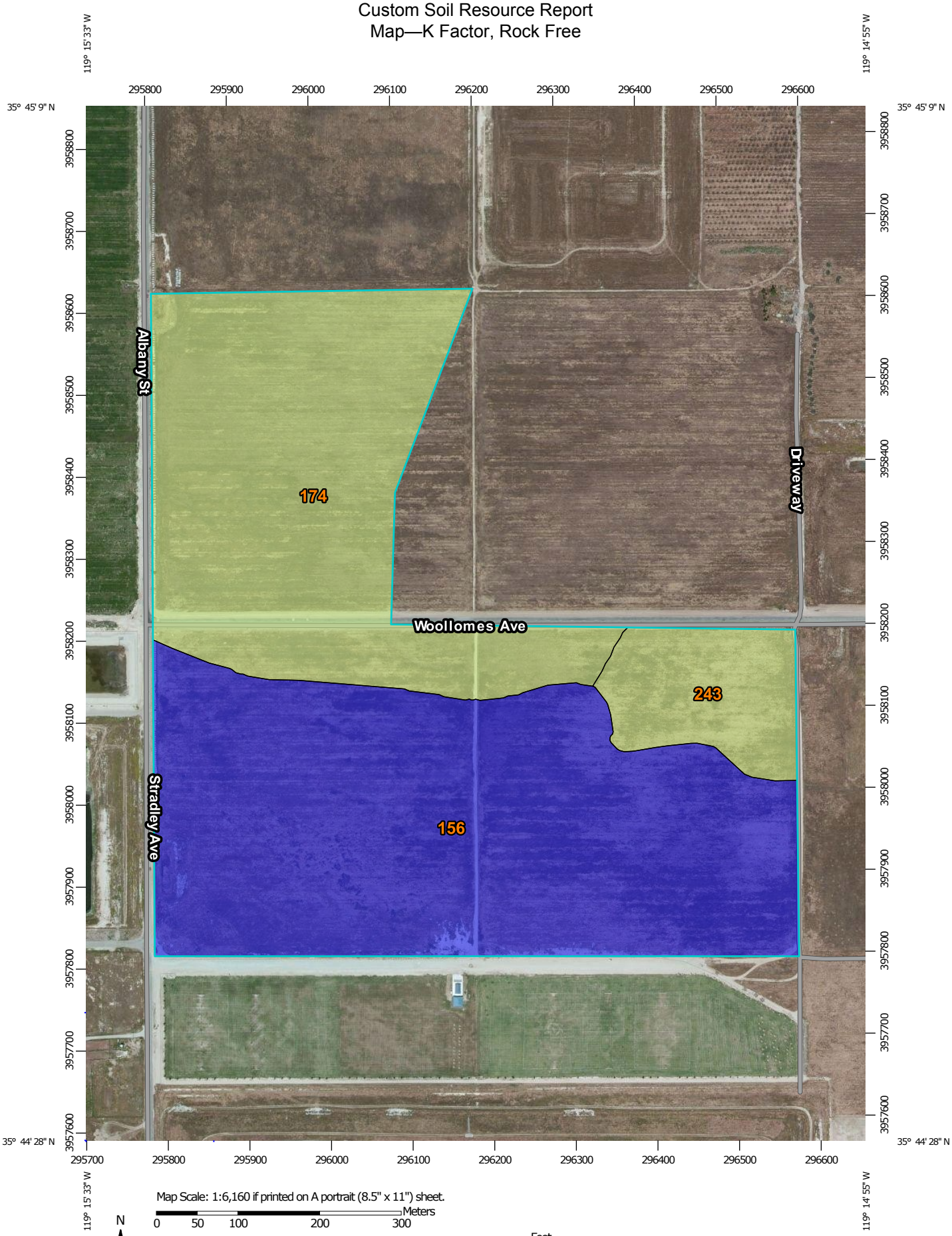
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Rock Free

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Map—K Factor, Rock Free




Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—K Factor, Rock Free

| K Factor, Rock Free— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | .64 | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | .24 | 42.4 | 38.0% |
| 243 | Wasco sandy loam | .24 | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—K Factor, Rock Free

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

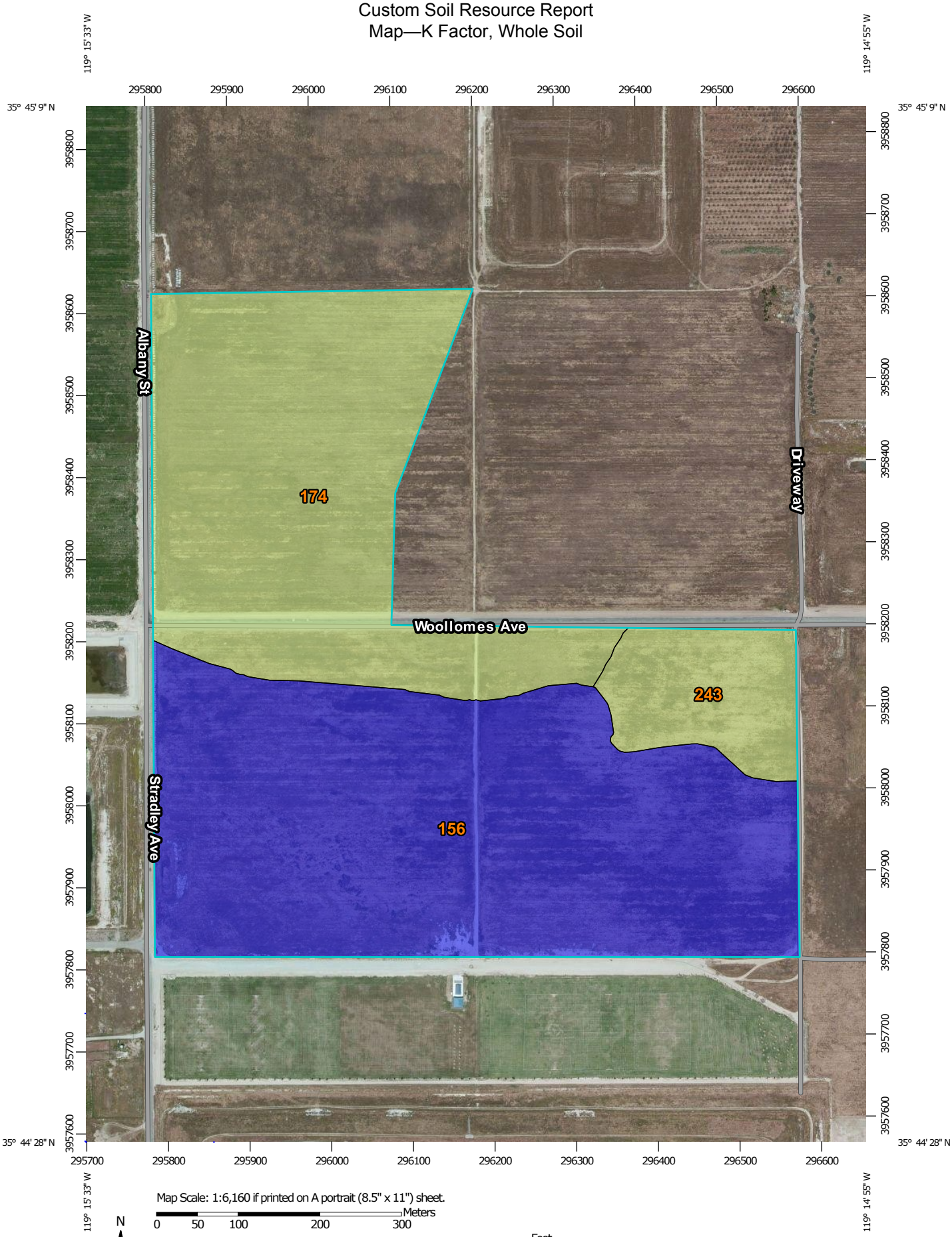
*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

## K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

# Custom Soil Resource Report
## Map—K Factor, Whole Soil




Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—K Factor, Whole Soil

| K Factor, Whole Soil— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | .64 | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | .24 | 42.4 | 38.0% |
| 243 | Wasco sandy loam | .24 | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

# Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

## Linear Extensibility

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

# Custom Soil Resource Report
## Map—Linear Extensibility

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Low (0 - 3)

Moderate (3 - 6)

High (6 - 9)

Very High (9 - 30)

Not rated or not available

**Soil Rating Lines**

Low (0 - 3)

Moderate (3 - 6)

High (6 - 9)

Very High (9 - 30)

Not rated or not available

**Soil Rating Points**

Low (0 - 3)

Moderate (3 - 6)

High (6 - 9)

Very High (9 - 30)

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—Linear Extensibility

| Linear Extensibility— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (percent)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | 4.5 | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | 1.2 | 42.4 | 38.0% |
| 243 | Wasco sandy loam | 1.5 | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—Linear Extensibility

*Units of Measure:* percent

*Aggregation Method:* Dominant Component

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Interpret Nulls as Zero:* No

*Layer Options (Horizon Aggregation Method):* Depth Range (Weighted Average)

*Top Depth:* 10

*Bottom Depth:* 36

*Units of Measure:* Inches

# Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

## Drainage Class

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

# Map—Drainage Class

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Excessively drained

Somewhat excessively drained

Well drained

Moderately well drained

Somewhat poorly drained

Poorly drained

Very poorly drained

Subaqueous

Not rated or not available

**Soil Rating Lines**

Excessively drained

Somewhat excessively drained

Well drained

Moderately well drained

Somewhat poorly drained

Poorly drained

Very poorly drained

Subaqueous

Not rated or not available

**Soil Rating Points**

Excessively drained

Somewhat excessively drained

Well drained

Moderately well drained

Somewhat poorly drained

Poorly drained

Very poorly drained

Subaqueous

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

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### Table—Drainage Class

| Drainage Class— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Well drained | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Well drained | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Well drained | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—Drainage Class

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

## Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the

surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

# Custom Soil Resource Report
## Map—Hydrologic Soil Group

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Lines**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Points**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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Survey Area Data: Version 6, Dec 7, 2013

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Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

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### Table—Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | D | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | A | 42.4 | 38.0% |
| 243 | Wasco sandy loam | A | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# Water Features

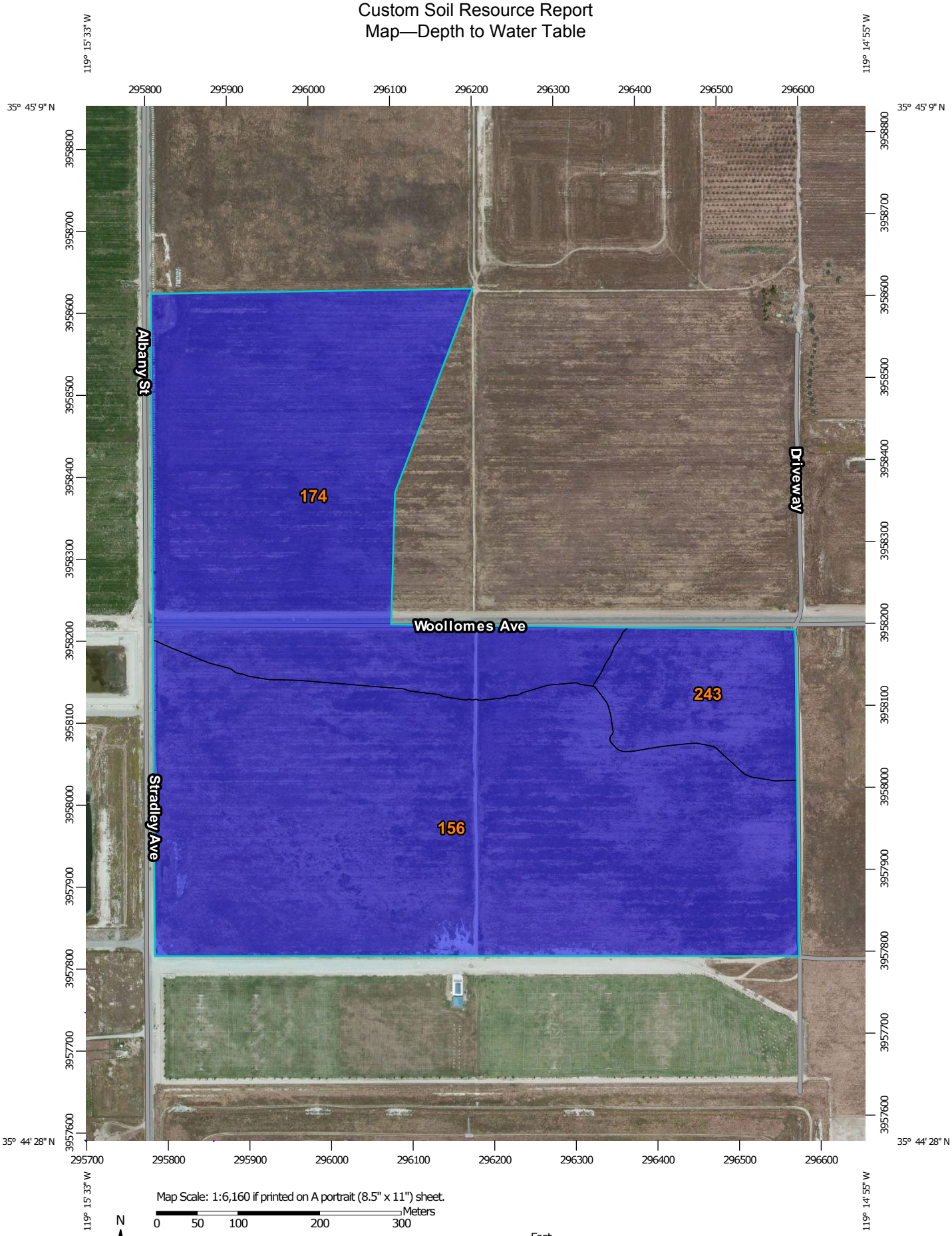
Water Features include ponding frequency, flooding frequency, and depth to water table.

## Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

# Custom Soil Resource Report
## Map—Depth to Water Table




Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

**Soil Rating Lines**

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

**Soil Rating Points**

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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## Table—Depth to Water Table

| Depth to Water Table— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (centimeters)** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | >200 | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | >200 | 42.4 | 38.0% |
| 243 | Wasco sandy loam | >200 | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

### Rating Options—Depth to Water Table

*Units of Measure:* centimeters

*Aggregation Method:* Dominant Component

*Component Percent Cutoff:* *None Specified*

*Tie-break Rule:* Lower

*Interpret Nulls as Zero:* No

*Beginning Month:* January

*Ending Month:* December

## Flooding Frequency Class

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

# Custom Soil Resource Report
## Map—Flooding Frequency Class

Map Scale: 1:6,160 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

**Soil Rating Lines**

- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

**Soil Rating Points**

- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

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Source of Map: Natural Resources Conservation Service
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## Table—Flooding Frequency Class

| Flooding Frequency Class— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | Rare | 60.1 | 53.9% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | Rare | 42.4 | 38.0% |
| 243 | Wasco sandy loam | Rare | 9.0 | 8.1% |
| **Totals for Area of Interest** | | | **111.5** | **100.0%** |

## Rating Options—Flooding Frequency Class

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* More Frequent

*Beginning Month:* January

*Ending Month:* December

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Soil Information for All Uses

## Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

## Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

### Irrigated Capability Class

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Map—Irrigated Capability Class

Map Scale: 1:6,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Soil Rating Lines**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Soil Rating Points**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

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Source of Map: Natural Resources Conservation Service
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Coordinate System: Web Mercator (EPSG:3857)

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Survey Area Data: Version 6, Dec 7, 2013

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Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

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### Table—Irrigated Capability Class

| Irrigated Capability Class— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | 3 | 60.4 | 55.4% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | 1 | 39.0 | 35.7% |
| 243 | Wasco sandy loam | 2 | 9.7 | 8.9% |
| **Totals for Area of Interest** | | | **109.0** | **100.0%** |

### Rating Options—Irrigated Capability Class

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

## Nonirrigated Capability Class

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

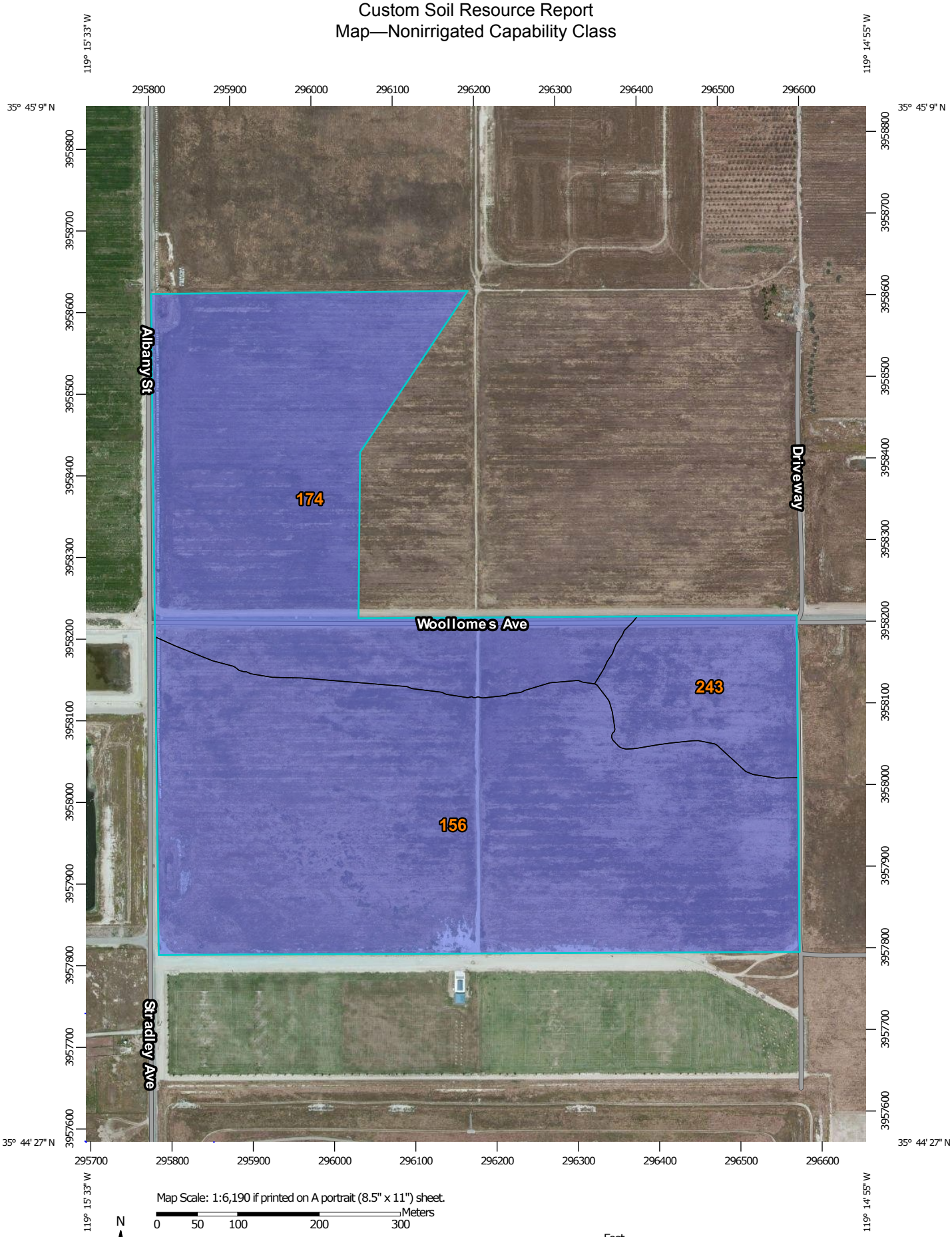
Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

# Custom Soil Resource Report
## Map—Nonirrigated Capability Class




Map Scale: 1:6,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Soil Rating Lines**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Soil Rating Points**

Capability Class - I

Capability Class - II

Capability Class - III

Capability Class - IV

Capability Class - V

Capability Class - VI

Capability Class - VII

Capability Class - VIII

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Soil Information for All Uses

## Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

## Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

### Irrigated Capability Subclass

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

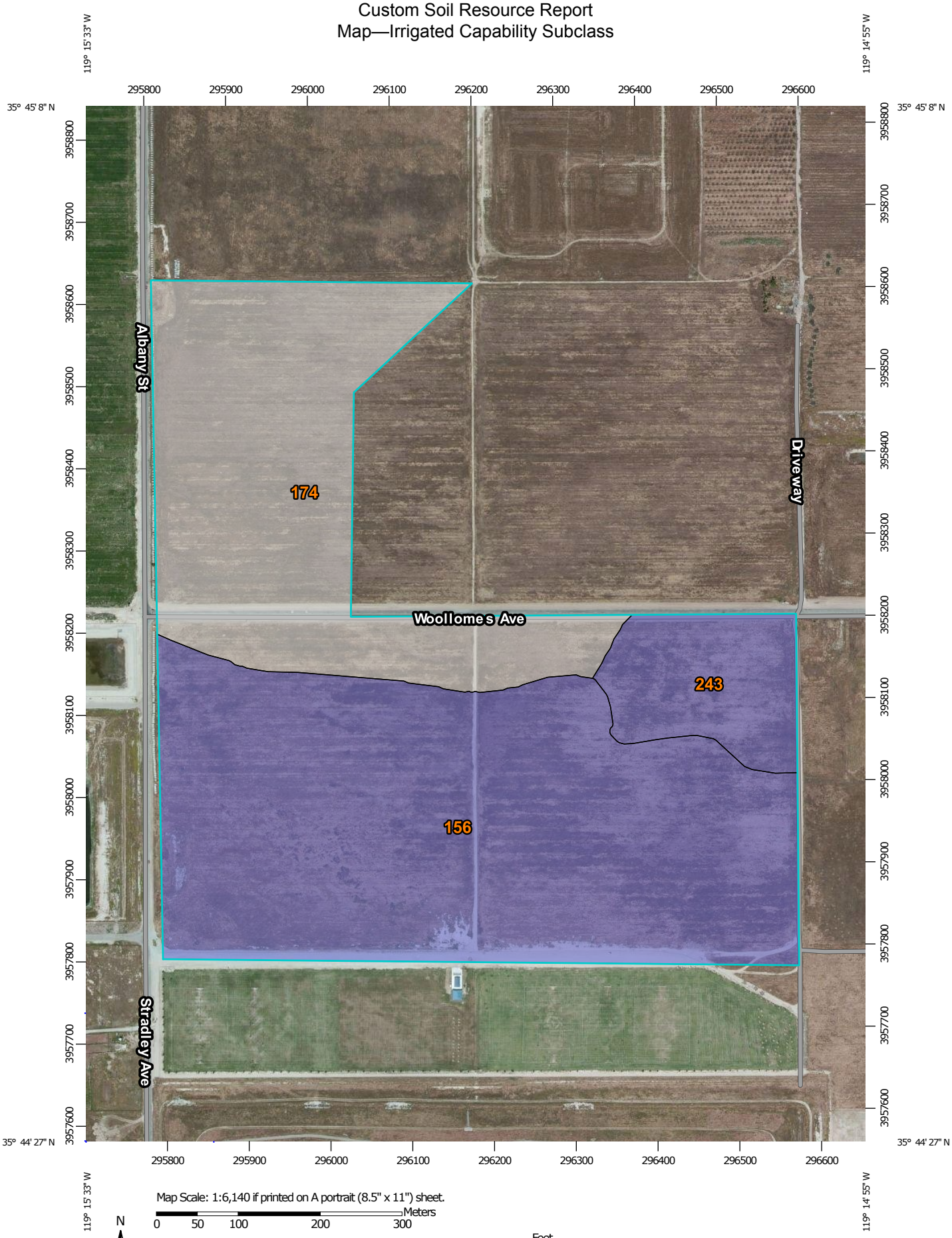
In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

Capability subclasses are soil groups within one capability class. They are designated by adding a small letter, "e," "w," "s," or "c," to the class numeral, for example, 2e. The letter "e" shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage);

"s" shows that the soil is limited mainly because it is shallow, droughty, or stony; and "c," used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by "w," "s," or "c" because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, or wildlife habitat.

# Custom Soil Resource Report
## Map—Irrigated Capability Subclass




Map Scale: 1:6,140 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Soil Rating Lines**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Soil Rating Points**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 6, Dec 7, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 7, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

### Table—Irrigated Capability Subclass

| Irrigated Capability Subclass— Summary by Map Unit — Kern County, California, Northwestern Part (CA666) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 156 | Garces silt loam | s | 62.4 | 57.5% |
| 174 | Kimberlina fine sandy loam, 0 to 2 percent slopes MLRA 17 | | 36.8 | 33.9% |
| 243 | Wasco sandy loam | s | 9.4 | 8.7% |
| **Totals for Area of Interest** | | | **108.6** | **100.0%** |

### Rating Options—Irrigated Capability Subclass

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Lower

## Nonirrigated Capability Subclass

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

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In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by "w," "s," or "c" because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, or wildlife habitat.

# Map—Nonirrigated Capability Subclass

Map Scale: 1:6,140 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Soil Rating Lines**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Soil Rating Points**

- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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# APPENDIX 4.8-A
## PHASE 1 ENVIRONMENTAL ASSESSMENT

MOORE TWINING

# PHASE I ENVIRONMENTAL SITE ASSESSMENT UPDATE

## APPROXIMATELY 77.2 ACRE PROPERTY

## ASSESSOR'S PARCEL NUMBER (APN#) 521-050-043

## DELANO, CALIFORNIA

Prepared For:

**Delano Retail Center West, LLC**
10508 Lower Azusa Road, # 201
El Monte, CA 91731

Prepared By:

**Moore Twining Associates, Inc.**
2527 Fresno Street
Fresno, California 93721

Project Number C68501.0200

July 11, 2013

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ACRONYMS

| | |
|---|---|
| AST(s) | Aboveground Storage Tank(s) |
| AWP | Annual Work Plan |
| CAL-EPA | State of California, Environmental Protection Agency |
| CERCLIS | Comprehensive Environmental Responsibility, Compensation, and Liability Information System |
| CIWMB | California Integrated Waste Management Board |
| DTSC | Department of Toxic Substances Control |
| ERNS | Emergency Response and Notification System |
| KCEHD | Kern County Environmental Health Department |
| LUST | Leaking Underground Storage Tank |
| NPL | National Priority List |
| RCRA | Resource Conservation and Recovery Act |
| RWQCB | Regional Water Quality Control Board |
| SWIS | Solid Waste Information System |
| SWRCB | State Water Resource Control Board |
| TSD | Hazardous Waste Transport, Storage, or Disposal Facilities |
| US EPA | United States Environmental Protection Agency |
| UST(s) | Underground Storage Tanks(s) |

## 1.0 INTRODUCTION

Moore Twining Associates, Inc. (MTA) was retained by Delano Retail Center West, LLC to conduct a Phase I Environmental Site Assessment (Phase I ESA) Update at the approximately 77.2 Acre property associated with Assessor's Parcel Number (APN#) 521-050-043, located near the southeastern intersection of Woollomes and Stradley Avenues, in the City of Delano and Kern County, California (Site). This Phase I ESA Update was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (Standard Designation E 1527-05), published November 2005, and in accordance with MTA's proposal to Delano Retail Center West, LLC, dated June 17, 2013.

### 1.1 Objective

The objective of this assessment was to identify recognized environmental conditions located at the Site or adjacent properties which could present material risk of harm to public health or to the environment. Recognized environmental conditions are defined in ASTM Designation E-1527 as the presence or likely presence of any hazardous wastes and/or substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

### 1.2 Scope of Services

This Phase I ESA Update was performed to evaluate the potential presence of environmental conditions that may have resulted from operations at the Site or at nearby properties. The assessment included a Site reconnaissance, review of available documentation of land-use history for evidence of the use, storage and/or disposal of hazardous substances, and a review of available regulatory information. This Phase I ESA Update included the following tasks:

- A review of the current and past uses of the Site since 1930;
- A Site reconnaissance to assess evidence of current and/or past use or storage of toxic or hazardous material; on-Site ponds, landfills, drywells, waste streams or other disposal units; visible soil discoloration; aboveground or underground storage tanks; electrical transformers containing polychlorinated biphenyls (PCBs); and drums, barrels and other storage containers;
- A visual review of adjacent properties to assess their potential to adversely impact the Site;
- A review of available federal Environmental Protection Agency (EPA), state EPA and regulatory agency lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site area.

Using area-profile services provided by Environmental Data Resources, Inc. (EDR), MTA cataloged sites in the vicinity of the Site that have been identified on regulatory agency lists. Search criteria were in conformance with ASTM Standard E 1527-05;

- Contact with relevant municipal, county and state agencies to re view readily available records and permits; and

- Preparation of this written report to present our methods, findings and conclusions.

The Scope of Services specifically excluded cultural, archeological, and biological assessments, as well as, sampling and analysis for the potential presence of asbestos containing building materials, lead based paint, or an assessment for radon gas. In addition, the Scope of Services did not include the collection and/or analysis of air, soil, groundwater, or other environmental samples.

## 1.3 Limitations and Limited Conditions

The purpose of an environmental assessment is to reasonably assess the potential for, or actual impact of, past practices on a given site which may pose an environmental impairment to the site. No assessment is thorough enough to identify all potential environmental impairments at a given site. If environmental impairments have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such conditions on the site, but rather the result of the services performed within the scope, limitations, and cost of the work performed.

The conclusions presented in this report are solely professional opinions based on information provided regarding the Site and the findings of the reconnaissance and records search. Information obtained from the aerial photographs is an interpretation of features observed in the photographs. Actual conditions at the Site may have been different from those interpreted. Conclusions presented are based on conditions as they existed at the time the work was performed. Changes in existing conditions of the Site due to time lapse, natural causes, or operations adjacent to and/or on the Site may deem conclusions presented in this Phase I ESA Update report invalid, unless the changes are reviewed and the conclusions reevaluated. Such conditions may require an additional site reconnaissance and require field exploration and laboratory testing to assess if the conclusions are applicable considering the changed conditions.

This work was performed for the sole use of our client. Any reliance on this report by a third party is at such party's sole risk. Others who seek to rely on the findings have a duty to determine the adequacy of this report for their intended use, time, and location. MTA does not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report. No other warranty, either express or implied, is made. The standard of practice is time-dependent. Services provided were performed consistent with generally-accepted professional consulting principles and practices for environmental assessors in Kern County, California at the time the work was performed. The findings and conclusions presented in this report are solely professional opinions derived in accordance with current standards of professional practice.

## 2.0 SITE DESCRIPTION

Information concerning the Site was obtained from interviews, a Site reconnaissance, and a review of the documents referenced in Section 4.0 of this report. The Site reconnaissance was conducted by Mr. Philip Marquez, an MTA representative, on June 28, 2013.

### 2.1 Location and Description of Property

The Site comprises one rectangular shaped parcel, and is located near the southeastern corner of Woollomes and Stradley Avenues, in the City of Delano and County of Kern, California. The Site has been assigned Kern County Assessor's Parcel Numbers (APN) 521-050-043. The listed owner for the Site is:

**Jennifer Lynn Westbrook, Successor Trustee, The Black Revocable Living Trust, Dated July 25, 1989**

The Site is an approximately 77.2 acre, rectangular shaped parcel, and is currently vacant property. A Site location map is presented as Drawing 1, and a Site plan, including Site boundaries, is presented as Drawing 2 in Appendix A.

### 2.2 Physical and Environmental Setting of the Site

Environmental characteristics including topography, geology, soil, and hydrogeology were evaluated based on Site observations, published literature, and maps.

#### Topography

Topographic map coverage of the Site is provided by the United States Geological Survey (USGS), Pond, California, 7.5-minute quadrangle map dated 1953, photorevised 1969, and photoinspected 1973. The Site lies within the northwest quarter of Section 23, Township 25 South, Range 25 East, Mount Diablo Baseline and Meridian. According to the map, the Site is located at an elevation of approximately 275 feet above mean sea level, and the land surface is gently sloped to the northwest. Areas to the southeast of the Site appear to be topographically upgradient.

#### Geology

The Site is located within the southern portion of the San Joaquin Valley in Kern County, California. The San Joaquin Valley is part of the Great Valley Geomorphic Province, a topographic and structural basin bounded on the east by the Sierra Nevada and to the west by the Coast Range. The Sierra Nevada, a fault block dipping gently to the southwest, is composed of igneous and metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley (USGS, 1986).

**Hydrogeology**

The depth of first encountered groundwater underlying the Site has not been assessed. According to information obtained from the California Department of Water Resources (CDWR) and the State Water Resources Control Board (SWRCB), depth to groundwater within the area of the Site is 180 feet below grade. Direction of groundwater flow is reported to be to the southwest.

**Soils**

According to the Soil Survey of Kern County, California, native soils in the vicinity of the Site are Wasco sandy loam (0 to 2 percent slopes), Garces silt loam (0 to 2 percent slopes) and Kimberlina fine sandy loam (0 to 2 percent slopes). Runoff for these soils is slow, with a slight to low potential for erosion.

## 3.0 INFORMATION FROM THE SITE RECONNAISSANCE

The objective of the Site reconnaissance was to observe the Site for specific indicators of environmental concern. The site reconnaissance included a systematic search of practically accessible areas of the Site and adjacent properties. A Site Plan depicting the Site, adjoining property use, and observed on-Site features is presented as Drawing 2 in Appendix A. Additionally, photographs were taken during the Site walk, and selected photographs of the Site are presented in Appendix B.

The Site reconnaissance was conducted on June 28, 2013 by Mr. Philip Marquez, a representative of MTA. The findings of the Site reconnaissance are summarized in the following subsections.

### 3.1 Site Reconnaissance - Description of Structures, Roads, and Other Site Improvements

The Site is located near the southeastern intersection of Woollomes and Stradley Avenues, in the City of Delano and Kern County, California. The Site is a rectangular parcel that comprises approximately 77.2 acres. The Site is currently vacant property.

### 3.2 Current Uses of the Site

The Site is currently vacant property.

### 3.3 Current Uses of the Adjoining Properties

Woollomes Avenue borders the northern edge of the Site, beyond which is vacant property. A grass-covered park and associated restroom building are observed south of the Site. Commercial development is observed east of the Site. Stradley Avenue borders the western edge of the Site, beyond which is vacant property and the "Sunset Transfer Station."

## 3.4 Site Reconnaissance - Specific Indicators of Environmental Concern

In addition to the general description of the Site, the following specific indicators of environmental concern were also evaluated for the Site.

### Hazardous Substances and Wastes

No hazardous substances or wastes were observed on the day of MTA's Site reconnaissance.

### Drums

No drums were observed on the day of MTA's Site reconnaissance.

### Potential Polychlorinatedbiphenyl (PCB) - Containing Equipment

Two (2) pole-mounted transformers were observed along the northern and western edges of the Site. The transformers, owned and operated by Southern California Edison (SCE), appeared to be in good condition and no evidence of staining, leakage, stressed vegetation, or odors was observed on the day of MTA's Site reconnaissance.

### Solid Waste

Miscellaneous debris, including concrete piping, was observed in the northeastern corner of the Site. No evidence of staining, leakage, or odors, was associated with the debris.

Several empty paint cans were observed along the western edge of the Site. No obvious evidence of staining, leakage, or odors was observed on or around the paint cans on the day of MTA's Site reconnaissance.

### Drains and Sumps

No drains or sumps were observed at the Sit on the day of MTA's Site reconnaissance.

### Other Containers

No other containers were observed on the day of MTA's Site reconnaissance.

### Wastewater

On-Site wastewater currently appears to be limited primarily to storm water runoff. However, runoff water is also believed to flow into the on-Site retention basin, located in the western portion of the Site.

**Water Wells**

One agricultural well/pump unit was observed near the previously noted retention basin.

MTA's previous assessment (Project # C68501.01, dated May 5, 2005) noted a second agricultural well/pump, located in the northeastern corner of the Site. However, this well/pump was not observed on the day of MTA's Site reconnaissance.

**Oil and Gas Wells**

No oil or gas wells were identified during the Site reconnaissance or shown on California Department of Conservation - Division of Oil and Gas maps reviewed as a part of this assessment.

**Pits, Ponds, and Lagoons**

One (1) retention basin, approximately 20 feet in width, 75 feet in length, and 5 feet in depth, was observed near the western edge of the Site, and is believed to have been on-Site since at least the late 1960's. The basin was dry on the day of MTA's Site reconnaissance. No evidence of staining, leakage, or odors was observed. According to information obtained from an interview conducted with Mr. Eugene Black, as part of MTA's previous investigation (Project # C68501.01, dated May 5, 2005), this retention basin was used to collect on-Site stormwater runoff and excess irrigation water. According to Mr. Black, the water was then pumped back to the fields for irrigation purposes using the agricultural well/pump system.

**Underground/Aboveground Storage Tanks**

No evidence for the presence or former presence of underground or aboveground storage tanks was found during the preparation of this report.

**Pipelines and Pipes of Unknown Use or Origin**

No pipes or pipelines of unknown use or origin were observed at the Site on the day of MTA's Site reconnaissance.

**Other Physical Evidence of Contamination**

No other physical evidence of contamination was observed on the day of MTA's Site reconnaissance.

## 4.0 HISTORICAL AND CURRENT INFORMATION OF THE PROPERTY AND ADJOINING PROPERTIES

The history of land-use on and near the Site was determined from interviews, review of historic aerial photographs, topographic and Sanborn maps, building permits, and historic city directories.

### 4.1 Aerial Photograph Review

Available historical aerial photographs of the Site and vicinity for the years 1946, 1956, 1967, 1972, 1984, 1994, 2005, 2009, and 2012 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. The aerial photographs were provided by Environmental Data Resources, Inc. (EDR).

*1946*

The Site appears as vacant property. No on-Site structures or features are observed.

An asphalt-paved road, believed to be Woollomes Avenue, borders the northern edge of the Site, beyond which is vacant property. Vacant property is also observed south and east of the Site. Stradley Avenue borders the western portion of the Site, beyond which is vacant property.

*1956*

The Site appears primarily vacant property. Several stormwater runoff channels are observed in the western portion of the Site.

Adjacent properties appear primarily unchanged from the 1946 aerial photograph, with the exception that several areas of ponding are observed approximately 500 feet south of the Site.

*1967*

The Site appears primarily as row crop agriculture. One (1) small pond-like feature is observed in the southwestern portion of the Site, and is believed to be the retention basin observed on the day of MTA's Site reconnaissance.

Woollomes Avenue borders the northern edge of the Site, beyond which is row crop and dry crop. Row crop agriculture borders the southern edge of the Site, beyond which are several pond-like features and vacant property. Row crop agriculture and rural residential development is observed east of the Site. Stradley Avenue borders the western edge of the Site, beyond which appears vacant property and a square shaped pond feature.

*1972-1984*

The Site and adjacent properties appear essentially unchanged from the 1967 aerial photograph.

*1994*

The Site appears as fallow field. The retention basin is still observed in the southwestern portion of the Site. A small dirt road trends through the central portion of the Site, in a north/south direction.

Adjacent properties appear essentially unchanged from the 1984 aerial photograph, with the exception that the previously noted pond-like features to the south are no longer depicted.

*2005*

The Site and adjacent properties appear essentially unchanged from the 1994 aerial photograph, with the exception of grading and discing activity observed south of the Site.

*2012*

The Site and adjacent properties appear unchanged from the 2005 aerial photograph, with the exception that a small park-like area is observed south of the Site.

## 4.2 Historical Topographic Map Review

Available historical topographic maps of the Site and vicinity for the years 1930, 1947, 1953, 1969, and 1973 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. The maps were provided by Environmental Data Resources, Inc. (EDR).

*1930-1953*

The Site and adjacent properties appear as vacant property. No on-Site structures or features are depicted.

*1969*

The Site appears primarily as vacant property, with the exception that an area of depression is depicted in the southwestern portion of the Site and is believed to be the on-Site retention basin. No other on-Site structures or features are noted.

Airport Avenue (Woollomes Avenue) borders the northern edge of the Site, beyond which is vacant property. Vacant property is also noted south and east of the Site. Stradley Avenue borders the western edge of the Site, beyond which are several rural residential and/or shed-like structures and

three (3) areas of depression.

*1973*

The Site and adjacent properties appear essentially unchanged from the 1969 aerial photograph.

### 4.3 Sanborn Fire Insurance Map Review

MTA reviewed Sanborn Fire Insurance for the City of Delano and Kern County, California. Sanborn Maps can provide historical information regarding a Site. Sanborn Fire Insurance

- Maps drawn for the City of Delano and Kern County did not include the Site or surrounding area.

### 4.4 Historical City Directory Review

City directories can provide information concerning past and current occupancy of the Site and adjacent areas. City directory information is obtained through the use of a physical address.

- Because the Site has no known physical address, information from this source was not available for review.

### 4.5 Building Permits

Building permit information can provide information concerning past and current occupancy of the Site and adjacent areas. Building permit information is obtained through the use of a physical address.

- Because the Site has no known physical address, information from this source was not available for review

### 4.6 User Provided Information

This section describes and summarizes information provided by the user that assisted in the identification of potential recognized environmental conditions (RECs) associated with the subject Site.

#### 4.6.1 Interviews with Site Representatives

MTA submitted an Environmental Questionnaire to Delano Retail Center West, LLC, Incorporated (Client). A copy of this questionnaire was filled out by Mr. Martin Hsu (Project Manager for Delano Retail Center West, LLC, Incorporated) and returned to MTA for review and inclusion into the report. A summary of

the information obtained from the questionnaire is included below. A copy of the questionnaire is included in Appendix C of this report.

- ***Mr. Martin Hsu (Delano Retail Center West, LLC Incorporated)***

  According to Mr. Hsu, the Site is currently owned by the Black Revocable Living Trust, and that the Site had been used for agricultural purposes for many years. Mr. Hsu also noted that proposed use for the Site is commercial development. To the best of Mr. Hsu's knowledge, electricity and gas is provided by Southern California Edison and Southern California Gas respectively. Mr. Hsu also believed that sewer and drinking water are currently provided by the City of Delano. Mr. Hsu had no knowledge of any chemical mixing or formulation areas associated with the Site. Nor was he aware of any generation or storage of hazardous materials and/or petroleum products being associated with the Site. Mr. Hsu had no knowledge of existing or previously existing underground or aboveground storage tanks, fueling operations, or vehicle/equipment repair areas being associated with the Site. Nor was Mr. Hsu aware of any spills, releases, incidents, or violations associated with the use and/or storage of hazardous materials or petroleum products at the Site. Mr. Hsu had no knowledge of any activity and/or land use limitations or environmental liens being associated with the Site. Nor was Mr. Hsu aware of any reasonably ascertainable information about the property that might assist the environmental professional. Mr. Hsu was also had no knowledge of obvious indicators that would point to the presence of on-Site contamination.

An interview was also conducted with Mr. Eugene Black (former property owner) as part of MTA's previous investigation, prepared in May of 2005. A summary of provided information is presented below.

- ***Mr. Eugene Black (former property owner)***

  According to the questionnaire completed by Mr. Back, indicated that he has owned and farmed the Site since 1968. Mr. Black also stated that he has leased the Site to Tillman Hay company and M.B. Farms, primarily for the growing of hay and row crop agriculture. Additionally, Mr. Black had no knowledge of any on the Site hazardous materials, storage, or disposal, or disposal areas on-Site. Further, Mr. Black had no information regarding releases, or spills of hazardous materials at the Site as a result of illegal dumping, or traffic accidents along the adjoining roadways. Further, Mr. Black had no knowledge of previous or current aboveground or underground storage tanks at the Site. Mr. Black noted that the on-Site retention basin has been present on the Site since at least the late 1960's. According to Mr. Black, the basin was used in connection with the agricultural well/pump system located on in the southwestern portion of the Site. To the best of Mr. Black's knowledge, runoff water and excess irrigation water was drained into the basin and was then pumped back onto on-Site crops for irrigation purposes.

### 4.6.2 Previous Investigations

A previous investigation, conducted by MTA (formerly Twining Laboratories, Incorporated) in May of 2005, was provided by the client for review and inclusion into the report. A summary of MTA's conclusions and recommendations are provided below. A copy of the previous investigation is included in Appendix E.

- *Because the Site has been in agricultural use, the possibility exists that Site soils may have been impacted by environmentally persistent agricultural chemicals that may have been applied to the Site in the past. Without the collection and analyses of soil samples, the impact to the Site is unknown. If the Site is to be developed for residential or commercial use in the future, it is recommended that soil samples be collected and analyzed to determine if environmentally persistent agricultural chemicals have impacted Site soils.*

- *Two agricultural water wells that are currently in use were observed on the Site during the Site reconnaissance. A water well not properly abandoned can pose an environmental concern by acting as a direct conduit for contaminants that are dumped or spilled in or near*

  *the well to impact groundwater beneath the Site. Twining recommends that if the wells are not to be used in the future, they should be properly abandoned according to California Department of Water Resources guidelines and Kern County requirements.*

No recognized environmental concerns (RECs) were identified at the time of preparation of MTA's previous investigation

### 4.6.3 Title Documentation

Title documents, including a chain of title and/or title report, can provide the environmental professional with information regarding current and past ownership and information regarding environmental liens and/or land use and limitation activities. Copies of provided title documents are included in Appendix F.

- As of June 6, 2013 title to said estate or interest is vested in Jennifer Lynn Westbrook, Successor Trustee, The Black Revocable Living Trust, dated July 25, 1989.

In addition to the above title information, a summary of relevant exceptions are summarized below.

- An easement for conduits and incidental purposes, in favor of the United States of America, recorded June 13, 1950, as Book 1696, Page 411 of Official Records.

- An easement for conduits and incidental purposes, in favor of the United States of America, recorded February 25, 1953, as Book 2054, Page 39 of Official Records.

- An easement for public highway and incidental purposes, in favor of Kern County, recorded April 3, 1957, as Book 2757, Page 381 of Official Records.

- An irrevocable offer to dedicate a portion of said land for use as a public right-of-way, in favor of the City of Delano, recorded September 14, 2005 as Instrument Number 0205251992 of Official Records.

- An easement for public utilities and incidental purposes, in favor of Southern California Edison Company, recorded January 10, 2013, as Instrument Number 0213004485 of Official Records.

No evidence of existing or formerly existing environmental liens or land activity and/or use limitations was found during MTA's review of the title documentation provided to our firm.

### 4.7 Past Uses of the Property

The Site appears to have been undeveloped since at least 1930 to sometime before 1968, when Mr. Black purchased the property. Since 1968 to present, the Site has been in agricultural use. The agricultural retention basin located on the western portion of the Site has been present on the Site since at least the late 1960's.

### 4.8 Past Uses of Adjoining Property

The adjoining properties to the north, east, and south of the Site have been in agricultural use or vacant since at least 1956 to present. The northwestern corner of the east adjoining property has been residentially developed since at least 1977 to present. The property adjoining the Site to the west beyond Stradley Avenue was developed as a transfer station sometime during the mid 1990s.

## 5.0 RECORDS REVIEW

MTA contracted Environmental Data Resources, Inc.(EDR) to perform searches of available federal, state, and local database information systems for the purpose of identifying known recognized environmental conditions present on the Site and nearby properties which have the potential to adversely impact the Site being assessed in this study. Information regarding the list, record, and permit review findings is summarized in Table 2. The complete report furnished by EDR is included in Appendix D of the report.

TABLE 1
SUMMARY OF REGULATORY LISTS SEARCHED BY EDR AND RECORDS REVIEWED

| Database | On-Site | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - ½ | ½ - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **FEDERAL ASTM STANDARD** | | | | | | | | |
| NPL | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| CERCLIS | | 0.5 | 0 | 0 | 1 | NR | NR | 1 |
| CERC-NFRAP | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| CORRACTS | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| RCRIS-TSD | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| RCRIS Lg, Quan. Gen. | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| RCRIS Sm. Quan. Gen. | | 0.25 | 0 | 1 | NR | NR | NR | 1 |
| ERNS | | 0 | NR | NR | NR | NR | NR | 0 |
| **STATE ASTM STANDARD** | | | | | | | | |
| AWP | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Cal-Sites (ENVIROSTOR) | | 1 | 0 | 0 | 0 | 1 | NR | 1 |
| CHMIRS | | 0 | NR | NR | NR | NR | NR | 0 |
| Hist Cortese | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| Notify 65 | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Toxic Pits | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| State Landfill | | 0.5 | 0 | 0 | 1 | NR | NR | 1 |
| WMUDS/SWAT | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| LUST | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| CA Bond Exp. Plan | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| UST | | 0.25 | 0 | 01 | NR | NR | NR | 0 |
| VCP | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| INDIAN LUST | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| CA FID UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| HIST UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |

NR = Not Requested (Beyond Search Distance)

## 5.1 Facilities Identified in the Regulatory Lists and Record Review

The information regarding the following facilities was obtained from the EDR report. A request to review files for the Site and adjacent properties were also submitted to the Kern County Department of Public Health (KCDPH), Regional Water Quality Control Board (RWQCB), and the Department of Toxic Substance Control (DTSC). Available files were reviewed at the offices of each respective agency. In addition, MTA reviewed available information from the RWQCB's "Geotracker" and the DTSC's "ENVIROSTOR" web sites (http://geotracker.waterboards.ca.gov/ and http://www.envirostor.dtsc.ca.gov/public/ respectively).

**ON-SITE**

- A review of available information from the above referenced agencies, revealed no reported releases, spills, incidents, or violations associated with the Site (APN# 521-050-043).

**OFF-SITE**

- **Kern County Dump-McFarland-Delano Sanitary Landfill (MDSL)** is located approximately 300 feet south of the Site. This facility is listed within the Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and Facility Index System (FINDS) databases. According to information obtained from the RWQCB, this facility was a class III landfill that operated between 1972 and 1992. Initial groundwater monitoring at the facility was conducted in 1986. This monitoring revealed concentrations of benzene, vinyl chloride, 1,4 dichlorbenzene, tetrachloroethene, and methylene chloride at concentrations reported to be above laboratory practical quantitative limits. This monitoring is reported to have been continued until 1996. According to information obtained from the EDR report and the RWQCB, this facility received closed from the RWQCB in June 1996. However, "Post Closure Maintenance" has been ongoing since that time. Monitoring activity has been conducted by the Kern County Waste Management Department (KCWMD). The most recent round of monitoring was conducted in March of 2013. The results were reported in KCWMD's "Monitoring Report for McFarland-Delano Sanitary Landfill, 1st Quarter 2013," dated May 2013. According to information obtained from this report, groundwater at the facility flows cross-gradient to the Site, and that the closest monitoring well is located approximately 150 feet south of the Site (MD1-26). This well is reported to have been installed in 2001 and has been non-detect for all analyzed constituents of concern since that

time. Due to the relative distance of this facility to the Site, because groundwater flow at the Site is reported to be cross-gradient to the facility, and because no detections of constituents of concern have been detected in the closest monitoring well to the Site (MD1-26), the current potential impact to the Site appears to be low. However, if a release from this facility were to impact the Site, the responsible party would typically be responsible for cleanup.

- **Sunset/McFarland-Delano Transfer Station**, located approximately 500 feet west of the Site, appears on the SWF/LF database due to its status as a transfer station. According to information obtained from the KCDPH, the transfer station receives municipal waste from the cities of Delano and McFarland. The waste is compacted at the transfer station and transported to the Shafter landfill. There are no reported releases, spills, incidents, or violations associated with this facility. Due to the relative distance of this facility to the Site, and because there are no reported releases, spills, incidents, or violations, the current potential impact to the Site from this facility appears to be low. However, it should be noted that this facility is an active transfer station. If a release from this facility were to impact the Site, the responsible party would typically be responsible for cleanup.

Based upon the status, distance, and/or direction of groundwater flow, the remaining listed facilities are not considered to pose an environmental concern to the Site.

### 5.2 Institutional and Engineering Controls/Land Use Limitations/Environmental Liens

Information regarding institutional and engineering controls was obtained from the EDR report, interviews with property owners, and MTA's Site reconnaissance. Institutional and Engineering Controls can indicate the current and/or historical presence of recognized environmental conditions that required remedial activity at the Site.

- No evidence of on-Site institutional and/or engineering controls, land use limitations, or environmental liens were observed during our Site Reconnaissance or reported in the EDR report. In addition, the client did not have any knowledge of these items.

## 6.0 SUMMARY OF FINDINGS

The findings of the Phase I ESA Update are summarized in the following sections:

### 6.1 On-Site

The Site appears to have been undeveloped since at least 1930 to sometime before 1968, when Mr. Black purchased the property. Since 1968 to present, the Site has been in agricultural use. The agricultural retention basin located on the western portion of the Site has been present on the Site since at least the late 1960's.

- One (1) retention basin, approximately 20 feet in width, 75 feet in length, and 5 feet in depth, was observed near the western edge of the Site, and is believed to have been on-Site since at least the late 1960's. The basin was dry on the day of MTA's Site reconnaissance. No evidence of staining, leakage, or odors was observed. According to information obtained from an interview conducted with Mr. Eugene Black, as part of MTA's previous investigation (Project # C68501.01, dated May 5, 2005), this retention basin was used to collect on-Site stormwater runoff and excess irrigation water. According to Mr. Black, the water was then pumped back to the fields for irrigation purposes using the agricultural well/pump system.

- One agricultural well/pump unit was observed near the retention basin on the day of MTA's Site reconnaissance. MTA's previous assessment also noted a second agricultural well/pump, located in the northeastern corner of the Site. However, this well/pump was not observed on the day of MTA's Site reconnaissance.

- Miscellaneous debris, including concrete piping, was observed in the northeastern corner of the Site. Several empty paint cans were also observed along the western edge of the Site. No obvious evidence of staining, leakage, or odors was observed on or around any of these items on the day of MTA's Site reconnaissance.

- Two (2) pole-mounted transformers were observed along the northern and western edges of the Site. The transformers, owned and operated by Southern California Edison (SCE), appeared to be in good condition and no evidence of staining, leakage, stressed vegetation, or odors was observed on the day of MTA's Site reconnaissance.

## 6.2 Off-Site

The adjoining properties to the north, east, and south of the Site have been in agricultural use or vacant since at least 1956 to present. The northwestern corner of the east adjoining property has been

residentially developed since at least 1977 to present. The property adjoining the Site to the west beyond Stradley Avenue was developed as a transfer station sometime during the mid 1990s.

- **Kern County Dump-McFarland-Delano Sanitary Landfill (MDSL)**, is located approximately 300 feet south of the Site. This facility is listed within the Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and Facility Index System (FINDS) databases.

- **Sunset/McFarland-Delano Transfer Station**, located approximately 500 feet west of the Site, appears on the SWF/LF database due to its status as a transfer station.

### 6.3 Data Gaps

Data gaps are described as a lack of or inability to obtain information required by the standards and practices listed in ASTM E 1527-05, despite good faith efforts by the environmental professional or prospective landowner.

- No data gaps were encountered during the preparation of this assessment.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

On behalf of Delano Retail Center West, LLC, Incorporated, MTA performed a Phase I Environmental Site Assessment Update in conformance with the scope and limitations of ASTM Practice E 1527 for the approximately 77.2-acre property located near the southeastern corner of Woollomes and Stradley Avenue, within the City of Delano and County of Kern, California. The Phase I ESA update was performed during July of 2013. This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection. However, the following potential concerns were identified during preparation of this assessment.

**ON-SITE**

- One (1) retention basin, approximately 20 feet in width, 75 feet in length, and 5 feet in depth, was observed near the western edge of the Site, and is believed to have been on-Site since at least the late 1960's. The basin was dry on the day of MTA's Site reconnaissance. No evidence of staining, leakage, or odors was observed. According to information obtained from an interview conducted with Mr. Eugene Black, as part of MTA's previous investigation (Project # C68501.01, dated May 5, 2005), this retention basin was used to collect on-Site stormwater runoff and excess irrigation water. According to Mr. Black, the water was then pumped back to the fields for irrigation purposes using the agricultural well/pump system. Because the Site has historically been used for agricultural purposes, MTA recommends that soil sampling for environmentally persistent pesticides be conducted throughout the Site, including within the on-Site retention basin.

- Two agricultural water wells are reported to be associated with the Site. One (1) of these wells was observed near the retention basin on the day of MTA's Site reconnaissance. A second well was reported to have been located in the northeastern portion of the Site as part of MTA's previous investigation. This well was not observed during preparation of this update report. However, a water well not properly abandoned can pose an environmental concern by acting as a direct conduit for contaminants that are dumped or spilled in or near the well to impact groundwater beneath the Site. Therefore, MTA recommends that if the wells are not to be used in the future, they should be abandoned and removed in accordance with all local, state, and federal guidelines.

- Subsurface irrigation lines are believed to be located at the Site as part of historical irrigation purposes. It was historically common for these pipelines to contain asbestos (i.e., Transite pipe). Subsurface exploration is not part of typical Phase I Environmental Site Assessment scope of work. In the event that subsurface structures are encountered during development or excavation of the Site, care should be exercised in determining whether or not the subsurface structures contain asbestos. If they contain asbestos, they should be removed, handled, transported, and disposed of in accordance with applicable local, county and state regulations.

- Miscellaneous debris, including concrete piping, was observed in the northeastern corner of the Site. Several empty paint cans were also observed along the western edge of the Site. No obvious evidence of staining, leakage, or odors was observed on or around any of these items on the day of MTA's Site reconnaissance. However, MTA recommends that this debris and paint cans be removed and disposed of in accordance with local, state, and federal guidelines. If any evidence of staining, leakage, or odors is encountered during removal, the signatories of this report should be notified.

**OFF-SITE**

- **Sunset/McFarland-Delano Transfer Station,** located approximately 500 feet west of the Site, appears on the SWF/LF database due to its status as a transfer station. According to information obtained from the KCDPH, the transfer station receives municipal waste from the cities of Delano and McFarland. The waste is compacted at the transfer station and transported to the Shafter landfill. There are no reported releases, spills, incidents, or violations associated with this facility. Due to the relative distance of this facility to the Site, and because there are no reported releases, spills, incidents, or violations, the current potential impact to the Site from this facility appears to be low. However, it should be noted that this facility is an active transfer station. If a release from this facility were to impact the Site, the responsible party would typically be responsible for cleanup.

## 8.0 CLOSING

Moore Twining Associates, Inc. performed a Phase I Environmental Site Assessment Update in conformance with the scope and limitations of ASTM Practice E 1527-05 for the subject Site. Any exceptions to, or deletions from, this practice are described in the following paragraph.

The material content of this report is intended to be consistent with a standard of practice as defined by ASTM practice E 1527-05. However, the report format differs in style, arrangement, and presentation of material facts from the format described by ASTM.

We appreciate the opportunity to be of service to you on this project. If you have questions regarding this report, please feel free to contact us at (800) 268-7021.

Sincerely,
**MOORE TWINING ASSOCIATES, INC.**
Environmental Services Division

Philip M Marquez
Phase I Supervisor/Environmental Professional

*" I declare that, to the best of my knowledge and belief, I meet the definition of Environmental Professional. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."*

## 9.0 REFERENCES


American Society for Testing and Materials, 2005, *ASTM Standards on Environmental Site Assessments for Commercial Real Estate*, 2nd ed., E 1527-05, Philadelphia, Pennsylvania.

Moore Twining Associates, Inc., *Phase I Environmental Site Assessment, Southeast Corner of the Intersection of Woollomes Avenue and Stradley Avenue, Delano, CA*, dated May 2005.

Munger, Averill H., Ed. 1994. *Munger Map Book, California-Alaska Oil and Gas Fields*. Munger: Los Angeles, California.

United States Geological Survey, 1973, Pond, California Quadrangle, 7.5 Minute Series Topographic Map.

John Wiley and Sons, Incorporated, 1976, *Geology of California*, Robert Norris and Robert W. Webb.

## 10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

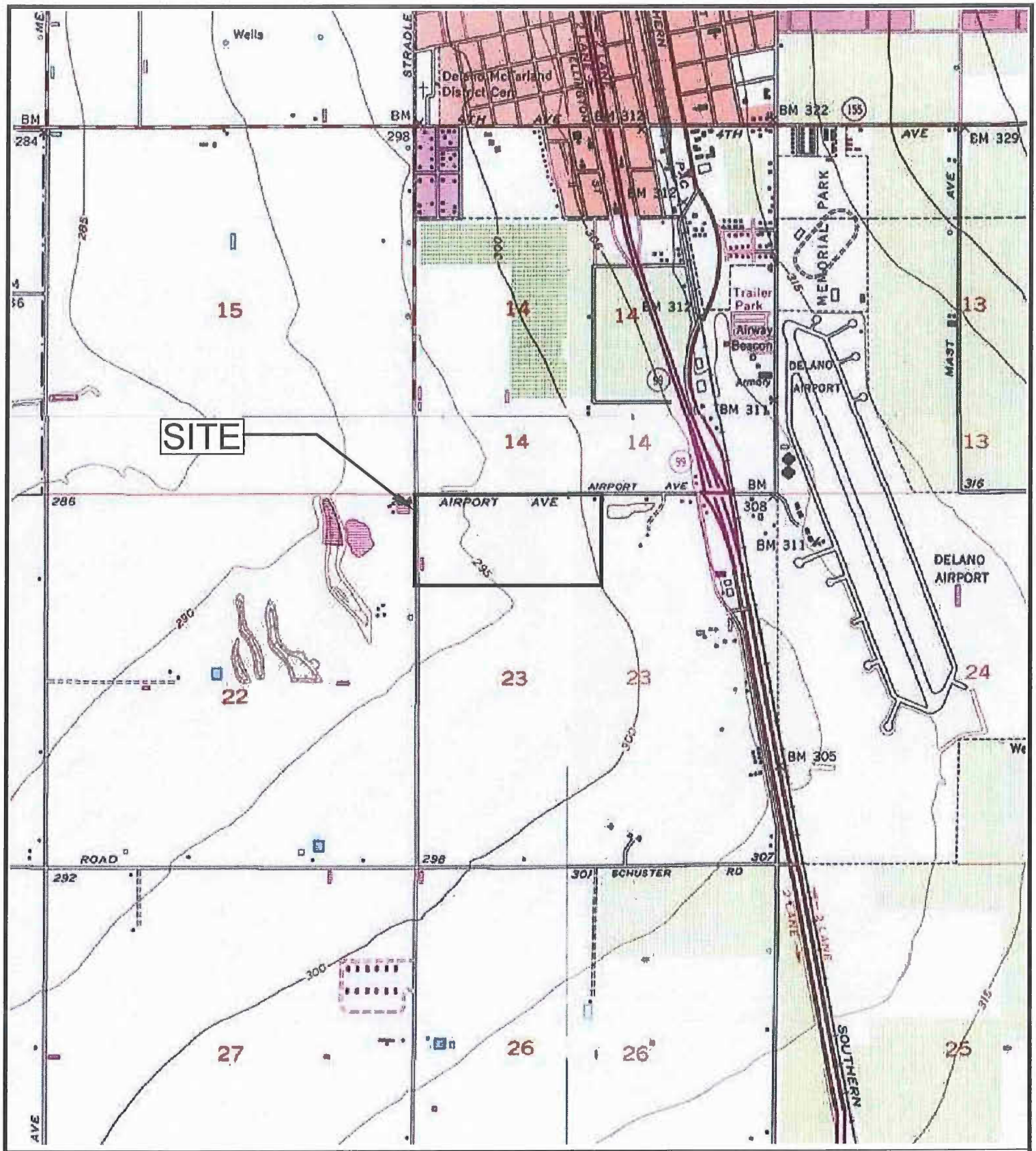
**Moore Twining Associates, Inc.** Phase I Environmental Site Assessment staff is composed of a group of environmental professionals that perform Environmental Site Assessments on a routine basis. The Phase I staff is managed and supervised by individuals who conduct, prepare, oversee, and/or review Environmental Site Assessments on a daily basis. Qualification profiles for these individuals are provided in the following section.

**Philip M. Marquez**
Supervisor - Phase I Environmental Site Assessments

Mr. Marquez has twelve years of experience conducting Phase I environmental site assessments and natural resource monitoring including biological resources and wetlands. Mr. Marquez has conducted environmental site assessments for a number of different project types including canning facilities, pesticide production facilities, shopping centers, gas stations, hospitals, school sites, and agricultural sites.

# APPENDIX A

## DRAWINGS



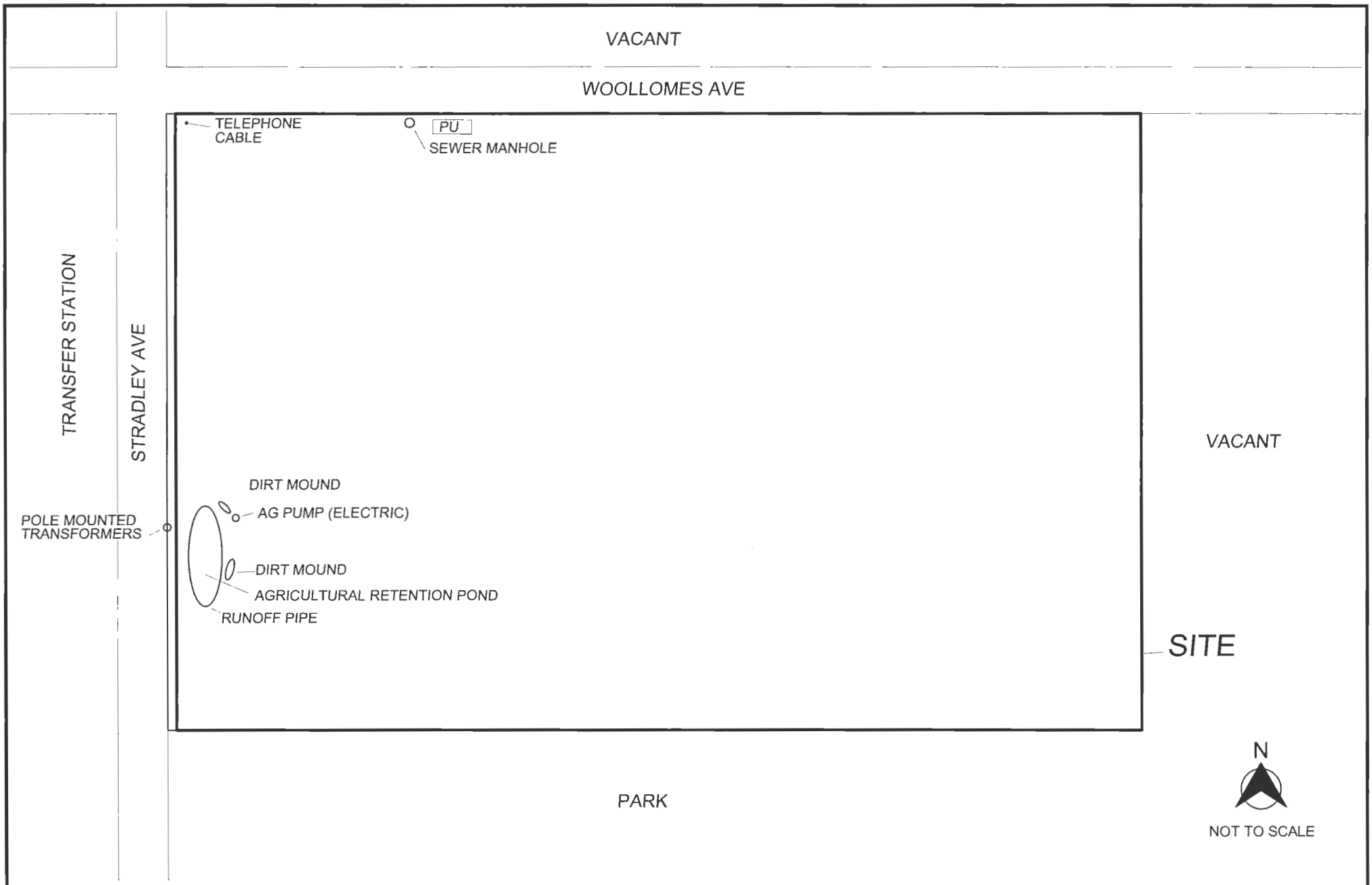

SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
DELANO WEST, CALIFORNIA QUADRANGLE, PHOTOREVISED 1969

0 2000
APPROXIMATE SCALE IN FEET

SITE LOCATION MAP
SEC OF WOOLLOMES AND STRADLEY AVENUES
DELANO, CALIFORNIA

| | |
|---|---|
| FILE NO.: 3913-0516 A | DATE: 07/12/13 |
| DRAWN BY: RM | APPROVED BY: |
| PROJECT NO. MTP 3913-0516 | DRAWING NO. 1 |

MOORE TWINING ASSOCIATES, INC.




SITE PLAN
SEC OF WOOLLOMES AND STRADLEY AVENUES
DELANO, CALIFORNIA

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| FILE NO. 3913-0516 | DATE DRAWN: 07/12/13 |
| DRAWN BY: RM | APPROVED BY: |
| PROJECT NO. MTP 3913-0516 | DRAWING NO. 2 |

MOORE TWINING

# APPENDIX B

## SITE PHOTOGRAPHS

**PHOTOGRAPH 1**

Site overview, looking west, from the eastern portion of the Site.

**PHOTOGRAPH 2**

Site overview, looking east from the western portion of the Site.

**PHOTOGRAPH 3**

Agricultural well/pump unit and retention basin, located in the southwestern portion of the Site.

**PHOTOGRAPH 4**

Empty paint cans, observed along the southern edge of the Site

**PHOTOGRAPH 5**

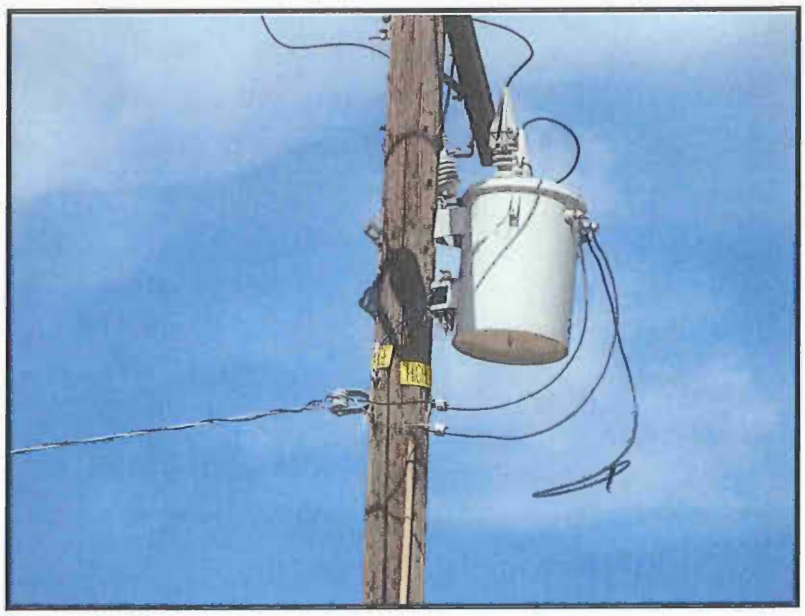
Public utility vault, observed along the northern edge of the Site.

**PHOTOGRAPH 6**

Concrete debris, located in the northeastern corner of the Site.

**PHOTOGRAPH 7**

Pole-mounted transformer, observed along the western edge of the Site.



**PHOTOGRAPH 8**

Woollomes Avenue, bordering the northern edge of the Site.

**PHOTOGRAPH 9**

Adjacent property, located south of the Site.

# APPENDIX C

# ENVIRONMENTAL QUESTIONNAIRE

# ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT

GENERAL INSTRUCTIONS: Please fill-in the blanks to the best of your ability. If you do not know the answer, please check the "DON'T KNOW" box. If you answer "YES" or the answer requires explanation please use additional pages and reference the table. Thank you, for your time and cooperation.

| SITE INFORMATION | |
|---|---|
| Current Site Address | Woollomes Ave, Delano CA |
| Current Site Use | Vacant |
| Current Site Zoning | Agricultural |
| Current Assessor's Parcel Number | 521-040-43 |
| Addresses Formerly Assigned to Site (if any) | |

| SITE OWNERSHIP AND PAST USE | | |
|---|---|---|
| OWNER NAME, ADDRESS & PHONE # | PERIOD OF OWNERSHIP/USE | TYPE OF USE |
| CURRENT The Black Revocable Living Trust | N/A. | |
| FORMER | | |
| FORMER | | |

| ADJACENT PROPERTY USE | | |
|---|---|---|
| DIRECTION | TYPE OF USE | LENGTH OF USE |
| North | Future commercial development | 3-5 yrs |
| East | Developing commercial plaza | 7 yrs |
| South | Vacant | N/A |
| West | City drainage & landfill | N/A |

| PRIOR FACILITY MANAGER'S NAME | |
|---|---|
| Contact Person | N/A. |
| Address | |
| Telephone | |

| EXISTING SITE STRUCTURES | | | |
|---|---|---|---|
| STRUCTURE DESCRIPTION | LOCATION | USE | DATE OF CONSTRUCTION |
| N/A. | | | |
| | | | |
| | | | |

| FORMER SITE STRUCTURES | | | |
|---|---|---|---|
| STRUCTURE DESCRIPTION | FORMER LOCATION | USE | DATE OF DEMOLITION |
| N/A. | | | |
| | | | |

| SITE LESSEES | | |
|---|---|---|
| NAME, ADDRESS & PHONE # | LENGTH/YEARS OF LEASE | TYPE OF USE |
| PRESENT: N/A. | | |
| FORMER: | | |
| FORMER: | | |

| SITE UTILITIES | |
|---|---|
| UTILITY | PROVIDER |
| Electricity | SCE |
| Natural Gas | So Cal Gas |
| Drinking Water | City of Delano |
| Storm water Drainage | Landowner |
| Solid Waste Disposal | Unknown |
| Sanitary Sewer | City of Delano |
| Emergency Power Source | None |

************ PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS *********
***Additional space is provided on page 7***

| # | SPECIFIC USES OF SITE AND ADJACENT PROPERTY* | SITE | | | ADJACENT | | |
|---|---|---|---|---|---|---|---|
| | | YES | NO | DON'T KNOW | YES | NO | DON'T KNOW |
| 1A | Agricultural chemical formulation, distribution, or application | | ✓ | | | ✓ | |
| 2A | Airport and/or airplane maintenance | | ✓ | | | ✓ | |
| 3A | Automotive wrecking yard | | ✓ | | | ✓ | |
| 4A | Bulk chemical or fuel storage | | ✓ | | | ✓ | |
| 5A | Commercial printing | | ✓ | | | ✓ | |
| 6A | Dry cleaning | | ✓ | | | ✓ | |
| 7A | Landfill | | ✓ | | | | ✓ |
| 8A | Metal plating or finishing | | ✓ | | | ✓ | |
| 9A | Mining or minerals processing | | ✓ | | | ✓ | |
| 10A | Motor vehicle or equipment repair and/or maintenance | | ✓ | | | ✓ | |
| 11A | Photographic laboratory | | ✓ | | | ✓ | |
| 12A | Service station | | ✓ | | | ✓ | |
| 13A | Railroad tracks or railroad spurs | | ✓ | | | ✓ | |
| 14A | Skeet shooting or gun club | | ✓ | | | ✓ | |
| 15A | Releases, or spills of hazardous materials as a result of illegal dumping, or traffic accidents along the adjoining roadways. | | | ✓ | | ✓ | |
| 16A | Waste treatment, storage, disposal, processing or recycling, other than a landfill. | | ✓ | | | ✓ | |

* "Adjacent Property" includes those properties that border the immediate site and properties located across the street from the site.

********** ***PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS*** **********
***Additional space is provided on page 7***

| # | ON-SITE HAZARDOUS MATERIALS USE, STORAGE AND DISPOSAL | YES | NO | DON'T KNOW |
|---|---|---|---|---|
| 1B | Are asbestos-containing materials present in on-site structures? | | ✓ | |
| 2B | Has an asbestos survey been conducted for on-site structures? | | ✓ | |
| 3B | Are any electrical transformers or capacitors on-site? | ✓ | | |
| 4B | Are any electrical transformers or capacitors on-site **not** owned by an electrical utility? | | ✓ | |
| 5B | Has an Environmental Audit or Assessment been conducted for the site? | ✓ | | |
| 6B | Do you know of any current or former aboveground storage tanks? | | ✓ | |
| 7B | Do you know of any current or former underground storage tanks (not septic)? | | ✓ | |
| 8B | Are there currently, or have there been in the past, any plastic or metal drums (ranging from 5 to 55-gallons) stored on-site? | | | ✓ |
| 9B | Do you know of any fill dirt having been imported to the site? | | | ✓ |
| 10B | Do you know of any current or former wells on site, including, domestic drinking water, irrigation water, disposal, oil and/or abandoned wells? | | | ✓ |
| 11B | Do you know of any pesticides/herbicides permits for the site? | | | ✓ |
| 12B | Do you know of any pesticides/herbicides stored or used on-site? | | | ✓ |
| 13B | Are solvents, petroleum products, or paint products stored on-site? | | | ✓ |
| 14B | Are you aware of any areas of obvious staining currently or previously existing on-site? | | ✓ | |
| 15B | Are you aware of any permits having been issued for the site by the local fire, environmental health, or air pollution control agencies? | | ✓ | |

********** ***PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS*** **********
***Additional space is provided on page 7***

| # | SITE WASTE GENERATION, STORAGE AND DISPOSAL | YES | NO | DON'T KNOW |
|---|---|---|---|---|
| 1C | Is liquid waste disposed of to a septic tank on-site? | | ✓ | |
| 2C | Is liquid waste disposed of elsewhere on-site? | | ✓ | |
| 3C | Are any ponds, sumps, basins, lagoons, or clarifiers used on-site to collect, treat, or dispose of liquid? | | ✓ | |
| 4C | If liquid waste is disposed of on-site, is a waste discharge permit required? | | | ✓ |
| 5C | Is liquid waste disposed of to an off-site treatment works or licensed hazardous waste materials company? | | | ✓ |
| 6C | Is solid waste disposed of on-site (burned or buried)? | | | ✓ |
| 7C | Does any solid or liquid off-site waste disposal require a waste manifest or disposal permit? | | | ✓ |
| 8C | Is any hazardous waste generated, stored, or treated on-site? | | | ✓ |
| 9C | Are any spills or releases of hazardous materials known or suspected to have occurred at the site? | | ✓ | |
| 10C | Is there another individual who may have additional or more complete information regarding the former use and activities at the site? | | | ✓ |

Please provide details of any investigations of an environmental or geotechnical nature that have been performed by you or by others related to the subject property. If you are not aware of any investigation(s) that have been performed in the past regarding the subject property, whether or not a report was ever prepared and/or issued to you, please so state in the space below.

- Biota Report 9/1/2005
- Phase I ESA 5/5/2005
- Cultural Resources Assessmt 8/1/2005
- Soils Report 7/1/2005
- Neg. Dec. Draft 7/5/2007

Please provide details of any conditions known to you that could represent an environmental impairment to the subject property other than those items previously noted in this questionnaire. If you are not aware of any conditions, please so state in the space below.

None

To your knowledge, has the property been subject to any regulatory action related to environmental conditions, whether or not a report was issued to you or filed with a regulatory agency. If you are not aware of any actions, please so state in the space below.

No

***PLEASE INDICATE IN THE BOXES BELOW IF THE FOLLOWING ITEMS EXIST AND IF YOU ARE ABLE TO PROVIDE THEM***
***Additional space is provided on page 7***

| | DOCUMENTS, REPORTS, LISTS, PLANS AND MAPS | Exists/Will Provide Copy | Exists/Will Not Provide Copy | Does Not Exist | Don't Know |
|---|---|---|---|---|---|
| 1D | Site plans and/or maps that include legal property boundaries | ✓ | | | |
| 2D | Building plans (architectural, utilities and structural) | | | ✓ | |
| 3D | Hazardous materials inventory | | | ✓ | |
| 4D | Hazardous waste inventory | | | ✓ | |
| 5D | Previously conducted Environmental Site Assessments | ✓ | | | |
| 6D | Reports of subsurface investigations performed on the site including analytical data | | | ✓ | |
| 7D | Reports of subsurface investigations performed on adjacent properties including analytical data | ✓ | | | |
| 8D | Previously conducted geotechnical/ soil investigations at the Site | | | ✓ | |
| 9D | Permits and location of USTs, sumps, pits, and drainage systems | | | | ✓ |
| 10D | Environmental permits and plans, including hazardous materials management plans, UST closure, etc. | | | | ✓ |
| 11D | Agricultural Chemical Permits | | | | ✓ |
| 12D | Literature or other sources of information regarding operations at the site | | | | ✓ |
| 13D | Individual who may have additional or more complete information regarding uses and activities at the site | | | | ✓ |

Questions per ASTM E 1527-05:

1. Have any environmental cleanup liens been filed or recorded against the Site?

   No.

2. Do you have knowledge of any activity and/or land use limitations that are in place on the Site or that have been filed or recorded in a registry?

   Don't know.

3. As the user of this Environmental Site Assessment (ESA) do you have any specialized knowledge related to the Site or activities at adjacent properties?

   Yes. We are the developer for adjacent sites to the north and east of subject land.

4. Does the purchase price being paid for the Site reasonably reflect the fair market value? If you conclude that there is a difference, have you considered whether the lower price is because contamination is known or believed to be present at the Site?

   Confidential.

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

   No.

6. As the user of this ESA, based on your knowledge and experience related to the Site, are there any obvious indicators that point to the presence of on Site contamination?

   No.

***PLEASE PROVIDE DETAILED INFORMATION FOR YES ANSWERS TO QUESTIONS (1A-15A), (1B-13B), (1C-10C)***

***ADDITIONALLY, PLEASE PROVIDE AN EXPLANATION WHY YOU ARE UNABLE TO PROVIDE (1D-13D) IF THEY EXIST***

N/A.

**THIS ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT WAS PREPARED BY:**

**NAME** Martin Hsu **TITLE** Project Manager

**FIRM** YK America Group, Inc **RELATIONSHIP TO SITE** User/Developer

**ADDRESS** 10508 Lower Azusa Rd. # 200
El Monte, CA 91731

**TELEPHONE NUMBER** 626-444-6668 **DATE** 7/2/13

**PREPARER REPRESENTS THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE THE ABOVE STATEMENTS AND FACTS ARE TRUE AND CORRECT AND THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE NO MATERIAL FACTS HAVE BEEN SUPPRESSED OR MISSTATED UNDER PENALTY OF PURGERY BY LAW.**

Signed

7/2/13
Date

# APPENDIX D

# EDR REPORT

**Proposed Shopping Center**
Woollomes Avenue/Stradley Avenue
Delano, CA 93215

Inquiry Number: 03647469.2r
June 25, 2013

# The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

FORM-YAR-LMI

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***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

## TARGET PROPERTY INFORMATION

### ADDRESS

WOOLLOMES AVENUE/STRADLEY AVENUE
DELANO, CA 93215

### COORDINATES

| | |
|---|---|
| Latitude (North): | 35.7451000 - 35° 44' 42.36" |
| Longitude (West): | 119.2540000 - 119° 15' 14.40" |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 296179.0 |
| UTM Y (Meters): | 3957820.0 |
| Elevation: | 298 ft. above sea level |

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

| | |
|---|---|
| Target Property Map: | 35119-F3 POND, CA |
| Most Recent Revision: | 1973 |
| North Map: | 35119-G3 DELANO WEST, CA |
| Most Recent Revision: | 1969 |
| Northeast Map: | 35119-G2 DELANO EAST, CA |
| Most Recent Revision: | 1969 |
| East Map: | 35119-F2 MCFARLAND, CA |
| Most Recent Revision: | 1969 |

### AERIAL PHOTOGRAPHY IN THIS REPORT

| | |
|---|---|
| Photo Year: | 2012 |
| Source: | USDA |

### TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

# EXECUTIVE SUMMARY

**DATABASES WITH NO MAPPED SITES**

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

**STANDARD ENVIRONMENTAL RECORDS**

***Federal NPL site list***

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

***Federal Delisted NPL site list***

Delisted NPL..... National Priority List Deletions

***Federal CERCLIS list***

FEDERAL FACILITY..... Federal Facility Site Information listing

***Federal CERCLIS NFRAP site List***

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

***Federal RCRA CORRACTS facilities list***

CORRACTS..... Corrective Action Report

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

***Federal RCRA generators list***

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls
LUCIS..... Land Use Control Information System

***Federal ERNS list***

ERNS..... Emergency Response Notification System

***State- and tribal - equivalent NPL***

RESPONSE..... State Response Sites

***State and tribal leaking storage tank lists***

LUST..... Geotracker's Leaking Underground Fuel Tank Report

SLIC..... Statewide SLIC Cases
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

***State and tribal registered storage tank lists***

UST..... Active UST Facilities
AST..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

***State and tribal voluntary cleanup sites***

VCP..... Voluntary Cleanup Program Properties
INDIAN VCP..... Voluntary Cleanup Priority Listing

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS..... A Listing of Brownfields Sites

***Local Lists of Landfill / Solid Waste Disposal Sites***

ODI..... Open Dump Inventory
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL..... Clandestine Drug Labs
HIST Cal-Sites..... Historical Calsites Database
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

***Local Lists of Registered Storage Tanks***

CA FID UST..... Facility Inventory Database
HIST UST..... Hazardous Substance Storage Container Database
SWEEPS UST..... SWEEPS UST Listing

***Local Land Records***

LIENS 2..... CERCLA Lien Information
LIENS..... Environmental Liens Listing
DEED..... Deed Restriction Listing

***Records of Emergency Release Reports***

HMIRS..... Hazardous Materials Information Reporting System

# EXECUTIVE SUMMARY

| | |
|---|---|
| CHMIRS | California Hazardous Material Incident Report System |
| LDS | Land Disposal Sites Listing |
| MCS | Military Cleanup Sites Listing |
| SPILLS 90 | SPILLS 90 data from FirstSearch |

***Other Ascertainable Records***

| | |
|---|---|
| RCRA NonGen / NLR | RCRA - Non Generators |
| DOT OPS | Incident and Accident Data |
| DOD | Department of Defense Sites |
| FUDS | Formerly Used Defense Sites |
| CONSENT | Superfund (CERCLA) Consent Decrees |
| ROD | Records Of Decision |
| UMTRA | Uranium Mill Tailings Sites |
| US MINES | Mines Master Index File |
| TRIS | Toxic Chemical Release Inventory System |
| TSCA | Toxic Substances Control Act |
| FTTS | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) |
| HIST FTTS | FIFRA/TSCA Tracking System Administrative Case Listing |
| SSTS | Section 7 Tracking Systems |
| ICIS | Integrated Compliance Information System |
| PADS | PCB Activity Database System |
| MLTS | Material Licensing Tracking System |
| RADINFO | Radiation Information Database |
| FINDS | Facility Index System/Facility Registry System |
| RAATS | RCRA Administrative Action Tracking System |
| RMP | Risk Management Plans |
| CA BOND EXP. PLAN | Bond Expenditure Plan |
| UIC | UIC Listing |
| NPDES | NPDES Permits Listing |
| Cortese | "Cortese" Hazardous Waste & Substances Sites List |
| HIST CORTESE | Hazardous Waste & Substance Site List |
| CUPA Listings | CUPA Resources List |
| Notify 65 | Proposition 65 Records |
| DRYCLEANERS | Cleaner Facilities |
| WIP | Well Investigation Program Case List |
| ENF | Enforcement Action Listing |
| HAZNET | Facility and Manifest Data |
| EMI | Emissions Inventory Data |
| INDIAN RESERV | Indian Reservations |
| SCRD DRYCLEANERS | State Coalition for Remediation of Drycleaners Listing |
| COAL ASH DOE | Steam-Electric Plant Operation Data |
| COAL ASH EPA | Coal Combustion Residues Surface Impoundments List |
| HWT | Registered Hazardous Waste Transporter Database |
| HWP | EnviroStor Permitted Facilities Listing |
| Financial Assurance | Financial Assurance Information Listing |
| LEAD SMELTERS | Lead Smelter Sites |
| 2020 COR ACTION | 2020 Corrective Action Program List |
| US AIRS | Aerometric Information Retrieval System Facility Subsystem |
| PRP | Potentially Responsible Parties |
| WDS | Waste Discharge System |
| EPA WATCH LIST | EPA WATCH LIST |
| US FIN ASSUR | Financial Assurance Information |
| PCB TRANSFORMER | PCB Transformer Registration Database |

# EXECUTIVE SUMMARY

PROC..... Certified Processors Database
MWMP..... Medical Waste Management Program Listing

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

EDR MGP..... EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat..... EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners..... EDR Exclusive Historic Dry Cleaners

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal CERCLIS list***

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 02/04/2013 has revealed that there is 1 CERCLIS site within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| *KERN COUNTY DUMP* | *WOOLOMES RD* | *WNW 1/4 - 1/2 (0.342 mi.)* | *4* | *13* |

***Federal RCRA generators list***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 02/12/2013 has revealed that there is 1

RCRA-SQG site within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| *HOME DEPOT USA INC HD 8426* | *601 WOOLLOMES AVE* | *NNE 1/8 - 1/4 (0.142 mi.)* | *1* | *8* |

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 05/06/2013 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| *WESTERN FARM SERVICES - CENTRA*<br>Status: Refer: Other Agency | *930 WOOLOMES ROAD* | *E 1/2 - 1 (0.647 mi.)* | *5* | *16* |

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, and dated 05/20/2013 has revealed that there are 2 SWF/LF sites within approximately 0.5 miles of the target property.

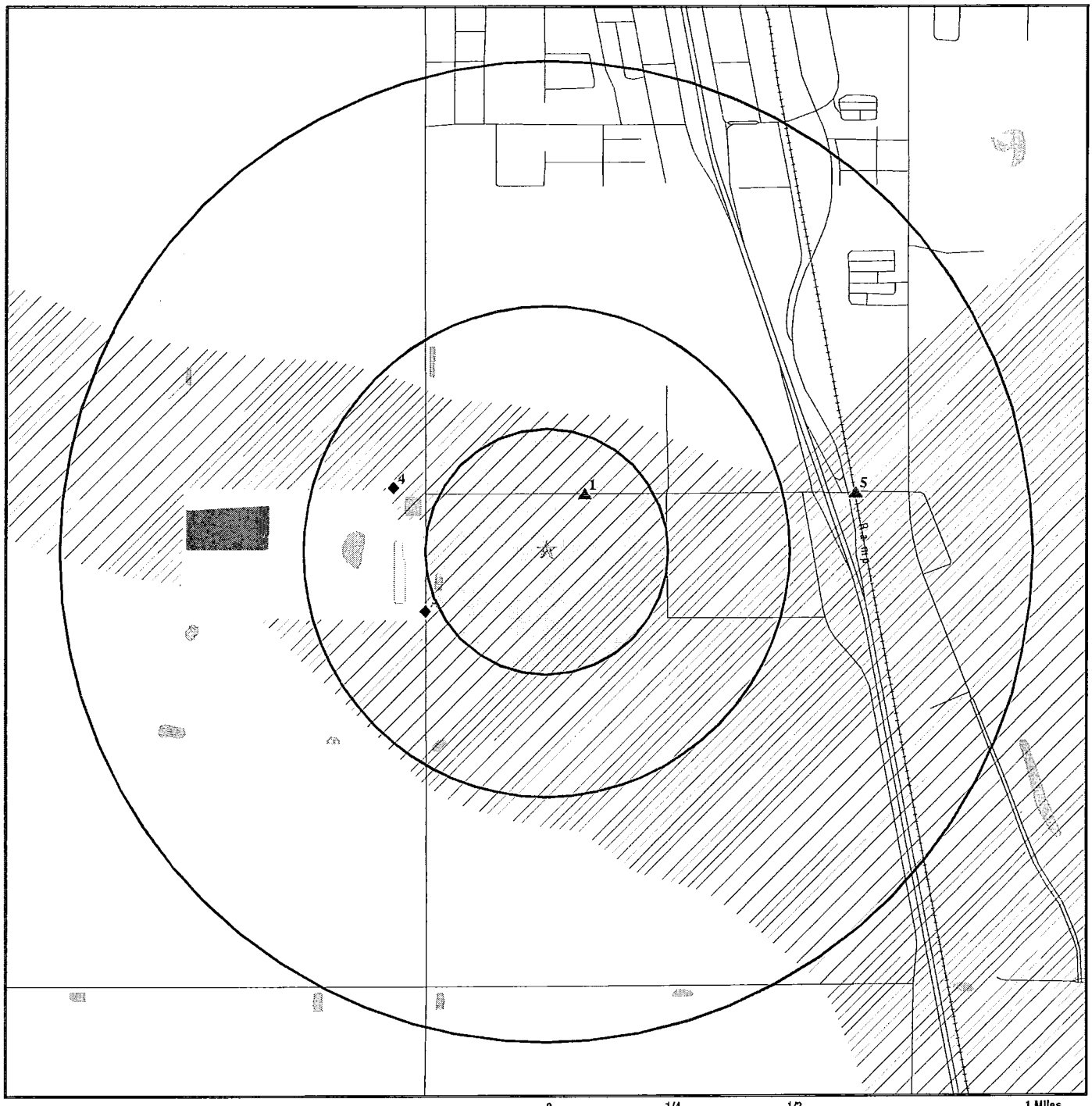
| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| MCFARLAND-DELANO R/TS CMHO | 11249 STRADLEY AVENUE | WSW 1/4 - 1/2 (0.277 mi.) | A2 | 11 |
| MCFARLAND-DELANO RECYCLING/TRA | 11249 STRADLEY AVE. | WSW 1/4 - 1/2 (0.277 mi.) | A3 | 12 |

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 37 records.

| Site Name | Database(s) |
|---|---|
| MCFARLAND-DELANO SAN LANDFILL | Cortese, LDS, ENF |
| DELANO GRAPE GROWERS | HIST CORTESE |
| BEACON STATION #647 AKA BINGO BEAC | HIST CORTESE, LUST |
| BINGO BEACON TRUCK STOP | CA FID UST, SWEEPS UST |
| DELANO RANCH 3 | CA FID UST, SWEEPS UST |
| PACIFIC BELL (SA-025) | SWEEPS UST |
| RANCH #9 ORANGES | SWEEPS UST |
| LAKE WOOLLOMES PARK | SWEEPS UST |
| BJ'S MINI MART | SWEEPS UST |
| D. PAPAGNI FRUIT CO. | CA FID UST, SWEEPS UST |
| S&L FARMS, INC. | CA FID UST, SWEEPS UST |
| JEFFRIES BROS. INC | CA FID UST, SWEEPS UST |
| DELANO #2 BD | SWF/LF |
| DELANO GRAPE GROWERS | LUST |
| DELANO GRAPE GROWERS | LUST |
| BEACON STATION #647 AKA BINGO BEAC | LUST |
| FARMERS HOME ADMINISTRATION | LUST |
| TRICAL | LUST |
| AKAL TRAVEL PLAZA | UST |
| BELLA ROSA WINERY | UST |
| TRICAL | UST |
| GOERTZEN SERVICE CENTER, INC. | UST |
| NORTH RANCH | UST |
| J & B FARMS SHOP | HIST UST |
| BILL REGAN | HIST UST |
| VESTAL SUBSTATION | HIST UST |
| CASE VANDER EYK JR DAIRY | AST |
| L S FARMS | AST |
| JAMES D MARENGO | AST |
| RANCHO NORTE | AST |
| BRAR LTD PARTNERSHIP | AST |
| FAMOSA VINEYARDS | AST |
| HOLMES AG MGT INC - AC SHERWOOD | AST |
| B AND D MORRIS FARMS | AST |
| DELANO COLLEGE CENTER | HAZNET |
| DELANO RANCH (ARKELO RANCH) | SLIC |
| KERN COUNTY DUMP | ENVIROSTOR |

# OVERVIEW MAP - 03647469.2r




0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Proposed Shopping Center<br>ADDRESS: Woollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7451 / 119.254 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03647469.2r<br>DATE: June 25, 2013 12:48 pm |

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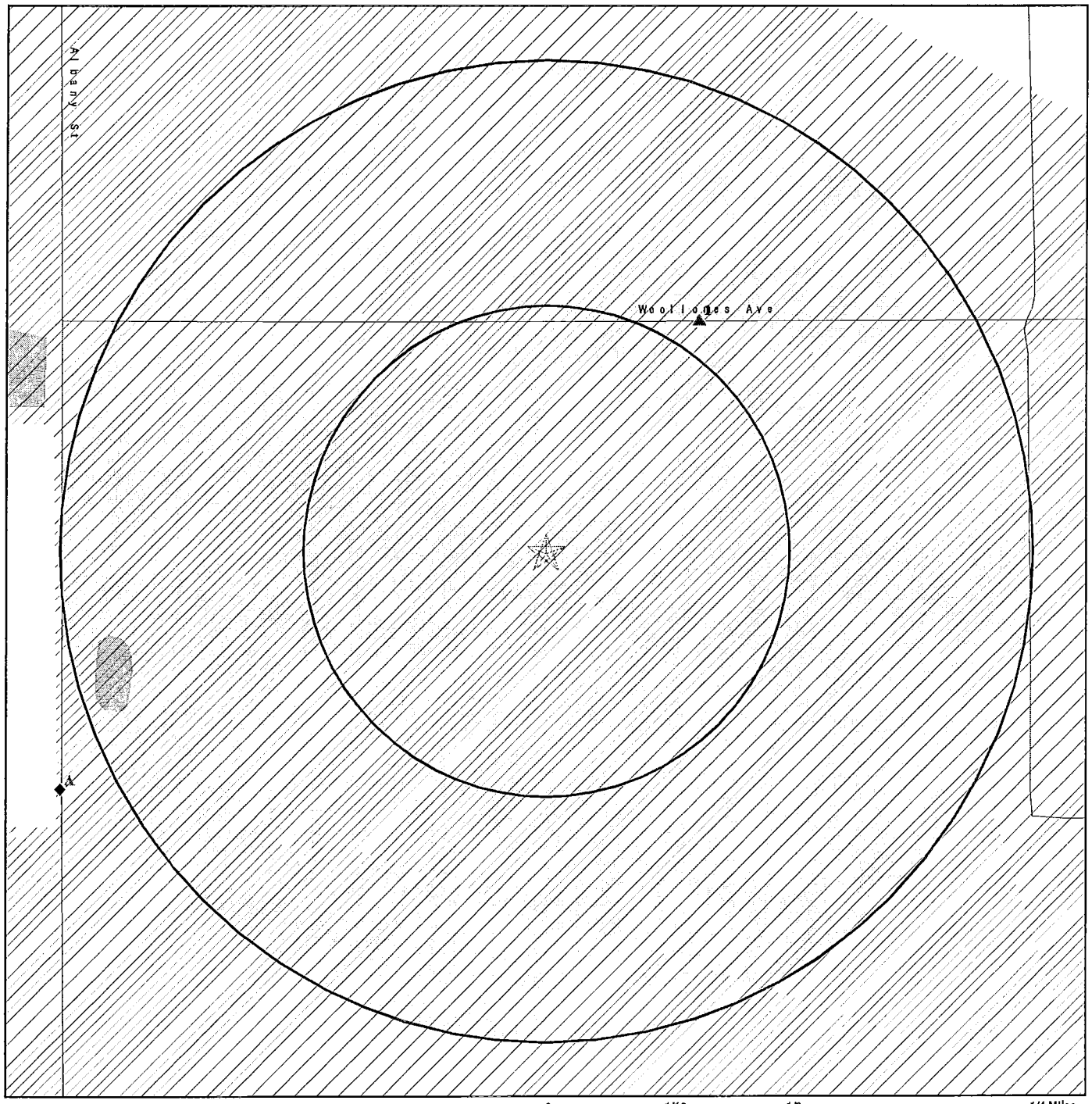
# DETAIL MAP - 03647469.2r




0 1/16 1/8 1/4 Miles

☆ Target Property

▲ Sites at elevations higher than or equal to the target property

◆ Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

National Wetland Inventory

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Proposed Shopping Center<br>ADDRESS: Woollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7451 / 119.254 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03647469.2r<br>DATE: June 25, 2013 12:52 pm |

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# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **STANDARD ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Federal NPL site list*** | | | | | | | | |
| NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| NPL LIENS | TP | | NR | NR | NR | NR | NR | 0 |
| ***Federal Delisted NPL site list*** | | | | | | | | |
| Delisted NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS list*** | | | | | | | | |
| CERCLIS | 0.500 | | 0 | 0 | 1 | NR | NR | 1 |
| FEDERAL FACILITY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal CERCLIS NFRAP site List*** | | | | | | | | |
| CERC-NFRAP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | | | |
| CORRACTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA non-CORRACTS TSD facilities list*** | | | | | | | | |
| RCRA-TSDF | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA generators list*** | | | | | | | | |
| RCRA-LQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| RCRA-SQG | 0.250 | | 0 | 1 | NR | NR | NR | 1 |
| RCRA-CESQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| US ENG CONTROLS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US INST CONTROL | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| LUCIS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal ERNS list*** | | | | | | | | |
| ERNS | TP | | NR | NR | NR | NR | NR | 0 |
| ***State- and tribal - equivalent NPL*** | | | | | | | | |
| RESPONSE | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State- and tribal - equivalent CERCLIS*** | | | | | | | | |
| ENVIROSTOR | 1.000 | | 0 | 0 | 0 | 1 | NR | 1 |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | 0.500 | | 0 | 0 | 2 | NR | NR | 2 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| SLIC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| AST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| INDIAN UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| FEMA UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| **ADDITIONAL ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Local Brownfield lists*** | | | | | | | | |
| US BROWNFIELDS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Landfill / Solid Waste Disposal Sites*** | | | | | | | | |
| ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| DEBRIS REGION 9 | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| WMUDS/SWAT | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| SWRCY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HAULERS | TP | | NR | NR | NR | NR | NR | 0 |
| INDIAN ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US CDL | TP | | NR | NR | NR | NR | NR | 0 |
| HIST Cal-Sites | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCH | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| Toxic Pits | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| CDL | TP | | NR | NR | NR | NR | NR | 0 |
| US HIST CDL | TP | | NR | NR | NR | NR | NR | 0 |
| ***Local Lists of Registered Storage Tanks*** | | | | | | | | |
| CA FID UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| HIST UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| SWEEPS UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS 2 | TP | | NR | NR | NR | NR | NR | 0 |
| LIENS | TP | | NR | NR | NR | NR | NR | 0 |
| DEED | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | TP | | NR | NR | NR | NR | NR | 0 |
| CHMIRS | TP | | NR | NR | NR | NR | NR | 0 |
| LDS | TP | | NR | NR | NR | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| MCS | TP | | NR | NR | NR | NR | NR | 0 |
| SPILLS 90 | TP | | NR | NR | NR | NR | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA NonGen / NLR | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| DOT OPS | TP | | NR | NR | NR | NR | NR | 0 |
| DOD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FUDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| CONSENT | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ROD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US MINES | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| TRIS | TP | | NR | NR | NR | NR | NR | 0 |
| TSCA | TP | | NR | NR | NR | NR | NR | 0 |
| FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| HIST FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| SSTS | TP | | NR | NR | NR | NR | NR | 0 |
| ICIS | TP | | NR | NR | NR | NR | NR | 0 |
| PADS | TP | | NR | NR | NR | NR | NR | 0 |
| MLTS | TP | | NR | NR | NR | NR | NR | 0 |
| RADINFO | TP | | NR | NR | NR | NR | NR | 0 |
| FINDS | TP | | NR | NR | NR | NR | NR | 0 |
| RAATS | TP | | NR | NR | NR | NR | NR | 0 |
| RMP | TP | | NR | NR | NR | NR | NR | 0 |
| CA BOND EXP. PLAN | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UIC | TP | | NR | NR | NR | NR | NR | 0 |
| NPDES | TP | | NR | NR | NR | NR | NR | 0 |
| Cortese | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HIST CORTESE | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| CUPA Listings | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| Notify 65 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DRYCLEANERS | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| WIP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ENF | TP | | NR | NR | NR | NR | NR | 0 |
| HAZNET | TP | | NR | NR | NR | NR | NR | 0 |
| EMI | TP | | NR | NR | NR | NR | NR | 0 |
| INDIAN RESERV | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCRD DRYCLEANERS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| COAL ASH DOE | TP | | NR | NR | NR | NR | NR | 0 |
| COAL ASH EPA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HWT | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| HWP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Financial Assurance | TP | | NR | NR | NR | NR | NR | 0 |
| LEAD SMELTERS | TP | | NR | NR | NR | NR | NR | 0 |
| 2020 COR ACTION | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| US AIRS | TP | | NR | NR | NR | NR | NR | 0 |
| PRP | TP | | NR | NR | NR | NR | NR | 0 |
| WDS | TP | | NR | NR | NR | NR | NR | 0 |
| EPA WATCH LIST | TP | | NR | NR | NR | NR | NR | 0 |
| US FIN ASSUR | TP | | NR | NR | NR | NR | NR | 0 |
| PCB TRANSFORMER | TP | | NR | NR | NR | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| PROC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| MWMP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| **EDR HIGH RISK HISTORICAL RECORDS** | | | | | | | | |
| ***EDR Exclusive Records*** | | | | | | | | |
| EDR MGP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| EDR US Hist Auto Stat | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| EDR US Hist Cleaners | 0.250 | | 0 | 0 | NR | NR | NR | 0 |

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

| | | | |
|---|---|---|---|
| **1 NNE 1/8-1/4 0.142 mi. 748 ft.** | **HOME DEPOT USA INC HD 8426 601 WOOLLOMES AVE DELANO, CA 93215** | **RCRA-SQG HAZNET** | **1008879956 CAR000168203** |

**Relative: Higher**

**Actual: 299 ft.**

RCRA-SQG:

| | |
|---|---|
| Date form received by agency: | 06/22/2005 |
| Facility name: | HOME DEPOT USA INC HD 8426 |
| Facility address: | 601 WOOLLOMES AVE<br>DELANO, CA 93215 |
| EPA ID: | CAR000168203 |
| Mailing address: | 1905 ASTON AVE<br>STE 100<br>CARLSBAD, CA 92008 |
| Contact: | ROBERT PERKINS |
| Contact address: | 1905 ASTON AVE STE 100<br>CARLSBAD, CA 92008 |
| Contact country: | US |
| Contact telephone: | 760-602-8700 |
| Contact email: | RPERKINS@3ECOMPANY.COM |
| EPA Region: | 09 |
| Classification: | Small Small Quantity Generator |
| Description: | Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time |

Owner/Operator Summary:

| | |
|---|---|
| Owner/operator name: | HOME DEPOT USA |
| Owner/operator address: | Not reported<br>Not reported |
| Owner/operator country: | US |
| Owner/operator telephone: | Not reported |
| Legal status: | Private |
| Owner/Operator Type: | Operator |
| Owner/Op start date: | 10/28/2004 |
| Owner/Op end date: | Not reported |

| | |
|---|---|
| Owner/operator name: | HOME DEPOT USA |
| Owner/operator address: | 2455 PACES FERRY RD<br>ATLANTA, GA 30339 |
| Owner/operator country: | US |
| Owner/operator telephone: | Not reported |
| Legal status: | Private |
| Owner/Operator Type: | Owner |
| Owner/Op start date: | 10/28/2004 |
| Owner/Op end date: | Not reported |

Handler Activities Summary:

| | |
|---|---|
| U.S. importer of hazardous waste: | No |
| Mixed waste (haz. and radioactive): | No |
| Recycler of hazardous waste: | No |
| Transporter of hazardous waste: | No |
| Treater, storer or disposer of HW: | No |
| Underground injection activity: | No |
| On-site burner exemption: | No |

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

| | |
|---|---|
| Furnace exemption: | No |
| Used oil fuel burner: | No |
| Used oil processor: | No |
| User oil refiner: | No |
| Used oil fuel marketer to burner: | No |
| Used oil Specification marketer: | No |
| Used oil transfer facility: | No |
| Used oil transporter: | No |

Hazardous Waste Summary:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D009
Waste name: MERCURY

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

HAZNET:

| | |
|---|---|
| Year: | 2011 |
| Gepaid: | CAR000168203 |
| Contact: | JORGE GOMEZ |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Not reported |
| TSD EPA ID: | CAD980884183 |
| TSD County: | Not reported |
| Waste Category: | Not reported |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.196 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2011 |
| Gepaid: | CAR000168203 |
| Contact: | JORGE GOMEZ |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Not reported |
| TSD EPA ID: | CAD980884183 |
| TSD County: | Not reported |
| Waste Category: | Latex waste |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.177 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2011 |
| Gepaid: | CAR000168203 |
| Contact: | JORGE GOMEZ |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Not reported |
| TSD EPA ID: | CAD980884183 |
| TSD County: | Not reported |
| Waste Category: | Other organic solids |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.0975 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2011 |
| Gepaid: | CAR000168203 |
| Contact: | JORGE GOMEZ |

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

| | |
|---|---|
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Not reported |
| TSD EPA ID: | CAD980884183 |
| TSD County: | Not reported |
| Waste Category: | Off-specification, aged or surplus organics |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.015 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2010 |
| Gepaid: | CAR000168203 |
| Contact: | CHRIS BAKER |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Not reported |
| TSD EPA ID: | WAD991281767 |
| TSD County: | Not reported |
| Waste Category: | Off-specification, aged or surplus organics |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.0865 |
| Facility County: | Kern |

Click this hyperlink while viewing on your computer to access
12 additional CA_HAZNET: record(s) in the EDR Site Report.

---

**A2 WSW 1/4-1/2 0.277 mi. 1465 ft.** **MCFARLAND-DELANO R/TS CMHO** **SWF/LF** **S113473415**
**11249 STRADLEY AVENUE** **N/A**
**DELANO, CA**

**Site 1 of 2 in cluster A**

**Relative: Lower**

**Actual: 296 ft.**

SWF/LF (SWIS):

| | |
|---|---|
| Region: | STATE |
| Facility ID: | 15-AA-0387 |
| Lat/Long: | 35.7447299 / -119.2634 |
| Owner Name: | County of Kern Waste Management Dept. |
| Owner Telephone: | 6618628900 |
| Owner Address: | Not reported |
| Owner Address2: | 2700 M Street, Suite 500 |
| Owner City,St,Zip: | Bakersfield, CA 93301 |
| Operational Status: | Active |
| Operator: | County of Kern Waste Management Dept. |
| Operator Phone: | 6618628900 |
| Operator Address: | Not reported |
| Operator Address2: | 2700 M Street, Suite 500 |
| Operator City,St,Zip: | Bakersfield, CA 93301 |
| Permit Date: | 12/30/2005 |
| Permit Status: | Permitted |
| Permitted Acreage: | 4 |
| Activity: | Composting Operation (Green Waste) |
| Regulation Status: | Notification |

**MCFARLAND-DELANO R/TS CMHO (Continued)** **S113473415**

| | |
|---|---|
| Landuse Name: | Commercial,Agricultural |
| GIS Source: | Map |
| Category: | Composting |
| Unit Number: | 01 |
| Inspection Frequency: | None |
| Accepted Waste: | Green Materials,Mixed municipal |
| Closure Date: | Not reported |
| Closure Type: | Not reported |
| Disposal Acreage: | Not reported |
| SWIS Num: | 15-AA-0387 |
| Waste Discharge Requirement Num: | Not reported |
| Program Type: | Not reported |
| Permitted Throughput with Units: | 539 |
| Actual Throughput with Units: | Cu Yards/day |
| Permitted Capacity with Units: | 7152 |
| Remaining Capacity: | Not reported |
| Remaining Capacity with Units: | Cu Yards/year |

---

**A3**
**WSW**
**1/4-1/2**
**0.277 mi.**
**1465 ft.**

**MCFARLAND-DELANO RECYCLING/TRANSFER STN** **SWF/LF** **S108239495**
**11249 STRADLEY AVE.** **N/A**
**DELANO, CA**

**Site 2 of 2 in cluster A**

**Relative:**
**Lower**

**Actual:**
**296 ft.**

SWF/LF (SWIS):

| | |
|---|---|
| Region: | STATE |
| Facility ID: | 15-AA-0305 |
| Lat/Long: | 35.7462200 / -119.25887 |
| Owner Name: | County of Kern Waste Management Dept. |
| Owner Telephone: | 6618628900 |
| Owner Address: | Not reported |
| Owner Address2: | 2700 M Street, Suite 500 |
| Owner City,St,Zip: | Bakersfield, CA 93301 |
| Operational Status: | Active |
| Operator: | County of Kern Waste Management Dept. |
| Operator Phone: | 6618628900 |
| Operator Address: | Not reported |
| Operator Address2: | 2700 M Street, Suite 500 |
| Operator City,St,Zip: | Bakersfield, CA 93301 |
| Permit Date: | 07/06/2012 |
| Permit Status: | Permitted |
| Permitted Acreage: | 58.8 |
| Activity: | Medium Volume Transfer/Proc Fac |
| Regulation Status: | Permitted |
| Landuse Name: | Agricultural |
| GIS Source: | Map |
| Category: | Transfer/Processing |
| Unit Number: | 01 |
| Inspection Frequency: | Monthly |
| Accepted Waste: | Mixed municipal |
| Closure Date: | Not reported |
| Closure Type: | Not reported |
| Disposal Acreage: | Not reported |
| SWIS Num: | 15-AA-0305 |
| Waste Discharge Requirement Num: | Not reported |
| Program Type: | Not reported |
| Permitted Throughput with Units: | 99 |
| Actual Throughput with Units: | Tons/day |

**MCFARLAND-DELANO RECYCLING/TRANSFER STN (Continued)** **S108239495**

Permitted Capacity with Units: 99
Remaining Capacity: Not reported
Remaining Capacity with Units: Tires/day

---

**4**
**WNW**
**1/4-1/2**
**0.342 mi.**
**1805 ft.**

**KERN COUNTY DUMP**
**WOOLOMES RD**
**DELANO, CA 93215**

**CERCLIS** **1000304685**
**FINDS** **CAD980817886**

**Relative:**
**Lower**

**Actual:**
**295 ft.**

CERCLIS:

| | |
|---|---|
| Site ID: | 0902089 |
| EPA ID: | CAD980817886 |
| Facility County: | KERN |
| Short Name: | KERN COUNTY DUMP |
| Congressional District: | 18 |
| IFMS ID: | Not reported |
| SMSA Number: | 0680 |
| USGC Hydro Unit: | 18030012 |
| Federal Facility: | Not a Federal Facility |
| DMNSN Number: | 0.00000 |
| Site Orphan Flag: | N |
| RCRA ID: | Not reported |
| USGS Quadrangle: | Not reported |
| Site Init By Prog: | Not reported |
| NFRAP Flag: | Not reported |
| Parent ID: | Not reported |
| RST Code: | Not reported |
| EPA Region: | 09 |
| Classification: | Not reported |
| Site Settings Code: | Not reported |
| NPL Status: | Not on the NPL |
| DMNSN Unit Code: | Not reported |
| RBRAC Code: | Not reported |
| RResp Fed Agency Code: | Not reported |
| Non NPL Status: | Other Cleanup Activity: State-Lead Cleanup |
| Non NPL Status Date: | 09/19/11 |
| Site Fips Code: | 06029 |
| CC Concurrence Date: | / / |
| CC Concurrence FY: | Not reported |
| Alias EPA ID: | Not reported |
| Site FUDS Flag: | Not reported |

CERCLIS Site Contact Name(s):

| | |
|---|---|
| Contact ID: | 9271184.00000 |
| Contact Name: | Karen Jurist |
| Contact Tel: | (415) 972-3219 |
| Contact Title: | Site Assessment Manager (SAM) |
| Contact Email: | Not reported |
| | |
| Contact ID: | 13003854.00000 |
| Contact Name: | Leslie Ramirez |
| Contact Tel: | (415) 972-3978 |
| Contact Title: | Site Assessment Manager (SAM) |
| Contact Email: | Not reported |
| | |
| Contact ID: | 13003858.00000 |

**KERN COUNTY DUMP (Continued)** **1000304685**

Contact Name: Sharon Murray
Contact Tel: (415) 972-4250
Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

Contact ID: 13004003.00000
Contact Name: Carl Brickner
Contact Tel: Not reported
Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

CERCLIS Site Alias Name(s):
Alias ID: 101
Alias Name: MCFARLAND-DELANO LANDFILL
Alias Address: Not reported
CA
Alias ID: 101
Alias Comments: PREVIOUS EPA ID# AZD 981 416 977
Site Description: OCA per SS Prioritization 8/04: Central Valley RWQCB

CERCLIS Assessment History:

Action Code: 001
Action: DISCOVERY
Date Started: / /
Date Completed: 11/01/79
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 001
Action: PRELIMINARY ASSESSMENT
Date Started: / /
Date Completed: 04/01/80
Priority Level: Low priority for further assessment
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

Action Code: 002
Action: PRELIMINARY ASSESSMENT
Date Started: / /
Date Completed: 06/30/89
Priority Level: Higher priority for further assessment
Operable Unit: SITEWIDE
Primary Responsibility: EPA Fund-Financed
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

**KERN COUNTY DUMP (Continued)** **1000304685**

| | |
|---|---|
| Action Code: | 001 |
| Action: | SITE INSPECTION |
| Date Started: | / / |
| Date Completed: | 07/02/91 |
| Priority Level: | Higher priority for further assessment |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 001 |
| Action: | SITE REASSESSMENT |
| Date Started: | / / |
| Date Completed: | 08/01/04 |
| Priority Level: | Not reported |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 002 |
| Action: | SITE REASSESSMENT |
| Date Started: | 07/01/11 |
| Date Completed: | 09/01/11 |
| Priority Level: | Not reported |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | State, Fund Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

FINDS:

Registry ID: 110009267890

Environmental Interest/Information System

CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) is the Superfund database that is used to support management in all phases of the Superfund program. The system contains information on all aspects of hazardous waste sites, including an inventory of sites, planned and actual site activities, and financial information.

**5 East 1/2-1 0.647 mi. 3417 ft.** | **WESTERN FARM SERVICES - CENTRAL VALLEY 2**
**930 WOOLOMES ROAD**
**DELANO, CA 93215** | **SLIC** | **S106483834**
**ENVIROSTOR** | **N/A**

**Relative: Higher**

**Actual: 310 ft.**

SLIC:

| | |
|---|---|
| Region: | STATE |
| **Facility Status:** | **Open - Site Assessment** |
| Status Date: | 09/30/1998 |
| Global Id: | SL185724257 |
| Lead Agency: | CENTRAL VALLEY RWQCB (REGION 5F) |
| Lead Agency Case Number: | Not reported |
| Latitude: | 35.7466 |
| Longitude: | -119.2422 |
| Case Type: | Cleanup Program Site |
| Case Worker: | GJI |
| Local Agency: | Not reported |
| RB Case Number: | SL185724257 |
| File Location: | Not reported |
| Potential Media Affected: | Aquifer used for drinking water supply |
| Potential Contaminants of Concern: | * * 1,1,2-TRICHLOROETHANE, * * 1,2,3-TRICHLOROPROPANE, Other Chlorinated Hydrocarbons, * * 1,4-DICHLOROBENZENE, * * 2,4-D, * * 2,4-DB, * * BROMOFORM (THM), * * DDD, * * DDE, DDD / DDE / DDT, * * DIBROMOCHLOROMETHANE (THM), * * DIBROMOCHLOROPROPANE (DBCP), * * DICAMBA, * * ENDOSULFAN I, * * ENDOSULFAN II, Other Solvent or Non-Petroleum Hydrocarbon, * * HEPTACHLOR, * * NITRATE + NITRITE (AS N), Tetrachloroethylene (PCE), * * TRICHLOROFLUOROMETHANE, * * DINOSEB |
| Site History: | The case was opened following an unauthorized release from an underground storage tank system at the subject site. Corrective action is underway as directed by the CVRWQCB. Corrective action may consist of preliminary site investigation, planning and implementation of remedial action, verification monitoring, or a combination thereof. A summary of the site history is available by clicking on either the "Cleanup Status History", "Regulatory Activities" or the "Site Maps/Documents" tab. For a complete site history the case file at the CVRWQCB should be consulted. |

Click here to access the California GeoTracker records for this facility:

ENVIROSTOR:

| | |
|---|---|
| Site Type: | Historical |
| Site Type Detailed: | * Historical |
| Acres: | Not reported |
| NPL: | NO |
| Regulatory Agencies: | NONE SPECIFIED |
| Lead Agency: | NONE SPECIFIED |
| Program Manager: | Not reported |
| Supervisor: | Referred - Not Assigned |
| Division Branch: | Cleanup Sacramento |
| Facility ID: | 15070002 |
| Site Code: | Not reported |
| Assembly: | 32 |
| Senate: | 14 |
| Special Program: | Not reported |
| Status: | Refer: Other Agency |
| Status Date: | 11/16/1994 |
| Restricted Use: | NO |
| Site Mgmt. Req.: | NONE SPECIFIED |

**WESTERN FARM SERVICES - CENTRAL VALLEY 2 (Continued)** **S106483834**

| | |
|---|---|
| Funding: | Not reported |
| Latitude: | 35.74666 |
| Longitude: | -119.2425 |
| APN: | NONE SPECIFIED |
| Past Use: | NONE SPECIFIED |
| Potential COC: | NONE SPECIFIED |
| Confirmed COC: | NONE SPECIFIED |
| Potential Description: | NONE SPECIFIED |
| Alias Name: | COBERLY & PLUMB OF KERN |
| Alias Type: | Alternate Name |
| Alias Name: | CAD066230798 |
| Alias Type: | HWTS Identification Code |
| Alias Name: | 15070002 |
| Alias Type: | Envirostor ID Number |

Completed Info:

| | |
|---|---|
| Completed Area Name: | PROJECT WIDE |
| Completed Sub Area Name: | Not reported |
| Completed Document Type: | * Discovery |
| Completed Date: | 02/09/1981 |
| Comments: | Facility Identified: Industrial Waste Haulers Survey. |
| Future Area Name: | Not reported |
| Future Sub Area Name: | Not reported |
| Future Document Type: | Not reported |
| Future Due Date: | Not reported |
| Schedule Area Name: | Not reported |
| Schedule Sub Area Name: | Not reported |
| Schedule Document Type: | Not reported |
| Schedule Due Date: | Not reported |
| Schedule Revised Date: | Not reported |

Count: 37 records.

ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| DELANO | S105023499 | DELANO GRAPE GROWERS | RT 1 BOX 283 | 93215 | HIST CORTESE |
| DELANO | S110654253 | DELANO GRAPE GROWERS | RT 1 | 93215 | LUST |
| DELANO | S104404282 | DELANO GRAPE GROWERS | ROUTE 1- BOX 283 | 93215 | LUST |
| DELANO | A100339926 | CASE VANDER EYK JR DAIRY | 24990 HWY 155 | 93215 | AST |
| DELANO | A100338838 | L S FARMS | 11011 HIGHWAY 43 | 93215 | AST |
| DELANO | A100338656 | JAMES D MARENGO | HWY 43 AND SCHUSTER | 93215 | AST |
| DELANO | S105023498 | BEACON STATION #647 AKA BINGO BEAC | HWY 99 @ AVE 16 | 93215 | HIST CORTESE, LUST |
| DELANO | U003937460 | AKAL TRAVEL PLAZA | HWY 99 & AVE 16 | 93215 | UST |
| DELANO | S101595927 | BINGO BEACON TRUCK STOP | HWY 99 / AVE 16 | 93215 | CA FID UST, SWEEPS UST |
| DELANO | S110655795 | BEACON STATION #647 AKA BINGO BEAC | HWY 99 & AVE 16 | 93215 | LUST |
| DELANO | S110655797 | FARMERS HOME ADMINISTRATION | AVE 16 & HWY 43 | 93215 | LUST |
| DELANO | A100337942 | RANCHO NORTE | S/W CRNR HWY 155 AND 65 | 93215 | AST |
| DELANO | S101620040 | DELANO RANCH 3 | 2045 GARCES HWY | 93215 | CA FID UST, SWEEPS UST |
| DELANO | S111213957 | DELANO #2 BD | 1525 METTLER AVE | | SWF/LF |
| DELANO | S106930322 | PACIFIC BELL (SA-025) | 2 MI N/O DELANO E/S HWY 99 | 93215 | SWEEPS UST |
| DELANO | S101480472 | KERN COUNTY DUMP | SE OF XING OF STRADLEY & WOOL | 93215 | ENVIROSTOR |
| DELANO | U004112707 | BELLA ROSA WINERY | POND ROAD OF HWY E | 93215 | UST |
| DELANO | S106931113 | RANCH #9 ORANGES | 1 1-2 S OF HWY 155 1 MILE M | 93215 | SWEEPS UST |
| DELANO | U001581106 | J & B FARMS SHOP | 1/4 MI SOUTH OF GARCES HWY. ON | 93215 | HIST UST |
| DELANO | A100339738 | BRAR LTD PARTNERSHIP | SW STRADLEY AND GARCES | 93215 | AST |
| DELANO | S109286696 | MCFARLAND-DELANO SAN LANDFILL | STRADLEY | 93215 | Cortese, LDS, ENF |
| DELANO | S113462720 | DELANO COLLEGE CENTER | 1450 TIMMONS AVE | 93215 | HAZNET |
| DELANO | S106928488 | LAKE WOOLLOMES PARK | WOOLLOMES AVE | 93250 | SWEEPS UST |
| DELANO | S106486319 | DELANO RANCH (ARKELO RANCH) | ZERKER RD & HWY 99 | 93215 | SLIC |
| MC FARLAND | U004112950 | TRICAL | HWY 99 & ELMO HWY | 93250 | UST |
| MC FARLAND | S110654293 | TRICAL | ELMO HWY & HWY 99 | 93250 | LUST |
| MC FARLAND | U004112938 | GOERTZEN SERVICE CENTER, INC. | FWY 99 & SHERWOOD | 93250 | UST |
| MC FARLAND | U004112706 | NORTH RANCH | WALLACE & WOODY FAMOSA HWY | 93250 | UST |
| MCFARLAND | S106923371 | BJ'S MINI MART | ROUTE 1, BOX 87 | 93250 | SWEEPS UST |
| MCFARLAND | S101620085 | D. PAPAGNI FRUIT CO. | NE CORNER ELMO HWY | 93250 | CA FID UST, SWEEPS UST |
| MCFARLAND | A100339278 | FAMOSA VINEYARDS | SW FAMOSO WOODY RD AT HWY 65 | 93250 | AST |
| MCFARLAND | S101620107 | S&L FARMS, INC. | FOMOSO-PORTERVILLE HWY | 93250 | CA FID UST, SWEEPS UST |
| MCFARLAND | S101620092 | JEFFRIES BROS. INC | 231 GOLDEN ST HWY | 93250 | CA FID UST, SWEEPS UST |
| MCFARLAND | U001582124 | BILL REGAN | RT-1-BOX 208 GARZOLI | 93250 | HIST UST |
| MCFARLAND | A100339093 | HOLMES AG MGT INC - AC SHERWOOD | NW SHERWOOD/HWY 65 | 93250 | AST |
| MCFARLAND | A100340156 | B AND D MORRIS FARMS | WHISLER RD AND HWY 99 | 93250 | AST |
| RICHGROVE | U001581170 | VESTAL SUBSTATION | PORTERVILLE-FOMOSA HWY,RICHGRV | 93215 | HIST UST |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

## STANDARD ENVIRONMENTAL RECORDS

### *Federal NPL site list*

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

| | |
|---|---|
| Date of Government Version: 02/01/2013 | Source: EPA |
| Date Data Arrived at EDR: 03/01/2013 | Telephone: N/A |
| Date Made Active in Reports: 03/13/2013 | Last EDR Contact: 05/09/2013 |
| Number of Days to Update: 12 | Next Scheduled EDR Contact: 07/22/2013 |
| | Data Release Frequency: Quarterly |

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

| | |
|---|---|
| EPA Region 1<br>Telephone 617-918-1143 | EPA Region 6<br>Telephone: 214-655-6659 |
| EPA Region 3<br>Telephone 215-814-5418 | EPA Region 7<br>Telephone: 913-551-7247 |
| EPA Region 4<br>Telephone 404-562-8033 | EPA Region 8<br>Telephone: 303-312-6774 |
| EPA Region 5<br>Telephone 312-886-6686 | EPA Region 9<br>Telephone: 415-947-4246 |
| EPA Region 10<br>Telephone 206-553-8665 | |

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

| | |
|---|---|
| Date of Government Version: 02/01/2013 | Source: EPA |
| Date Data Arrived at EDR: 03/01/2013 | Telephone: N/A |
| Date Made Active in Reports: 03/13/2013 | Last EDR Contact: 05/09/2013 |
| Number of Days to Update: 12 | Next Scheduled EDR Contact: 07/22/2013 |
| | Data Release Frequency: Quarterly |

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

| | |
|---|---|
| Date of Government Version: 10/15/1991 | Source: EPA |
| Date Data Arrived at EDR: 02/02/1994 | Telephone: 202-564-4267 |
| Date Made Active in Reports: 03/30/1994 | Last EDR Contact: 08/15/2011 |
| Number of Days to Update: 56 | Next Scheduled EDR Contact: 11/28/2011 |
| | Data Release Frequency: No Update Planned |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal Delisted NPL site list***

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

| | |
|---|---|
| Date of Government Version: 02/01/2013 | Source: EPA |
| Date Data Arrived at EDR: 03/01/2013 | Telephone: N/A |
| Date Made Active in Reports: 03/13/2013 | Last EDR Contact: 05/09/2013 |
| Number of Days to Update: 12 | Next Scheduled EDR Contact: 07/22/2013 |
| | Data Release Frequency: Quarterly |

***Federal CERCLIS list***

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

| | |
|---|---|
| Date of Government Version: 02/04/2013 | Source: EPA |
| Date Data Arrived at EDR: 03/01/2013 | Telephone: 703-412-9810 |
| Date Made Active in Reports: 03/13/2013 | Last EDR Contact: 05/29/2013 |
| Number of Days to Update: 12 | Next Scheduled EDR Contact: 09/09/2013 |
| | Data Release Frequency: Quarterly |

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

| | |
|---|---|
| Date of Government Version: 07/31/2012 | Source: Environmental Protection Agency |
| Date Data Arrived at EDR: 10/09/2012 | Telephone: 703-603-8704 |
| Date Made Active in Reports: 12/20/2012 | Last EDR Contact: 04/10/2013 |
| Number of Days to Update: 72 | Next Scheduled EDR Contact: 07/22/2013 |
| | Data Release Frequency: Varies |

***Federal CERCLIS NFRAP site List***

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

| | |
|---|---|
| Date of Government Version: 02/05/2013 | Source: EPA |
| Date Data Arrived at EDR: 03/01/2013 | Telephone: 703-412-9810 |
| Date Made Active in Reports: 03/13/2013 | Last EDR Contact: 05/29/2013 |
| Number of Days to Update: 12 | Next Scheduled EDR Contact: 05/09/2013 |
| | Data Release Frequency: Quarterly |

***Federal RCRA CORRACTS facilities list***

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 6

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

***Federal RCRA generators list***

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/29/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/29/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

***Federal ERNS list***

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 29

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

***State- and tribal - equivalent NPL***

RESPONSE: State Response Sites
Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/06/2013
Date Data Arrived at EDR: 05/07/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 49

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 05/06/2013
Date Data Arrived at EDR: 05/07/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 49

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/20/2013
Date Data Arrived at EDR: 05/21/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 35

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/21/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Quarterly

***State and tribal leaking storage tank lists***

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/01/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 162

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/01/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

***State and tribal registered storage tank lists***

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 04/18/2013
Number of Days to Update: 30

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-327-5092
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/21/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 45

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 08/02/2012
Date Data Arrived at EDR: 08/03/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 94

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 11/07/2012
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 156

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/18/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

***State and tribal voluntary cleanup sites***

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/06/2013
Date Data Arrived at EDR: 05/07/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 49

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/28/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 14

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/05/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 9

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/25/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Semi-Annually

***Local Lists of Landfill / Solid Waste Disposal Sites***

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 04/26/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 20

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/03/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 59

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/06/2013
Date Data Arrived at EDR: 05/07/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 49

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 41

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Local Lists of Registered Storage Tanks***

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Local Land Records***

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 04/25/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/11/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/11/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Semi-Annually

***Records of Emergency Release Reports***

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 55

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 03/12/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 55

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 05/01/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Other Ascertainable Records***

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/07/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 57

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/11/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 04/18/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 22

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/04/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 09/01/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 131

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/29/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/25/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Every 4 Years

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Annually

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/01/2012
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 114

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/21/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 60

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/09/2013
Date Data Arrived at EDR: 04/11/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 29

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/11/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/23/2011
Date Data Arrived at EDR: 12/13/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 79

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/13/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/08/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/30/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 05/20/2013
Date Data Arrived at EDR: 05/21/2013
Date Made Active in Reports: 06/12/2013
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/21/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Quarterly

UIC: UIC Listing

A listing of underground control injection wells.

Date of Government Version: 03/05/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/21/2013
Next Scheduled EDR Contact: 12/31/2012
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 04/01/2013
Date Data Arrived at EDR: 04/02/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 42

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 04/02/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/11/2012
Date Data Arrived at EDR: 12/12/2012
Date Made Active in Reports: 01/04/2013
Number of Days to Update: 23

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 12/24/2012
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 04/29/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 17

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/26/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/06/2012
Number of Days to Update: 14

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 19

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/25/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/03/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 03/06/2013
Date Data Arrived at EDR: 03/12/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 13

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/18/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/14/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 31

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/16/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/25/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 27

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/29/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/19/2013
Date Data Arrived at EDR: 02/20/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 28

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 05/03/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

2020 COR ACTION: 2020 Corrective Action Program List
The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/17/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: N/A

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 12/02/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 04/04/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Quarterly

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/30/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Annually

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

## EDR HIGH RISK HISTORICAL RECORDS

***EDR Exclusive Records***

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

## COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites
A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 30

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Semi-Annually

Underground Tanks
Underground storage tank sites located in Alameda county.

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 30

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List
Cupa Facility List

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 04/04/2013
Number of Days to Update: 21

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 10/16/2012
Date Data Arrived at EDR: 10/17/2012
Date Made Active in Reports: 11/13/2012
Number of Days to Update: 27

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/26/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 04/16/2013
Date Data Arrived at EDR: 04/17/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 29

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

COLUSA COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
Cupa facility list.

Date of Government Version: 01/04/2013
Date Data Arrived at EDR: 01/14/2013
Date Made Active in Reports: 03/01/2013
Number of Days to Update: 46

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/13/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 04/09/2013
Date Data Arrived at EDR: 04/10/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 34

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/09/2013
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/25/2013
Number of Days to Update: 46

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/20/2013
Date Data Arrived at EDR: 05/21/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 35

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/31/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 30

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 05/01/2012
Date Data Arrived at EDR: 05/02/2012
Date Made Active in Reports: 06/11/2012
Number of Days to Update: 40

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/29/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/26/2012
Date Data Arrived at EDR: 06/27/2012
Date Made Active in Reports: 08/17/2012
Number of Days to Update: 51

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/13/2013
Date Made Active in Reports: 03/21/2013
Number of Days to Update: 36

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

LAKE COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/25/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 12/28/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 28

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/24/2013
Date Data Arrived at EDR: 04/24/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 23

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/24/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 32

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 04/29/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 18

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/26/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 31

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county?s Certified Unified Program Agency database. California?s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 04/16/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 31

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 11/26/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/21/2013
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/28/2013
Date Data Arrived at EDR: 05/29/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 27

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

MONO COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
CUPA Facility List

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/08/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 17

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 03/14/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/08/2013
Date Data Arrived at EDR: 03/08/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 17

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/17/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2013
Date Data Arrived at EDR: 05/15/2013
Date Made Active in Reports: 06/12/2013
Number of Days to Update: 28

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2013
Date Data Arrived at EDR: 05/15/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 41

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 05/01/2013
Date Data Arrived at EDR: 05/15/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 41

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/12/2013
Date Data Arrived at EDR: 03/13/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 14

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/23/2013
Date Data Arrived at EDR: 04/24/2013
Date Made Active in Reports: 05/17/2013
Number of Days to Update: 23

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/23/2013
Date Data Arrived at EDR: 04/24/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 22

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Toxic Site Clean-Up List

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 04/11/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 04/12/2013
Date Made Active in Reports: 05/16/2013
Number of Days to Update: 34

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/05/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 20

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/13/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 08/17/2012
Date Data Arrived at EDR: 08/20/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 44

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 11/06/2012
Date Made Active in Reports: 11/30/2012
Number of Days to Update: 24

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/26/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/10/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/25/2013
Date Data Arrived at EDR: 03/25/2013
Date Made Active in Reports: 04/18/2013
Number of Days to Update: 24

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/18/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/26/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 27

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/09/2013
Date Data Arrived at EDR: 04/10/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 34

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/13/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/18/2013
Date Data Arrived at EDR: 03/19/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 8

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/17/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/05/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 20

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/04/2013
Date Data Arrived at EDR: 03/06/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 19

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/03/2013
Next Scheduled EDR Contact: 09/16/2013
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/16/2013
Date Data Arrived at EDR: 05/17/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 39

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/13/2013
Next Scheduled EDR Contact: 08/26/2013
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 02/26/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 22

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/15/2013
Date Data Arrived at EDR: 03/15/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 12

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/20/2013
Date Data Arrived at EDR: 03/28/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 47

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/12/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/20/2013
Date Data Arrived at EDR: 03/28/2013
Date Made Active in Reports: 05/13/2013
Number of Days to Update: 46

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/12/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 04/01/2013
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 41

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/02/2013
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/14/2013
Number of Days to Update: 41

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 04/01/2013
Next Scheduled EDR Contact: 07/15/2013
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 03/13/2013
Date Data Arrived at EDR: 03/14/2013
Date Made Active in Reports: 03/27/2013
Number of Days to Update: 13

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/10/2013
Next Scheduled EDR Contact: 09/23/2013
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/14/2013
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 42

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 05/15/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 04/26/2013
Date Data Arrived at EDR: 05/22/2013
Date Made Active in Reports: 06/25/2013
Number of Days to Update: 34

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/08/2013
Next Scheduled EDR Contact: 07/22/2013
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 01/28/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 47

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 06/11/2013
Next Scheduled EDR Contact: 08/12/2013
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/28/2013
Date Made Active in Reports: 05/13/2013
Number of Days to Update: 46

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/12/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 03/25/2013
Date Data Arrived at EDR: 03/29/2013
Date Made Active in Reports: 05/13/2013
Number of Days to Update: 45

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/07/2013
Next Scheduled EDR Contact: 10/07/2013
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 03/05/2013
Date Data Arrived at EDR: 03/06/2013
Date Made Active in Reports: 03/25/2013
Number of Days to Update: 19

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/20/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Varies

**OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/21/2013
Number of Days to Update: 31

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/21/2013
Next Scheduled EDR Contact: 09/02/2013
Data Release Frequency: Annually

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/19/2013
Next Scheduled EDR Contact: 07/29/2013
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 02/07/2013
Date Made Active in Reports: 03/15/2013
Number of Days to Update: 36

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/09/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/23/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 57

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/23/2013
Next Scheduled EDR Contact: 08/05/2013
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/31/2012
Number of Days to Update: 39

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/28/2013
Next Scheduled EDR Contact: 09/09/2013
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 09/27/2012
Number of Days to Update: 70

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/14/2013
Next Scheduled EDR Contact: 09/30/2013
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

**STREET AND ADDRESS INFORMATION**

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# GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

**TARGET PROPERTY ADDRESS**

PROPOSED SHOPPING CENTER
WOOLLOMES AVENUE/STRADLEY AVENUE
DELANO, CA 93215

**TARGET PROPERTY COORDINATES**

| | |
|---|---|
| Latitude (North): | 35.7451 - 35° 44' 42.36" |
| Longitude (West): | 119.254 - 119° 15' 14.40" |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 296179.0 |
| UTM Y (Meters): | 3957820.0 |
| Elevation: | 298 ft. above sea level |

**USGS TOPOGRAPHIC MAP**

| | |
|---|---|
| Target Property Map: | 35119-F3 POND, CA |
| Most Recent Revision: | 1973 |
| North Map: | 35119-G3 DELANO WEST, CA |
| Most Recent Revision: | 1969 |
| Northeast Map: | 35119-G2 DELANO EAST, CA |
| Most Recent Revision: | 1969 |
| East Map: | 35119-F2 MCFARLAND, CA |
| Most Recent Revision: | 1969 |

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

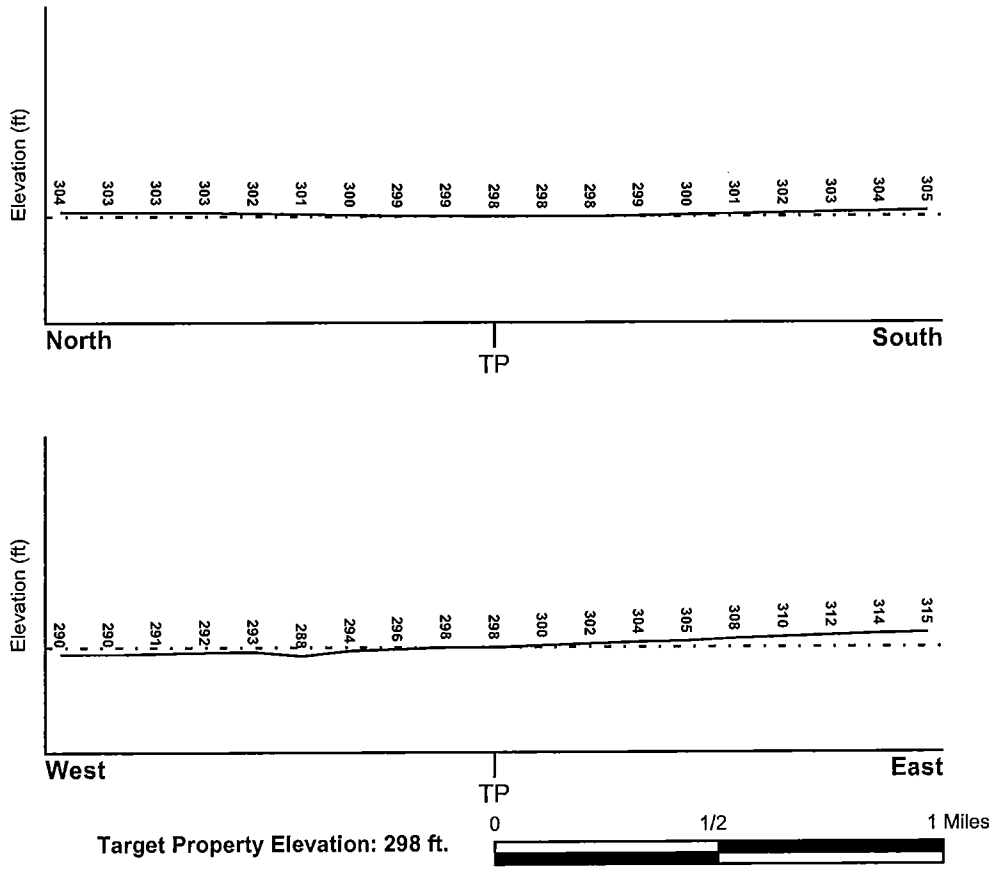
**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

General Topographic Gradient: General West

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**




**Target Property Elevation: 298 ft.**

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

## HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

### FEMA FLOOD ZONE

| Target Property County | FEMA Flood Electronic Data |
|---|---|
| KERN, CA | YES - refer to the Overview Map and Detail Map |

Flood Plain Panel at Target Property: 06029C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

### NATIONAL WETLAND INVENTORY

| NWI Quad at Target Property | NWI Electronic Data Coverage |
|---|---|
| POND | YES - refer to the Overview Map and Detail Map |

## HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

***Site-Specific Hydrogeological Data*:***

Search Radius: 1.25 miles
Status: Not found

## AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

| MAP ID | LOCATION FROM TP | GENERAL DIRECTION GROUNDWATER FLOW |
|---|---|---|
| Not Reported | | |

* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

## GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

## GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

**ROCK STRATIGRAPHIC UNIT**

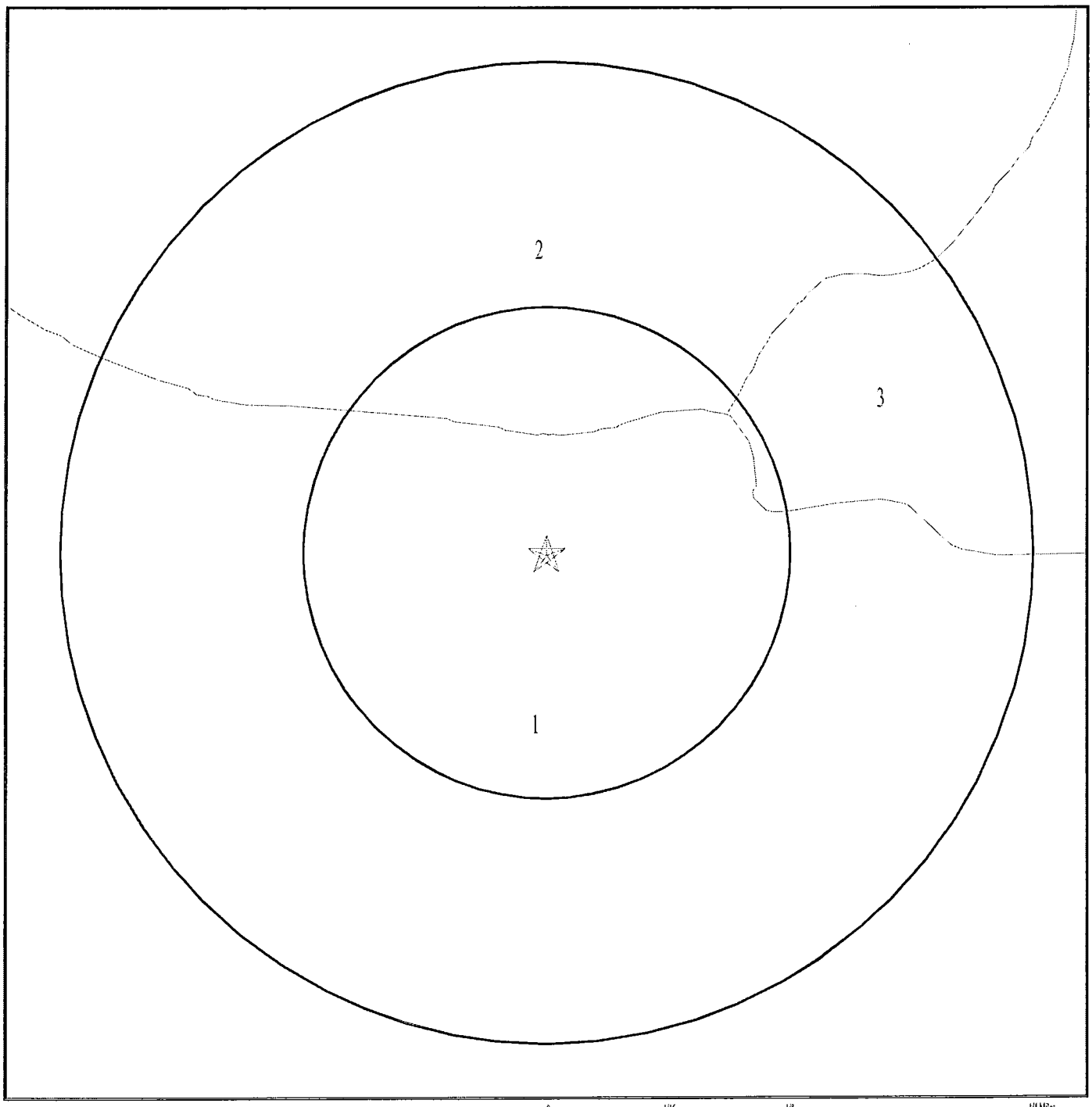
| | |
|---|---|
| Era: | Cenozoic |
| System: | Quaternary |
| Series: | Quaternary |
| Code: | Q *(decoded above as Era, System & Series)* |

**GEOLOGIC AGE IDENTIFICATION**

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

# SSURGO SOIL MAP - 03647469.2r




Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

| | |
|---|---|
| SITE NAME: Proposed Shopping Center<br>ADDRESS: Woollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7451 / 119.254 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03647469.2r<br>DATE: June 25, 2013 12:52 pm |

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# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY**

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

---

**Soil Map ID: 1**

Soil Component Name: GARCES

Soil Surface Texture:
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

| Soil Layer Information | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boundary | | | Classification | | Saturated hydraulic conductivity micro m/sec | Soil Reaction (pH) |
| Layer | Upper | Lower | Soil Texture Class | AASHTO Group | Unified Soil | | |
| 1 | 0 inches | 1 inches | | Not reported | Not reported | Max: 4<br>Min: 1.4 | Max: 9.6<br>Min: 8.4 |
| 2 | 1 inches | 9 inches | | Not reported | Not reported | Max: 4<br>Min: 1.4 | Max: 9.6<br>Min: 8.4 |
| 3 | 9 inches | 22 inches | | Not reported | Not reported | Max: 4<br>Min: 1.4 | Max: 9.6<br>Min: 8.4 |
| 4 | 22 inches | 37 inches | | Not reported | Not reported | Max: 4<br>Min: 1.4 | Max: 9.6<br>Min: 8.4 |
| 5 | 37 inches | 59 inches | | Not reported | Not reported | Max: 4<br>Min: 1.4 | Max: 9.6<br>Min: 8.4 |

---

**Soil Map ID: 2**

Soil Component Name: KIMBERLINA

Soil Surface Texture:
Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

| Soil Layer Information | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boundary | | | Classification | | Saturated hydraulic conductivity micro m/sec | Soil Reaction (pH) |
| Layer | Upper | Lower | Soil Texture Class | AASHTO Group | Unified Soil | | |
| 1 | 0 inches | 9 inches | | Not reported | Not reported | Max: 14<br>Min: 4 | Max: 8.4<br>Min: 7.9 |
| 2 | 9 inches | 44 inches | | Not reported | Not reported | Max: 14<br>Min: 4 | Max: 8.4<br>Min: 7.9 |
| 3 | 44 inches | 70 inches | | Not reported | Not reported | Max: 14<br>Min: 4 | Max: 8.4<br>Min: 7.9 |

---

**Soil Map ID: 3**

Soil Component Name: WASCO

Soil Surface Texture:

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

| Soil Layer Information | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Boundary | | | Classification | | Saturated hydraulic conductivity micro m/sec | Soil Reaction (pH) |
| Layer | Upper | Lower | Soil Texture Class | AASHTO Group | Unified Soil | | |
| 1 | 0 inches | 14 inches | | Not reported | Not reported | Max: 42<br>Min: 14 | Max: 8.4<br>Min: 6.6 |
| 2 | 14 inches | 59 inches | | Not reported | Not reported | Max: 42<br>Min: 14 | Max: 8.4<br>Min: 6.6 |

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

## LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

## WELL SEARCH DISTANCE INFORMATION

| DATABASE | SEARCH DISTANCE (miles) |
|---|---|
| Federal USGS | 1.000 |
| Federal FRDS PWS | Nearest PWS within 1 mile |
| State Database | 1.000 |

## FEDERAL USGS WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| 2 | USGS40000166991 | 1/8 - 1/4 Mile WSW |
| A5 | USGS40000167057 | 1/2 - 1 Mile ENE |
| 6 | USGS40000167096 | 1/2 - 1 Mile NE |
| 7 | USGS40000167007 | 1/2 - 1 Mile East |
| 8 | USGS40000167135 | 1/2 - 1 Mile North |
| B9 | USGS40000166883 | 1/2 - 1 Mile South |
| B10 | USGS40000166882 | 1/2 - 1 Mile South |
| 11 | USGS40000166952 | 1/2 - 1 Mile ESE |
| 12 | USGS40000166960 | 1/2 - 1 Mile ESE |
| 13 | USGS40000167095 | 1/2 - 1 Mile NE |
| 14 | USGS40000166884 | 1/2 - 1 Mile SSW |
| 15 | USGS40000166968 | 1/2 - 1 Mile WSW |
| 16 | USGS40000167053 | 1/2 - 1 Mile ENE |
| 17 | USGS40000166885 | 1/2 - 1 Mile SW |
| 18 | USGS40000166932 | 1/2 - 1 Mile ESE |
| 22 | USGS40000167155 | 1/2 - 1 Mile North |
| 23 | USGS40000166923 | 1/2 - 1 Mile ESE |
| C24 | USGS40000167161 | 1/2 - 1 Mile North |

## FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| No PWS System Found | | |

Note: PWS System location is not always the same as well location.

## STATE DATABASE WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| 1 | 15886 | 0 - 1/8 Mile North |
| 3 | 15887 | 1/4 - 1/2 Mile NNE |
| A4 | CADW50000016777 | 1/4 - 1/2 Mile ENE |

# GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

**STATE DATABASE WELL INFORMATION**

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| 19 | CADW50000016672 | 1/2 - 1 Mile South |
| 20 | 15888 | 1/2 - 1 Mile SE |
| 21 | CADW50000016833 | 1/2 - 1 Mile NNW |
| C25 | 15885 | 1/2 - 1 Mile North |

# PHYSICAL SETTING SOURCE MAP - 03647469.2r

0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

| | |
|---|---|
| SITE NAME: Proposed Shopping Center<br>ADDRESS: Woollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7451 / 119.254 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03647469.2r<br>DATE: June 25, 2013 12:52 pm |

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# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

| Map ID<br>Direction<br>Distance<br>Elevation | Database | EDR ID Number |
|---|---|---|
| **1**<br>**North**<br>**0 - 1/8 Mile**<br>**Higher** | **CA WELLS** | **15886** |

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 25S/25E-23D01 M | User ID: | 15C |
| FRDS Number: | 1502455001 | County: | Kern |
| District Number: | 45 | Station Type: | WELL/AMBNT/MUN/INTAKE |
| Water Type: | Well/Groundwater | Well Status: | Active Raw |
| Source Lat/Long: | 354446.0 1191512.0 | Precision: | 0.5 Mile (30 Seconds) |
| Source Name: | WELL 01 | | |
| System Number: | 1502455 | | |
| System Name: | BOWEN WATER SYSTEM | | |
| Organization That Operates System: | Not Reported | | |
| Pop Served: | Unknown, Small System | Connections: | Unknown, Small System |
| Area Served: | Not Reported | | |

---

| | | |
|---|---|---|
| **2**<br>**WSW**<br>**1/8 - 1/4 Mile**<br>**Lower** | **FED USGS** | **USGS40000166991** |

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354440119152401 | | |
| Monloc name: | 025S025E22H001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7443982 |
| Longitude: | -119.2576095 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 293.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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| | | |
|---|---|---|
| **3**<br>**NNE**<br>**1/4 - 1/2 Mile**<br>**Lower** | **CA WELLS** | **15887** |

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 25S/25E-23H02 M | User ID: | CYA |
| FRDS Number: | 1510005013 | County: | Kern |
| District Number: | 12 | Station Type: | WELL/AMBNT/MUN/INTAKE/SUPPLY |
| Water Type: | Well/Groundwater | Well Status: | Active Treated |
| Source Lat/Long: | 354500.0 1191500.0 | Precision: | Undefined |
| Source Name: | WELL 14 - TREATED | | |
| System Number: | 1510005 | | |
| System Name: | DELANO, CITY OF | | |
| Organization That Operates System: | | | |
| | 725 S LEXINGTON<br>DELANO, CA 93215 | | |
| Pop Served: | 29944 | Connections: | 6098 |
| Area Served: | DELANO | | |
| Sample Collected: | 07/01/2011 | Findings: | 6.1 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 07/06/2011 | Findings: | 700. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 07/11/2011 | Findings: | 24. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08/09/2011 | Findings: | 1.01 PCI/L |
| Chemical: | RADIUM 228 | | |
| Sample Collected: | 08/09/2011 | Findings: | 0.471 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 10/04/2011 | Findings: | 690. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10/04/2011 | Findings: | 5. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 11/10/2011 | Findings: | 0.396 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 11/29/2011 | Findings: | 660. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 01/10/2012 | Findings: | 720. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 01/10/2012 | Findings: | 6.4 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 04/17/2012 | Findings: | 680. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 04/17/2012 | Findings: | 6.2 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 05/24/2012 | Findings: | 0.382 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 08/28/2012 | Findings: | 0.328 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 08/28/2012 | Findings: | 1. UNITS |
| Chemical: | COLOR | | |

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

| | | | |
|---|---|---|---|
| Sample Collected: | 08/28/2012 | Findings: | 699. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 08/28/2012 | Findings: | 8.62 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 08/28/2012 | Findings: | 36. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 08/28/2012 | Findings: | 38. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 08/28/2012 | Findings: | 2.9 MG/L |
| Chemical: | CARBONATE ALKALINITY | | |
| Sample Collected: | 08/28/2012 | Findings: | 38. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 08/28/2012 | Findings: | 15. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 08/28/2012 | Findings: | 0.2 MG/L |
| Chemical: | MAGNESIUM | | |
| Sample Collected: | 08/28/2012 | Findings: | 120. MG/L |
| Chemical: | SODIUM | | |
| Sample Collected: | 08/28/2012 | Findings: | 97. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 08/28/2012 | Findings: | 0.29 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 08/28/2012 | Findings: | 8.2 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 08/28/2012 | Findings: | 430. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 08/28/2012 | Findings: | 28. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08/28/2012 | Findings: | 0.49 NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 08/28/2012 | Findings: | 650. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 11/05/2012 | Findings: | 0.291 PCI/L |
| Chemical: | RADIUM 228 COUNTING ERROR | | |
| Sample Collected: | 11/05/2012 | Findings: | 690. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 11/05/2012 | Findings: | 8.4 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 01/26/2011 | Findings: | 6.1 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 04/11/2011 | Findings: | 6.4 UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 04/25/2011 | Findings: | 720. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |

# GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS

| Map ID<br>Direction<br>Distance<br>Elevation | Database | EDR ID Number |
|---|---|---|
| **A4**<br>**ENE**<br>**1/4 - 1/2 Mile**<br>**Higher** | **CA WELLS** | **CADW50000016777** |

| | | | |
|---|---|---|---|
| Latitude : | 35.7486 | | |
| Longitude : | 119.2466 | | |
| Site code: | 357486N1192466W001 | Casgem sta: | 25S25E23B001M |
| Local well: | Not Reported | Casgem s 1: | Unknown |
| County id: | 15 | | |
| Basin cd: | 5-22.14 | Basin desc: | Kern County |
| Org unit n: | South Central Region Office | Site id: | CADW50000016777 |

---

| | | |
|---|---|---|
| **A5**<br>**ENE**<br>**1/2 - 1 Mile**<br>**Higher** | **FED USGS** | **USGS40000167057** |

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354455119144101 | | |
| Monloc name: | 025S025E23B001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7485647 |
| Longitude: | -119.2456646 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 308.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19580201 | Welldepth: | 400 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 1

| Date | Feet below Surface | Feet to Sealevel |
|---|---|---|
| 1958-02-01 | 123.00 | |

---

| | | |
|---|---|---|
| **6**<br>**NE**<br>**1/2 - 1 Mile**<br>**Higher** | **FED USGS** | **USGS40000167096** |

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354507119144701 | | |
| Monloc name: | 025S025E14R001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7518981 |
| Longitude: | -119.2473313 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 311.00 |
| Vert measure units: | feet | Vertacc measure val: | 52 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19521021 | Welldepth: | 300 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 1

| Date | Feet below Surface | Feet to Sealevel |
|---|---|---|
| 1952-10-21 | 151.20 | |

---

**7**
**East**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000167007**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354445119143201 | | |
| Monloc name: | 025S025E23H001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.745787 |
| Longitude: | -119.2431645 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 304.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |

| | | | |
|---|---|---|---|
| Aquifer type: | Not Reported | | |
| Construction date: | 19580201 | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 1

| Date | Feet below Surface | Feet to Sealevel |
|---|---|---|
| 1958-02-01 | 121.30 | |

---

**8**
**North**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000167135**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354517119150601 | | |
| Monloc name: | 025S025E14P001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7546759 |
| Longitude: | -119.2526093 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 302.00 |
| Vert measure units: | feet | Vertacc measure val: | 52 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

---

**B9**
**South**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166883**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354407119151101 | | |
| Monloc name: | 025S025E23N001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7352317 |
| Longitude: | -119.2539982 | Sourcemap scale: | 63360 |

| | | | |
|---|---|---|---|
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 300.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19510101 | Welldepth: | 500 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**B10**
**South**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166882**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354407119150701 | | |
| Monloc name: | 025S025E23P001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7352317 |
| Longitude: | -119.252887 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 301.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19370101 | Welldepth: | 400 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**11**
**ESE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166952**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354426119143001 | | |
| Monloc name: | 025S025E23J003M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7405093 |
| Longitude: | -119.2426089 | Sourcemap scale: | 63360 |

| | | | |
|---|---|---|---|
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 304.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**12**
**ESE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166960**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354430119142601 | | |
| Monloc name: | 025S025E23J002M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7416204 |
| Longitude: | -119.2414977 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 305.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | 228 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**13**
**NE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000167095**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354507119143301 | | |
| Monloc name: | 025S025E13N001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.751898 |
| Longitude: | -119.2434423 | Sourcemap scale: | 63360 |

| | | | |
|---|---|---|---|
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 308.00 |
| Vert measure units: | feet | Vertacc measure val: | 52 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**14**
**SSW**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166884**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354407119153301 | | |
| Monloc name: | 025S025E22R001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7352317 |
| Longitude: | -119.2601096 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 297.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19510101 | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**15**
**WSW**
**1/2 - 1 Mile**
**Lower**

**FED USGS** **USGS40000166968**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354432119155501 | | |
| Monloc name: | 025S025E22F001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7421761 |
| Longitude: | -119.267332 | Sourcemap scale: | 63360 |

| | | | |
|---|---|---|---|
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 292.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Alluvium Above E-Clay | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19380601 | Welldepth: | 197 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 1

| Date | Feet below Surface | Feet to Sealevel |
|---|---|---|
| 1938-06-01 | 75.00 | |

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**16**
**ENE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000167053**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354454119142201 | | |
| Monloc name: | 025S025E23A001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7482869 |
| Longitude: | -119.2403866 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 312.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19340101 | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**17**
**SW**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166885**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354407119154301 | | |
| Monloc name: | 025S025E22Q001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7352318 |
| Longitude: | -119.2628874 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 295.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19470101 | Welldepth: | 750 |
| Welldepth units: | ft | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

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**18**
**ESE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166932**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354421119142301 | | |
| Monloc name: | 025S025E23J001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7391204 |
| Longitude: | -119.2406643 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 307.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19460101 | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

| Map ID<br>Direction<br>Distance<br>Elevation | Database | EDR ID Number |
|---|---|---|
| **19**<br>**South**<br>**1/2 - 1 Mile**<br>**Higher** | **CA WELLS** | **CADW50000016672** |

| | | | |
|---|---|---|---|
| Latitude : | 35.7325 | | |
| Longitude : | 119.2551 | | |
| Site code: | 357325N1192551W001 | Casgem sta: | 25S25E23N001M |
| Local well: | Not Reported | Casgem s 1: | Unknown |
| County id: | 15 | | |
| Basin cd: | 5-22.14 | Basin desc: | Kern County |
| Org unit n: | South Central Region Office | Site id: | CADW50000016672 |

---

| | | |
|---|---|---|
| **20**<br>**SE**<br>**1/2 - 1 Mile**<br>**Higher** | **CA WELLS** | **15888** |

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 25S/25E-23J04 M | User ID: | CYA |
| FRDS Number: | 1502534001 | County: | Kern |
| District Number: | 12 | Station Type: | WELL/AMBNT/MUN/INTAKE |
| Water Type: | Well/Groundwater | Well Status: | Active Untreated |
| Source Lat/Long: | 354411.0 1191430.0 | Precision: | 0.5 Mile (30 Seconds) |
| Source Name: | WELL 01 | | |
| System Number: | 1502534 | | |
| System Name: | FLORES WATER SYSTEM | | |
| Organization That Operates System: | | | |
| | 1013 NILES ST.<br>BAKERSFIELD, CA 93305 | | |
| Pop Served: | 25 | Connections: | 13 |
| Area Served: | Not Reported | | |

---

| | | |
|---|---|---|
| **21**<br>**NNW**<br>**1/2 - 1 Mile**<br>**Higher** | **CA WELLS** | **CADW50000016833** |

| | | | |
|---|---|---|---|
| Latitude : | 35.7575 | | |
| Longitude : | 119.2587 | | |
| Site code: | 357575N1192587W001 | Casgem sta: | 25S25E15H002M |
| Local well: | Not Reported | Casgem s 1: | Unknown |
| County id: | 15 | | |
| Basin cd: | 5-22.14 | Basin desc: | Kern County |
| Org unit n: | South Central Region Office | Site id: | CADW50000016833 |

---

| | | |
|---|---|---|
| **22**<br>**North**<br>**1/2 - 1 Mile**<br>**Higher** | **FED USGS** | **USGS40000167155** |

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354530119150701 | | |
| Monloc name: | 025S025E14L001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.758287 |
| Longitude: | -119.252887 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 303.00 |
| Vert measure units: | feet | Vertacc measure val: | 52 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | Not Reported | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 0

---

**23**
**ESE**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000166923**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354416119142101 | | |
| Monloc name: | 025S025E23R002M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7377316 |
| Longitude: | -119.2401088 | Sourcemap scale: | 63360 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 305.00 |
| Vert measure units: | feet | Vertacc measure val: | 2 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19580218 | Welldepth: | Not Reported |
| Welldepth units: | Not Reported | Wellholedepth: | Not Reported |
| Wellholedepth units: | Not Reported | | |

Ground-water levels, Number of Measurements: 1

| Date | Feet below Surface | Feet to Sealevel |
|---|---|---|
| 1958-02-18 | 120.20 | |

---

**C24**
**North**
**1/2 - 1 Mile**
**Higher**

**FED USGS** **USGS40000167161**

| | | | |
|---|---|---|---|
| Org. Identifier: | USGS-CA | | |
| Formal name: | USGS California Water Science Center | | |
| Monloc Identifier: | USGS-354533119151201 | | |
| Monloc name: | 025S025E14D001M | | |
| Monloc type: | Well | | |
| Monloc desc: | Not Reported | | |
| Huc code: | 18030012 | Drainagearea value: | Not Reported |
| Drainagearea Units: | Not Reported | Contrib drainagearea: | Not Reported |
| Contrib drainagearea units: | Not Reported | Latitude: | 35.7591203 |
| Longitude: | -119.254276 | Sourcemap scale: | 24000 |
| Horiz Acc measure: | 1 | Horiz Acc measure units: | seconds |
| Horiz Collection method: | Interpolated from map | | |
| Horiz coord refsys: | NAD83 | Vert measure val: | 302 |
| Vert measure units: | feet | Vertacc measure val: | 2.5 |
| Vert accmeasure units: | feet | | |
| Vertcollection method: | Interpolated from topographic map | | |
| Vert coord refsys: | NGVD29 | Countrycode: | US |
| Aquifername: | Central Valley aquifer system | | |
| Formation type: | Not Reported | | |
| Aquifer type: | Not Reported | | |
| Construction date: | 19811009 | Welldepth: | 1420 |
| Welldepth units: | ft | Wellholedepth: | 1440 |
| Wellholedepth units: | ft | | |

Ground-water levels, Number of Measurements: 0

---

**C25**
**North**
**1/2 - 1 Mile**
**Higher**

**CA WELLS** **15885**

**Water System Information:**

| | | | |
|---|---|---|---|
| Prime Station Code: | 25S/25E-14D01 M | User ID: | CYA |
| FRDS Number: | 1510005016 | County: | Kern |
| District Number: | 12 | Station Type: | WELL/AMBNT/MUN/INTAKE |
| Water Type: | Well/Groundwater | Well Status: | Active Treated |
| Source Lat/Long: | 354534.0 1191509.0 | Precision: | 100 Feet (one Second) |
| Source Name: | WELL 19 - TREATED | | |
| System Number: | 1510005 | | |
| System Name: | DELANO, CITY OF | | |
| Organization That Operates System: | | | |
| | 725 S LEXINGTON | | |
| | DELANO, CA 93215 | | |
| Pop Served: | 29944 | Connections: | 6098 |
| Area Served: | DELANO | | |

| | | | |
|---|---|---|---|
| Sample Collected: | 01/26/2011 | Findings: | 15. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 04/11/2011 | Findings: | 15. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 04/25/2011 | Findings: | 580. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 07/01/2011 | Findings: | 13. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 07/06/2011 | Findings: | 560. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 07/11/2011 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 08/09/2011 | Findings: | 10.3 PCI/L |
| Chemical: | GROSS ALPHA | | |
| Sample Collected: | 08/09/2011 | Findings: | 0.33 PCI/L |
| Chemical: | GROSS ALPHA COUNTING ERROR | | |
| Sample Collected: | 10/04/2011 | Findings: | 560. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10/04/2011 | Findings: | 13. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 12/14/2011 | Findings: | 740. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 06/04/2012 | Findings: | 19. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 06/12/2012 | Findings: | 540. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 07/11/2012 | Findings: | 1. UNITS |
| Chemical: | COLOR | | |
| Sample Collected: | 07/11/2012 | Findings: | 549. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 07/11/2012 | Findings: | 8.86 |
| Chemical: | PH, LABORATORY | | |
| Sample Collected: | 07/11/2012 | Findings: | 57. MG/L |
| Chemical: | ALKALINITY (TOTAL) AS CACO3 | | |
| Sample Collected: | 07/11/2012 | Findings: | 57. MG/L |
| Chemical: | BICARBONATE ALKALINITY | | |
| Sample Collected: | 07/11/2012 | Findings: | 6.2 MG/L |
| Chemical: | CARBONATE ALKALINITY | | |
| Sample Collected: | 07/11/2012 | Findings: | 26. MG/L |
| Chemical: | HARDNESS (TOTAL) AS CACO3 | | |
| Sample Collected: | 07/11/2012 | Findings: | 10. MG/L |
| Chemical: | CALCIUM | | |
| Sample Collected: | 07/11/2012 | Findings: | 100. MG/L |
| Chemical: | SODIUM | | |

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

| | | | |
|---|---|---|---|
| Sample Collected: | 07/11/2012 | Findings: | 74. MG/L |
| Chemical: | CHLORIDE | | |
| Sample Collected: | 07/11/2012 | Findings: | 0.46 MG/L |
| Chemical: | FLUORIDE (F) (NATURAL-SOURCE) | | |
| Sample Collected: | 07/11/2012 | Findings: | 18. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 07/11/2012 | Findings: | 270. MG/L |
| Chemical: | TOTAL DISSOLVED SOLIDS | | |
| Sample Collected: | 07/11/2012 | Findings: | 19. MG/L |
| Chemical: | NITRATE (AS NO3) | | |
| Sample Collected: | 07/11/2012 | Findings: | 0.15 NTU |
| Chemical: | TURBIDITY, LABORATORY | | |
| Sample Collected: | 07/24/2012 | Findings: | 540. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10/16/2012 | Findings: | 550. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10/16/2012 | Findings: | 15. UG/L |
| Chemical: | ARSENIC | | |
| Sample Collected: | 10/22/2012 | Findings: | 550. US |
| Chemical: | SPECIFIC CONDUCTANCE | | |
| Sample Collected: | 10/22/2012 | Findings: | 15. UG/L |
| Chemical: | ARSENIC | | |

# GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
# RADON

**AREA RADON INFORMATION**

State Database: CA Radon

Radon Test Results

| Zipcode | Num Tests | > 4 pCi/L |
|---|---|---|
| 93215 | 3 | 0 |

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

---

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

| Area | Average Activity | % <4 pCi/L | % 4-20 pCi/L | % >20 pCi/L |
|---|---|---|---|---|
| Living Area - 1st Floor | 1.422 pCi/L | 98% | 2% | 0% |
| Living Area - 2nd Floor | Not Reported | Not Reported | Not Reported | Not Reported |
| Basement | Not Reported | Not Reported | Not Reported | Not Reported |

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

## HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

## HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

## GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

## LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

## OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

# PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

**STREET AND ADDRESS INFORMATION**

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# APPENDIX E

## PREVIOUS INVESTIGATION

THE TWINING LABORATORIES, INC.
EST. 1898
ANALYTICAL CHEMISTRY • ENVIRONMENTAL SERVICES
GEOTECHNICAL ENGINEERING • SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

# SOUTHEAST CORNER OF THE INTERSECTION OF

# WOOLLOMES AVENUE AND STRADLEY AVENUE

# APN 521-040-43-00-5

# DELANO, KERN COUNTY, CALIFORNIA

Prepared For:

**YK America International, Inc.**
10508 Lower Azusa Road, # 200
El Monte, California 91731

Prepared By:

**The Twining Laboratories, Inc.**
2527 Fresno Street
Fresno, California 93721

C68501.01

May 5, 2005

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ACRONYMS

| | |
|---|---|
| AST(s) | Aboveground Storage Tank(s) |
| AWP | Annual Workplan |
| CAL-EPA | State of California, Environmental Protection Agency |
| CERCLIS | Comprehensive Environmental Responsibility, Compensation, and Liability Information System |
| CIWMB | California Integrated Waste Management Board |
| CRWQCB-CVR | California Regional Water Quality Control Board, Central Valley Region |
| DTSC | Department of Toxic Substances Control |
| ERNS | Emergency Response and Notification System |
| KCAO | Kern County Assessor's Office |
| KCEHD | Kern County Environmental Health Department |
| KCRO | Kern County Recorder's Office |
| LUST | Leaking Underground Storage Tank |
| NPL | National Priority List |
| RCRA | Resource Conservation and Recovery Act |
| SWIS | Solid Waste Information System |
| SWRCB | State Water Resource Control Board |
| TSD | Hazardous Waste Transport, Storage, or Disposal Facilities |
| US EPA | United States Environmental Protection Agency |
| UST(s) | Underground Storage Tanks(s) |

## 1.0 INTRODUCTION

The Twining Laboratories, Inc. (Twining) was retained by YK America International, Inc to conduct a Phase I Environmental Site Assessment (Phase I) at an approximately 77 acre property located on the southeast corner of the intersection of Woollomes and Stradley Avenues, city of Delano, Kern County, California (Site). This Phase I was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (Standard Designation E 1527-00), published July 2000, and in accordance with Twining's proposal to Mr. Geary Coats of YK America International, Inc. dated March 28, 2005.

### 1.1 Objective

The objective of this assessment is to identify recognized environmental conditions located at the Site or adjacent properties which could present material risk of harm to public health or to the environment. Recognized environmental conditions are defined within ASTM Designation E-1527-00 as the presence or likely presence of any hazardous wastes and/or substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

### 1.2 Scope of Services

The Phase I Scope of Services included the following tasks:

- A review of the current and past uses of the Site since 1937;
- A Site reconnaissance to assess evidence of current and/or past use or storage of toxic or hazardous material; on-Site ponds, landfills, drywells, waste streams or other disposal units; visible soil discoloration; aboveground or underground storage tanks; electrical transformers containing polychlorinated biphenyls (PCBs); and drums, barrels and other storage containers;
- A visual review of adjacent properties to assess their potential to adversely impact the Site;
- A review of available federal and state Environmental Protection Agency (EPA) lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site area. Using area-profile services, Twining cataloged sites in the vicinity of the Site that have been identified on regulatory agency lists. Search criteria were in conformance with ASTM Standard E 1527-00;
- Contact with relevant municipal, county and state agencies to review readily available records and permits; and
- Preparation of this written report to present the findings and conclusions.

The Scope of Services specifically excluded sampling and analysis for the potential presence of asbestos containing building materials or lead based paint, or an assessment for radon gas. In addition, the Scope of Services did not include the collection and/or analysis of air, soil, groundwater, or other environmental samples.

## 1.3 Limitations

The purpose of an environmental assessment is to reasonably assess the potential for, or actual impact of, past practices on a given site which may pose an environmental impairment to it. No assessment is thorough enough to identify all potential environmental impairments at a given site. If environmental impairments have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such conditions on the site, but rather the result of the services performed within the scope, limitations, and cost of the work performed.

The conclusions presented in this report are solely professional opinions based on information provided regarding the Site and the findings of the reconnaissance and records search. Information obtained from the aerial photographs is an interpretation of features observed in the photographs. Actual conditions at the Site may have been different from those interpreted. Conclusions presented are based on conditions as they existed at the time the work was performed. Changes in existing conditions of the Site due to time lapse, natural causes, or operations adjacent to the Site may deem conclusions presented invalid, unless the changes are reviewed and the conclusions reevaluated. Such conditions may require additional field and laboratory investigations to assess if the conclusions are applicable considering the changed conditions.

This work was performed for the sole use of our client, YK America International, Inc. Any reliance on this report by a third party is at such party's sole risk. Others who seek to rely on the findings have a duty to determine the adequacy of this report for their intended use, time, and location. Twining does not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report. No other warranty, either express or implied, is made. The standard of practice is time-dependent. Services provided were performed consistent with generally-accepted professional consulting principles and practices for environmental assessors in Kern County, California at the time the work was performed. The findings and conclusions presented in this report are solely professional opinions derived in accordance with current standards of professional practice. There were no limiting conditions encountered during the completion of this Phase I.

## 2.0 SITE DESCRIPTION

Information concerning the Site was obtained from a Site reconnaissance conducted by Mr. Joshua Rhodes and Zubair Anwar, representatives of the Twining Fresno, California office on Tuesday, April 5, 2005; interviews with Site representatives; and review of the documents referenced in Section 3.0 of this report.

### 2.1 Location and Description of the Site

The Site is located on the southeast corner of the intersection of Woollomes and Stradley Avenues, Kern County, California. The Kern County Assessor's Office has assigned Assessor's Parcel Number (APN) 521-04-043, and listed the owner as:

**Eugene Black**
**17840 North Saddle Drive**
**Surprise, Arizona 85374**

The Site is an approximately 77 acre parcel consisting of agricultural land that is currently in production of crops. A Site location map is presented as Drawing 1, and a Site plan is presented as Drawing 2 in Appendix A. Additionally, photographs were taken during the Site reconnaissance and selected photographs of the Site are presented in Appendix B.

### 2.2 Physical and Environmental Setting of the Site

Physical and environmental characteristics of the Site including topography, geology, soil, and hydrogeology were evaluated based on Site observations, published literature, and maps.

#### Topography

Topographic map coverage of the Site is provided by the United States Geological Survey (USGS), Pond, California, 7.5-minute quadrangle map dated 1953, photorevised 1969, and photoinspected 1973. The Site lies within the northwest quarter of Section 23, Township 25 South, Range 25 East, Mount Diablo Baseline and Meridian. According to the map, the Site is located at an elevation of approximately 275 feet above mean sea level, and the land surface is gently sloped to the northwest. Areas to the southeast of the Site appear to be topographically upgradient.

#### Geology

The Site is located within the southern portion of the San Joaquin Valley in Kern County, California. The San Joaquin Valley is part of the Great Valley Geomorphic Province, a topographic and structural basin bounded on the east by the Sierra Nevada and to the west by the Coast Range. The Sierra Nevada, a fault block dipping gently to the southwest, is composed of igneous and

metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley (USGS, 1986).

**Hydrogeology**

The depth of first encountered groundwater underlying the Site has not been assessed. However, according to hydrograph data displayed on the California Department of Water Resources, Water Data Library website (http://wdl.water.ca.gov), the depth to first encountered groundwater underlying the Site is estimated to be approximately 180 feet below grade. The nearest surface waterway to the Site is a agricultural run-off pond, which is located in the western portion of the Site.

**Soils**

According to the Soil Survey of Kern County, California, native soils in the vicinity of the Site are Wasco sandy loam (0 to 2 percent slopes), Garces silt loam (0 to 2 percent slopes) and Kimberlina fine sandy loam (0 to 2 percent slopes). Characteristics of these soil types are described below.

Wasco sandy loam, 0 to 2 percent slopes
Run-off is slow, and the available water holding capacity is low to moderate. The hazard of water erosion is slight and permeability of this soil is moderately rapid.

Garces silt loam, 0 to 2 percent slopes
Run-off is slow, and the hazard of water erosion is slight. The soil is well drained and water holding capacity is low to high.

Kimberlina fine sandy loam, 0 to 2 percent slopes
Run-off is slow, and the hazard of water erosion is slight. Permeability is moderate and the water holding capacity is high.

## 3.0 INFORMATION FROM THE SITE RECONNAISSANCE

Twining's Site reconnaissance was conducted on Tuesday, April 5, 2005 by Mr. Joshua Rhodes and Mr. Zubair Anwar, representatives of the Twining Fresno, California Office. The Site reconnaissance included a Site walk to observe and photograph any specific indicators of environmental concern at the Site. There were no significant limitations encountered at the time of the Site reconnaissance.

The findings of the Site reconnaissance are summarized below. A Site Plan depicting the Site, adjoining property use, and observed on-Site features is presented as Drawing 2 in Appendix A. Copies of selected photographs are presented in Appendix B.

### 3.1 Site Reconnaissance - Description of Structures, Roads, & Other Site Improvements

Woollomes and Stradley Avenues form the northern and western boundaries of the Site, respectively. An agricultural service road forms the eastern boundary of the Site. Additionally, an agricultural service road traverses the central portion of the Site from north to south. An agricultural run off pond is located on the western portion of the Site. Two agricultural wells are located on the Site. The wells are located on the northeastern portion and western portion of the Site.

### 3.2 Current Uses of the Site

The Site is currently in fallow crop production.

### 3.3 Current Uses of the Adjoining Properties

Woollomes Avenue adjoins the Site to the north, with vacant property beyond the roadway. The adjoining property to the south of the Site is currently vacant. Stradley Avenue adjoins the site to the west, with a transfer station operated by Kern County Waste Management beyond the avenue. The adjoining property to the east of the Site is vacant with the exception of northwestern potion, which is residential housing.

### 3.4 Specific Indicators of Environmental Concern

**Hazardous Substances and Wastes**

Twining did not observe any hazardous substances or wastes at the Site on the day of the Site reconnaissance.

**Underground Storage Tanks (USTs) / Aboveground Storage Tanks (ASTs)**

Visual indications of USTs such as vent lines or fill ports were not observed on the Site during Twining's Site reconnaissance. Additionally, there were no indications of ASTs observed on the Site during the Site reconnaissance.

**Septic Tanks, Water Wells, and Dry Wells**

No visual indications of septic tanks, water wells, or dry wells were observed on the Site during the Site reconnaissance.

**Drums or Other Storage Containers**

During the Site reconnaissance, Twining observed a 5-gallon pump oil bucket along the western boundary of the Site. No additional drums or other storage containers were observed at the Site during the Site reconnaissance.

**Potential Polychlorinatedbiphenyl (PCB)-Containing Equipment**

During the Site reconnaissance, Twining observed two transformers on western boundary of the Site. The transformers have the potential to contain PCBs. Twining did not observe any additional transformers or other equipment on the Site that may contain PCBs.

**Solid Waste**

No indication of solid waste disposal was observed at the Site during the Site reconnaissance.

**Drains and Sumps**

No drains or sumps were observed on-Site.

**Wastewater**

No wastewater appears to be generated at the Site, with the exception of waste water secreted from the agricultural irrigation of the Site.

**Oil and Gas Wells**

No on-Site oil or gas wells were identified during the Site reconnaissance or within California Department of Conservation - Division of Oil & Gas maps reviewed during this assessment

**Pits, Ponds, and Lagoons**

During the Site reconnaissance, Twining observed an agricultural runoff retention pond on the western portion of the Site. No other pits, ponds, or lagoons were observed at the Site during the Site reconnaissance.

**Pipelines and Pipes of unknown use or origin.**

No pipes of unknown use or origin were observed on the Site. However, Twining identified various irrigation riser pipes and water control valves traversing the Site. The pipes are associated with irrigation activities at the Site.

**Debris, Refuse, and Dumping**

Twining observed minor dumped household refuse along the northern and western boundaries of the Site. The household refuse included items such as a mattress, rags, etc. None of the items observed appear to be hazardous in nature or contain hazardous materials.

**Water Wells**

Twining observed two agricultural water wells on the Site. The agricultural water well located on the northeastern portion of the Site was serviced by electricity, and appeared to be in use at the time of the Site reconnaissance. The agricultural water well located on the western portion of the Site was serviced by electricity and appeared to be in use as an agricultural return pump at the time of the Site reconnaissance.

**Agricultural Chemicals**

No agricultural chemicals, or areas where agricultural chemicals may have been stored or mixed were observed at the Site during the Site reconnaissance. However, because the Site has been used for agricultural purposes, the possibility exists that residual concentrations of environmentally persistent agricultural chemicals that may have been used in the past may remain in soil at the Site.

**Wetlands and Surface Waters**

During the Site reconnaissance, Twining did not observe any wetlands or surface waters on the Site.

**Other Physical Evidence of Contamination**

Indications of contamination (i.e., stressed vegetation, pavement degradation, etc.) were not observed on the Site the day of the Site reconnaissance.

## 4.0 HISTORICAL INFORMATION OF THE SITE AND ADJOINING PROPERTIES.

The history of land-use on and near the Site was determined from interviews, review of historic aerial photographs and topographic and Sanborn maps, building permits, and historic city directories.

### 4.1 Aerial Photograph and Topographic Map Review

Available historical aerial photographs of the Site and vicinity for the years 1956, 1969, 1977, 1984, 1990, and 1995 were reviewed for indications of past use and/or activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. The aerial photographs were reviewed at the Department of Water Resources. San Joaquin District Office, on Tuesday, April 19, 2005.

- The 1956 aerial photograph depicts the Site and adjoining properties as undeveloped land. Woollomes and Stradley Avenues border the Site to the north and west, respectively. Properties beyond the avenues are depicted as vacant.

- The 1977 aerial photograph depicts the Site as agriculturally developed. An agricultural retention pond is depicted along the western boundary. The east, north,

and south adjoining properties are depicted as agriculturally developed. The west adjoining property is depicted as developed as a transfer station.

- The 1984, 1990, and 1995 aerial photographs depict the Site and adjoining properties in similar use as the 1977 aerial photograph observations.

### 4.2 Sanborn Fire Insurance Map Review

Twining reviewed Sanborn Fire Insurance Maps at the Kern County Free Library, located in Bakersfield, California. Sanborn Maps can provide historical information regarding a site. Sanborn Fire Insurance Maps drawn for the city of Delano did not include the Site or surrounding area.

### 4.3 Historical City Directory Review

City directories published by R.L. Polk Company (Polk) for the city of Delano were reviewed at the Kern County Library, located in Bakersfield, California. City directories can provide information concerning past and current occupancy of the Site. Polk city directories for the city of Delano did not include the Site or surrounding area.

### 4.4 Building Permit Review

Building permit records were reviewed to assess features which may present a potential environmental concern. No building permits were found on file for the Site at the Kern County Building Department or the city of Delano building department.

### 4.5 Interviews and Discussion of Environmental Questionnaire and Disclosure Statement

An Environmental Questionnaire and Disclosure Statement was submitted to Mr. Eugene Black, current owner of the Site. The questionnaire was completed and returned, and a copy of the questionnaire is presented in Appendix C.

According to the questionnaire completed by Mr. Back, indicated that he has owned and farmed the Site since 1968. Mr. Black also stated that he is currently leasing the Site to Tillman Hay company and the Site was previously leased to M.B. Farms Additionally, Mr. Black had no knowledge of any on the Site hazardous materials, storage, or disposal, or disposal areas on-Site. Further, Mr. Black had no information regarding releases, or spills of hazardous materials at the Site as a result of illegal dumping, or traffic accidents along the adjoining roadways. Further, Mr. Black had no knowledge of previous or current aboveground or underground storage tanks at the Site.

### 4.6 Previous Investigations

Twining was not supplied with previous investigations for the Site, nor were any identified during the course of this Phase I.

## 4.7 Past Uses of the Site

The Site appears to have been undeveloped since at least 1956 to sometime before 1968, when Mr. Black purchased the property. Since 1968 to present, the Site has been in agricultural use. The agricultural retention pond located on the western portion of the Site has been present on the Site since at least 1977.

## 4.8 Past Uses of the Adjoining Properties

The adjoining properties to the north, east, and south of the Site have been in agricultural use or vacant since at least 1956 to present. The northwestern corner of the east adjoining property has been residentially developed since at least 1977 to present. The property adjoining the Site to the west beyond Stradley Avenue was developed as a transfer station sometime during the mid 1990s.

## 5.0 RECORDS REVIEW

Twining contracted Environmental Data Resources, Inc. (EDR) to perform searches of available federal, state, and local database information systems for the purpose of identifying known recognized environmental conditions present on the Site and nearby properties which have the potential to adversely impact the Site being assessed in this study. Information regarding the list, record, and permit review findings is summarized in Table 1. The complete report furnished by EDR is included in Appendix D of the report.

| Database | On Site | Search Distance | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | Total Hits |
|---|---|---|---|---|---|---|---|---|
| **FEDERAL ASTM STANDARD** | | | | | | | | |
| NPL | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| CERCLIS | | 0.500 | 0 | 0 | 1 | NR | NR | 1 |
| CERC-NFRAP | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| CORRACTS | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| RCRIS-TSD | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| RCRIS Large Quantity Generator | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| RCRIS Small Quantity Generator | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| ERNS | | TP | NR | NR | NR | NR | NR | 0 |
| **STATE ASTM STANDARD** | | | | | | | | |
| AWP | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| Cal-Sites (SMBRP) | | 1.000 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHMIRS | | TP | NR | NR | NR | NR | NR | 0 |
| Cortese | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| Notify 65 | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| Toxic Pits | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| State Landfill | | 0.500 | 0 | 0 | 1 | NR | NR | 1 |
| WMUDS/SWAT | | 0.500 | 0 | 0 | 1 | NR | NR | 1 |
| LUST | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| CA Bond Exp. Plan | | 1.000 | 0 | 0 | 0 | 0 | NR | 0 |
| UST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| VCP | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN LUST | | 0.500 | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN UST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| CA FID UST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |
| HIST UST | | 0.250 | 0 | 0 | NR | NR | NR | 0 |

Search Distance in miles.

NR=Not Requested (ASTM does not require a search at this distance)

TP=Target Property

## 5.1 Facilities Identified in the Regulatory Lists and Record Review

The information regarding the following facilities was obtained from the Kern County Environmental Health Department (KCEHD) in Bakersfield, California and the Regional Water Quality Control Board in Fresno, California (RWQCB):

- **Kern County Dump -McFarland-Delano Sanitary Landfill (MDSL)** is located approximately 269 feet south of the Site. This facility is listed within the Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and Facility Index System (FINDS) databases. According to Mr. Herman Robbins with the Kern County Waste Management Department (KCWMD) the landfill was closed in 1995. During 1999, a landfill gas system was installed and ongoing monitoring of the system indicates that the landfill is stable and relatively dry. Mr. Robbins indicated that shallow groundwater beneath the landfill is found between 37 and 45 feet below ground surface(BGS) and that only landfill gas constituents have been reported in groundwater. Further, based on Mr. Robbins evaluation of data acquired during monitoring, waste degradation created gas has been declining since monitoring started in 1999.

  A review of files with the KCWMD revealed the facility was a class III landfill that operated between 1972 and 1992. Final closure in 1995 included placement of a low permeability cap on the surface. Initial groundwater monitoring at the facility began in 1986 and included the installation of three monitoring wells screened at 40 to 60 feet BGS. Groundwater samples indicated benzene, vinyl chloride, 1,4 dichlorbenzene, tetrachloroethene, and methylene chloride at a concentration above laboratory practical quantitative limits. During 1989, five additional wells were installed at the facility, and from 1990 to 1991, off-site groundwater monitoring wells were installed as part of the Detection Monitoring Program (DMP) to study groundwater at the facility. These studies revealed volatile organic compounds and inorganic compounds south-southeast of the facility (down gradient of the subject Site of this Phase I). Declining groundwater in 1993 necessitated the installation of deep monitioring wells. Currently, an Evaluation Monitoring Program (EMP) is being completed for MDSL. As part of the DMP and EMP, groundwater is sampled on a quarterly basis and analyzed for VOCs, inorganics, and metals constituents. Landfill gas monitoring wells are installed around the perimeter of the former landfill and are monitored quarterly. An upgradient monitoring well MD1-26 was installed in July 2001 (north of the landfill approximately 300 feet and south of the subject Site approximately 400 feet. This well is sampled for background water quality and has been reported during all sampling events as none detected (ND) for all constituents of concern. Based upon the information identified for this facility, the environmental concern posed to the Site from this facility appears low.

- **McFarland-Delano Transfer Station** is located beyond the west adjoining Stradley Avenue. According to Mr. Tony Bonanno with the KCWMD, the transfer station receives municipal waste from the cities of Delano and McFarland. The waste is

compacted at the transfer station and transported to the Shafter landfill. Mr. Bonanno also stated that he does not have any knowledge of ground water monitoring systems utilized at the transfer station. Based upon the information identified for this facility, the environmental concern posed to the Site from this facility appears low.

No other facilities were identified in the list and records review. Therefore, it is Twining's opinion that the environmental concern presented to the Site from off-Site sources appears low.

## 6.0 SUMMARY OF FINDINGS

The findings of the Phase I are summarized in the following sections:

### 6.1 On-Site

The Site appears to have been undeveloped since at least 1956 to sometime before 1968, when the current owner, Mr. Black, purchased the property. Since 1968 to present, the Site has been in agricultural use. An agricultural retention pond has been present on the Site since at least 1977. The pond is used in connection with the agricultural return pump located on the western portion of the Site. During the irrigation process excess water is collected in the pond and pumped back on to the field using the agricultural return pump. Additionally, Twining observed a second agricultural pump on the northeastern portion of the Site. Two transformers were observed on western boundary of the Site. The transformers are reportedly owned and operated by the Pacific Gas & Electric Company. No agricultural chemicals, or areas where agricultural chemicals may have been stored, mixed, and/or formulated were observed at the Site during the Site reconnaissance. However, because the Site has been used for agricultural purposes, the possibility exists that residual concentrations of environmentally persistent agricultural chemicals that may have been used in the past may remain in soil at the Site. Without the collection and analysis of soil samples for environmentally persistent agricultural chemicals, the potential impact to the Site is unknown. With the possible exception of environmentally persistent agricultural chemicals that may have been applied to the Site in the past, the environmental concern posed to the Site from on-Site sources appears low.

### 6.2 Off-Site

The adjoining properties to the north, east, and south of the Site have been in agricultural use or vacant since at least 1956. The northwestern corner of the east adjoining property has been residentially developed since at least 1977 to present. There are no indications that potential impacts to soil and/or groundwater beneath the former landfill have migrated to the subject Site. Therefore, the environmental concern posed to the Site from off-Site sources appears low

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

On behalf of YK America International, Inc., Twining performed a Phase I for a property located southeast of the intersection of Woollomes and Stradley Avenues, in the city Delano, Kern County, California. This Phase I was performed during April 2005, and includes 77 acres of property that has been in agricultural production since 1968 to present. This Phase I has not identified any recognized environmental conditions in connection with the Site, with the exception of the following:

- Because the Site has been in agricultural use, the possibility exists that Site soils may have been impacted by environmentally persistent agricultural chemicals that may have been applied to the Site in the past. Without the collection and analyses of soil samples, the impact to the Site is unknown. If the Site is to be developed for residential or commercial use in the future, it is recommended that soil samples be collected and analyzed to determine if environmentally persistent agricultural chemicals have impacted Site soils.

- Two agricultural water wells that are currently in use were observed on the Site during the Site reconnaissance. A water well not properly abandoned can pose an environmental concern by acting as a direct conduit for contaminants that are dumped or spilled in or near the well to impact groundwater beneath the Site. Twining recommends that if the wells are not to be used in the future, they should be properly abandoned according to California Department of Water Resources guidelines and Kern County requirements

## 8.0 CLOSING

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 of the Site. Any exceptions to, or deletions from, this practice are described in the following paragraph.

The material content of this report is intended to be consistent with a standard of practice as defined by ASTM practice E 1527-00. However, the report format differs in style, arrangement, and presentation of material facts from the format described by ASTM.

We appreciate the opportunity to be of service to you on this project. If you have questions regarding this report, please feel free to contact us at (559) 268-7021.

Sincerely,

**THE TWINING LABORATORIES, INC.**
Environmental Services Division

Zubair Anwar
Environmental Assessor

Joshua Rhodes
Senior Environmental Assessor / Quality Control Reviewer

## 9.0 REFERENCES

American Society for Testing and Materials, 2000, *ASTM Standards on Environmental Site Assessments for Commercial Real Estate*, 2nd ed., E 1527-00, Philadelphia, Pennsylvania.

Munger, Averill H., Ed. 1994. *Munger Map Book, California-Alaska Oil and Gas Fields*. Munger: Los Angeles, California.

United States Department of Agriculture, 1971, *Soil Survey of Kern County, California*; Soil Conservation Service in cooperation with the California Agricultural Experiment Station, U.S. Government Printing Office, Washington D.C.

United States Geological Survey, 1953 photorevised 1969, Pond, California Quadrangle, 7.5 Minute Series Topographic Map.

## 10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

**The Twining Laboratories, Inc.** Phase I Environmental Site Assessment staff is composed of a group of environmental professionals that perform Environmental Site Assessments on a routine basis. The Phase I staff is managed and supervised by individuals who conduct, prepare, oversee, and/or review Environmental Site Assessments on a daily basis. Qualification profiles for these individuals are provided in the following section.

**Joshua S. Rhodes, EIT**
Supervisor - Phase I Environmental Site Assessments

Mr. Rhodes joined Twining's Environmental Division in November of 2003. Since joining Twining, Mr. Rhodes has attended training courses for conducting Phase I environmental site assessments, and hazardous materials operations and emergency response training. Mr. Rhodes has successfully completed these courses and has received forty-hour certification for hazardous materials operations and certification for performing Environmental Site Assessments.

# APPENDIX F

# TITLE DOCUMENTATION

NORTH AMERICAN TITLE COMPANY
Like Clockwork®

101 North Brand Blvd., Suite 1800
Glendale, California 91203
Office Phone: (818)240-4912
Office Fax: (818)551-5337
Email: nchoudhry@nat.com

North American Title Company
101 North Brand Blvd., Suite 1800
Glendale, CA 91203

Our Order No.: 1243424
Property Address: Woollomes Avenue, Delano, CA 93215

Attention: Pamela Del Paine

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**Preliminary Report** Dated as of June 6, 2013 at 7:30 A.M.

In response to the above referenced application for a Policy of Title Insurance,

**First American Title Insurance Company**

Hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and limitations on covered risks of said Policy or Policies are set forth in Exhibit A attached. The Policy to be issued may contain an Arbitration Clause. When the amount of insurance is less than that set forth in the Arbitration Clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the Parties. Limitations on covered risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a deductible amount and a maximum dollar limit of liability for certain coverages are also set forth in Exhibit A. Copies of the Policy forms should be read. They are available from the office which issued this report.

**Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.**

**It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.**

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

The form of Policy of title insurance contemplated by this report is: ALTA Extended Owner Policy - 2006

Please note that the America's First Homeowner's Policy (CLTA/ ALTA Homeowner's Policy) can only be issued on transactions involving individuals as purchasers and residential 1-4 properties. Any indication that the America's First Homeowner's Policy (CLTA/ ALTA Homeowner's Policy) will be issued in a transaction that does not meet these criteria is hereby revised to state that the policy contemplated is a Standard Coverage Policy.

Nader Choudhry, Title Officer

## SCHEDULE A

1. The estate or interest in the land hereinafter described or referred to covered by this report is:

   Fee simple.

2. Title to said estate or interest at the date hereof is vested in:

   JENNIFER LYNN WESTBROOK, SUCCESSOR TRUSTEE, THE BLACK REVOCABLE LIVING TRUST DATED JULY 25, 1989

3. The Land referred to in this report is situated in the State of California, County of Kern, and is described as follows:

**See attached Legal Description**

## LEGAL DESCRIPTION

Real property in the unincorporated area of the County of Kern, State of California, described as follows:

THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 23, TOWNSHIP 25 SOUTH, RANGE 25 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA OF KERN COUNTY, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES LYING BELOW THE SURFACE OF SAID LAND, BUT WITH NO RIGHT OF SURFACE ENTRY, AS PROVIDED IN DEEDS OF RECORD.

APN: 521-040-43-00-5

## SCHEDULE B

At the date hereof exceptions to coverage in addition to the printed exceptions and exclusions in the policy form designated on the face page of this report would be as follows:

1. General and special taxes and assessments for the fiscal year 2013-2014, a lien not yet due or payable.

2. Taxes for proration purposes only for the fiscal year 2012-2013.

| | |
|---|---|
| First Installment: | $2,490.63, PAID |
| Second Installment: | $2,490.62, PAID |
| Tax Rate Area: | 065-003 |
| APN: | 521-040-43-00-5 |

3. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

4. Assessments, if any, for community facility districts affecting said land which may exist by virtue of assessment maps or notices filed by said districts. Said assessments are collected with the County property taxes.

5. Water rights, claims or title to water, whether or not shown by the public records.

6. Rights of the public, county and/or city in that portion lying within the street as it now exists: Stradley Avenue

7. An easement for conduits and incidental purposes, recorded June 13, 1950 as Book 1696, Page 411 of Official Records.
   In Favor of: The United States of America
   Affects: Portion of said land

8. An easement for conduits and incidental purposes, recorded February 25, 1953 as Book 2045, Page 39 of Official Records.
   In Favor of: United States of America
   Affects: Portion of said land

9. An easement for public highway and incidental purposes, recorded April 3, 1957 as Book 2757, Page 381 of Official Records.
   In Favor of: County of Kern
   Affects: The Northerly 30 feet of said land, Woollomes Avenue

10. An irrevocable offer to dedicate a portion of said land for the purposes shown below.

    In favor of: City of Delano, a public agency
    Purpose: Public right-of-way
    Recorded: September 14, 2005 as Instrument No. 0205251992, of Official Records
    Affects: Portion of said land

11. The effect of a deed dated September 26, 2011, executed by Jennifer Lynn Westbrook, Successor Trustee, The Black Revocable Living Trust dated July 25, 1989, as Grantor, to Jennifer Westbrook, Successor Trustee, Exemption Trust under The Black Revocable Living Trust dated July 25, 1989, as to an undivided one-half (1/2) interest and to Jennifer Lynn Westbrook,

Successor Trustee, Survivor's Trust under The Black Revocable Living Trust dated July 25, 1989, as to an undivided one-half (1/2) interest, as Grantee, recorded October 14, 2011, as Instrument No. 0211135666 of Official Records.

The requirement that this office be furnished with evidence that the deed was an absolute conveyance for value, and that there are no other agreements, oral or written, regarding the ownership of the land described herein.

12. An easement for public utilities and incidental purposes, recorded January 10, 2013 as Instrument No. 0213004485 of Official Records.

| | |
|---|---|
| In Favor of: | Southern California Edison Company, a corporation, its successors and assigns |
| Affects: | The Southerly 20.00 feet of the Northerly 50.00 feet of the Easterly 845.00 feet |

13. We find no open deeds of trust. Escrow please confirm before closing.

14. With respect to the trust referred to in the vesting:
a. A certification pursuant to Section 18100.5 of the California Probate Code in a form satisfactory to the Company.
b. Copies of those excerpts from the original trust documents and amendments thereto which designate the trustee and confer upon the trustee the power to act in the pending transaction.
c. Other requirements which the Company may impose following its review of the material required herein and other information which the Company may require.

15. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

16. Any rights, interests, or claims of parties in possession of the land not shown by the public records.

********** END OF REPORT **********

## ***** NOTES *****

1. This report is preparatory to the issuance of an ALTA Loan Policy. We have no knowledge of any fact which would preclude the issuance of the policy with CLTA endorsement forms 100 and 116 and if applicable, 115 and 116.2 attached.

   When issued, the CLTA endorsement form 116 or 116.2, if applicable will reference a(n) Agriculture known as Woollomes Avenue, Delano, California, 93215.

2. According to the public records, there has been no conveyance of the land within a period of twenty four months prior to the date of this report, except as follows:

   A document recorded October 14, 2011 as Instrument No. 0211135666 of Official Records.
   From: Jennifer Lynn Westbrook, Successor Trustee, The Black Revocable Living Trust dated July 25, 1989
   To: Jennifer Westbrook, Successor Trustee, Exemption Trust under The Black Revocable Living Trust dated July 25, 1989, as to an undivided one-half (1/2) interest and to Jennifer Lynn Westbrook, Successor Trustee, Survivor's Trust under The Black Revocable Living Trust dated July 25, 1989, as to an undivided one-half (1/2) interest

3. Short term rate applies.

4. Notice of change in ownership recording procedure

   Effective July 1, 1985 pursuant to state law as amended January 1, 2011 (Section 480.3 of the Revenue and Taxation Code), all Deeds and other Documents that reflect a change in ownership must be accompanied by a Preliminary Change of Ownership Report to be completed by the transferee.

   If this special report is not presented at the time of recording, an additional recording fee of $20.00, as required by law, will be charged.

   Preliminary Change in Ownership forms, instructions on how to complete them, and a non-exclusive list of documents that are affected by this change, are available from the County Recorder's Office or the Office of the County Assessor.

5. GOOD FUNDS LAW

   Under Section 12413.1 of the California Insurance Code, North American Title Company, Inc. may only make funds available for disbursement in accordance with the following rules:

   Same day availability. Disbursement on the date of deposit is allowed only when funds are deposited to North American Title Company, Inc. by Cash or Electronic Transfer (Wire). Cash will be accepted only under special circumstances and upon approval by management.

   Next business day availability. If funds are deposited to North American Title Company, Inc. by cashier's checks, certified checks or teller's checks, disbursement may be on the next business day following deposit. A "teller's check" is one drawn by an insured financial institution against another insured financial institution (e.g., a savings and loan funding with a check drawn against a FDIC insured bank).

   Second business day availability. If the deposit is made by checks other than those described in paragraphs 1 and 2 above, disbursement may occur on the day when funds must be made

available to depositors under Federal Reserve Regulation CC. In most cases, these checks will be available on the second business day following deposit. (For further details, consult California Insurance Code Section 12413, et seq. and Regulation CC).

These are the minimum periods before funds will be made available. North American Title Company, Inc. is not obligated to disburse funds at the expiration of the time periods above, and expressly reserves the right to require additional time before disbursing on deposited funds. Close of escrow and final disbursement will not be made based on deposits in the form of personal checks, corporate checks, credit union checks, money market checks, travelers checks and official checks until confirmation of final clearance of the funds.

North American Title Company will not be responsible for accruals of interest or other charges resulting from compliance with the disbursement restrictions imposed by state law.

For Your Information, Our Wire Instructions Are:

| **Wire To:** | **Credit the Account of:** |
|---|---|
| Comerica Bank | North American Title Company, Inc. |
| 2321 Rosecrans Ave, Ste 5000 | Bank Account No.: 1892091172 ABA No.: 121137522 |
| El Segundo, CA 90245 | Escrow No. 91401-1243424-13 |

**ACH FUNDS** - Automatic Clearing House

North American Title Company, Inc. will not accept funds in the form of ACH transfers.

Be sure to reference our order number 91401-1243424-13.

Should this office be required to wire funds out at close of escrow, please be informed that wiring instructions should be received as soon as possible, but no later than the following times.

Wires outside the State of California:
11:00 A.M. ON DATE OF WIRE

Wires within the State of California:
12:00 P.M. ON DATE OF WIRE

Effective January 1, 1991

A service charge of $25.00 will be assessed for all funds disbursed by this Company by wire.

6. Payoff Requirement

If any of the deeds of trust shown in this Preliminary Report secures a revolving credit loan, this Company will require prior to closing that:

1. The Borrower provide authorization to the Lender to freeze the loan from further disbursements and that we be provided with proof that the account has been frozen and the effective date of the freeze.

2. All unused checks, voided checks and/or credit cards be submitted to this Company.

3. There are no outstanding checks unpaid.

4. Should the Company be unable to ascertain that one or more of the above have not been complied with, we will withhold from the proceeds the maximum amount of the loan obligation until such time as we may verify that the payoff was sufficient to obtain a full reconveyance.

7. North American Title Company, Inc.'s charges for recording the transaction documents include charges for services performed by North American Title Company, Inc., in addition to an estimate of payments to be made to governmental agencies.

8. The map attached, if any, may or may not be a survey of the land depicted hereon. North American Title Company expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

**NORTH AMERICAN TITLE COMPANY**
101 North Brand Blvd., Suite 1800, Glendale, CA 91203
(818)240-4912
Fax: (818)551-5337 Email: nchoudhry@nat.com

Attention:

Your Ref:
Our Order No.: 91401-1243424-13

**LENDERS SUPPLEMENTAL REPORT**

Dated as of June 6, 2013 AT 7:30 A.M.

Title Officer: Nader Choudhry

The above numbered report (including any supplements or amendments thereto) is hereby modified and/or supplemented in order to reflect the following additional items relating to the issuance of an American Land Title Association loan form policy of Title Insurance:

Our ALTA Loan Policy, when issued, will contain Endorsement Nos. 100 and 116.

There is located on said land a Agriculture
Known as: Woollomes Avenue
Unincorporated Area of Delano
County of Kern
State of California.

North American Title Company

## EQUITY LINE AFFIDAVIT AND INSTRUCTIONS

With regard to our _____
Original Lender Equity /Credit Line

Address: _____

Currently held by _____
Bank/Lender (Beneficiary)

Address:_____

Deed of Trust: (date recorded) _____ (as Instrument Number) _____

Loan/Account # _____, we hereby certify that:

Outstanding Balance, as of Date below $_____

## BORROWER(S) CERTIFICATION:

To induce the above-named Lender to issue its demand and thereafter, its reconveyance upon satisfaction of the lien described in the demand, the undersigned hereby certifies as follows:

- I/We have destroyed all credit cards and/or personalized checks for the above referenced account. The last check # _____ has cleared and that there are no other outstanding checks or charges on this account as of the date indicated below or I/We have not drawn checks or made charges on this account since day_____ year _____.
- I/We are returning herewith all credit cards and/or unused personalized checks in our possession, cut in half, unless previously destroyed.
- I/We have notified any merchant, to whom we have pre-authorized charges, to cancel said charge (i.e., insurance premium, subscriptions, membership fees, loan payments, etc.).
- I/We will be responsible for any and all charges which are presented for payment, including charges presented after the requested demand is prepared.

If North American Title Company advances, on my/our behalf, funds to pay off the Equity Line / Credit Line in full, I/We agree, upon written demand, to promptly reimburse North American Title Company.

**CONTINUED ON NEXT PAGE**

## Freeze and Close Account
## (Lender Instructions)

I/We hereby instruct the above named Lender to freeze the above referenced account and make no further disbursements. I/We further instruct you to issue your demand statement to North American Title Company and that said demand indicates that the account has been frozen and no further disbursements will be authorized. Upon payment in full by North American Title Company, you are instructed to close the above referenced account and forward a reconveyance/release and/or satisfaction to the appropriate county recorder's office for recording in accordance with California Civil Code Sections 2941 and 2943, as amended, which became effective January 1, 2002.

I/We acknowledge this affidavit is given to induce the above named Lender to accept funds as a full payoff of the account, and that it is a crime under federal law to knowingly make any false statement, or report, for the purpose of influencing the actions of any federally insured institution.
I/We declare under penalty of perjury, pursuant to state and federal law, that the foregoing is true and correct.

_____ _____
Owner/Borrower Date

_____ _____
Owner/Borrower Date

## AUTHORIZATION TO CLOSE ACCOUNT

In accordance with your demand, we have remitted funds in the amount of $_____ to pay the above-referenced line of credit in full. This line of credit has now been fully paid off, and you are hereby instructed to close this line of credit.

Please issue your Deed of Full Reconveyance, Release of Lien and/or Satisfaction and forward it directly to the County Recorder for recording.

PLEASE NOTE: The amended California Civil Code Sections 2941 and 2943, effective January 1, 2002, require the Beneficiary, or Trustee, to execute a Reconveyance within 51 days after receipt in payment in full; and further require the Beneficiary, or Trustee, to record the Full Reconveyance directly with the county recorder of the county in which the Deed of Trust was recorded. The reconveyance must show the payor's name and mailing address in the area indicated as "When Recorded Mail to" or the document will be declined by the county recorder.

Any overpayment should be sent to the undersigned, at the following address:

_____

_____

Borrower(s) Signature:

_____ _____

**********END OF ATTACHMENT**********

# NORTH AMERICAN TITLE GROUP FAMILY OF COMPANIES
## Privacy Policy Notice (7/01/12)

We at the North American Title Group family of companies take your privacy very seriously. This Notice is being given on behalf of each of the companies listed below1 (the "North American Title Companies"), as well as on behalf of North American Advantage Insurance Services, LLC. It explains our policy regarding the personal information of our customers and our former customers.

**OUR PRIVACY POLICIES AND PRACTICES**

***The North American Title Companies***

**1. Information North American Title Companies collect, and the sources from which we collect it:** On forms related to your real estate transaction, North American Title Companies collect personal information that you, our affiliates or third parties have provided to us, such as, for example, your name, address, and sale price of your home. All of the information that we collect is referred to in this notice as "NAT Collected Information".

**2. What information North American Title Companies disclose to our affiliates:** From time to time, as permitted by law, the North American Title Companies may share NAT Collected Information with each other and with North American Advantage Insurance Services, LLC ("NAAIS") about customers and former customers. You may ask us not to share NAT Collected Information among the North American Title Companies and NAAIS by writing to us and letting us know at: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. Your request will not affect NAT Collected Information that the North American Title Companies are otherwise permitted by law to share, such as, in certain circumstances, NAT Collected Information related to our experiences and transactions with you.

**3. What information North American Title Companies disclose to third parties:**

- If permitted by federal law and the law of your state, we may disclose some or all of the following information to companies that perform marketing services on our behalf and to certain unaffiliated insurance companies with whom we have joint marketing agreements: your name, current address, purchased property address, and closing date.
- We also may share NAT Collected Information about customers and former customers with other unaffiliated third parties, as permitted by law. For example, NAT Collected Information may be shared in certain circumstances (A) with companies involved in servicing or processing your account (B) with insurance regulatory authorities, and (C) with law enforcement officials, to protect against fraud or other crimes.

**4. Your right to access your personal information:** You have the right to review your personal information that we have on record about you. If you wish to review that information, please contact the local North American Title Company office identified on the title insurance product to which this notice is attached or where you received this notice and give us a reasonable time to make that information available to you. If you believe any information is incorrect, notify us, and if we agree, we will correct it. If we disagree, we will advise you in writing why we disagree.

***North American Advantage Insurance Services, LLC***

**1. Information North American Advantage Insurance Services, LLC ("NAAIS") collect and sources from which we collect it:** NAAIS collects personal information about you from you, our affiliates, or third parties on forms related to your transaction with NAAIS or a North American Title Company, such as your name, address, or information about the property that is or will be insured. We also receive information from companies, which compile and distribute public records. All of the information that NAAIS collects, as described in this paragraph, is referred to in this notice as "NAAIS Collected Information."

**2. Information NAAIS may disclose to its affiliates or third parties:** NAAIS may disclose NAAIS Collected Information about you or others without your permission as permitted or required by law, including to the following types of institutions for the reasons described:

- To a third party or an affiliate if the disclosure will enable that party to perform a business, professional or insurance function for us in connection with an insurance transaction involving you.
- To an insurance institution, agent, or credit reporting agency in order to detect or prevent criminal activity, fraud or misrepresentation in connection with an insurance transaction.
- To an insurance institution, agent, or credit reporting agency for either this agency or the entity to whom we disclose the information to perform a function in connection with an insurance transaction involving you.

- To an insurance regulatory authority, law enforcement, or other governmental authority in order to protect our interests in preventing or prosecuting fraud, or if we believe that you have conducted illegal activities.

**3. Your right to access and amend your personal information:** You have the right to request access to the personal information that we record about you. Your right includes the right to know the source of the information and the identity of the persons, institutions or types of institutions to whom we have disclosed such information within two (2) years prior to your request. Your right includes the right to view such information and copy it in person, or request that a copy of it be sent to you by mail (for which we may charge you a reasonable fee to cover our costs). Your right also includes the right to request corrections, amendments or deletions of any information in our possession. The procedures that you must follow to request access to or an amendment of your information are as follows:

To obtain access to your information: You should submit a request in writing to: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. The request should include your name, address, social security number, telephone number, and the recorded information to which you would like access. The request should state whether you would like access in person or a copy of the information sent to you by mail. Upon receipt of your request, we will contact you within 30 business days to arrange providing you with access in person or the copies that you have requested.

To correct, amend, or delete any of your information: You should submit a request in writing to: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. The request should include your name, address, social security number, telephone number, the specific information in dispute, and the identity of the document or record that contains the disputed information. Upon receipt of your request, we will contact you within 30 business days to notify you either that we have made the correction, amendment or deletion, or that we refuse to do so and the reasons for the refusal, which you will have an opportunity to challenge.

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**SECURITY PROCEDURES**

We restrict access to NAT Collected Information and NAAIS Collected Information about you to individuals who need to know such information in order to provide you with your product or service. We maintain physical, electronic and procedural safeguards to protect NAT Collected Information and NAAIS Collected Information about you.

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**CHANGES TO OUR PRIVACY POLICY**

This Notice reflects our privacy policy as of July 1, 2012. We reserve the right to change, modify or amend this policy at any time. Please check our Privacy Policy periodically for changes.

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[1]The North American Title Group Family of Companies are: North American Title Company; North American Title Insurance Company; North American Title Alliance, LLC; North American Title Florida Alliance, LLC; North American Services, LLC; North American Exchange Company; North American Title Agency; North American Abstract Agency; North American Legal Services, L.L.C.; NASSA, LLC; North American Real Estate Group, LLC; Benjamin Management Group, Inc.; North American Title, LLC; and North American National Title Solutions, LLC.

********

**ACKNOWLEDGEMENT**

Your receipt of a copy of the preliminary report, commitment, your policy of insurance, or escrow documents accompanied by this Notice will constitute your acknowledgment of receipt of this Privacy Policy Notice.

**Exhibit A (Revised 06-04-10)**

**CLTA STANDARD COVERAGE POLICY – 1990**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

(a) Any law, ordinance or governmental regulation (including but not limited to building or zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien, or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

(b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate of interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

**EXCEPTIONS FROM COVERAGE - SCHEDULE B, PART I**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (10/22/03)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. Land use
   d. improvements on the Land
   e. Land division
   f. environmental protection
   This Exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.
   This Exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. a notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.
   This Exclusion does not limit the coverage described in Covered Risk 11 or 18.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 14, 15, 16 and 18, Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 14: | 1% of Policy Amount or $2,500 (whichever is less) | $10,000 |
| Covered Risk 15: | 1% of Policy Amount or $5,000 (whichever is less) | $10,000 |
| Covered Risk 16: | 1% of Policy Amount or $5,000 (whichever is less) | $25,000 |
| Covered Risk 18: | 1% of Policy Amount or $2,500 (whichever is less) | $5,000 |

**CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (01-01-08)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   a. building;
   b. zoning;
   c. land use;
   d. improvements on the Land;
   e. land division; and
   f. environmental protection.

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 16: | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $10,000 |
| Covered Risk 18: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $10,000 |
| Covered Risk 19: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $25,000 |
| Covered Risk 21: | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $5,000 |

**CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (02-03-10)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   a. building;
   b. zoning;
   c. land use;
   d. improvements on the Land;
   e. land division; and
   f. environmental protection.

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.

3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.
   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.
7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:
- For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 16: | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $10,000 |
| Covered Risk 18: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $10,000 |
| Covered Risk 19: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $25,000 |
| Covered Risk 21: | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $5,000 |

**ALTA RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:
1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   * land use
   * improvements on the land
   * land division
   * environmental protection
   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:
   * a notice of exercising the right appears in the public records
   * on the Policy Date
   * the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking
3. Title Risks:
   * that are created, allowed, or agreed to by you
   * that are known to you, but not to us, on the Policy Date -- unless they appeared in the public records
   * that result in no loss to you
   * that first affect your title after the Policy Date -- this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   * to any land outside the area specifically described and referred to in Item 3 of Schedule A
   OR
   * in streets, alleys, or waterways that touch your land
   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

**ALTA LOAN POLICY (10-17-92)**
**WITH ALTA ENDORSEMENT- FORM 1 COVERAGE**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.

3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) Resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine or equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgement or lien creditor.

The above policy forms may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**2006 ALTA LOAN POLICY (06-17-06)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:
1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
      (i) the occupancy, use, or enjoyment of the Land;
      (ii) the character, dimensions, or location of any improvement erected on the Land;
      (iii) the subdivision of land; or
      (iv) environmental protection;
      or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**ALTA OWNER'S POLICY (10-17-92)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgement or lien creditor.

The above policy forms may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage Policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**2006 ALTA OWNER'S POLICY (06-17-06)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
      (i) the occupancy, use, or enjoyment of the Land;
      (ii) the character, dimensions, or location of any improvement erected on the Land;
      (iii) the subdivision of land; or
      (iv) environmental protection;
      or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown in the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and that are not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (10/13/01)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the Land; (iii) a separation in ownership or a change in the dimensions or areas of the Land or any parcel of which the Land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting In no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (this paragraph does not limit the coverage provided under Covered Risks 8, 16, 18, 19, 20, 21, 22, 23, 24, 25 and 26); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.
5. Invalidity or unenforceability of the lien of the Insured Mortgage, or claim thereof, which arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, except as provided in Covered Risk 27, or any consumer credit protection or truth in lending law.
6. Real property taxes or assessments of any governmental authority which become a lien on the Land subsequent to Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 7, 8(e) and 26.
7. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided in Covered Risk 8.
8. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting the title, the existence of which are Known to the Insured at:
   (a) The time of the advance; or
   (b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of Interest is greater as a result of the modification than it would have been before the modification. This exclusion does not limit the coverage provided in Covered Risk 8.
9. The failure of the residential structure, or any portion thereof to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at Date of Policy.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (01-01-08)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11,16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing -business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (02-03-10)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.
9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

## NATCO NOTES:

**DON'T DELAY YOUR CLOSE OF ESCROW! IF ANY OF THE FOLLOWING ITEMS AFFECT YOUR TRANSACTION, PLEASE NOTIFY YOUR ESCROW OFFICER AS SOON AS POSSIBLE.**

**I. Ongoing Construction**

The Title Company will require, as a minimum, the following prior to insuring:

A. Valid Notice of Completion verified by inspection and expiration of 60 days from recordation of said notice or;
B. Approved Indemnities from Borrower/Seller, approved financial statement not over one year old and a waiver of lien rights from the general contractor.
C. The Title Company may also require proof of payment of subcontractors, indemnity and financial statement from the general contractor, a copy of the contract and the with-holding of a sum of money, to cover the contract until the mechanics lien period has expired, with which to pay filed mechanics liens, or other assurances to be determined on a case by case basis.

**II. Bankruptcy**

The Title Company will require, as a minimum, the following prior to insuring:

A. The bankruptcy case be closed or,
B. An order from the bankruptcy court verifying the transaction, with a demand placed into escrow by the trustee.
C. Escrow may not close until 15 days have elapsed from the order and the file has been checked to verify that there are no objections to said order.

**III. Abstracts of Judgment, Liens, Tax Liens**

The Title Company will require, as a minimum, the following prior to insuring:

A. Proof that the buyer/seller is not the same party as on the recorded liens.
B. This is accomplished by the buyer/seller/borrower completely filling out and signing a statement of information.
C. The items are to paid off in escrow.
D. The items are to be subordinated to the new transaction.

**IV. Community Property**

California and Nevada are community property states:

A. A quitclaim from one spouse to another must specifically quitclaim any community property interest.
B. An interlocutory decree of divorce specifically granting the property to one spouse is sufficient if a final decree is issued and recorded in the county.

## DID YOU KNOW?

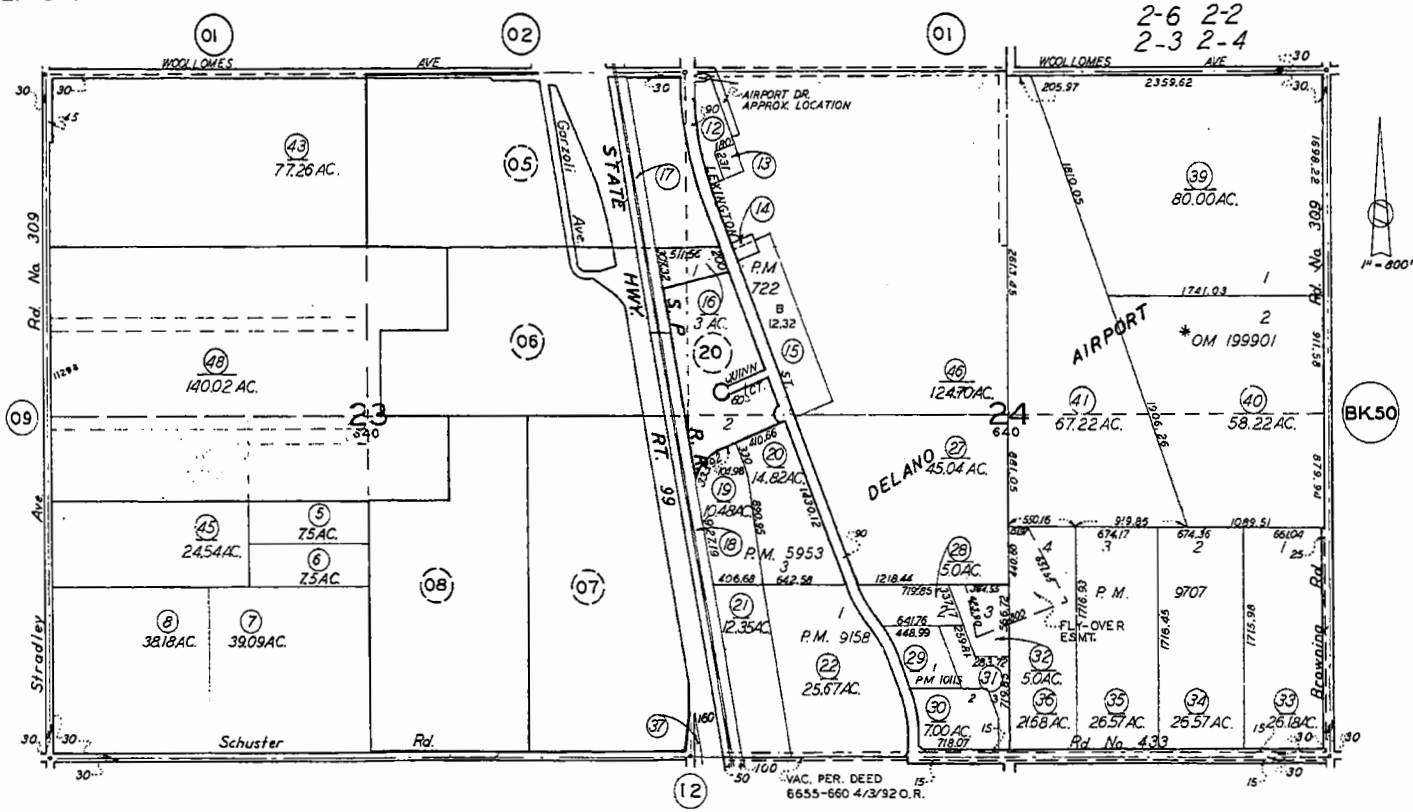
Any of the following situations could cause a substantial delay in close of escrow. The earlier we are made aware of potential problems, the earlier the issues can be dealt with to ensure a smooth and timely close of your transaction.

- Are your principals trying to accomplish a tax deferred exchange? If so, have they chosen an intermediary and who is it?
- Will any of the principals be using a Power of Attorney?
- Are any of the vested owners deceased or in any way incapacitated?
- Do all of the principals who will be signing have a current photo I.D. or Driver's License?
- Has there been a change in marital status of any of the vested owners or will we be adding anyone to title, i.e. co-signers, additional insured, etc.?
- Is the property currently vested in a trust or will the new buyer/borrower vest in a trust?
- Are any of the trustees of the trust deceased or incapacitated?
- Will this transaction involve a short sale?
- Will there be a new entity formed, i.e. partnership, corporation?
- Will all of the principals be available to sign or will we be Federal Expressing documents to another state/country? If so, where?

If you have any other information which may be useful to us, please contact your escrow officer as soon as possible. Our goal is to make your transaction as easy and trouble-free as possible. We appreciate your business and hope that you find North American Title Company your company of choice for all of your title and escrow needs.

521-04 T.25S. R.25E. SCHOOL DIST. 65-3 521-04

2-6 2-2
2-3 2-4




*City of Delano Official Map No. 1999-01 Recorded in Bk.1 Pg.75 of Miscellaneous Maps

Revised: Nov. 2, 2005

Note: This map is for assessment purposes only. It is not to be construed as portraying legal ownership or divisions of land for purposes of zoning or subdivision law.

**ASSESSORS MAP NO. 521-04**
**COUNTY OF KERN**

MOORE TWINING ASSOCIATES, INC.

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

## APPROXIMATELY 32 ACRE PROPERTY

## ASSESSOR'S PARCEL NUMBERS 521-010-19 AND 521-010-20

## NORTHEASTERN CORNER OF WOOLLOMES AND STRADLEY AVENUE

## DELANO, CALIFORNIA

Prepared For:

**Delano Retail Center West, LLC c/o YK America Group**
10508 Lower Azusa Road, #201
El Monte, CA 91731

Prepared By:

**Moore Twining Associates, Inc.**
2527 Fresno Street
Fresno, California 93721

Project Number E58002.0100

April 28, 2014

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Appendix D - EDR Report

ACRONYMS

| | |
|---|---|
| AST(s) | Aboveground Storage Tank(s) |
| AWP | Annual Work Plan |
| CAL-EPA | State of California, Environmental Protection Agency |
| CERCLIS | Comprehensive Environmental Responsibility, Compensation, and Liability Information System |
| CIWMB | California Integrated Waste Management Board |
| DTSC | Department of Toxic Substances Control |
| ERNS | Emergency Response and Notification System |
| KCEHD | Kern County Environmental Health Department |
| LUST | Leaking Underground Storage Tank |
| NPL | National Priority List |
| RCRA | Resource Conservation and Recovery Act |
| RWQCB | Regional Water Quality Control Board |
| SWIS | Solid Waste Information System |
| SWRCB | State Water Resource Control Board |
| TSD | Hazardous Waste Transport, Storage, or Disposal Facilities |
| US EPA | United States Environmental Protection Agency |
| UST(s) | Underground Storage Tanks(s) |

## 1.0 INTRODUCTION

Moore Twining Associates, Inc. (Moore Twining) was retained by Delano Retail Center West, LLC c/o YK America Group to conduct a Phase I Environmental Site Assessment (Phase I ESA) for a property located near the northeastern intersection of Woollomes Avenue and Stradley Avenue in the City of Delano and County of Kern, California (Site). This Phase I ESA was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (Standard Designation E 1527-13), published November 2013, and in accordance with Moore Twining's proposal to Delano Retail Center West, LLC c/o YK America Group, dated March 28, 2014. It is our understanding that this Phase I ESA was requested to assist Delano Retail Center West, LLC c/o YK America Group in the sale of the Site property.

### 1.1 Objective

The objective of this assessment was to identify recognized environmental conditions located at the Site or adjacent properties which could present material risk of harm to public health or to the environment. Recognized environmental conditions are defined in ASTM Designation E-1527 as the presence or likely presence of any hazardous wastes and/or substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

### 1.2 Scope of Services

This Phase I ESA was performed to evaluate the potential presence of environmental conditions that may have resulted from operations at the Site or at nearby properties. The assessment included a Site reconnaissance, review of available documentation of land-use history for evidence of the use, storage and/or disposal of hazardous substances, and a review of available regulatory information. This Phase I ESA included the following tasks:

- A review of the current and past uses of the Site since 1930;
- A Site reconnaissance to assess evidence of current and/or past use or storage of toxic or hazardous material; on-Site ponds, landfills, drywells, waste streams or other disposal units; visible soil discoloration; aboveground or underground storage tanks; electrical transformers containing polychlorinated biphenyls (PCBs); and drums, barrels and other storage containers;
- Visual observation of adjacent properties in order to determine if current and/or historical operations may pose a threat to the subject Site;

- A review of available federal Environmental Protection Agency (EPA), state EPA and regulatory agency lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site area. Using area-profile services provided by Environmental Data Resources, Inc. (EDR), Moore Twining cataloged sites in the vicinity of the Site that have been identified on regulatory agency lists. Search criteria were in conformance with ASTM Standard E 1527-013;

- Contact with relevant municipal, county and state agencies to review readily available records and permits; and

- Preparation of this written report to present our methods, findings and conclusions.

The Scope of Services specifically excluded cultural, archeological, and biological assessments, as well as, sampling and analysis for the potential presence of asbestos containing building materials, lead based paint, or an assessment for radon gas. In addition, the Scope of Services did not include the collection and/or analysis of air, soil-gas, soil, groundwater, or other environmental samples.

### 1.3 Limitations and Limited Conditions

The purpose of an environmental assessment is to reasonably assess the potential for, or actual impact of, past practices on a given site which may pose an environmental impairment to the Site. No assessment is thorough enough to identify all potential environmental impairments at a given site. If environmental impairments have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such conditions on the Site, but rather the result of the services performed within the scope, limitations, and cost of the work performed.

The conclusions presented in this report are solely professional opinions based on information provided regarding the Site and the findings of the reconnaissance and records search. Information obtained from the aerial photographs is an interpretation of features observed in the photographs. Actual conditions at the Site may have been different from those interpreted. Conclusions presented are based on conditions as they existed at the time the work was performed. Changes in existing conditions of the Site due to time lapse, natural causes, or operations adjacent to the Site may deem conclusions presented in this Phase I ESA report invalid, unless the changes are reviewed and the conclusions reevaluated. Such conditions may require additional site reconnaissance, and require field exploration and laboratory testing to assess if the conclusions are applicable considering the changed conditions.

This work was performed for the sole use of our client. Any reliance on this report by a third party is at such party's sole risk. Others who seek to rely on the findings have a duty to determine the adequacy of this report for their intended use, time, and location. Moore Twining

does not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report. No other warranty, either expressed or implied, is made. The standard of practice is time-dependent. Services provided were performed consistent with generally-accepted professional consulting principles and practices for environmental assessors in Kern County, California at the time this work was performed. The findings and conclusions presented in this report are solely professional opinions derived in accordance with current standards of professional practice.

## 2.0 SITE DESCRIPTION

Information concerning the Site was obtained from interviews, a Site reconnaissance, and a review of the documents referenced in Section 4.0 of this report. The Site reconnaissance was conducted by Mr. Philip Marquez, a Moore Twining representative, on April 10, 2014.

### 2.1 Location and Description of Property

The Site is located near the northeastern intersection of Woollomes Road and Stradley Road in the City of Delano and Kern County, California. The Site is a rectangular piece of property, approximately 32 acres in size, and is currently vacant property. A retention basin, approximately 150 feet in length by 95 feet in width by 4 feet in depth, was observed in the northwestern corner of the Site. An agricultural pumping system was located along the northeastern corner of the basin. The southwestern portion of the Site was vacant, graded property on the day of Moore Twining's Site reconnaissance. The southwestern portion of the Site was vacant, graded property on the day of Moore Twining's Site reconnaissance. This area of grading appeared to be associated with proposed commercial development, and is believed to be part of a future driveway and parking area. No structures are located on the Site. This parcel has been assigned Kern County Assessor's Parcel Numbers (APNs) 521-010-19 and 521-010-20. The listed owner for the Site is:

**Delano Retail Center West, LLC**

A Site location map is presented as Drawing 1, and a Site plan, which includes Site boundaries, is presented as Drawing 2 in Appendix A.

### 2.2 Physical and Environmental Setting of the Site

Environmental characteristics including topography, geology, soil, and hydrogeology were evaluated based on Site observations, and review of published literature and maps.

#### Topography

Topographic map coverage of the Site is provided by the United States Geological Survey (USGS), Pond, California, 7.5-minute quadrangle map dated 1973. The Site lies within Section

14, Township 25 South, Range 25 East. According to the map, the Site is located at an elevation of approximately 275 feet above mean sea level.

**Geology**

The Site is located within the central portion of the San Joaquin Valley. The San Joaquin Valley is part of the Great Valley Geomorphic Province, a topographic and structural basin bound to the east by the Sierra Nevada and to the west by the Coast Range. The Sierra Nevada, a fault block dipping gently to the southwest, is composed of igneous and metamorphic rocks of pre-Tertiary age which comprise the basement complex beneath the valley (USGS, 1986). The subsurface of the Site and surrounding vicinity is characterized by a thick sequence of unconsolidated sediments. Subsurface material beneath the Site is primarily composed of alluvial fan deposits and flood plain over-bank deposits including interbedded silts, sands, clays, and gravels (USGS, 1986).

**Soils**

According to information obtained from the USDA Natural Resource Conservation Service (NRCS), soil at the Site is classified as Kimberlina fine sandy loam. Kimberlina fine sandy loam is typically found on alluvial fans and formed from alluvium derived from igneous and sedimentary rock. This soil is well drained and has a moderate available water holding capacity.

**Hydrogeology**

The depth of first encountered groundwater underlying the Site has not been assessed. However, according to information obtained from the State Water Resources Control Board (SWRCB) and the California Department of Water Resources (CDWR), the depth to first encountered groundwater in the vicinity of the Site is estimated to be approximately 180 feet below grade, and flow appears to be to the southwest.

## 3.0 INFORMATION FROM THE SITE RECONNAISSANCE

The objective of the Site reconnaissance was to observe the Site for specific indicators of environmental concern. The site reconnaissance included a systematic search of practically accessible areas of the Site and adjacent properties. A Site Plan depicting the Site, adjoining property use, and observed on-Site features is presented as Drawing 2 in Appendix A. Additionally, photographs were taken during the Site walk, and selected photographs of the Site are presented in Appendix B.

The Site reconnaissance was conducted on April 10, 2014 by Mr. Philip Marquez, a representative of Moore Twining. The findings of the Site reconnaissance are summarized in the following subsections.

## 3.1 Site Reconnaissance - Description of Structures, Roads, and Other Site Improvements

The Site is located near the northeastern intersection of Woollomes Road and Stradley Road in the City of Delano and Kern County, California. The Site is a rectangular piece of property, approximately 32 acres in size, and was vacant property at the time of the Site reconnaissance. A retention basin, approximately 150 feet in length by 95 feet in width by 4 feet in depth, was observed in the northwestern corner of the Site. An agricultural pumping system was located along the northeastern corner of the basin. The southwestern portion of the Site was vacant, graded property on the day of Moore Twining's Site reconnaissance. This area of grading appeared to be associated with proposed commercial development, and is believed to be part of a future driveway and parking area. No structures were located on the Site at the time of the Site reconnaissance.

## 3.2 Current Uses of the Site

The Site was vacant property at the time of the Site reconnaissance.

## 3.3 Current Uses of the Adjoining Properties

Dry crop agriculture and vacant property existed north of the Site with residential development beyond. Woollomes Avenue borders the southern edge of the Site with vacant property beyond. Dry crop agriculture existed east of the Site. Stradley Avenue borders the western edge of the Site with vacant property beyond.

## 3.4 Site Reconnaissance - Specific Indicators of Environmental Concern

In addition to the general description of the Site, the following specific indicators of environmental concern were also evaluated for the Site.

### Hazardous Substances and Wastes

No hazardous substances or wastes were observed at the Site on the day of Moore Twining's Site reconnaissance.

### Drums

No drums were observed on the day of Moore Twining's Site reconnaissance.

### Potential Polychlorinatedbiphenyl (PCB) - Containing Equipment

Four (4) pole-mounted transformers were observed on the western edge of the Site. The transformers are owned and operated by Southern California Edison (SCE) and appeared to be in

good working condition on the day of Moore Twining's Site reconnaissance. No staining, leakage or odors were noted on or around the transformers.

**Solid Waste**

Miscellaneous debris was located in a dry retention basin located in the northwestern corner of the Site. This debris included mattresses, a broken coffee table, garbage bags of used clothing, fast food containers, etc. No evidence of staining or leakage was observed on or around the debris on the day of Moore Twining's Site reconnaissance.

**Drains and Sumps**

No drains or sumps were observed at the Site on the day of Moore Twining's Site reconnaissance.

**Other Containers**

No other containers were observed on the day of Moore Twining's Site reconnaissance.

**Wastewater**

No wastewater is generated at the Site. Runoff is limited primarily to storm water. Excess irrigation water is believed to be pumped into the on-Site retention basin for storage until it is reused for irrigation purposes.

**Water Wells**

One agricultural pumping unit and an agricultural well were observed near the retention basin located in the northwestern corner of the Site.

**Oil and Gas Wells**

No oil or gas wells were identified during the Site reconnaissance or shown on California Department of Conservation - Division of Oil and Gas maps reviewed as a part of this assessment.

**Pits, Ponds, and Lagoons**

One (1) retention basin, approximately 150 feet in length by 95 feet in width by 4 feet in depth, is located in the northwestern corner of the Site. The retention basin was dry on the day of Moore Twining's Site reconnaissance. According to Mr. Martin Hsu (YK America Group, Inc.), the retention basin is used to store stormwater runoff for groundwater recharge purposes. No evidence of staining, leakage or odors was associated with the basin on the day of Moore Twining's Site reconnaissance.

**Underground/Aboveground Storage Tanks**

No evidence of Underground and/or aboveground storage tanks was found during the preparation of this assessment.

**Pipelines and Pipes**

Two (2) concrete stand pipes were observed in the northwestern and southeastern corners of the Site, and are believed to be associated with an on-Site irrigation system.

**Other Physical Evidence of Contamination**

No other physical evidence of contamination was observed on the day of Moore Twining's Site reconnaissance.

## 4.0 HISTORICAL AND CURRENT INFORMATION ON THE PROPERTY AND ADJOINING PROPERTIES

The history of land-use on and near the Site was determined from interviews, and review of historic aerial photographs, topographic maps, Sanborn maps, building permits, and historic city directories.

### 4.1 Aerial Photograph Review

Available historical aerial photographs of the Site and vicinity for the years 1946, 1956, 1967, 1972, 1984, 1994, 2005, 2006, 2009, 2010 and 2012 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. Aerial photographs for this assessment were provided by Environmental Data Resources (EDR).

***1946***

The Site appears as vacant property. No structures are observed at the Site.

Vacant property is noted north of the Site. Woollomes Avenue borders the southern edge of the Site with vacant property beyond. Dry crop agriculture and a retention basin are depicted east of the Site. Stradley Avenue borders the western edge of the Site with vacant property beyond.

***1956***

The Site appears primarily as dry crop agriculture. A patch of vacant, tree-lined property is noted in the northwestern portion of the Site. No structures are observed on the Site.

Adjacent properties to the north, south and east appear essentially unchanged from the 1946 aerial photograph. Stradley Avenue borders the western edge of the Site with row crop agriculture beyond.

*1967*

A retention basin feature is depicted in the northwestern corner of the Site. The northern portion of the Site appears as dry crop agriculture. The southern portion appears as row crop agriculture.

Adjacent properties appear essentially unchanged, with the exception that the previously noted retention basin east of the Site is no longer observed. A retention basin and vacant property are depicted southwest of the Site.

*1972*

The Site appears primarily as dry crop agriculture. The retention basin is still observed in the northwestern corner of the Site. No structures are depicted on the Site.

Vacant property is observed north of the Site. Woollomes Avenue borders the southern portion of the Site with dry crop agriculture beyond. Dry crop is also observed east of the Site. Stradley Avenue borders the western edge of the Site with row crop agriculture beyond.

*1984-2012*

The Site and adjacent properties appear essentially unchanged from the 1972 aerial photograph.

## 4.2 Historical Topographic Maps

Available historical topographic maps of the Site and vicinity for the years 1930, 1947, 1953, 1969 and 1973 were reviewed for indications of past Site use and/or Site activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. Historical topographic maps were provided by Environmental Data Resources, Inc. (EDR).

*1930-1973*

The Site and adjacent properties appear primarily as vacant property or dry crop agriculture. Woollomes and Stradley Avenues have bordered the southern and western edges of the Site since at least 1930. No structures are observed on the Site.

### 4.3 Sanborn Fire Insurance Map Review

Moore Twining reviewed Sanborn Fire Insurance Maps that were provided by EDR. Sanborn Maps can provide historical information regarding a site.

- Sanborn Fire Insurance Maps drawn for the City of Delano do not include the Site.

### 4.4 Historical City Directory Review

City directories can provide information concerning past and current occupancy of the Site and adjacent areas. City directory information for this assessment was provided by Environmental Data Resources (EDR).

- City directory information is retrieved by a physical address. Because the Site has no physical address, information from this source was not available.

### 4.5 Building Permits

Building records can provide a history of on-Site structures, features, and development. Building permit information for this assessment was provided by EDR.

- Building Permit information is retrieved by a physical address. Because the Site has no physical address, information from this source was not available.

### 4.6 User Provided Information

This section summarizes information provided by the user that assisted in the identification of potential recognized environmental conditions (RECs) associated with the subject Site.

#### 4.6.1 Interviews with Site Representatives

Moore Twining submitted an Environmental Questionnaire to the client as part of this assessment. The questionnaire was completed by Mr. Martin Hsu (YK America Group, Inc.) and returned to Moore Twining. The information presented in the questionnaire is summarized below. A copy of the questionnaire is included in Appendix C of this report.

- ***Mr. Martin Hsu (YK America Group, Inc.)***

  According to Mr. Hsu, the Site is currently vacant property. Mr. Hsu had no knowledge of any existing or previously existing structures on the Site. He was not aware of any physical addresses ever being associated with the subject Site. To the best of Mr. Hsu's knowledge, electricity at the Site is provided by Southern California Edison (SCE). Mr. Hsu also noted that sewer and water services to the Site are currently provided by the City of Delano. Mr. Hsu had no knowledge of any agricultural chemical formulation or

mixing areas associated with the Site. Mr. Hsu was not aware of any current or historical bulk chemical and/or fuel storage at the Site. Mr. Hsu had no knowledge of any releases, spills, incidents or violations associated with the storage of hazardous materials and/or petroleum products at the Site. In addition, Mr. Hsu had no knowledge of any current or former aboveground or underground storage tanks being associated with the Site. According to Mr. Hsu's knowledge, the on-Site retention basin is used to collect stormwater runoff for groundwater recharge purposes. Mr. Hsu had no knowledge of the water being reused for irrigation purposes. According to Mr. Hsu, no environmental cleanup liens or activity and/or land use limitations have been filed or recorded for the Site. In addition, Mr. Hsu was unaware of any commonly known or reasonably ascertainable information that would indicate a release or threatened release of hazardous materials and/or petroleum products at the Site.

### 4.6.2 Previous Investigations

No reports of previous investigations were provided for this assessment.

### 4.6.3 Title Documentation

Title documents, including a chain of title and/or title report, can provide the environmental professional with information regarding current and past ownership and information regarding environmental liens and/or land use and activity limitations.

- No title documentation was provided by the client as part of this assessment.

## 4.7 Past Uses of the Property

The Site has been vacant property or used for agricultural purposes, including dry and row crop, since at least the 1930's. One (1) existing retention basin was constructed at the Site sometime in the mid 1960's. No structures have been associated with the Site.

## 4.8 Past Uses of Adjoining Property

Adjacent properties have been vacant property or used for agricultural purposes since at least the 1930's. Woollomes and Stradley Avenues have bordered the southern and western edges of the Site since at least the 1930's.

## 5.0 RECORDS REVIEW

Moore Twining contracted Environmental Data Resources, Inc. (EDR) to perform searches of available federal, state, and local database information systems for the purpose of identifying known recognized environmental conditions present on the Site and nearby properties which have the potential to adversely impact the Site being assessed in this study. Information regarding the list, record, and permit review findings is summarized in Table 1. The complete report furnished by EDR is included in Appendix D of the report.

TABLE 1
SUMMARY OF REGULATORY LISTS SEARCHED BY EDR AND RECORDS REVIEWED

| Database | Target Site | Search Distance (Miles) | < 1/8 | 1/8 - 1/4 | 1/4 - ½ | ½ - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **FEDERAL ASTM STANDARD** | | | | | | | | |
| NPL | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| CERCLIS | | 0.5 | 0 | 1 | 0 | NR | NR | 1 |
| CERC-NFRAP | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| CORRACTS | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| RCRIS-TSD | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| RCRIS Lg, Quan. Gen. | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| RCRIS Sm. Quan. Gen. | | 0.25 | 0 | 1 | NR | NR | NR | 1 |
| ERNS | | 0 | NR | NR | NR | NR | NR | 0 |
| **STATE ASTM STANDARD** | | | | | | | | |
| AWP | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Cal-Sites (ENVIROSTOR) | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| CHMIRS | | 0 | NR | NR | NR | NR | NR | 0 |
| HIST Cortese | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| Notify 65 | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| Toxic Pits | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| State Landfill | | 0.5 | 0 | 0 | 1 | NR | NR | 1 |
| WMUDS/SWAT | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| LUST | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| CA Bond Exp. Plan | | 1 | 0 | 0 | 0 | 0 | NR | 0 |
| UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| VCP | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| INDIAN LUST | | 0.5 | 0 | 0 | 0 | NR | NR | 0 |
| CA FID UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |
| HIST UST | | 0.25 | 0 | 0 | NR | NR | NR | 0 |

NR = Not Requested (Beyond Search Distance)
TP = Target Property

## 5.1 Facilities Identified in the Regulatory Lists and Record Review

The information regarding the following facilities was obtained from the EDR report. A request to review files for the Site and adjacent properties was also submitted to the Kern County Environmental Health Department (KCEHD), State Water Resources Control Board (SWRCB), and the Department of Toxic Substance Control (DTSC). Additional information pertaining to the Site and adjacent properties was reviewed on the SWRCB's "Geotracker" and the DTSC's "Envirostor" websites. No files for the Site were available from the KCEHD, SWRCB or DTSC. Off-Site information provided by the KCEHD SWRCB and DTSC was reviewed on April 10 (KCEHD) and April 15 (SWRCB and DTSC), 2014.

**On-Site**

- No documentation for the on-Site parcels was identified by any of the above referenced regulatory agencies as part of this assessment.

**Off-Site**

- **Kern County Dump-McFarland-Delano Sanitary Landfill (MDSL)** is located approximately 1,200 feet south of the Site. This facility is listed in the Environmental Protection Agency's (EPA) Comprehensive Environmental Compensation and Liability Information System (CERCLIS) and Facility Index System (FINDS) databases. According to information obtained from the SWRCB, this facility was a class III landfill that operated between 1972 and 1992. Initial groundwater monitoring at the facility was conducted in 1986. This monitoring revealed concentrations of benzene, vinyl chloride, 1,4 dichlorobenzene, tetrachloroethene and methylene chloride at concentrations reported to be above laboratory practical quantitative limits. According to information obtained from the EDR report and the SWRCB, this facility received closure from the SWRCB in June of 1996. However, "Post Closure Maintenance" has been ongoing since that time. Monitoring activity has been conducted by the KCEHD. The most recent round of monitoring was conducted in March of 2013. The results were reported in KCEHD's "Annual Monitoring Report for McFarland-Delano Sanitary Landfill," dated May 2013. According to information obtained from this report, groundwater at the facility flows cross-gradient to the Site and the closest monitoring well is located approximately 1,000 feet south of the Site (MD1-26). This well is reported to have been installed in 2001 and has been non-detect for the analyzed constituents since that time. Due to the relative distance of this facility from the Site, because groundwater flow at the Site is reported to be cross-gradient to the facility, and because no detections of constituents of concern have been detected in the closest monitoring well (MD1-26), the current potential impact to the Site from this facility appears to be low.

- **Sunset/McFarland-Delano Transfer Station**, located approximately 2,000 feet west/southwest of the Site, appears on the State Landfill database due to its status as a transfer station. According to information obtained from the KCEHD, the transfer station receives municipal waste from the cities of McFarland and Delano. The waste is compacted at the transfer station and transported to the Shafter landfill. There are no reported releases, spills, incidents or violations associated with this facility. Due to the distance of this facility to the Site, and because there are no reported releases, spills, incidents or violations, the current potential impact to the Site from this facility appears to be low.

Due to the reported distance, and/or direction of groundwater flow, the current potential environmental impact to the Site from the remaining listed facilities appears to be low.

### 5.2 Institutional and Engineering Controls/Land Use Limitations/Environmental Liens

Information regarding institutional and engineering controls was obtained from the EDR report, interviews with property owners, and Moore Twining's Site reconnaissance. Institutional and Engineering Controls can indicate the current and/or historical presence of recognized environmental conditions that required remedial activity at the Site.

- No institutional and engineering controls, land use limitations or environmental liens related to remediation and/or cleanup were found as part of this assessment.

## 6.0 SUMMARY OF FINDINGS

The findings of the Phase I ESA are summarized in the following sections:

### 6.1 On-Site

The Site has been vacant property or used for agricultural purposes, including dry and row crop agriculture, since at least the 1930's. One (1) existing retention basin was constructed on the Site sometime in the mid 1960's. No structures have been associated with the Site.

- One (1) retention basin, approximately 150 feet in length by 95 feet in width by 4 feet in depth, exists in the northwestern corner of the Site. The retention basin was dry on the day of Moore Twining's Site reconnaissance. According to Mr. Martin Hsu (YK America Group, Inc.), the retention basin is used to store stormwater runoff for groundwater recharge purposes. No evidence of staining, leakage or odors was associated with the basin on the day of Moore Twining's Site reconnaissance.

- One agricultural pumping unit and an agricultural well were observed near the retention basin located in the northwestern corner of the Site.

- Two (2) concrete stand pipes were observed in the northwestern and southeastern corners of the Site, and are believed to be associated with an on-Site irrigation system.

- Miscellaneous debris was located in a dry retention basin located in the northwestern corner of the Site. This debris included mattresses, a broken coffee table, garbage bags of used clothing, fast food containers, etc. No evidence of staining or leakage was observed on or around the debris on the day of Moore Twining's Site reconnaissance.

- Four (4) pole-mounted transformers were observed on the western edge of the Site. The transformers are owned and operated by Southern California Edison (SCE) and appeared to be in good working condition on the day of Moore Twining's Site reconnaissance. No staining, leakage or odors were noted on or around the transformers.

## 6.2 Off-Site

Adjacent properties have been vacant property or used for agricultural purposes since at least the 1930's. Woollomes and Stradley Avenues have bordered the southern and western edges of the Site since at least the 1930's as well.

- **Kern County Dump-McFarland-Delano Sanitary Landfill (MDSL)**, is located approximately 1,200 feet south of the Site. This facility is listed in the Environmental Protection Agency's (EPA) Comprehensive Environmental Compensation and Liability Information System (CERCLIS) and Facility Index System (FINDS) databases. According to information obtained from the SWRCB, this facility was a class III landfill that operated between 1972 and 1992.

- **Sunset/McFarland-Delano Transfer Station**, located approximately 2,000 feet west/southwest of the Site, appears on the State Landfill database due to its status as a transfer station.

## 6.3 Data Gaps

Data gaps are described as a lack of or inability to obtain information required by the standards and practices listed in ASTM E 1527-13, despite good faith efforts by the environmental professional or prospective landowner.

- Title documents, including a chain of title and/or title report, can provide the environmental professional with information regarding current and past ownership and information regarding environmental liens and/or land use and activity limitations. No title documentation was provided by the client as part of this assessment. If information changing the findings of this report is obtained at a later date, the client will be notified and an addendum to the report will be issued

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

On behalf of Delano Retail Centers West, LLC c/o YK America Group, Moore Twining performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527 for the property located near the northeastern intersection of Woollomes and Stradley Avenues, in the City of Delano and County of Kern, California. The Phase I ESA was performed during April of 2014. This assessment has revealed no evidence of recognized environmental conditions (RECs). However, the following items were identified during the preparation of this assessment:

- One (1) retention basin, approximately 150 feet in length by 95 feet in width by 4 feet in depth, is located in the northwestern corner of the Site. The retention basin was dry on the day of Moore Twining's Site reconnaissance. According to Mr. Martin Hsu (YK America Group, Inc.), the retention basin is used to store stormwater runoff for groundwater recharge purposes. No evidence of staining, leakage or odors was associated with the basin on the day of Moore Twining's Site reconnaissance. Due to the historical agricultural use of the property, stormwater runoff that has emptied into the retention basin may have contained residual concentrations of agricultural chemicals that have been applied at the Site. As a result of this finding, Moore Twining recommends that shallow soil sampling be conducted within the basin in order to determine existing concentrations of any residual agricultural chemicals.

- As noted above, the Site has historically been used for agricultural purposes. Therefore, there is a potential that environmentally persistent pesticides may have been applied to the Site. As a result of this finding, Moore Twining recommends that shallow soil sampling be conducted throughout the Site in order to help determine existing concentrations of any residual agricultural chemicals.

- One agricultural pumping unit and an agricultural well were observed near the retention basin located in the northwestern corner of the Site. If the well and pumping unit are not going to be used in association with future development, Moore Twining recommends that they be removed and disposed of in accordance with local, state and federal guidelines. If any evidence of staining, leakage or odors is identified during removal, the signatories of this report should be notified.

- Miscellaneous debris was located in the dry retention basin, located in the northwestern corner of the Site. This debris included mattresses, a broken coffee table, garbage bags of used clothing, fast food containers, etc. No evidence of staining or leakage was observed on or around the debris on the day of Moore Twining's Site reconnaissance. However, Moore Twining recommends that this debris be removed and disposed of in accordance with local, state and federal guidelines prior to further development. If any evidence of staining, leakage or odors is identified during this removal, our firm should be notified.

- Two (2) concrete stand pipes were observed in the southwestern and southeastern corners of the Site, and are believed to be associated with a subsurface irrigation system. It was historically common for subsurface irrigation pipelines to contain asbestos (i.e., Transite pipe). Subsurface exploration is not part of a typical Phase I Environmental Site Assessment scope of work. In the event that subsurface structures are encountered during development or excavation at the Site, care should be exercised in determining whether or not the subsurface structures contain asbestos. If they contain asbestos, they should be removed, handle, transported and disposed of in accordance with applicable local, state and federal guidelines.

## 8.0 CLOSING

Moore Twining Associates, Inc. performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 for the subject Site. Any exceptions to, or deletions from, this practice are described in the following paragraph.

The material content of this report is intended to be consistent with a standard of practice as defined by ASTM practice E 1527-13. However, the report format differs in style, arrangement, and presentation of material facts from the format described by ASTM.

We appreciate the opportunity to be of service to Delano Retail Center West, LLC c/o YK America Group on this project. If you have any questions regarding this report, please contact our office at (800) 268-7021.

Sincerely,
**MOORE TWINING ASSOCIATES, INC.**
Environmental Services Division

Philip M Marquez
Phase I ESA Supervisor/Environmental Professional

*"I declare that, to the best of my knowledge and belief, I meet the definition of Environmental Professional. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."*

## 9.0 REFERENCES

American Society for Testing and Materials, 2013, *ASTM Standards on Environmental Site Assessments for Commercial Real Estate*, 2nd ed., E 1527-13, Philadelphia, Pennsylvania.

Munger, Averill H., Ed. 1994. *Munger Map Book, California-Alaska Oil and Gas Fields.* Munger: Los Angeles, California.

United States Geological Survey, 1973, Pond Quadrangle, 7.5 Minute Series Topographic Map.

John Wiley and Sons, Incorporated, 1976, *Geology of California*, Robert Norris and Robert W. Webb.

## 10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

**Moore Twining Associates, Inc.** Phase I Environmental Site Assessment staff is composed of a group of environmental professionals that perform Environmental Site Assessments on a routine basis. The Phase I ESA staff is managed and supervised by individuals who conduct, prepare, oversee, and/or review Environmental Site Assessments on a daily basis. Qualification profiles for these individuals are provided in the following section.

**Philip M. Marquez**
Supervisor - Phase I Environmental Site Assessments

Mr. Marquez has twelve years of experience conducting Phase I environmental site assessments and natural resource monitoring including biological resources and wetlands. Mr. Marquez has conducted environmental site assessments for a number of different project types including canning facilities, pesticide production facilities, shopping centers, gas stations, hospitals, school sites, and agricultural sites.

# APPENDIX A

## DRAWINGS

# APPENDIX B

## SITE PHOTOGRAPHS

**PHOTOGRAPH 1**

Site overview, looking south from the northern portion of the Site.

**PHOTOGRAPH 2**

Site overview, looking west from the eastern portion of the Site.

**PHOTOGRAPH 3**

Retention basin, located in the northwestern corner of the Site.

**PHOTOGRAPH 4**

Miscellaneous debris, located within the retention basin.

**PHOTOGRAPH 5**

Agricultural pump and well system, located just northeast of the retention basin.

**PHOTOGRAPH 6**

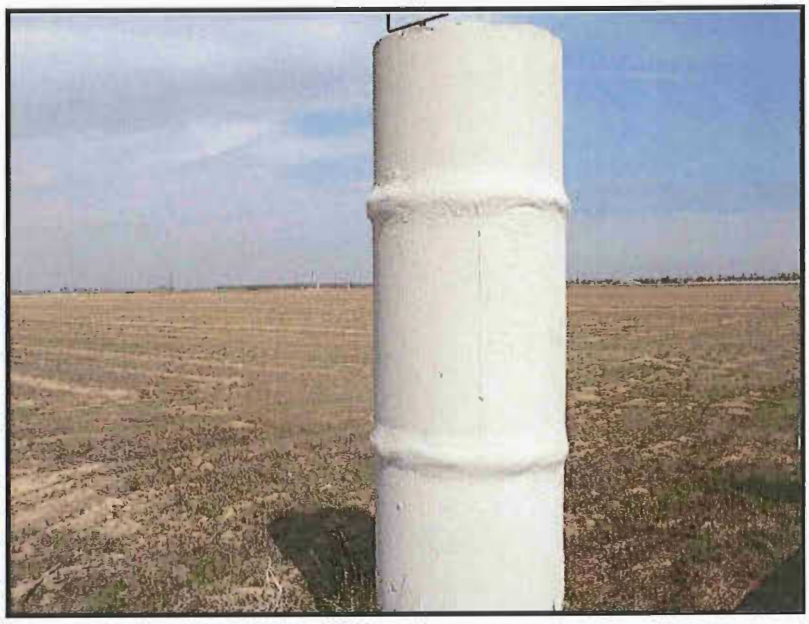
Pole-mounted transformers, observed in the northwestern portion of the Site.

**PHOTOGRAPH 7**

Area of grading, believed to be associated with future commercial development, located in the southwestern corner of the Site.

**PHOTOGRAPH 8**

Concrete standpipe, observed in the southeastern portion of the Site.



**PHOTOGRAPH 9**

Adjacent property, observed north of the Site.

**PHOTOGRAPH 10**

Woollomes Avenue and adjacent property, observed south of the Site.

**PHOTOGRAPH 11**

Vacant property, observed east of the Site.

**PHOTOGRAPH 12**

Stradley Avenue and adjacent property, located west of the Site.

# APPENDIX C

# ENVIRONMENTAL QUESTIONNAIRE

# ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT

GENERAL INSTRUCTIONS: Please fill-in the blanks to the best of your ability. If you do not know the answer, please check the "DON'T KNOW" box. If you answer "YES" or the answer requires explanation please use additional pages and reference the table. Thank you, for your time and cooperation.

| SITE INFORMATION | |
|---|---|
| Current Site Address | NE corner of Woollomes Ave / Stradley Av |
| Current Site Use | Vacant |
| Current Site Zoning | CRC - community Retail Commercial |
| Current Assessor's Parcel Number | 521-010-19<br>521-010-20 |
| Addresses Formerly Assigned to Site (if any) | N/A. |

| SITE OWNERSHIP AND PAST USE | | |
|---|---|---|
| OWNER NAME, ADDRESS & PHONE # | PERIOD OF OWNERSHIP/USE | TYPE OF USE |
| CURRENT Grapevine Villa, LLC | | |
| FORMER | | |
| FORMER | | |

| ADJACENT PROPERTY USE | | |
|---|---|---|
| DIRECTION | TYPE OF USE | LENGTH OF USE |
| North | Vacant? Zoned residential | Not known |
| East | Vacant with temp retention basin | since 8/13 |
| South | Vacant. County land. | Not known |
| West | Vacant. County land. | Not known |

| PRIOR FACILITY MANAGER'S NAME | |
|---|---|
| Contact Person | N/A. |
| Address | |
| Telephone | |

| EXISTING SITE STRUCTURES | | | |
|---|---|---|---|
| STRUCTURE DESCRIPTION | LOCATION | USE | DATE OF CONSTRUCTION |
| N/A | | | |
| | | | |
| | | | |

| FORMER SITE STRUCTURES | | | |
|---|---|---|---|
| STRUCTURE DESCRIPTION | FORMER LOCATION | USE | DATE OF DEMOLITION |
| N/A | | | |
| | | | |

| SITE LESSEES | | |
|---|---|---|
| NAME, ADDRESS & PHONE # | LENGTH/YEARS OF LEASE | TYPE OF USE |
| PRESENT: N/A | | |
| FORMER: | | |
| FORMER: | | |

| SITE UTILITIES | |
|---|---|
| UTILITY | PROVIDER |
| Electricity | SCE |
| Natural Gas | So Cal Gas |
| Drinking Water | City of Delano |
| Storm water Drainage | Landowner |
| Solid Waste Disposal | Unknown |
| Sanitary Sewer | City of Delano |
| Emergency Power Source | None |

********** ***PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS*** **********
***Additional space is provided on page 7***

| # | SPECIFIC USES OF SITE AND ADJACENT PROPERTY* | SITE | | | ADJACENT | | |
|---|---|---|---|---|---|---|---|
| | | YES | NO | DON'T KNOW | YES | NO | DON'T KNOW |
| 1A | Agricultural chemical formulation, distribution, or application | | ✓ | | | ✓ | |
| 2A | Airport and/or airplane maintenance | | ✓ | | | ✓ | |
| 3A | Automotive wrecking yard | | ✓ | | | ✓ | |
| 4A | Bulk chemical or fuel storage | | ✓ | | | ✓ | |
| 5A | Commercial printing | | ✓ | | | ✓ | |
| 6A | Dry cleaning | | ✓ | | | ✓ | |
| 7A | Landfill | | ✓ | | | ✓ | |
| 8A | Metal plating or finishing | | ✓ | | | ✓ | |
| 9A | Mining or minerals processing | | ✓ | | | ✓ | |
| 10A | Motor vehicle or equipment repair and/or maintenance | | ✓ | | | ✓ | |
| 11A | Photographic laboratory | | ✓ | | | ✓ | |
| 12A | Service station | | ✓ | | | ✓ | |
| 13A | Railroad tracks or railroad spurs | | ✓ | | | ✓ | |
| 14A | Skeet shooting or gun club | | ✓ | | | ✓ | |
| 15A | Releases, or spills of hazardous materials as a result of illegal dumping, or traffic accidents along the adjoining roadways. | | ✓ | | | ✓ | |
| 16A | Waste treatment, storage, disposal, processing or recycling, other than a landfill. | | ✓ | | | ✓ | |

* "Adjacent Property" includes those properties that border the immediate site and properties located across the street from the site.

********** ***PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS*** **********
***Additional space is provided on page 7***

| # | ON-SITE HAZARDOUS MATERIALS USE, STORAGE AND DISPOSAL | YES | NO | DON'T KNOW |
|---|---|---|---|---|
| 1B | Are asbestos-containing materials present in on-site structures? | | ✓ | |
| 2B | Has an asbestos survey been conducted for on-site structures? | | ✓ | |
| 3B | Are any electrical transformers or capacitors on-site? | | ✓ | |
| 4B | Are any electrical transformers or capacitors on-site **not** owned by an electrical utility? | | ✓ | |
| 5B | Has an Environmental Audit or Assessment been conducted for the site? | | ✓ | |
| 6B | Do you know of any current or former aboveground storage tanks? | | ✓ | |
| 7B | Do you know of any current or former underground storage tanks (not septic)? | | ✓ | |
| 8B | Are there currently, or have there been in the past, any plastic or metal drums (ranging from 5 to 55-gallons) stored on-site? | | ✓ | |
| 9B | Do you know of any fill dirt having been imported to the site? | | ✓ | |
| 10B | Do you know of any current or former wells on site, including, domestic drinking water, irrigation water, disposal, oil and/or abandoned wells? | | ✓ | |
| 11B | Do you know of any pesticides/herbicides permits for the site? | | ✓ | |
| 12B | Do you know of any pesticides/herbicides stored or used on-site? | | ✓ | |
| 13B | Are solvents, petroleum products, or paint products stored on-site? | | ✓ | |
| 14B | Are you aware of any areas of obvious staining currently or previously existing on-site? | | ✓ | |
| 15B | Are you aware of any permits having been issued for the site by the local fire, environmental health, or air pollution control agencies? | | ✓ | |

********** ***PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS*** **********
***Additional space is provided on page 7***

| # | SITE WASTE GENERATION, STORAGE AND DISPOSAL | YES | NO | DON'T KNOW |
|---|---|---|---|---|
| 1C | Is liquid waste disposed of to a septic tank on-site? | | ✓ | |
| 2C | Is liquid waste disposed of elsewhere on-site? | | ✓ | |
| 3C | Are any ponds, sumps, basins, lagoons, or clarifiers used on-site to collect, treat, or dispose of liquid? | | ✓ | |
| 4C | If liquid waste is disposed of on-site, is a waste discharge permit required? | | ✓ | |
| 5C | Is liquid waste disposed of to an off-site treatment works or licensed hazardous waste materials company? | | ✓ | |
| 6C | Is solid waste disposed of on-site (burned or buried)? | | ✓ | |
| 7C | Does any solid or liquid off-site waste disposal require a waste manifest or disposal permit? | | ✓ | |
| 8C | Is any hazardous waste generated, stored, or treated on-site? | | ✓ | |
| 9C | Are any spills or releases of hazardous materials known or suspected to have occurred at the site? | | ✓ | |
| 10C | Is there another individual who may have additional or more complete information regarding the former use and activities at the site? | | ✓ | |

Please provide details of any investigations of an environmental or geotechnical nature that have been performed by you or by others related to the subject property. If you are not aware of any investigation(s) that have been performed in the past regarding the subject property, whether or not a report was ever prepared and/or issued to you, please so state in the space below.

Phase I ESA 2005
Air Qual Study 2005, Biota Report 2005, Prelim Geotech Study 2006

Please provide details of any conditions known to you that could represent an environmental impairment to the subject property other than those items previously noted in this questionnaire. If you are not aware of any conditions, please so state in the space below.

N/A.

To your knowledge, has the property been subject to any regulatory action related to environmental conditions, whether or not a report was issued to you or filed with a regulatory agency. If you are not aware of any actions, please so state in the space below.

NO.

***PLEASE INDICATE IN THE BOXES BELOW IF THE FOLLOWING ITEMS EXIST AND IF YOU ARE ABLE TO PROVIDE THEM***
***Additional space is provided on page 7***

| | DOCUMENTS, REPORTS, LISTS, PLANS AND MAPS | Exists/Will Provide Copy | Exists/Will Not Provide Copy | Does Not Exist | Don't Know |
|---|---|---|---|---|---|
| 1D | Site plans and/or maps that include legal property boundaries | ✓ | | | |
| 2D | Building plans (architectural, utilities and structural) | | | ✓ | |
| 3D | Hazardous materials inventory | | | ✓ | |
| 4D | Hazardous waste inventory | | | ✓ | |
| 5D | Previously conducted Environmental Site Assessments | ✓ | | | |
| 6D | Reports of subsurface investigations performed on the site including analytical data | ✓ | | | |
| 7D | Reports of subsurface investigations performed on adjacent properties including analytical data | | ✓ | | |
| 8D | Previously conducted geotechnical/ soil investigations at the Site | ✓ | | | |
| 9D | Permits and location of USTs, sumps, pits, and drainage systems | | | | ✓ |
| 10D | Environmental permits and plans, including hazardous materials management plans, UST closure, etc. | | | | ✓ |
| 11D | Agricultural Chemical Permits | | | | ✓ |
| 12D | Literature or other sources of information regarding operations at the site | | | ✓ | |
| 13D | Individual who may have additional or more complete information regarding uses and activities at the site | | | ✓ | |

Questions per ASTM E 1527-05:

1. Have any environmental cleanup liens been filed or recorded against the Site?

   No.

2. Do you have knowledge of any activity and/or land use limitations that are in place on the Site or that have been filed or recorded in a registry?

   No.

3. As the user of this Environmental Site Assessment (ESA) do you have any specialized knowledge related to the Site or activities at adjacent properties?

   We are developer of Delano Marketplace to the SE, & Grapevine to the E.

4. Does the purchase price being paid for the Site reasonably reflect the fair market value? If you conclude that there is a difference, have you considered whether the lower price is because contamination is known or believed to be present at the Site?

   Not known.

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

   No.

6. As the user of this ESA, based on your knowledge and experience related to the Site, are there any obvious indicators that point to the presence of on Site contamination?

   No.

***PLEASE PROVIDE DETAILED INFORMATION FOR YES ANSWERS TO QUESTIONS (1A-15A), (1B-13B), (1C-10C)***

***ADDITIONALLY, PLEASE PROVIDE AN EXPLANATION WHY YOU ARE UNABLE TO PROVIDE (1D-13D) IF THEY EXIST***

Temporary retention basin at adjacent site (521-010-21) is used for retainage of storm water runoff for percolation, not to be pumped for irrigation.

**THIS ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT WAS PREPARED BY:**

**NAME** Martin Hsu **TITLE** Project Manager

**FIRM** YK America Group, Inc. **RELATIONSHIP TO SITE** Developer

**ADDRESS** 10508 Lower Azusa Rd. #200
El Monte, CA 91731

**TELEPHONE NUMBER** 626-444-6668 **DATE** 4/21/14

**PREPARER REPRESENTS THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE THE ABOVE STATEMENTS AND FACTS ARE TRUE AND CORRECT AND THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE NO MATERIAL FACTS HAVE BEEN SUPPRESSED OR MISSTATED UNDER PENALTY OF PURGERY BY LAW.**

Signed

4/21/14.
Date

# APPENDIX D

## EDR REPORT

**Wollomes Avenue/Stradley Avenue**
Wollomes Avenue/Stradley Avenue
Delano, CA 93215

Inquiry Number: 03899615.2r
April 02, 2014

# The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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## GEOCHECK ADDENDUM

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***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


**Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

## TARGET PROPERTY INFORMATION

### ADDRESS

WOLLOMES AVENUE/STRADLEY AVENUE
DELANO, CA 93215

### COORDINATES

| | |
|---|---|
| Latitude (North): | 35.7488000 - 35' 44' 55.68" |
| Longitude (West): | 119.2562000 - 119' 15' 22.32" |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 295989.4 |
| UTM Y (Meters): | 3958235.0 |
| Elevation: | 297 ft. above sea level |

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

| | |
|---|---|
| Target Property Map: | 35119-F3 POND, CA |
| Most Recent Revision: | 1973 |
| North Map: | 35119-G3 DELANO WEST, CA |
| Most Recent Revision: | 1969 |
| Northeast Map: | 35119-G2 DELANO EAST, CA |
| Most Recent Revision: | 1969 |
| East Map: | 35119-F2 MCFARLAND, CA |
| Most Recent Revision: | 1969 |

### AERIAL PHOTOGRAPHY IN THIS REPORT

| | |
|---|---|
| Photo Year: | 2012 |
| Source: | USDA |

## TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

# EXECUTIVE SUMMARY

**DATABASES WITH NO MAPPED SITES**

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

**STANDARD ENVIRONMENTAL RECORDS**

***Federal NPL site list***

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

***Federal Delisted NPL site list***

Delisted NPL..... National Priority List Deletions

***Federal CERCLIS list***

FEDERAL FACILITY..... Federal Facility Site Information listing

***Federal CERCLIS NFRAP site List***

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

***Federal RCRA CORRACTS facilities list***

CORRACTS..... Corrective Action Report

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

***Federal RCRA generators list***

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls
LUCIS..... Land Use Control Information System

***Federal ERNS list***

ERNS..... Emergency Response Notification System

***State- and tribal - equivalent NPL***

RESPONSE..... State Response Sites

***State and tribal leaking storage tank lists***

LUST..... Geotracker's Leaking Underground Fuel Tank Report

SLIC..... Statewide SLIC Cases
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

***State and tribal registered storage tank lists***

UST..... Active UST Facilities
AST..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

***State and tribal voluntary cleanup sites***

VCP..... Voluntary Cleanup Program Properties
INDIAN VCP..... Voluntary Cleanup Priority Listing

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS..... A Listing of Brownfields Sites

***Local Lists of Landfill / Solid Waste Disposal Sites***

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL..... Clandestine Drug Labs
HIST Cal-Sites..... Historical Calsites Database
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

***Local Lists of Registered Storage Tanks***

CA FID UST..... Facility Inventory Database
HIST UST..... Hazardous Substance Storage Container Database
SWEEPS UST..... SWEEPS UST Listing

***Local Land Records***

LIENS 2..... CERCLA Lien Information
LIENS..... Environmental Liens Listing
DEED..... Deed Restriction Listing

***Records of Emergency Release Reports***

HMIRS..... Hazardous Materials Information Reporting System

| | |
|---|---|
| CHMIRS | California Hazardous Material Incident Report System |
| LDS | Land Disposal Sites Listing |
| MCS | Military Cleanup Sites Listing |
| SPILLS 90 | SPILLS 90 data from FirstSearch |

***Other Ascertainable Records***

| | |
|---|---|
| RCRA NonGen / NLR | RCRA - Non Generators |
| DOT OPS | Incident and Accident Data |
| DOD | Department of Defense Sites |
| FUDS | Formerly Used Defense Sites |
| CONSENT | Superfund (CERCLA) Consent Decrees |
| ROD | Records Of Decision |
| UMTRA | Uranium Mill Tailings Sites |
| US MINES | Mines Master Index File |
| TRIS | Toxic Chemical Release Inventory System |
| TSCA | Toxic Substances Control Act |
| FTTS | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) |
| HIST FTTS | FIFRA/TSCA Tracking System Administrative Case Listing |
| SSTS | Section 7 Tracking Systems |
| ICIS | Integrated Compliance Information System |
| PADS | PCB Activity Database System |
| MLTS | Material Licensing Tracking System |
| RADINFO | Radiation Information Database |
| FINDS | Facility Index System/Facility Registry System |
| RAATS | RCRA Administrative Action Tracking System |
| RMP | Risk Management Plans |
| CA BOND EXP. PLAN | Bond Expenditure Plan |
| UIC | UIC Listing |
| NPDES | NPDES Permits Listing |
| Cortese | "Cortese" Hazardous Waste & Substances Sites List |
| HIST CORTESE | Hazardous Waste & Substance Site List |
| CUPA Listings | CUPA Resources List |
| Notify 65 | Proposition 65 Records |
| DRYCLEANERS | Cleaner Facilities |
| WIP | Well Investigation Program Case List |
| ENF | Enforcement Action Listing |
| HAZNET | Facility and Manifest Data |
| EMI | Emissions Inventory Data |
| INDIAN RESERV | Indian Reservations |
| SCRD DRYCLEANERS | State Coalition for Remediation of Drycleaners Listing |
| 2020 COR ACTION | 2020 Corrective Action Program List |
| LEAD SMELTERS | Lead Smelter Sites |
| WDS | Waste Discharge System |
| PROC | Certified Processors Database |
| Financial Assurance | Financial Assurance Information Listing |
| HWP | EnviroStor Permitted Facilities Listing |
| HWT | Registered Hazardous Waste Transporter Database |
| US AIRS | Aerometric Information Retrieval System Facility Subsystem |
| EPA WATCH LIST | EPA WATCH LIST |
| PRP | Potentially Responsible Parties |
| US FIN ASSUR | Financial Assurance Information |
| PCB TRANSFORMER | PCB Transformer Registration Database |
| COAL ASH EPA | Coal Combustion Residues Surface Impoundments List |

# EXECUTIVE SUMMARY

MWMP..... Medical Waste Management Program Listing
COAL ASH DOE..... Steam-Electric Plant Operation Data

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

EDR MGP..... EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat..... EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners..... EDR Exclusive Historic Dry Cleaners

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LF..... Recovered Government Archive Solid Waste Facilities List
RGA LUST..... Recovered Government Archive Leaking Underground Storage Tank

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal CERCLIS list***

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 10/25/2013 has revealed that there is 1 CERCLIS site within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| KERN COUNTY DUMP | WOOLOMES RD | WSW 1/8 - 1/4 (0.229 mi.) | 3 | 13 |

# EXECUTIVE SUMMARY

### *Federal RCRA generators list*

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/10/2013 has revealed that there are 2 RCRA-SQG sites within approximately 0.25 miles of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***WALMART SUPERCENTER NO 5215*** | ***530 WOOLLOMES AVE*** | ***SSE 1/8 - 1/4 (0.167 mi.)*** | ***1*** | ***8*** |
| ***HOME DEPOT USA INC HD 8426*** | ***601 WOOLLOMES AVE*** | ***SE 1/8 - 1/4 (0.244 mi.)*** | ***4*** | ***16*** |

### *State- and tribal - equivalent CERCLIS*

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 02/03/2014 has revealed that there are 2 ENVIROSTOR sites within approximately 1 mile of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***WESTERN FARM SERVICE - DELANO***<br>Status: Refer: Other Agency | ***930 WOOLOMES AVE*** | ***E 1/2 - 1 (0.771 mi.)*** | ***7*** | ***21*** |

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| KERN COUNTY DUMP<br>Status: Refer: RWQCB | SE OF XING OF STRADLEY | SSW 1/8 - 1/4 (0.201 mi.) | 2 | 12 |

### *State and tribal landfill and/or solid waste disposal site lists*

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, and dated 02/14/2014 has revealed that there are 2 SWF/LF sites within approximately 0.5 miles of the target property.

# EXECUTIVE SUMMARY

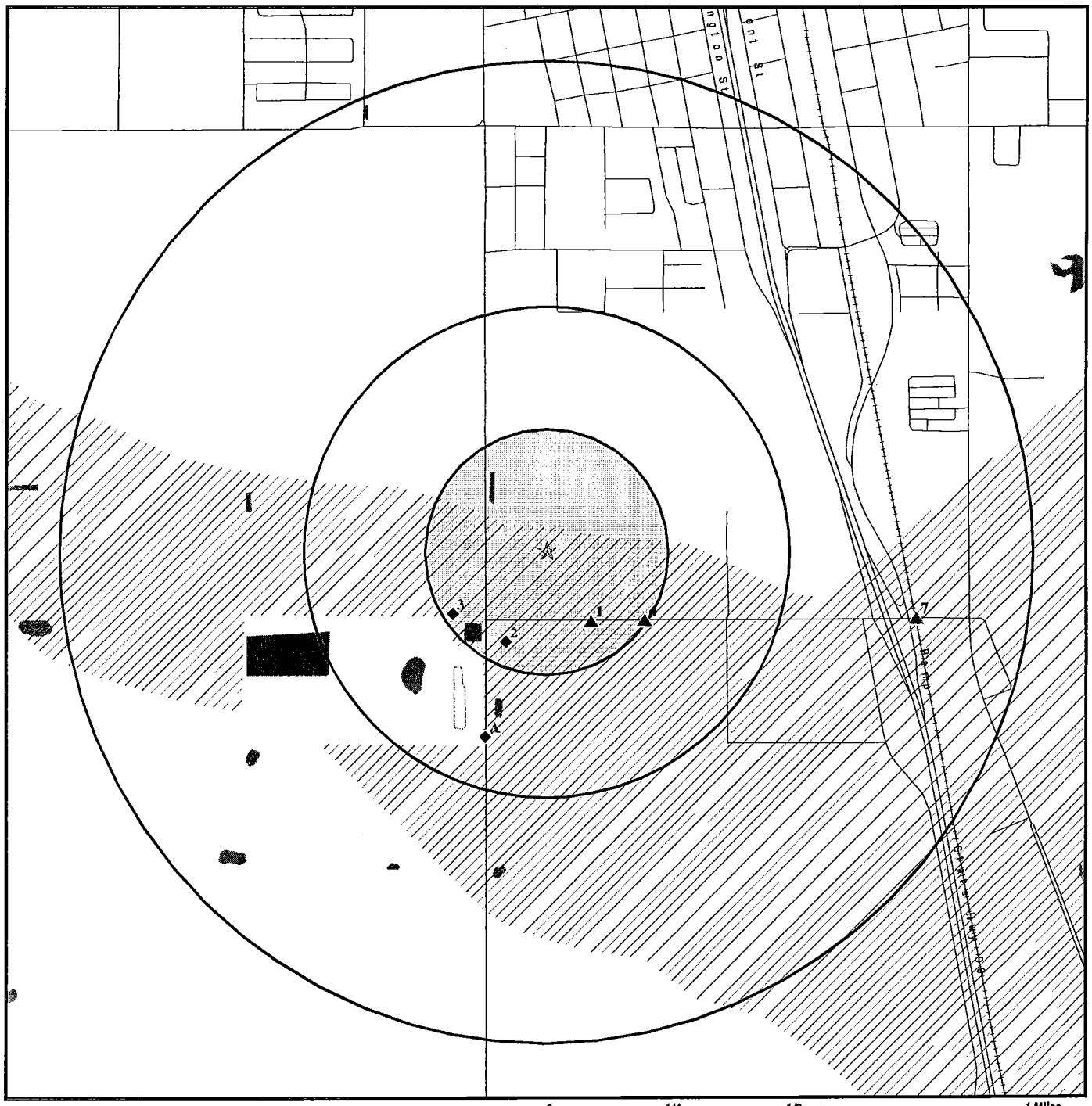
| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| MCFARLAND-DELANO R/TS CMHO | 11249 STRADLEY AVENUE | SSW 1/4 - 1/2 (0.397 mi.) | A5 | 20 |
| MCFARLAND-DELANO RECYCLING/TRA | 11249 STRADLEY AVE. | SSW 1/4 - 1/2 (0.397 mi.) | A6 | 20 |

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 17 records.

| Site Name | Database(s) |
|---|---|
| DELANO GRAPE GROWERS | HIST CORTESE |
| BEACON STATION #647 | HIST CORTESE, LUST |
| MCFARLAND-DELANO SAN LAND | HIST CORTESE, Notify 65 |
| BINGO BEACON TRUCK STOP | CA FID UST, SWEEPS UST |
| PACIFIC BELL (SA-025) | SWEEPS UST |
| RANCH #9 ORANGES | SWEEPS UST |
| DELANO #2 BD | SWF/LF |
| DELANO GRAPE GROWERS | LUST |
| AKAL TRAVEL PLAZA | UST |
| BELLA ROSA WINERY | UST |
| BONKOSKY'S SERVICE | UST |
| J & B FARMS SHOP | HIST UST |
| VESTAL SUBSTATION | HIST UST |
| CASE VANDER EYK JR DAIRY | AST |
| JAMES D MARENGO | AST |
| RANCHO NORTE | AST |
| BRAR LTD PARTNERSHIP | AST |

# OVERVIEW MAP - 03899615.2r




0 1/4 1/2 1 Miles

- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Wollomes Avenue/Stradley Avenue<br>ADDRESS: Wollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7488 / 119.2562 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03899615.2r<br>DATE: April 02, 2014 5:48 pm |

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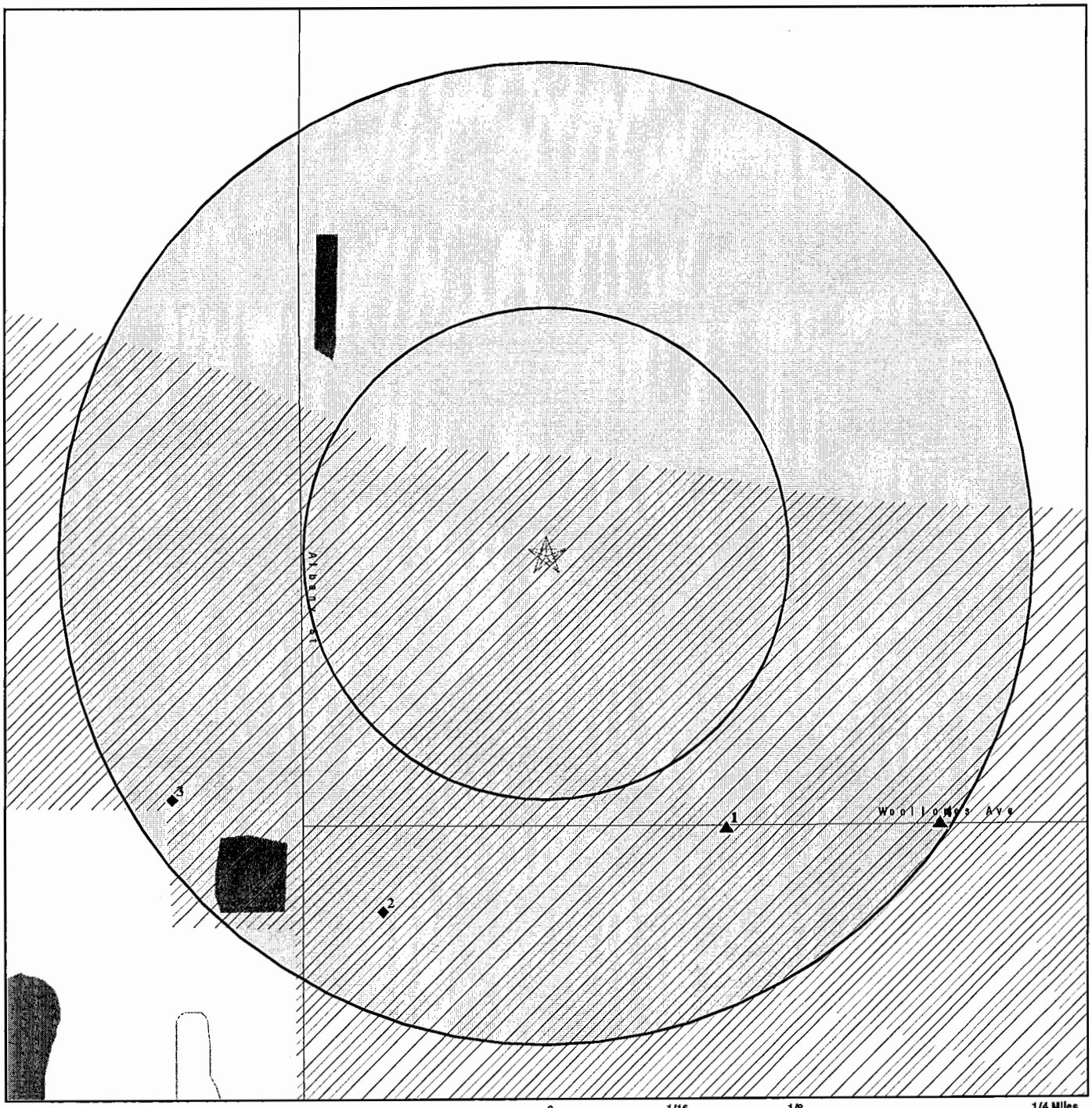
# DETAIL MAP - 03899615.2r




0 1/16 1/8 1/4 Miles

- ☆ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Wollomes Avenue/Stradley Avenue<br>ADDRESS: Wollomes Avenue/Stradley Avenue<br>Delano CA 93215<br>LAT/LONG: 35.7488 / 119.2562 | CLIENT: MooreTwining Associates, Inc.<br>CONTACT: Philip Marquez<br>INQUIRY #: 03899615.2r<br>DATE: April 02, 2014 5:51 pm |

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# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **STANDARD ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Federal NPL site list*** | | | | | | | | |
| NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| NPL LIENS | TP | | NR | NR | NR | NR | NR | 0 |
| ***Federal Delisted NPL site list*** | | | | | | | | |
| Delisted NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS list*** | | | | | | | | |
| CERCLIS | 0.500 | | 0 | 1 | 0 | NR | NR | 1 |
| FEDERAL FACILITY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal CERCLIS NFRAP site List*** | | | | | | | | |
| CERC-NFRAP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | | | |
| CORRACTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA non-CORRACTS TSD facilities list*** | | | | | | | | |
| RCRA-TSDF | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal RCRA generators list*** | | | | | | | | |
| RCRA-LQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| RCRA-SQG | 0.250 | | 0 | 2 | NR | NR | NR | 2 |
| RCRA-CESQG | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| US ENG CONTROLS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US INST CONTROL | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| LUCIS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal ERNS list*** | | | | | | | | |
| ERNS | TP | | NR | NR | NR | NR | NR | 0 |
| ***State- and tribal - equivalent NPL*** | | | | | | | | |
| RESPONSE | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State- and tribal - equivalent CERCLIS*** | | | | | | | | |
| ENVIROSTOR | 1.000 | | 0 | 1 | 0 | 1 | NR | 2 |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | 0.500 | | 0 | 0 | 2 | NR | NR | 2 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| SLIC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| AST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| INDIAN UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| FEMA UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| **ADDITIONAL ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Local Brownfield lists*** | | | | | | | | |
| US BROWNFIELDS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Landfill / Solid Waste Disposal Sites*** | | | | | | | | |
| DEBRIS REGION 9 | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| WMUDS/SWAT | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| SWRCY | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HAULERS | TP | | NR | NR | NR | NR | NR | 0 |
| INDIAN ODI | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US CDL | TP | | NR | NR | NR | NR | NR | 0 |
| HIST Cal-Sites | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCH | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| Toxic Pits | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| CDL | TP | | NR | NR | NR | NR | NR | 0 |
| US HIST CDL | TP | | NR | NR | NR | NR | NR | 0 |
| ***Local Lists of Registered Storage Tanks*** | | | | | | | | |
| CA FID UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| HIST UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| SWEEPS UST | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS 2 | TP | | NR | NR | NR | NR | NR | 0 |
| LIENS | TP | | NR | NR | NR | NR | NR | 0 |
| DEED | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | TP | | NR | NR | NR | NR | NR | 0 |
| CHMIRS | TP | | NR | NR | NR | NR | NR | 0 |
| LDS | TP | | NR | NR | NR | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| MCS | TP | | NR | NR | NR | NR | NR | 0 |
| SPILLS 90 | TP | | NR | NR | NR | NR | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA NonGen / NLR | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| DOT OPS | TP | | NR | NR | NR | NR | NR | 0 |
| DOD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FUDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| CONSENT | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ROD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| US MINES | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| TRIS | TP | | NR | NR | NR | NR | NR | 0 |
| TSCA | TP | | NR | NR | NR | NR | NR | 0 |
| FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| HIST FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| SSTS | TP | | NR | NR | NR | NR | NR | 0 |
| ICIS | TP | | NR | NR | NR | NR | NR | 0 |
| PADS | TP | | NR | NR | NR | NR | NR | 0 |
| MLTS | TP | | NR | NR | NR | NR | NR | 0 |
| RADINFO | TP | | NR | NR | NR | NR | NR | 0 |
| FINDS | TP | | NR | NR | NR | NR | NR | 0 |
| RAATS | TP | | NR | NR | NR | NR | NR | 0 |
| RMP | TP | | NR | NR | NR | NR | NR | 0 |
| CA BOND EXP. PLAN | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UIC | TP | | NR | NR | NR | NR | NR | 0 |
| NPDES | TP | | NR | NR | NR | NR | NR | 0 |
| Cortese | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| HIST CORTESE | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| CUPA Listings | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| Notify 65 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DRYCLEANERS | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| WIP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| ENF | TP | | NR | NR | NR | NR | NR | 0 |
| HAZNET | TP | | NR | NR | NR | NR | NR | 0 |
| EMI | TP | | NR | NR | NR | NR | NR | 0 |
| INDIAN RESERV | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCRD DRYCLEANERS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| 2020 COR ACTION | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| LEAD SMELTERS | TP | | NR | NR | NR | NR | NR | 0 |
| WDS | TP | | NR | NR | NR | NR | NR | 0 |
| PROC | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| Financial Assurance | TP | | NR | NR | NR | NR | NR | 0 |
| HWP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| HWT | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| US AIRS | TP | | NR | NR | NR | NR | NR | 0 |
| EPA WATCH LIST | TP | | NR | NR | NR | NR | NR | 0 |
| PRP | TP | | NR | NR | NR | NR | NR | 0 |
| US FIN ASSUR | TP | | NR | NR | NR | NR | NR | 0 |
| PCB TRANSFORMER | TP | | NR | NR | NR | NR | NR | 0 |
| COAL ASH EPA | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| MWMP | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| COAL ASH DOE | TP | | NR | NR | NR | NR | NR | 0 |
| **EDR HIGH RISK HISTORICAL RECORDS** | | | | | | | | |
| ***EDR Exclusive Records*** | | | | | | | | |
| EDR MGP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| EDR US Hist Auto Stat | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| EDR US Hist Cleaners | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| **EDR RECOVERED GOVERNMENT ARCHIVES** | | | | | | | | |
| ***Exclusive Recovered Govt. Archives*** | | | | | | | | |
| RGA LF | TP | | NR | NR | NR | NR | NR | 0 |
| RGA LUST | TP | | NR | NR | NR | NR | NR | 0 |

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

| | | | |
|---|---|---|---|
| **1 SSE 1/8-1/4 0.167 mi. 882 ft.** | **WALMART SUPERCENTER NO 5215 530 WOOLLOMES AVE DELANO, CA** | **RCRA-SQG FINDS** | **1016168138 CAR000240382** |

**Relative: Higher**

**Actual: 299 ft.**

RCRA-SQG:

| | |
|---|---|
| Date form received by agency: | 06/26/2013 |
| Facility name: | WALMART SUPERCENTER NO 5215 |
| Facility address: | 530 WOOLLOMES AVE<br>DELANO, CA 93215 |
| EPA ID: | CAR000240382 |
| Mailing address: | PO BOX 8041<br>BENTONVILLE, AR 72712 8041 |
| Contact: | JUSTIN WILSON |
| Contact address: | PO BOX 8041<br>BENTONVILLE, AR 72712 8041 |
| Contact country: | US |
| Contact telephone: | 479-204-3517 |
| Contact email: | JUSTIN.P.WILSON@WAL-MART.COM |
| EPA Region: | 09 |
| Classification: | Small Small Quantity Generator |
| Description: | Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time |

Owner/Operator Summary:

| | |
|---|---|
| Owner/operator name: | WAL MART STORES INC |
| Owner/operator address: | Not reported<br>Not reported |
| Owner/operator country: | US |
| Owner/operator telephone: | Not reported |
| Legal status: | Private |
| Owner/Operator Type: | Operator |
| Owner/Op start date: | 07/08/2013 |
| Owner/Op end date: | Not reported |

| | |
|---|---|
| Owner/operator name: | WAL MART STORES INC |
| Owner/operator address: | PO BOX 8041<br>BENTONVILLE, AR 72712 |
| Owner/operator country: | US |
| Owner/operator telephone: | 479-204-3517 |
| Legal status: | Private |
| Owner/Operator Type: | Owner |
| Owner/Op start date: | 07/08/2013 |
| Owner/Op end date: | Not reported |

Handler Activities Summary:

| | |
|---|---|
| U.S. importer of hazardous waste: | No |
| Mixed waste (haz. and radioactive): | No |
| Recycler of hazardous waste: | No |
| Transporter of hazardous waste: | No |
| Treater, storer or disposer of HW: | No |
| Underground injection activity: | No |
| On-site burner exemption: | No |
| Furnace exemption: | No |

**WALMART SUPERCENTER NO 5215 (Continued)** **1016168138**

Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: 122
Waste name: 122

Waste code: 141
Waste name: 141

Waste code: 181
Waste name: 181

Waste code: 213
Waste name: 213

Waste code: 214
Waste name: 214

Waste code: 221
Waste name: 221

Waste code: 232
Waste name: 232

Waste code: 311
Waste name: 311

Waste code: 331
Waste name: 331

Waste code: 352
Waste name: 352

Waste code: 541
Waste name: 541

Waste code: 791
Waste name: 791

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A

**WALMART SUPERCENTER NO 5215 (Continued)** **1016168138**

CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D004
Waste name: ARSENIC

Waste code: D005
Waste name: BARIUM

Waste code: D006
Waste name: CADMIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D010
Waste name: SELENIUM

Waste code: D011
Waste name: SILVER

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

Waste code: D022
Waste name: CHLOROFORM

Waste code: D024
Waste name: M-CRESOL

Waste code: D026
Waste name: CRESOL

Waste code: D027
Waste name: 1,4-DICHLOROBENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

**WALMART SUPERCENTER NO 5215 (Continued)** **1016168138**

Waste code: D039
Waste name: TETRACHLOROETHYLENE

Waste code: D043
Waste name: VINYL CHLORIDE

Waste code: P001
Waste name: 2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%

Waste code: P075
Waste name: NICOTINE, & SALTS

Waste code: U002
Waste name: ACETONE (I)

Waste code: U034
Waste name: ACETALDEHYDE, TRICHLORO-

Waste code: U035
Waste name: BENZENEBUTANOIC ACID, 4-[BIS(2-CHLOROETHYL)AMINO]-

Waste code: U058
Waste name: CYCLOPHOSPHAMIDE

Waste code: U072
Waste name: BENZENE, 1,4-DICHLORO-

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U122
Waste name: FORMALDEHYDE

Waste code: U129
Waste name: CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, (1ALPHA,2ALPHA,3BETA,4ALPHA,5ALPHA,6BETA)-

Waste code: U132
Waste name: HEXACHLOROPHENE

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U150
Waste name: MELPHALAN

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U165
Waste name: NAPHTHALENE

Waste code: U182

**WALMART SUPERCENTER NO 5215 (Continued)** **1016168138**

Waste name: PARALDEHYDE

Waste code: U188
Waste name: PHENOL

Waste code: U200
Waste name: RESERPINE

Waste code: U205
Waste name: SELENIUM SULFIDE

Waste code: U210
Waste name: ETHENE, TETRACHLORO-

Waste code: U249
Waste name: ZINC PHOSPHIDE ZN3P2, WHEN PRESENT AT CONCENTRATIONS OF 10% OR LESS

Waste code: U279
Waste name: CARBARYL (OR) 1-NAPHTHALENOL, METHYLCARBAMATE

Waste code: U409
Waste name: CARBAMIC ACID, [1,2-PHENYLENEBIS (IMINOCARBONOTHIOYL)]BIS-, DIMETHYL ESTER (OR) THIOPHANATE-METHYL

Violation Status: No violations found

FINDS:

Registry ID: 110055522992

Environmental Interest/Information System

---

**2**
**SSW**
**1/8-1/4**
**0.201 mi.**
**1059 ft.**

**KERN COUNTY DUMP** **ENVIROSTOR** **S101480472**
**SE OF XING OF STRADLEY & WOOLOMES AVES** **N/A**
**DELANO, CA 93215**

**Relative:**
**Lower**

**Actual:**
**296 ft.**

ENVIROSTOR:

| | |
|---|---|
| Site Type: | Evaluation |
| Site Type Detailed: | Evaluation |
| Acres: | Not reported |
| NPL: | NO |
| Regulatory Agencies: | SMBRP, RWQCB 5F - Central Valley, US EPA |
| Lead Agency: | RWQCB 5F - Central Valley |
| Program Manager: | Not reported |
| Supervisor: | Referred - Not Assigned |
| Division Branch: | Cleanup Sacramento |
| Facility ID: | 15490017 |
| Site Code: | Not reported |
| Assembly: | 32 |
| Senate: | 14 |
| Special Program: | Not reported |
| Status: | Refer: RWQCB |
| Status Date: | 06/23/1992 |
| Restricted Use: | NO |
| Site Mgmt. Req.: | NONE SPECIFIED |
| Funding: | Not reported |

**KERN COUNTY DUMP (Continued)** **S101480472**

| | |
|---|---|
| Latitude: | 35.74616 |
| Longitude: | -119.2577 |
| APN: | NONE SPECIFIED |
| Past Use: | NONE SPECIFIED |
| Potential COC: | NONE SPECIFIED |
| Confirmed COC: | NONE SPECIFIED, NONE SPECIFIED |
| Potential Description: | NONE SPECIFIED |
| Alias Name: | DELANO BURNING DUMP |
| Alias Type: | Alternate Name |
| Alias Name: | MCFARLANE-DELANO LANDFILL |
| Alias Type: | Alternate Name |
| Alias Name: | CAD980817886 |
| Alias Type: | EPA Identification Number |
| Alias Name: | 15490017 |
| Alias Type: | Envirostor ID Number |

Completed Info:

| | |
|---|---|
| Completed Area Name: | PROJECT WIDE |
| Completed Sub Area Name: | Not reported |
| Completed Document Type: | Site Screening |
| Completed Date: | 08/09/2006 |
| Comments: | DTSC completed a reassessment for USEPA under the PA/SI grant. |

| | |
|---|---|
| Completed Area Name: | PROJECT WIDE |
| Completed Sub Area Name: | Not reported |
| Completed Document Type: | * Discovery |
| Completed Date: | 06/27/1989 |
| Comments: | Facility identified via EPA Field Investigation Team (FIT) Preliminary Assessment (PA). EPA completed PA and recommended Screening Site Inspection; EPA is lead agency. Site is located in the northwest quarter of Township 25 S, Range 25 E, Section 23. |

| | |
|---|---|
| Completed Area Name: | PROJECT WIDE |
| Completed Sub Area Name: | Not reported |
| Completed Document Type: | * Discovery |
| Completed Date: | 06/01/1997 |
| Comments: | Not reported |

| | |
|---|---|
| Future Area Name: | Not reported |
| Future Sub Area Name: | Not reported |
| Future Document Type: | Not reported |
| Future Due Date: | Not reported |
| Schedule Area Name: | Not reported |
| Schedule Sub Area Name: | Not reported |
| Schedule Document Type: | Not reported |
| Schedule Due Date: | Not reported |
| Schedule Revised Date: | Not reported |

---

**3 WSW 1/8-1/4 0.229 mi. 1209 ft.** **KERN COUNTY DUMP WOOLOMES RD DELANO, CA 93215** **CERCLIS** **1000304685 CAD980817886**

**Relative: Lower**
**Actual: 295 ft.**

CERCLIS:

| | |
|---|---|
| Site ID: | 0902089 |
| EPA ID: | CAD980817886 |
| Facility County: | KERN |

**KERN COUNTY DUMP (Continued)** **1000304685**

| | |
|---|---|
| Short Name: | KERN COUNTY DUMP |
| Congressional District: | 18 |
| IFMS ID: | Not reported |
| SMSA Number: | 0680 |
| USGC Hydro Unit: | 18030012 |
| Federal Facility: | Not a Federal Facility |
| DMNSN Number: | 0.00000 |
| Site Orphan Flag: | N |
| RCRA ID: | Not reported |
| USGS Quadrangle: | Not reported |
| Site Init By Prog: | Not reported |
| NFRAP Flag: | Not reported |
| Parent ID: | Not reported |
| RST Code: | Not reported |
| EPA Region: | 09 |
| Classification: | Not reported |
| Site Settings Code: | Not reported |
| NPL Status: | Not on the NPL |
| DMNSN Unit Code: | Not reported |
| RBRAC Code: | Not reported |
| RResp Fed Agency Code: | Not reported |
| Non NPL Status: | Other Cleanup Activity: State-Lead Cleanup |
| Non NPL Status Date: | 09/19/11 |
| Site Fips Code: | 06029 |
| CC Concurrence Date: | / / |
| CC Concurrence FY: | Not reported |
| Alias EPA ID: | Not reported |
| Site FUDS Flag: | Not reported |

CERCLIS Site Contact Name(s):

| | |
|---|---|
| Contact ID: | 13003854.00000 |
| Contact Name: | Leslie Ramirez |
| Contact Tel: | (415) 972-3978 |
| Contact Title: | Site Assessment Manager (SAM) |
| Contact Email: | Not reported |
| | |
| Contact ID: | 13003858.00000 |
| Contact Name: | Sharon Murray |
| Contact Tel: | (415) 972-4250 |
| Contact Title: | Site Assessment Manager (SAM) |
| Contact Email: | Not reported |
| | |
| Contact ID: | 13004003.00000 |
| Contact Name: | Carl Brickner |
| Contact Tel: | Not reported |
| Contact Title: | Site Assessment Manager (SAM) |
| Contact Email: | Not reported |

CERCLIS Site Alias Name(s):

| | |
|---|---|
| Alias ID: | 101 |
| Alias Name: | MCFARLAND-DELANO LANDFILL |
| Alias Address: | Not reported |
| | CA |
| Alias ID: | 101 |
| Alias Comments: | PREVIOUS EPA ID# AZD 981 416 977 |

Site Description: OCA per SS Prioritization 8/04: Central Valley RWQCB

**KERN COUNTY DUMP (Continued)** **1000304685**

CERCLIS Assessment History:

| | |
|---|---|
| Action Code: | 001 |
| Action: | DISCOVERY |
| Date Started: | / / |
| Date Completed: | 11/01/79 |
| Priority Level: | Not reported |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 001 |
| Action: | PRELIMINARY ASSESSMENT |
| Date Started: | / / |
| Date Completed: | 04/01/80 |
| Priority Level: | Low priority for further assessment |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 002 |
| Action: | PRELIMINARY ASSESSMENT |
| Date Started: | / / |
| Date Completed: | 06/30/89 |
| Priority Level: | Higher priority for further assessment |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 001 |
| Action: | SITE INSPECTION |
| Date Started: | / / |
| Date Completed: | 07/02/91 |
| Priority Level: | Higher priority for further assessment |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 001 |
| Action: | SITE REASSESSMENT |
| Date Started: | / / |
| Date Completed: | 08/01/04 |
| Priority Level: | Not reported |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | EPA Fund-Financed |

**KERN COUNTY DUMP (Continued)** **1000304685**

| | |
|---|---|
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

| | |
|---|---|
| Action Code: | 002 |
| Action: | SITE REASSESSMENT |
| Date Started: | 07/01/11 |
| Date Completed: | 09/01/11 |
| Priority Level: | Not reported |
| Operable Unit: | SITEWIDE |
| Primary Responsibility: | State, Fund Financed |
| Planning Status: | Not reported |
| Urgency Indicator: | Not reported |
| Action Anomaly: | Not reported |

---

**4**
**SE**
**1/8-1/4**
**0.244 mi.**
**1289 ft.**

**HOME DEPOT USA INC HD 8426**
**601 WOOLLOMES AVE**
**DELANO, CA 93215**

**RCRA-SQG** **1008879956**
**HAZNET** **CAR000168203**

**Relative:**
**Higher**

**Actual:**
**299 ft.**

RCRA-SQG:

| | |
|---|---|
| Date form received by agency: | 06/22/2005 |
| Facility name: | HOME DEPOT USA INC HD 8426 |
| Facility address: | 601 WOOLLOMES AVE<br>DELANO, CA 93215 |
| EPA ID: | CAR000168203 |
| Mailing address: | 1905 ASTON AVE<br>STE 100<br>CARLSBAD, CA 92008 |
| Contact: | ROBERT PERKINS |
| Contact address: | 1905 ASTON AVE STE 100<br>CARLSBAD, CA 92008 |
| Contact country: | US |
| Contact telephone: | 760-602-8700 |
| Contact email: | RPERKINS@3ECOMPANY.COM |
| EPA Region: | 09 |
| Classification: | Small Small Quantity Generator |
| Description: | Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time |

Owner/Operator Summary:

| | |
|---|---|
| Owner/operator name: | HOME DEPOT USA |
| Owner/operator address: | Not reported<br>Not reported |
| Owner/operator country: | US |
| Owner/operator telephone: | Not reported |
| Legal status: | Private |
| Owner/Operator Type: | Operator |
| Owner/Op start date: | 10/28/2004 |
| Owner/Op end date: | Not reported |

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

| | |
|---|---|
| Owner/operator name: | HOME DEPOT USA |
| Owner/operator address: | 2455 PACES FERRY RD<br>ATLANTA, GA 30339 |
| Owner/operator country: | US |
| Owner/operator telephone: | Not reported |
| Legal status: | Private |
| Owner/Operator Type: | Owner |
| Owner/Op start date: | 10/28/2004 |
| Owner/Op end date: | Not reported |

Handler Activities Summary:

| | |
|---|---|
| U.S. importer of hazardous waste: | No |
| Mixed waste (haz. and radioactive): | No |
| Recycler of hazardous waste: | No |
| Transporter of hazardous waste: | No |
| Treater, storer or disposer of HW: | No |
| Underground injection activity: | No |
| On-site burner exemption: | No |
| Furnace exemption: | No |
| Used oil fuel burner: | No |
| Used oil processor: | No |
| User oil refiner: | No |
| Used oil fuel marketer to burner: | No |
| Used oil Specification marketer: | No |
| Used oil transfer facility: | No |
| Used oil transporter: | No |

Hazardous Waste Summary:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D009
Waste name: MERCURY

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

Waste code: D035

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

Waste name: METHYL ETHYL KETONE

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

HAZNET:

Year: 2012
Gepaid: CAR000168203
Contact: CHRIS BAKER
Telephone: 7136257015
Mailing Name: Not reported
Mailing Address: 5151 SAN FELIPE ST STE 1600
Mailing City,St,Zip: HOUSTON, TX 770563647
Gen County: Kern
TSD EPA ID: CAD008364432
TSD County: Los Angeles
Waste Category: Not reported
Disposal Method: Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons: 0.164
Facility County: Kern

Year: 2012
Gepaid: CAR000168203
Contact: CHRIS BAKER
Telephone: 7136257015
Mailing Name: Not reported
Mailing Address: 5151 SAN FELIPE ST STE 1600
Mailing City,St,Zip: HOUSTON, TX 770563647
Gen County: Kern
TSD EPA ID: CAD980884183
TSD County: Sacramento
Waste Category: Not reported
Disposal Method: Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons: 0.034
Facility County: Kern

**HOME DEPOT USA INC HD 8426 (Continued)** **1008879956**

| | |
|---|---|
| Year: | 2012 |
| Gepaid: | CAR000168203 |
| Contact: | CHRIS BAKER |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Kern |
| TSD EPA ID: | CAD008364432 |
| TSD County: | Los Angeles |
| Waste Category: | Not reported |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.049 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2012 |
| Gepaid: | CAR000168203 |
| Contact: | CHRIS BAKER |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Kern |
| TSD EPA ID: | CAD980884183 |
| TSD County: | Sacramento |
| Waste Category: | Not reported |
| Disposal Method: | Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135) |
| Tons: | 0.0645 |
| Facility County: | Kern |

| | |
|---|---|
| Year: | 2012 |
| Gepaid: | CAR000168203 |
| Contact: | CHRIS BAKER |
| Telephone: | 7136257015 |
| Mailing Name: | Not reported |
| Mailing Address: | 5151 SAN FELIPE ST STE 1600 |
| Mailing City,St,Zip: | HOUSTON, TX 770563647 |
| Gen County: | Kern |
| TSD EPA ID: | NVD980895338 |
| TSD County: | 99 |
| Waste Category: | Not reported |
| Disposal Method: | Fuel Blending Prior To Energy Recovery At Another Site |
| Tons: | 0.0195 |
| Facility County: | Kern |

Click this hyperlink while viewing on your computer to access
24 additional CA_HAZNET: record(s) in the EDR Site Report.

**A5 SSW 1/4-1/2 0.397 mi. 2096 ft.** — **MCFARLAND-DELANO R/TS CMHO**, **11249 STRADLEY AVENUE**, **DELANO, CA** — **SWF/LF** — **S113473415**, **N/A**

**Site 1 of 2 in cluster A**

**Relative: Lower**
**Actual: 296 ft.**

SWF/LF (SWIS):

| | |
|---|---|
| Region: | STATE |
| Facility ID: | 15-AA-0387 |
| Lat/Long: | 35.7447299 / -119.2634 |
| Owner Name: | County of Kern Waste Management Dept. |
| Owner Telephone: | 6618628900 |
| Owner Address: | Not reported |
| Owner Address2: | 2700 M Street, Suite 500 |
| Owner City,St,Zip: | Bakersfield, CA 93301 |
| Operational Status: | Active |
| Operator: | County of Kern Waste Management Dept. |
| Operator Phone: | 6618628900 |
| Operator Address: | Not reported |
| Operator Address2: | 2700 M Street, Suite 500 |
| Operator City,St,Zip: | Bakersfield, CA 93301 |
| Permit Date: | 12/30/2005 |
| Permit Status: | Permitted |
| Permitted Acreage: | $4.00 |
| Activity: | Composting Operation (Green Waste) |
| Regulation Status: | Notification |
| Landuse Name: | Commercial,Agricultural |
| GIS Source: | Map |
| Category: | Composting |
| Unit Number: | 01 |
| Inspection Frequency: | Quarterly |
| Accepted Waste: | Green Materials,Mixed municipal |
| Closure Date: | Not reported |
| Closure Type: | Not reported |
| Disposal Acreage: | Not reported |
| SWIS Num: | 15-AA-0387 |
| Waste Discharge Requirement Num: | Not reported |
| Program Type: | Not reported |
| Permitted Throughput with Units: | 539 |
| Actual Throughput with Units: | Cu Yards/day |
| Permitted Capacity with Units: | 7152 |
| Remaining Capacity: | Not reported |
| Remaining Capacity with Units: | Cu Yards/year |

---

**A6 SSW 1/4-1/2 0.397 mi. 2096 ft.** — **MCFARLAND-DELANO RECYCLING/TRANSFER STN**, **11249 STRADLEY AVE.**, **DELANO, CA** — **SWF/LF** — **S108239495**, **N/A**

**Site 2 of 2 in cluster A**

**Relative: Lower**
**Actual: 296 ft.**

SWF/LF (SWIS):

| | |
|---|---|
| Region: | STATE |
| Facility ID: | 15-AA-0305 |
| Lat/Long: | 35.7462200 / -119.25887 |
| Owner Name: | County of Kern Waste Management Dept. |
| Owner Telephone: | 6618628900 |
| Owner Address: | Not reported |
| Owner Address2: | 2700 M Street, Suite 500 |
| Owner City,St,Zip: | Bakersfield, CA 93301 |
| Operational Status: | Active |

**MCFARLAND-DELANO RECYCLING/TRANSFER STN (Continued)** **S108239495**

| | |
|---|---|
| Operator: | County of Kern Waste Management Dept. |
| Operator Phone: | 6618628900 |
| Operator Address: | Not reported |
| Operator Address2: | 2700 M Street, Suite 500 |
| Operator City,St,Zip: | Bakersfield, CA 93301 |
| Permit Date: | 07/06/2012 |
| Permit Status: | Permitted |
| Permitted Acreage: | $58.80 |
| Activity: | Medium Volume Transfer/Proc Fac |
| Regulation Status: | Permitted |
| Landuse Name: | Agricultural |
| GIS Source: | Map |
| Category: | Transfer/Processing |
| Unit Number: | 01 |
| Inspection Frequency: | Monthly |
| Accepted Waste: | Mixed municipal |
| Closure Date: | Not reported |
| Closure Type: | Not reported |
| Disposal Acreage: | Not reported |
| SWIS Num: | 15-AA-0305 |
| Waste Discharge Requirement Num: | Not reported |
| Program Type: | Not reported |
| Permitted Throughput with Units: | 99 |
| Actual Throughput with Units: | Tons/day |
| Permitted Capacity with Units: | 99 |
| Remaining Capacity: | Not reported |
| Remaining Capacity with Units: | Tires/day |

---

**7 East 1/2-1 0.771 mi. 4072 ft.**

**WESTERN FARM SERVICE - DELANO**
**930 WOOLOMES AVE**
**DELANO, CA 93215**

**SLIC** **S106483834**
**ENVIROSTOR** **N/A**

**Relative: Higher**

**Actual: 310 ft.**

SLIC:

| | |
|---|---|
| Region: | STATE |
| **Facility Status:** | **Open - Site Assessment** |
| Status Date: | 09/30/1998 |
| Global Id: | SL185724257 |
| Lead Agency: | CENTRAL VALLEY RWQCB (REGION 5F) |
| Lead Agency Case Number: | Not reported |
| Latitude: | 35.7466 |
| Longitude: | -119.2422 |
| Case Type: | Cleanup Program Site |
| Case Worker: | GJI |
| Local Agency: | Not reported |
| RB Case Number: | SL185724257 |
| File Location: | Not reported |
| Potential Media Affected: | Aquifer used for drinking water supply |
| Potential Contaminants of Concern: | * * 1,1,2-TRICHLOROETHANE, * * 1,2,3-TRICHLOROPROPANE, Other Chlorinated Hydrocarbons, * * 1,4-DICHLOROBENZENE, * * 2,4-D, * * 2,4-DB, * * BROMOFORM (THM), * * DDD, * * DDE, DDD / DDE / DDT, * * DIBROMOCHLOROMETHANE (THM), * * DIBROMOCHLOROPROPANE (DBCP), * * DICAMBA, * * ENDOSULFAN I, * * ENDOSULFAN II, Other Solvent or Non-Petroleum Hydrocarbon, * * HEPTACHLOR, * * NITRATE + NITRITE (AS N), Tetrachloroethylene (PCE), * * TRICHLOROFLUOROMETHANE, * * DINOSEB |
| Site History: | The case was opened following an unauthorized release from an underground storage tank system at the subject site. Corrective |

**WESTERN FARM SERVICE - DELANO (Continued)** **S106483834**

action is underway as directed by the CVRWQCB. Corrective action may consist of preliminary site investigation, planning and implementation of remedial action, verification monitoring, or a combination thereof. A summary of the site history is available by clicking on either the "Cleanup Status History", "Regulatory Activities" or the "Site Maps/Documents" tab. For a complete site history the case file at the CVRWQCB should be consulted.

Click here to access the California GeoTracker records for this facility:

ENVIROSTOR:

| | |
|---|---|
| Site Type: | Historical |
| Site Type Detailed: | * Historical |
| Acres: | Not reported |
| NPL: | NO |
| Regulatory Agencies: | NONE SPECIFIED |
| Lead Agency: | NONE SPECIFIED |
| Program Manager: | Not reported |
| Supervisor: | Referred - Not Assigned |
| Division Branch: | Cleanup Sacramento |
| Facility ID: | 15070002 |
| Site Code: | Not reported |
| Assembly: | 32 |
| Senate: | 14 |
| Special Program: | Not reported |
| Status: | Refer: Other Agency |
| Status Date: | 11/16/1994 |
| Restricted Use: | NO |
| Site Mgmt. Req.: | NONE SPECIFIED |
| Funding: | Not reported |
| Latitude: | 35.74666 |
| Longitude: | -119.2425 |
| APN: | NONE SPECIFIED |
| Past Use: | NONE SPECIFIED |
| Potential COC: | NONE SPECIFIED |
| Confirmed COC: | NONE SPECIFIED, NONE SPECIFIED |
| Potential Description: | NONE SPECIFIED |
| Alias Name: | COBERLY & PLUMB OF KERN |
| Alias Type: | Alternate Name |
| Alias Name: | CAD066230798 |
| Alias Type: | HWTS Identification Code |
| Alias Name: | 15070002 |
| Alias Type: | Envirostor ID Number |

Completed Info:

| | |
|---|---|
| Completed Area Name: | PROJECT WIDE |
| Completed Sub Area Name: | Not reported |
| Completed Document Type: | * Discovery |
| Completed Date: | 02/09/1981 |
| Comments: | Facility Identified: Industrial Waste Haulers Survey. |
| Future Area Name: | Not reported |
| Future Sub Area Name: | Not reported |
| Future Document Type: | Not reported |
| Future Due Date: | Not reported |
| Schedule Area Name: | Not reported |
| Schedule Sub Area Name: | Not reported |

**WESTERN FARM SERVICE - DELANO (Continued)** **S106483834**

Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 17 records.

ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| DELANO | S105023499 | DELANO GRAPE GROWERS | RT 1 BOX 283 | 93215 | HIST CORTESE |
| DELANO | S104404282 | DELANO GRAPE GROWERS | ROUTE 1- BOX 283 | 93215 | LUST |
| DELANO | A100339926 | CASE VANDER EYK JR DAIRY | 24990 HWY 155 | 93215 | AST |
| DELANO | A100338656 | JAMES D MARENGO | HWY 43 AND SCHUSTER | 93215 | AST |
| DELANO | U003937460 | AKAL TRAVEL PLAZA | HWY 99 & AVE 16 | 93215 | UST |
| DELANO | S105023498 | BEACON STATION #647 | HWY 99 AVE 16 | 93215 | HIST CORTESE, LUST |
| DELANO | S101595927 | BINGO BEACON TRUCK STOP | HWY 99 & AVE 16 | 93215 | CA FID UST, SWEEPS UST |
| DELANO | A100337942 | RANCHO NORTE | S/W CRNR HWY 155 AND 65 | 93215 | AST |
| DELANO | S111213957 | DELANO #2 BD | 1525 METTLER AVE | | SWF/LF |
| DELANO | S106930322 | PACIFIC BELL (SA-025) | 2 MI N/O DELANO E/S HWY 99 | 93215 | SWEEPS UST |
| DELANO | U004112707 | BELLA ROSA WINERY | POND RD E OF HWY 99 | 93215 | UST |
| DELANO | S106931113 | RANCH #9 ORANGES | 1 1-2 S OF HWY 155 1 MILE M | 93215 | SWEEPS UST |
| DELANO | U001581106 | J & B FARMS SHOP | 1/4 MI SOUTH OF GARCES HWY. ON | 93215 | HIST UST |
| DELANO | S100178545 | MCFARLAND-DELANO SAN LAND | STRADLEY AVE | 93215 | HIST CORTESE, Notify 65 |
| DELANO | A100339738 | BRAR LTD PARTNERSHIP | SW STRADLEY AND GARCES | 93215 | AST |
| DELANO | U004113814 | BONKOSKY'S SERVICE | 22100 WOLLOMES AVE | 93215 | UST |
| RICHGROVE | U001581170 | VESTAL SUBSTATION | PORTERVILLE-FOMOSA HWY,RICHGRV | 93215 | HIST UST |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

## STANDARD ENVIRONMENTAL RECORDS

### *Federal NPL site list*

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 01/21/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 01/09/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal Delisted NPL site list***

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

| | |
|---|---|
| Date of Government Version: 10/25/2013 | Source: EPA |
| Date Data Arrived at EDR: 11/11/2013 | Telephone: N/A |
| Date Made Active in Reports: 01/28/2014 | Last EDR Contact: 01/09/2014 |
| Number of Days to Update: 78 | Next Scheduled EDR Contact: 04/21/2014 |
| | Data Release Frequency: Quarterly |

***Federal CERCLIS list***

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

| | |
|---|---|
| Date of Government Version: 10/25/2013 | Source: EPA |
| Date Data Arrived at EDR: 11/11/2013 | Telephone: 703-412-9810 |
| Date Made Active in Reports: 02/13/2014 | Last EDR Contact: 02/28/2014 |
| Number of Days to Update: 94 | Next Scheduled EDR Contact: 06/09/2014 |
| | Data Release Frequency: Quarterly |

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

| | |
|---|---|
| Date of Government Version: 05/31/2013 | Source: Environmental Protection Agency |
| Date Data Arrived at EDR: 07/08/2013 | Telephone: 703-603-8704 |
| Date Made Active in Reports: 12/06/2013 | Last EDR Contact: 01/10/2014 |
| Number of Days to Update: 151 | Next Scheduled EDR Contact: 04/21/2014 |
| | Data Release Frequency: Varies |

***Federal CERCLIS NFRAP site List***

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

| | |
|---|---|
| Date of Government Version: 10/25/2013 | Source: EPA |
| Date Data Arrived at EDR: 11/11/2013 | Telephone: 703-412-9810 |
| Date Made Active in Reports: 02/13/2014 | Last EDR Contact: 02/28/2014 |
| Number of Days to Update: 94 | Next Scheduled EDR Contact: 06/09/2014 |
| | Data Release Frequency: Quarterly |

***Federal RCRA CORRACTS facilities list***

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

***Federal RCRA generators list***

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***Federal institutional controls / engineering controls registries***

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/17/2013
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/17/2013
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 11/20/2013
Date Data Arrived at EDR: 11/21/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 95

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Varies

***Federal ERNS list***

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/30/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 66

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 02/07/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Annually

***State- and tribal - equivalent NPL***

RESPONSE: State Response Sites
Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 02/03/2014
Date Data Arrived at EDR: 02/06/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Quarterly

***State- and tribal - equivalent CERCLIS***

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 02/03/2014
Date Data Arrived at EDR: 02/06/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Quarterly

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/14/2014
Date Data Arrived at EDR: 02/18/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 28

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/18/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Quarterly

***State and tribal leaking storage tank lists***

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/19/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/16/2014
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 08/27/2013
Date Data Arrived at EDR: 08/27/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 66

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/21/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 11/26/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/30/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/13/2014
Date Data Arrived at EDR: 02/14/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 10

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

***State and tribal registered storage tank lists***

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/19/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 01/03/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/30/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 11/26/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/13/2014
Date Data Arrived at EDR: 02/14/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 10

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 01/29/2014
Date Data Arrived at EDR: 01/29/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 42

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 43

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 07/29/2013
Date Data Arrived at EDR: 08/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 92

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 07/29/2013
Date Data Arrived at EDR: 07/30/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 129

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 02/06/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 65

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Varies

***State and tribal voluntary cleanup sites***

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/17/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 66

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/01/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 02/03/2014
Date Data Arrived at EDR: 02/06/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Quarterly

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 09/24/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/20/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Semi-Annually

***Local Lists of Landfill / Solid Waste Disposal Sites***

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/18/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 02/20/2014
Date Made Active in Reports: 03/27/2014
Number of Days to Update: 35

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 11/04/2013
Next Scheduled EDR Contact: 02/17/2014
Data Release Frequency: Varies

***Local Lists of Hazardous waste / Contaminated Sites***

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 12/04/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 65

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/04/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 02/03/2014
Date Data Arrived at EDR: 02/06/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 39

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/28/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 20

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/04/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: No Update Planned

***Local Lists of Registered Storage Tanks***

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Local Land Records***

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/06/2013
Date Data Arrived at EDR: 04/25/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 01/17/2014
Date Data Arrived at EDR: 01/21/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 21

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

DEED: Deed Restriction Listing
Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 12/09/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 24

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 03/11/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Semi-Annually

***Records of Emergency Release Reports***

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/03/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 52

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/01/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 10/14/2013
Date Data Arrived at EDR: 10/30/2013
Date Made Active in Reports: 12/03/2013
Number of Days to Update: 34

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/30/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing
The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 18

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing
The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Other Ascertainable Records***

RCRA NonGen / NLR: RCRA - Non Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/06/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Varies

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/15/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/27/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/11/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/25/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 09/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 28

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/05/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/26/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/28/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/28/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/09/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2013
Date Data Arrived at EDR: 07/17/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 107

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/28/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/09/2014
Date Data Arrived at EDR: 01/10/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/10/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 11/18/2013
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 13

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/14/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/01/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/28/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 09/25/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/18/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 02/17/2014
Date Data Arrived at EDR: 02/18/2014
Date Made Active in Reports: 03/27/2014
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/18/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 12/30/2013
Date Data Arrived at EDR: 12/31/2013
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 42

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 12/31/2013
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/16/2013
Number of Days to Update: 35

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 19

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/16/2013
Date Made Active in Reports: 08/26/2013
Number of Days to Update: 41

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/17/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2010
Date Data Arrived at EDR: 06/25/2013
Date Made Active in Reports: 08/22/2013
Number of Days to Update: 58

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/25/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/15/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/18/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 08/13/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/03/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Varies

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 07/03/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 72

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/15/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: N/A

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 11/20/2013
Date Data Arrived at EDR: 12/03/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/30/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/11/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 09/20/2013
Date Data Arrived at EDR: 12/11/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 24

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/13/2014
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/14/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 21

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/25/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/14/2014
Date Data Arrived at EDR: 02/18/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 28

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 01/28/2014
Date Data Arrived at EDR: 01/30/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 12

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LF: Recovered Government Archive Solid Waste Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**COUNTY RECORDS**

ALAMEDA COUNTY:

Contaminated Sites
A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/22/2014
Date Data Arrived at EDR: 01/23/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 19

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Semi-Annually

Underground Tanks
Underground storage tank sites located in Alameda county.

Date of Government Version: 01/22/2014
Date Data Arrived at EDR: 01/23/2014
Date Made Active in Reports: 02/12/2014
Number of Days to Update: 20

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List
Cupa Facility List

Date of Government Version: 12/05/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 24

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 08/22/2013
Number of Days to Update: 20

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 09/30/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 11/26/2013
Number of Days to Update: 56

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 12/05/2013
Date Data Arrived at EDR: 12/05/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 53

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 03/13/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 21

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 02/05/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/09/2013
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/25/2013
Number of Days to Update: 46

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 11/04/2013
Next Scheduled EDR Contact: 02/17/2014
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/20/2014
Date Data Arrived at EDR: 02/21/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 27

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 02/04/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 28

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 01/27/2014
Date Data Arrived at EDR: 01/28/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 14

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/25/2014
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 21

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/25/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 12/06/2013
Date Data Arrived at EDR: 01/28/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 48

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/20/2014
Date Data Arrived at EDR: 01/21/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 21

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/21/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/07/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/25/2014
Number of Days to Update: 28

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 02/10/2014
Date Data Arrived at EDR: 02/12/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 33

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/30/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 07/18/2013
Date Made Active in Reports: 08/20/2013
Number of Days to Update: 33

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/13/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/09/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 02/20/2014
Number of Days to Update: 72

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 01/03/2014
Date Data Arrived at EDR: 01/09/2014
Date Made Active in Reports: 02/12/2014
Number of Days to Update: 34

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/03/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 11/25/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 91

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/04/2014
Date Made Active in Reports: 04/01/2014
Number of Days to Update: 28

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 01/09/2014
Date Data Arrived at EDR: 01/10/2014
Date Made Active in Reports: 02/14/2014
Number of Days to Update: 35

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/06/2014
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 12/04/2013
Number of Days to Update: 27

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/01/2014
Date Data Arrived at EDR: 02/12/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 33

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/03/2014
Date Data Arrived at EDR: 02/13/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 33

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/01/2014
Date Data Arrived at EDR: 02/12/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 34

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 12/09/2013
Date Data Arrived at EDR: 12/10/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 28

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/14/2014
Date Data Arrived at EDR: 01/15/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 27

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/02/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/14/2014
Date Data Arrived at EDR: 01/15/2014
Date Made Active in Reports: 02/12/2014
Number of Days to Update: 28

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 01/09/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/06/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/21/2013
Date Data Arrived at EDR: 01/09/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/06/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 11/26/2013
Date Data Arrived at EDR: 11/27/2013
Date Made Active in Reports: 12/31/2013
Number of Days to Update: 34

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2013
Date Data Arrived at EDR: 11/19/2013
Date Made Active in Reports: 12/31/2013
Number of Days to Update: 42

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/14/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 03/10/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 12/18/2013
Date Data Arrived at EDR: 12/19/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 20

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/26/2014
Number of Days to Update: 28

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 01/13/2014
Date Data Arrived at EDR: 01/14/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 28

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 12/12/2013
Date Data Arrived at EDR: 12/17/2013
Date Made Active in Reports: 01/07/2014
Number of Days to Update: 21

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 03/04/2014
Date Data Arrived at EDR: 03/06/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 14

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 03/03/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 02/07/2014
Date Data Arrived at EDR: 02/11/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 34

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/10/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 02/24/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 23

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 12/03/2013
Date Data Arrived at EDR: 12/04/2013
Date Made Active in Reports: 01/02/2014
Number of Days to Update: 29

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/18/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 21

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 12/16/2013
Date Data Arrived at EDR: 12/19/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 20

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/02/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 40

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/03/2014
Date Data Arrived at EDR: 01/03/2014
Date Made Active in Reports: 02/11/2014
Number of Days to Update: 39

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/31/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 12/10/2013
Date Data Arrived at EDR: 12/11/2013
Date Made Active in Reports: 01/04/2014
Number of Days to Update: 24

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 06/23/2014
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/27/2014
Date Data Arrived at EDR: 01/28/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 48

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 01/28/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/20/2014
Number of Days to Update: 23

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/18/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/03/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/17/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 10/02/2013
Date Data Arrived at EDR: 10/30/2013
Date Made Active in Reports: 11/27/2013
Number of Days to Update: 28

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 03/21/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 11/26/2013
Date Data Arrived at EDR: 12/18/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 21

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 12/18/2013
Date Data Arrived at EDR: 12/24/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 15

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/24/2014
Next Scheduled EDR Contact: 07/07/2014
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 02/11/2014
Date Data Arrived at EDR: 02/13/2014
Date Made Active in Reports: 03/17/2014
Number of Days to Update: 32

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 12/06/2013
Next Scheduled EDR Contact: 02/17/2014
Data Release Frequency: Varies

**OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/21/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/17/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/07/2014
Date Made Active in Reports: 03/31/2014
Number of Days to Update: 52

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 03/12/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/24/2013
Date Made Active in Reports: 08/19/2013
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 08/05/2013
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 08/09/2013
Date Made Active in Reports: 09/27/2013
Number of Days to Update: 49

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/17/2014
Next Scheduled EDR Contact: 06/30/2014
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

**STREET AND ADDRESS INFORMATION**

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# APPENDIX 4.9-A
## HYDROLOGICAL STUDY

CORNERSTONE
ENGINEERING
CONSULTING CIVIL ENGINEERS & LAND SURVEYORS

# HYDROLOGY STUDY
# FOR
# Delano Grapevine Site

*Civil Engineering*

*Surveying Services*

*Sewer & Water Engineering*

*Storm Water Engineering*

*Storm Water Quality SWPPP*

*Road And Street Engineering*

*School Site Engineering*

*Site Development, Planning And Surveying*

*Construction Staking Services*

*Redevelopment Area Enhancement Engineering*

*Traffic Engineering*

*Transportation Planning*

APN 521-010-19, 20, 21 AND 521-040-43
Section 14 AND 23, Township 25 South, Range 25 East
City of Delano, California

Revised:
June 27, 2014

Prepared By:

Derrill Whitten, PE
RCE# 51930
6/27/14

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

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**ATTACHMENTS:**

Rainfall Intensity Curves ..... 5
Figure 1. - Site Plan
Exhibit "A" – Preliminary Hydrology Full (24x36 sheet)
Exhibit "B" – Grapevine Residential (24x36 sheets)
Exhibit "C" – Grapevine South Parcel (24x36 sheet)

*Civil Engineering*

*Surveying Services*

*Sewer & Water Engineering*

*Storm Water Engineering*

*Storm Water Quality SWPPP*

*Road And Street Engineering*

*School Site Engineering*

*Site Development, Planning And Surveying*

*Construction Staking Services*

*Redevelopment Area Enhancement*

208 Oak Street
Bakersfield, CA 93304-2433
Tel: 661.325.9474 - Fax 661.322.0129
**www.cornerstoneeng.com**

## PROJECT DESCRIPTION

The project applicant, YK America has submitted a project application for approximately 200 acres of commercial and residential development. The project is located in the south ½ of the SW ¼ of Section 14 and the north ½ of the NW ¼ of Section 23, T25S, R25E MDB&M. This preliminary hydrology is prepared in support of this project. The study includes 40 acres of existing Delano Market Place (DMP), 80 acres of proposed Delano Grapevine project which includes 34 acres of Residential and 46 acres of commercial development, 80 acres of DMP West Pavilion which includes 32 acres of residential and 48 acres of commercial development. The following study also includes 60 acres of additional flows from east of Dover parkway and north of Wollomes Ave. This additional area is not proposed for development by the applicant but is included in the study at the request of the city of Delano. The site plan for the proposed project is shown in **Figure 1**, **Site Plan**.

## PURPOSE

The purpose of this study is to describe a general drainage plan for stormwater runoff from the site and determine preliminary design parameters for the on-site storm water collection system. This report is limited to the project collection system.

## EXISTING CONDITIONS

The project site currently is undeveloped with little vegetation and relatively flat. Existing storm sewer in the area consists of pipe installed for the development to the east by means of a 60” ø reinforced concrete pipe (RCP) in Woollomes Avenue. The project will convey runoff to the west in a 54” ø reinforced concrete pipe (RCP) to a retention basin to the west of Stradley, south of Woollomes.

The FEMA flood zoning maps designate the site to be 75% coverage within Zone ‘A’ an area subject to flooding. The site can be found on FEMA flood map panel 06029C0725E. The scope of this study is to provide a preliminary hydrology analysis. Flood hazard analysis is outside the scope of this report and is to be completed by others.

## METHODOLOGY

Onsite stormwater volume and peak flow were calculated using the Rational Method in accordance with the Kern County Hydrology Manual [Hromadka; Section D[1]]. The 10 year storm frequency was used to design the pipe to convey the peak flow generated. Civild software by Joseph E. Bonadiman and Associates was utilized in performing the analysis. The software is the only application approved for this use by the County of Kern.

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[1]Hromadka, T.V. County of Kern. Department of Planning and Development Services. Kern County Hydrology Manual. 1993. Print.

The initial area Tc was calculated by the software with data input specific to the initial areas. For subsequent sub-areas, the time of concentration, $T_C$, was determined from the distance traveled and the change in elevation experienced across the sub-area. Each Tc was then used with the intensity curves to obtain an intensity, I. The runoff coefficient for the site was assigned by the software based upon a general commercial land use.

Runoff generated at any location of new development is required by Kern County to be retained. The adequate sizing of a sump capable of retaining the runoff was calculated by employing the City of Delano sump criteria (1 acre-ft per 6 acres of commercial development. This same criteria was also used for the residential portion of the site.

## PROPOSED DRAINAGE PLAN

Proposed site improvements do not incorporate the use of the existing retention basin. The existing runoff is to be redirected to an existing retention basin on City owned land at the SW corner of Woollomes and Stradley by means of a 54" ø R.C.P.

Runoff will be collected and carried offsite by means of various lateral mains connecting to 54" ø R.C.P. Preliminary locations of stormwater collection structures and preliminary sizing can be observed in attached **Exhibit A**. Runoff will then be conveyed to the 54" ø R.C.P. extended along Woollomes Avenue, and thence to a retention basin.

## CONCLUSION

All pipes on the site have been sized and will convey a 10 year 24-hour precipitation event without allowing the hydraulic grade line to get within a foot of the surface grade. The final design shall meet or exceed the design standards of the City of Delano.

## WATER QUALITY

The State of California has designated urban stormwater as a potential source of pollution to lakes and streams. Since this project will cause an increase in stormwater runoff by the creation of additional impervious area, the handling of this runoff must be done in a manner which will not impact the quality of water to nearby lakes and streams and will not increase the volume of stormwater discharged from the site above the pre-development level. To mitigate these stormwater impacts one or more Best Management Practices (Stormwater BMPs) must be implemented.

All stormwater from the project site will be routed to a stormwater retention basin. This basin will be sized to accommodate the stormwater runoff from a 25yr-24hr storm event. The water will be retained in the basin and disposed of by percolation into the ground. Stormwater retention basins are a reliable BMP used throughout the Valley. The stormwater basin will be owned and maintained by the City of Delano.

# Calculations

Sump Sizing

Per the city of Delano Standard 48-2.01 (b): *The retention basin capacity shall be based on one (1) acre foot for each eight (8) acres of commercial development in areas where M.A.P. is seven (7") inches.* Cornerstone has elected to provide capacity based on a 1 acre-ft per 6 acres of commercial development.

| Table 1. – Sump Requirements | | | |
|---|---|---|---|
| Description | Area (ac.) | Volume Required (ac-ft) | Volume Provided (ac-ft) |
| Delano Marketplace | 40 | 5 | 6.7 |
| Grapevine Commercial | 46 | 5.8 | 7.7 |
| Grapevine Residential | 34 | 4.25 | 5.7 |
| DMP West Pavilion Commercial | 48 | 6 | 8 |
| DMP West Pavilion Residential | 32 | 4 | 5.3 |
| | | **Total:** | **33.4** |

DMP WOOLLOMES MAIN LINE HYDROLOGY CALCULATIONS
This study is the analysis for the main trunk line down Woollomes Avenue to the terminal sump. This computer run takes in all the flow beginning at the most upstream end of the DMP-Phase 1, down Woollomes to Stradely.
The DMP-Grapevine Residential area is done in as a separate computer run with the flow added as a manual input into this computer model at node 58.
The flow from the southerly half of the DMP West Pavilion site was also done as a separate computer model and the flow from that model is input into this computer model at node 89.

DW 6/26/2014

Kern County Rational Hydrology Program

(Hydrology Manual Dated 1992)

```
  CIVILCADD/CIVILDESIGN  Engineering Software, (c) 2006   Version 7.2
       Rational Hydrology Study        Date: 06/27/14 File: 390gpvf.out
--------------------------------------------------------------------------
FINAL HYROLOGY INCLUDING ALL ADDITIONAL AREAS
60 AC, 110 CFS, Tc 20min
RESIDENCIAL AREA
AND SOUTH SIDE
--------------------------------------------------------------------------
Program License Serial Number 6027
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------
ENGLISH UNITS USED FOR RAINFALL DATA

Rainfall map data: Year Storm    Hour    Rainfall
                          2         6        0.745(In.)
                          2        24        1.100(In.)
                        100         6        1.650(In.)
                        100        24        2.500(In.)
Latitude in degrees =  35.75
SAN JOAQUIN VALLEY area of study
Y2 =   0.342, Y100 =   0.696 or Y100 =   0.697
Note: Larger value of Y100 =   0.697 used
Slope used for rainfall intensity curve b =  0.6500

Remaining year storm values:

1 Hour Rainfall -  Year Storm
          0.342          2
          0.430          5
          0.488          10
          0.563          25
          0.632          50
          0.697          100

24 Hour Rainfall -  Year Storm
          1.100          2
          1.446          5
          1.675          10
          1.973          25
          2.244          50
          2.500          100

Note: Computer estimated pipe sizes use 10 year storm flow rates
NOTE: ENGLISH (IN-LB) INPUT DATA UNITS USED
NOTE: ENGLISH (IN-LB) OUTPUT DATA UNITS USED
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 1.000 to Point 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 400.000(Ft.)
Top (of initial area) elevation = 293.590(Ft.)
Bottom (of initial area) elevation = 292.790(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00200 s(%)= 0.20
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.574 min.
Rainfall intensity = 2.032(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 4.701(CFS)
Subarea runoff = 5.456(CFS)
Total initial stream area = 3.040(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 3.0 | 11.57 | 1.25 | 0.04 | 0.83 | 2.8 | 3.3 | 3.3 |
| 10 | 3.0 | 11.57 | 1.42 | 0.04 | 0.83 | 3.2 | 3.8 | 3.8 |
| 25 | 3.0 | 11.57 | 1.64 | 0.04 | 0.84 | 3.8 | 4.4 | 4.4 |
| 50 | 3.0 | 11.57 | 1.84 | 0.04 | 0.84 | 4.2 | 4.9 | 4.9 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        2.000 to Point        3.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   291.79(Ft.)
Downstream point elevation =   290.69(Ft.)
Pipe Slope = 0.0022 Ft/Ft
Pipe length  =   500.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.456(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     5.456(CFS)
Normal flow depth in pipe =   12.20(In.)
Flow top width inside pipe =   24.00(In.)
Critical Depth =    9.88(In.)
Pipe flow velocity =      3.40(Ft/s)
Travel time through pipe =    2.45 min.
Time of concentration (TC) =    14.02 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     3.321(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     3.321(CFS)
Normal flow depth in pipe =    9.22(In.)
Flow top width inside pipe =   23.35(In.)
Critical Depth =    7.63(In.)
Pipe flow velocity =      2.99(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     3.785(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     3.785(CFS)
Normal flow depth in pipe =    9.90(In.)
Flow top width inside pipe =   23.63(In.)
Critical Depth =    8.18(In.)
Pipe flow velocity =      3.09(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     4.388(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.388(CFS)
Normal flow depth in pipe =   10.76(In.)
Flow top width inside pipe =   23.87(In.)
Critical Depth =    8.83(In.)
Pipe flow velocity =      3.22(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     4.938(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.938(CFS)
Normal flow depth in pipe =   11.51(In.)
Flow top width inside pipe =   23.98(In.)
Critical Depth =    9.39(In.)
Pipe flow velocity =      3.32(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 2.000 to Point 3.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 6.251(CFS)
Time of concentration = 14.02 min.
Rainfall intensity = 1.794(In/Hr) for a 100 year storm
Subarea runoff = 1.781(CFS) for 1.540(Ac.)
Total runoff = 7.237(CFS) Total area = 4.58(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 4.6 | 16.83 | 0.98 | 0.04 | 0.83 | 3.3 | 3.9 | 3.9 |
| 10 | 4.6 | 15.99 | 1.15 | 0.04 | 0.83 | 4.0 | 4.6 | 4.6 |
| 25 | 4.6 | 15.01 | 1.39 | 0.04 | 0.84 | 4.8 | 5.6 | 5.6 |
| 50 | 4.6 | 14.45 | 1.60 | 0.04 | 0.84 | 5.5 | 6.4 | 6.4 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        3.000 to Point        4.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   290.69(Ft.)
Downstream point elevation =   290.41(Ft.)
Pipe Slope = 0.0015 Ft/Ft
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.237(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     7.237(CFS)
Normal flow depth in pipe =   16.57(In.)
Flow top width inside pipe =   22.19(In.)
Critical Depth =   11.46(In.)
Pipe flow velocity =      3.13(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    15.01 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     3.889(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     3.889(CFS)
Normal flow depth in pipe =   11.17(In.)
Flow top width inside pipe =   23.94(In.)
Critical Depth =    8.29(In.)
Pipe flow velocity =      2.71(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     4.592(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.592(CFS)
Normal flow depth in pipe =   12.30(In.)
Flow top width inside pipe =   23.99(In.)
Critical Depth =    9.04(In.)
Pipe flow velocity =      2.83(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     5.560(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     5.560(CFS)
Normal flow depth in pipe =   13.84(In.)
Flow top width inside pipe =   23.72(In.)
Critical Depth =    9.99(In.)
Pipe flow velocity =      2.96(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     6.421(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     6.421(CFS)
Normal flow depth in pipe =   15.21(In.)
Flow top width inside pipe =   23.12(In.)
Critical Depth =   10.76(In.)
Pipe flow velocity =      3.06(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        3.000 to Point        4.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =   8.032(CFS)
Time of concentration =    15.01 min.
Rainfall intensity =      1.716(In/Hr) for a 100 year storm
Subarea runoff =      2.052(CFS) for    1.570(Ac.)
Total runoff =      9.289(CFS)   Total area =        6.15(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5    6.2   18.01     0.94      0.04   0.83     4.3   5.0   5.0
  10    6.2   17.11     1.10      0.04   0.83     5.1   5.9   5.9
  25    6.2   16.06     1.33      0.04   0.84     6.2   7.1   7.1
  50    6.2   15.46     1.53      0.04   0.84     7.1   8.2   8.2
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        4.000 to Point        5.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   290.41(Ft.)
Downstream point elevation =   290.21(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   202.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.289(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     9.289(CFS)
Normal flow depth in pipe =   21.07(In.)
Flow top width inside pipe =   22.36(In.)
Critical Depth =   12.59(In.)
Pipe flow velocity =      2.79(Ft/s)
Travel time through pipe =    1.21 min.
Time of concentration (TC) =    16.22 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     4.987(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     4.987(CFS)
Normal flow depth in pipe =   13.69(In.)
Flow top width inside pipe =   27.00(In.)
Critical Depth =    9.11(In.)
Pipe flow velocity =      2.47(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     5.891(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     5.891(CFS)
Normal flow depth in pipe =   15.14(In.)
Flow top width inside pipe =   26.80(In.)
Critical Depth =    9.94(In.)
Pipe flow velocity =      2.57(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     7.135(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     7.135(CFS)
Normal flow depth in pipe =   17.16(In.)
Flow top width inside pipe =   25.99(In.)
Critical Depth =   10.97(In.)
Pipe flow velocity =      2.68(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     8.240(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =     8.240(CFS)
Normal flow depth in pipe =   19.03(In.)
Flow top width inside pipe =   24.63(In.)
Critical Depth =   11.83(In.)
Pipe flow velocity =      2.75(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        4.000 to Point        5.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  10.544(CFS)
Time of concentration =    16.22 min.
Rainfall intensity =      1.632(In/Hr) for a 100 year storm
Subarea runoff =      2.891(CFS) for    2.340(Ac.)
Total runoff =     12.180(CFS)   Total area =        8.49(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5    8.5   19.46     0.89      0.04   0.83     5.6   6.5   6.5
  10    8.5   18.49     1.05      0.04   0.83     6.7   7.7   7.7
  25    8.5   17.35     1.26      0.04   0.84     8.1   9.4   9.4
  50    8.5   16.70     1.45      0.04   0.84     9.3  10.8  10.8
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        5.000 to Point        6.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   290.21(Ft.)
Downstream point elevation =   289.65(Ft.)
Pipe Slope = 0.0015 Ft/Ft
Pipe length  =   377.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.180(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    12.180(CFS)
Normal flow depth in pipe =   19.76(In.)
Flow top width inside pipe =   28.45(In.)
Critical Depth =   14.04(In.)
Pipe flow velocity =      3.55(Ft/s)
Travel time through pipe =    1.77 min.
Time of concentration (TC) =    17.99 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.533(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     6.533(CFS)
Normal flow depth in pipe =   13.44(In.)
Flow top width inside pipe =   29.84(In.)
Critical Depth =   10.15(In.)
Pipe flow velocity =      3.07(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.720(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     7.720(CFS)
Normal flow depth in pipe =   14.79(In.)
Flow top width inside pipe =   30.00(In.)
Critical Depth =   11.06(In.)
Pipe flow velocity =      3.20(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     9.352(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     9.352(CFS)
Normal flow depth in pipe =   16.59(In.)
Flow top width inside pipe =   29.83(In.)
Critical Depth =   12.23(In.)
Pipe flow velocity =      3.35(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    10.804(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    10.804(CFS)
Normal flow depth in pipe =   18.21(In.)
Flow top width inside pipe =   29.30(In.)
Critical Depth =   13.20(In.)
Pipe flow velocity =      3.47(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        5.000 to Point        6.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  10.810(CFS)
Time of concentration =    17.99 min.
Rainfall intensity =      1.526(In/Hr) for a 100 year storm
Subarea runoff =      0.287(CFS) for    0.820(Ac.)
Total runoff =     12.467(CFS)   Total area =        9.31(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5    9.3   21.58     0.83      0.04   0.83     5.8   6.7   6.7
  10    9.3   20.50     0.98      0.04   0.83     6.8   7.9   7.9
  25    9.3   19.24     1.18      0.04   0.84     8.3   9.6   9.6
  50    9.3   18.53     1.36      0.04   0.84     9.6  11.1  11.1
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        6.000 to Point        7.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   289.65(Ft.)
Downstream point elevation =   287.70(Ft.)
Pipe Slope = 0.0055 Ft/Ft
Pipe length  =   354.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.467(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    12.467(CFS)
Normal flow depth in pipe =   13.37(In.)
Flow top width inside pipe =   29.82(In.)
Critical Depth =   14.23(In.)
Pipe flow velocity =      5.89(Ft/s)
Travel time through pipe =    1.00 min.
Time of concentration (TC) =    18.99 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.678(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     6.678(CFS)
Normal flow depth in pipe =    9.54(In.)
Flow top width inside pipe =   27.95(In.)
Critical Depth =   10.27(In.)
Pipe flow velocity =      4.97(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.894(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     7.894(CFS)
Normal flow depth in pipe =   10.42(In.)
Flow top width inside pipe =   28.57(In.)
Critical Depth =   11.20(In.)
Pipe flow velocity =      5.21(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     9.568(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     9.568(CFS)
Normal flow depth in pipe =   11.55(In.)
Flow top width inside pipe =   29.20(In.)
Critical Depth =   12.38(In.)
Pipe flow velocity =      5.49(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    11.056(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    11.056(CFS)
Normal flow depth in pipe =   12.50(In.)
Flow top width inside pipe =   29.58(In.)
Critical Depth =   13.36(In.)
Pipe flow velocity =      5.71(Ft/s)
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        6.000 to Point        7.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  13.553(CFS)
Time of concentration =    18.99 min.
Rainfall intensity =      1.473(In/Hr) for a 100 year storm
Subarea runoff =      3.148(CFS) for    2.780(Ac.)
Total runoff =     15.615(CFS)   Total area =       12.09(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   12.1   22.78     0.81      0.04   0.83     7.3   8.4   8.4
  10   12.1   21.65     0.95      0.04   0.83     8.6   9.9   9.9
  25   12.1   20.32     1.14      0.04   0.84    10.4  12.0  12.0
  50   12.1   19.56     1.31      0.04   0.84    12.0  13.8  13.8
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        7.000 to Point        8.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   287.70(Ft.)
Downstream point elevation =   286.98(Ft.)
Pipe Slope = 0.0021 Ft/Ft
Pipe length  =   350.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.615(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    15.615(CFS)
Normal flow depth in pipe =   21.05(In.)
Flow top width inside pipe =   27.45(In.)
Critical Depth =   16.01(In.)
Pipe flow velocity =      4.25(Ft/s)
Travel time through pipe =    1.37 min.
Time of concentration (TC) =    20.36 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     8.357(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     8.357(CFS)
Normal flow depth in pipe =   14.10(In.)
Flow top width inside pipe =   29.95(In.)
Critical Depth =   11.53(In.)
Pipe flow velocity =      3.69(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     9.882(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     9.882(CFS)
Normal flow depth in pipe =   15.55(In.)
Flow top width inside pipe =   29.98(In.)
Critical Depth =   12.59(In.)
Pipe flow velocity =      3.85(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    11.980(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    11.980(CFS)
Normal flow depth in pipe =   17.51(In.)
Flow top width inside pipe =   29.58(In.)
Critical Depth =   13.93(In.)
Pipe flow velocity =      4.03(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    13.846(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    13.846(CFS)
Normal flow depth in pipe =   19.29(In.)
Flow top width inside pipe =   28.75(In.)
Critical Depth =   15.02(In.)
Pipe flow velocity =      4.15(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        7.000 to Point        8.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  17.289(CFS)
Time of concentration =    20.36 min.
Rainfall intensity =      1.408(In/Hr) for a 100 year storm
Subarea runoff =      4.281(CFS) for    4.050(Ac.)
Total runoff =     19.895(CFS)   Total area =       16.14(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   16.1   24.43     0.77      0.04   0.83     9.3  10.6  10.6
  10   16.1   23.21     0.90      0.04   0.83    10.9  12.6  12.6
  25   16.1   21.79     1.09      0.04   0.84    13.2  15.3  15.3
  50   16.1   20.97     1.25      0.04   0.84    15.3  17.6  17.6
----------------------------------------------------------------
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Process from Point        8.000 to Point        9.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   286.98(Ft.)
Downstream point elevation =   286.48(Ft.)
Pipe Slope = 0.0020 Ft/Ft
Pipe length  =   250.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.895(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.471(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.588(Ft.)
 Minor friction loss =      0.383(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.05(Ft/s)
Travel time through pipe =    1.03 min.
Time of concentration (TC) =    21.39 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.637(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    10.637(CFS)
Normal flow depth in pipe =   16.41(In.)
Flow top width inside pipe =   29.87(In.)
Critical Depth =   13.10(In.)
Pipe flow velocity =      3.88(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.582(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    12.582(CFS)
Normal flow depth in pipe =   18.26(In.)
Flow top width inside pipe =   29.28(In.)
Critical Depth =   14.27(In.)
Pipe flow velocity =      4.03(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    15.259(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    15.259(CFS)
Normal flow depth in pipe =   20.91(In.)
Flow top width inside pipe =   27.58(In.)
Critical Depth =   15.82(In.)
Pipe flow velocity =      4.18(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    17.639(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    17.639(CFS)
Normal flow depth in pipe =   23.63(In.)
Flow top width inside pipe =   24.54(In.)
Critical Depth =   17.04(In.)
Pipe flow velocity =      4.26(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        8.000 to Point        9.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  22.565(CFS)
Time of concentration =    21.39 min.
Rainfall intensity =      1.363(In/Hr) for a 100 year storm
Subarea runoff =      6.047(CFS) for    5.610(Ac.)
Total runoff =     25.943(CFS)   Total area =       21.75(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   21.8   25.67     0.75      0.04   0.83    12.1  13.9  13.9
  10   21.8   24.38     0.88      0.04   0.83    14.3  16.4  16.4
  25   21.8   22.89     1.05      0.04   0.84    17.3  19.9  19.9
  50   21.8   22.03     1.21      0.04   0.84    20.0  23.0  23.0
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        9.000 to Point       10.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   286.48(Ft.)
Downstream point elevation =   285.25(Ft.)
Pipe Slope = 0.0034 Ft/Ft
Pipe length  =   367.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.943(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    25.943(CFS)
Normal flow depth in pipe =   21.61(In.)
Flow top width inside pipe =   35.27(In.)
Critical Depth =   19.72(In.)
Pipe flow velocity =      5.86(Ft/s)
Travel time through pipe =    1.04 min.
Time of concentration (TC) =    22.43 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    13.859(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    13.859(CFS)
Normal flow depth in pipe =   14.91(In.)
Flow top width inside pipe =   35.46(In.)
Critical Depth =   14.20(In.)
Pipe flow velocity =      5.01(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    16.398(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    16.398(CFS)
Normal flow depth in pipe =   16.38(In.)
Flow top width inside pipe =   35.85(In.)
Critical Depth =   15.52(In.)
Pipe flow velocity =      5.24(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    19.892(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    19.892(CFS)
Normal flow depth in pipe =   18.33(In.)
Flow top width inside pipe =   35.99(In.)
Critical Depth =   17.18(In.)
Pipe flow velocity =      5.50(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    22.998(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    22.998(CFS)
Normal flow depth in pipe =   20.02(In.)
Flow top width inside pipe =   35.77(In.)
Critical Depth =   18.53(In.)
Pipe flow velocity =      5.70(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point        9.000 to Point       10.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.750(Ac.)
Runoff from this stream =     25.943(CFS)
Time of concentration =   22.43 min.
Rainfall intensity =     1.322(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

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Process from Point 11.000 to Point 12.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 370.000(Ft.)
Top (of initial area) elevation = 293.740(Ft.)
Bottom (of initial area) elevation = 293.380(Ft.)
Difference in elevation = 0.360(Ft.)
Slope = 0.00097 s(%)= 0.10
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.958 min.
Rainfall intensity = 1.888(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 7.127(CFS)
Subarea runoff = 8.260(CFS)
Total initial stream area = 4.960(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 5.0 | 12.96 | 1.16 | 0.04 | 0.83 | 4.3 | 5.0 | 5.0 |
| 10 | 5.0 | 12.96 | 1.32 | 0.04 | 0.83 | 4.9 | 5.7 | 5.7 |
| 25 | 5.0 | 12.96 | 1.53 | 0.04 | 0.84 | 5.7 | 6.6 | 6.6 |
| 50 | 5.0 | 12.96 | 1.71 | 0.04 | 0.84 | 6.4 | 7.5 | 7.5 |

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Process from Point       12.000 to Point       13.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   293.38(Ft.)
Downstream point elevation =   292.54(Ft.)
Pipe Slope = 0.0052 Ft/Ft
Pipe length  =   160.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.260(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.793(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.989(Ft.)
 Minor friction loss =      0.645(Ft.)  K-factor =   1.90
Pipe flow velocity =      4.67(Ft/s)
Travel time through pipe =    0.57 min.
Time of concentration (TC) =    13.53 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     5.023(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     5.023(CFS)
Normal flow depth in pipe =   10.68(In.)
Flow top width inside pipe =   17.69(In.)
Critical Depth =   10.35(In.)
Pipe flow velocity =      4.60(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     5.726(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     5.726(CFS)
Normal flow depth in pipe =   11.65(In.)
Flow top width inside pipe =   17.20(In.)
Critical Depth =   11.08(In.)
Pipe flow velocity =      4.73(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     6.641(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.641(CFS)
Normal flow depth in pipe =   13.01(In.)
Flow top width inside pipe =   16.12(In.)
Critical Depth =   11.97(In.)
Pipe flow velocity =      4.85(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     7.475(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     7.475(CFS)
Normal flow depth in pipe =   14.48(In.)
Flow top width inside pipe =   14.27(In.)
Critical Depth =   12.70(In.)
Pipe flow velocity =      4.91(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       12.000 to Point       13.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  10.717(CFS)
Time of concentration =    13.53 min.
Rainfall intensity =      1.836(In/Hr) for a 100 year storm
Subarea runoff =      4.153(CFS) for    2.710(Ac.)
Total runoff =     12.412(CFS)   Total area =        7.67(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5    7.7   16.23     1.00      0.04   0.83     5.7   6.7   6.7
  10    7.7   15.42     1.18      0.04   0.83     6.8   7.9   7.9
  25    7.7   14.48     1.42      0.04   0.84     8.2   9.5   9.5
  50    7.7   13.93     1.63      0.04   0.84     9.5  11.0  11.0
----------------------------------------------------------------
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Process from Point       13.000 to Point       14.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   292.54(Ft.)
Downstream point elevation =   292.15(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.412(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.259(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.815(Ft.)
 Minor friction loss =      2.835(Ft.)  K-factor =   3.70
Pipe flow velocity =      7.02(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    13.84 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.673(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.954(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.524(Ft.)
 Minor friction loss =      0.819(Ft.)  K-factor =   3.70
Pipe flow velocity =      3.78(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.879(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.483(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.731(Ft.)
 Minor friction loss =      1.142(Ft.)  K-factor =   3.70
Pipe flow velocity =      4.46(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     9.538(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.355(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.072(Ft.)
 Minor friction loss =      1.674(Ft.)  K-factor =   3.70
Pipe flow velocity =      5.40(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    11.014(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.270(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.429(Ft.)
 Minor friction loss =      2.232(Ft.)  K-factor =   3.70
Pipe flow velocity =      6.23(Ft/s)
-------------------------------------------------------------------
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Process from Point 13.000 to Point 14.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 11.621(CFS)
Time of concentration = 13.84 min.
Rainfall intensity = 1.809(In/Hr) for a 100 year storm
Subarea runoff = 1.043(CFS) for 0.770(Ac.)
Total runoff = 13.456(CFS) Total area = 8.44(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 8.4 | 16.60 | 0.99 | 0.04 | 0.83 | 6.2 | 7.2 | 7.2 |
| 10 | 8.4 | 15.77 | 1.16 | 0.04 | 0.83 | 7.3 | 8.5 | 8.5 |
| 25 | 8.4 | 14.81 | 1.40 | 0.04 | 0.84 | 8.9 | 10.3 | 10.3 |
| 50 | 8.4 | 14.25 | 1.61 | 0.04 | 0.84 | 10.3 | 11.9 | 11.9 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       14.000 to Point       15.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   292.15(Ft.)
Downstream point elevation =   290.85(Ft.)
Pipe Slope = 0.0049 Ft/Ft
Pipe length  =   268.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.456(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    13.456(CFS)
Normal flow depth in pipe =   14.48(In.)
Flow top width inside pipe =   29.98(In.)
Critical Depth =   14.79(In.)
Pipe flow velocity =      5.73(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =    14.62 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     7.232(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     7.232(CFS)
Normal flow depth in pipe =   10.29(In.)
Flow top width inside pipe =   28.48(In.)
Critical Depth =   10.71(In.)
Pipe flow velocity =      4.85(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     8.540(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     8.540(CFS)
Normal flow depth in pipe =   11.25(In.)
Flow top width inside pipe =   29.05(In.)
Critical Depth =   11.67(In.)
Pipe flow velocity =      5.08(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    10.339(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    10.339(CFS)
Normal flow depth in pipe =   12.48(In.)
Flow top width inside pipe =   29.57(In.)
Critical Depth =   12.89(In.)
Pipe flow velocity =      5.35(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    11.939(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    11.939(CFS)
Normal flow depth in pipe =   13.52(In.)
Flow top width inside pipe =   29.85(In.)
Critical Depth =   13.90(In.)
Pipe flow velocity =      5.56(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 14.000 to Point 15.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 17.593(CFS)
Time of concentration = 14.62 min.
Rainfall intensity = 1.746(In/Hr) for a 100 year storm
Subarea runoff = 6.898(CFS) for 4.800(Ac.)
Total runoff = 20.354(CFS) Total area = 13.24(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 13.2 | 17.54 | 0.96 | 0.04 | 0.83 | 9.4 | 10.9 | 10.9 |
| 10 | 13.2 | 16.66 | 1.12 | 0.04 | 0.83 | 11.1 | 12.9 | 12.9 |
| 25 | 13.2 | 15.64 | 1.35 | 0.04 | 0.84 | 13.5 | 15.6 | 15.6 |
| 50 | 13.2 | 15.05 | 1.55 | 0.04 | 0.84 | 15.6 | 18.1 | 18.1 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       15.000 to Point       16.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   290.35(Ft.)
Downstream point elevation =   289.61(Ft.)
Pipe Slope = 0.0035 Ft/Ft
Pipe length  =   212.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.354(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    20.354(CFS)
Normal flow depth in pipe =   18.35(In.)
Flow top width inside pipe =   35.99(In.)
Critical Depth =   17.38(In.)
Pipe flow velocity =      5.62(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    15.24 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.933(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    10.933(CFS)
Normal flow depth in pipe =   12.96(In.)
Flow top width inside pipe =   34.56(In.)
Critical Depth =   12.57(In.)
Pipe flow velocity =      4.77(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.912(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    12.912(CFS)
Normal flow depth in pipe =   14.18(In.)
Flow top width inside pipe =   35.18(In.)
Critical Depth =   13.70(In.)
Pipe flow velocity =      4.99(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    15.636(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    15.636(CFS)
Normal flow depth in pipe =   15.76(In.)
Flow top width inside pipe =   35.72(In.)
Critical Depth =   15.13(In.)
Pipe flow velocity =      5.25(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    18.058(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    18.058(CFS)
Normal flow depth in pipe =   17.11(In.)
Flow top width inside pipe =   35.96(In.)
Critical Depth =   16.33(In.)
Pipe flow velocity =      5.45(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       15.000 to Point       16.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  18.579(CFS)
Time of concentration =    15.24 min.
Rainfall intensity =      1.699(In/Hr) for a 100 year storm
Subarea runoff =      1.127(CFS) for    1.130(Ac.)
Total runoff =     21.481(CFS)   Total area =       14.37(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   14.4   18.29     0.93      0.04   0.83    10.0  11.5  11.5
  10   14.4   17.38     1.09      0.04   0.83    11.7  13.6  13.6
  25   14.4   16.31     1.31      0.04   0.84    14.2  16.5  16.5
  50   14.4   15.70     1.51      0.04   0.84    16.5  19.1  19.1
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       16.000 to Point       17.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   289.61(Ft.)
Downstream point elevation =   289.02(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   197.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.481(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    21.481(CFS)
Normal flow depth in pipe =   19.85(In.)
Flow top width inside pipe =   35.81(In.)
Critical Depth =   17.86(In.)
Pipe flow velocity =      5.37(Ft/s)
Travel time through pipe =    0.61 min.
Time of concentration (TC) =    15.86 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    11.532(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    11.532(CFS)
Normal flow depth in pipe =   13.90(In.)
Flow top width inside pipe =   35.05(In.)
Critical Depth =   12.91(In.)
Pipe flow velocity =      4.58(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    13.622(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    13.622(CFS)
Normal flow depth in pipe =   15.23(In.)
Flow top width inside pipe =   35.57(In.)
Critical Depth =   14.09(In.)
Pipe flow velocity =      4.79(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    16.499(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    16.499(CFS)
Normal flow depth in pipe =   16.97(In.)
Flow top width inside pipe =   35.94(In.)
Critical Depth =   15.55(In.)
Pipe flow velocity =      5.03(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    19.057(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    19.057(CFS)
Normal flow depth in pipe =   18.47(In.)
Flow top width inside pipe =   35.99(In.)
Critical Depth =   16.79(In.)
Pipe flow velocity =      5.22(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 16.000 to Point 17.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 27.840(CFS)
Time of concentration = 15.86 min.
Rainfall intensity = 1.656(In/Hr) for a 100 year storm
Subarea runoff = 10.688(CFS) for 7.720(Ac.)
Total runoff = 32.169(CFS) Total area = 22.09(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 22.1 | 19.03 | 0.91 | 0.04 | 0.83 | 14.9 | 17.3 | 17.3 |
| 10 | 22.1 | 18.08 | 1.06 | 0.04 | 0.83 | 17.6 | 20.4 | 20.4 |
| 25 | 22.1 | 16.97 | 1.28 | 0.04 | 0.84 | 21.3 | 24.7 | 24.7 |
| 50 | 22.1 | 16.33 | 1.47 | 0.04 | 0.84 | 24.7 | 28.5 | 28.5 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       17.000 to Point       10.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   289.02(Ft.)
Downstream point elevation =   285.25(Ft.)
Pipe Slope = 0.0047 Ft/Ft
Pipe length  =   797.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    32.169(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    32.169(CFS)
Normal flow depth in pipe =   22.22(In.)
Flow top width inside pipe =   35.00(In.)
Critical Depth =   22.08(In.)
Pipe flow velocity =      7.02(Ft/s)
Travel time through pipe =    1.89 min.
Time of concentration (TC) =    17.75 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    17.261(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    17.261(CFS)
Normal flow depth in pipe =   15.30(In.)
Flow top width inside pipe =   35.59(In.)
Critical Depth =   15.95(In.)
Pipe flow velocity =      6.03(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    20.393(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    20.393(CFS)
Normal flow depth in pipe =   16.80(In.)
Flow top width inside pipe =   35.92(In.)
Critical Depth =   17.41(In.)
Pipe flow velocity =      6.30(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    24.704(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    24.704(CFS)
Normal flow depth in pipe =   18.82(In.)
Flow top width inside pipe =   35.96(In.)
Critical Depth =   19.24(In.)
Pipe flow velocity =      6.61(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    28.536(CFS)
Given pipe size =     36.00(In.)
Calculated individual pipe flow  =    28.536(CFS)
Normal flow depth in pipe =   20.55(In.)
Flow top width inside pipe =   35.64(In.)
Critical Depth =   20.73(In.)
Pipe flow velocity =      6.84(Ft/s)
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       17.000 to Point       10.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     22.090(Ac.)
Runoff from this stream =     32.169(CFS)
Time of concentration =   17.75 min.
Rainfall intensity =     1.539(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 3
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 19.000 to Point 23.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 650.000(Ft.)
Top (of initial area) elevation = 300.000(Ft.)
Bottom (of initial area) elevation = 298.700(Ft.)
Difference in elevation = 1.300(Ft.)
Slope = 0.00200 s(%)= 0.20
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.055 min.
Rainfall intensity = 1.791(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 12.567(CFS)
Subarea runoff = 14.547(CFS)
Total initial stream area = 9.220(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 9.2 | 14.06 | 1.10 | 0.04 | 0.83 | 7.6 | 8.8 | 8.8 |
| 10 | 9.2 | 14.06 | 1.25 | 0.04 | 0.83 | 8.7 | 10.1 | 10.1 |
| 25 | 9.2 | 14.06 | 1.45 | 0.04 | 0.84 | 10.1 | 11.7 | 11.7 |
| 50 | 9.2 | 14.06 | 1.62 | 0.04 | 0.84 | 11.3 | 13.2 | 13.2 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       19.000 to Point       23.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 3 in normal stream number 1
Stream flow area =      9.220(Ac.)
Runoff from this stream =     14.547(CFS)
Time of concentration =   14.06 min.
Rainfall intensity =     1.791(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       99.000 to Point       23.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Rainfall intensity =      1.424(In/Hr) for a 100 year storm
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
User specified values are as follows:
TC =  20.00 min.  Rain intensity =       1.42(In/Hr)
Total area =        60.00(Ac.)  Total runoff =    110.00(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       99.000 to Point       23.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 3 in normal stream number 2
Stream flow area =     60.000(Ac.)
Runoff from this stream =    110.000(CFS)
Time of concentration =   20.00 min.
Rainfall intensity =     1.424(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


1       14.547     14.06    0.038    0.846    1.791
2      110.000     20.00    0.038    0.846    1.424

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 14.547) +
       1.000 * 1.000 * 1.000 * 0.851 * 110.000) + =     108.199
Qmax(2) =
       0.791 * 1.000 * 1.000 * 1.000 * 14.547) +
       1.000 * 1.000 * 1.000 * 1.000 * 110.000) + =     121.502

Total of 2 streams to confluence:
Flow rates before confluence point:
      14.547     110.000
Maximum flow rates at confluence using above data:
      108.199      121.502
Area of stream before confluence:
        9.220       60.000
Effective area values after confluence:
       49.609       69.220
Results of confluence:
Total flow rate =    121.502(CFS)
Time of concentration =    20.000 min.
Effective stream area after confluence =     69.220(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
Study area average yield Y =    0.846(In/Hr)
Study area average SCS CN =   80.000
Study area total (this main stream) =      69.22(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   69.2   24.00     0.78      0.04   0.83    40.2  46.2  46.2
  10   69.2   22.80     0.91      0.04   0.83    47.4  54.6  54.6
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25 | 69.2 | 21.40 | 1.10 | 0.04 | 0.84 | 57.5 | 66.2 | 66.2 |
| 50 | 69.2 | 20.60 | 1.27 | 0.04 | 0.84 | 66.5 | 76.6 | 76.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       23.000 to Point       24.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.73(Ft.)
Downstream point elevation =   284.33(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   465.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   121.502(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    10.090(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      6.779(Ft.)
 Minor friction loss =      4.705(Ft.)  K-factor =   1.90
Pipe flow velocity =     12.63(Ft/s)
Travel time through pipe =    0.61 min.
Time of concentration (TC) =    20.61 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    46.180(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    46.180(CFS)
Normal flow depth in pipe =   29.44(In.)
Flow top width inside pipe =   38.46(In.)
Critical Depth =   25.43(In.)
Pipe flow velocity =      6.42(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    54.619(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    54.619(CFS)
Normal flow depth in pipe =   34.13(In.)
Flow top width inside pipe =   32.79(In.)
Critical Depth =   27.76(In.)
Pipe flow velocity =      6.53(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    66.235(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.018(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.015(Ft.)
 Minor friction loss =      1.398(Ft.)  K-factor =   1.90
Pipe flow velocity =      6.88(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    76.562(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.165(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.692(Ft.)
 Minor friction loss =      1.868(Ft.)  K-factor =   1.90
Pipe flow velocity =      7.96(Ft/s)
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       23.000 to Point       24.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.080(In/Hr)
Minimum Q (Qmin=0.9YIA) =  80.645(CFS)
The area added to the existing stream causes a
a lower flow rate of Q =     92.779(CFS)
therefore the upstream flow rate of Q =    121.502(CFS) is being used
Time of concentration =    20.61 min.
Rainfall intensity =      1.396(In/Hr) for a 100 year storm
Subarea runoff =      0.000(CFS) for    6.670(Ac.)
Total runoff =    121.502(CFS)   Total area =       75.89(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   75.9   24.74     0.76      0.04   0.83    43.2  49.6  49.6
  10   75.9   23.50     0.90      0.04   0.83    51.0  58.7  58.7
  25   75.9   22.06     1.08      0.04   0.84    61.8  71.2  71.2
  50   75.9   21.23     1.24      0.04   0.84    71.4  82.3  82.3
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       24.000 to Point       10.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   284.33(Ft.)
Downstream point elevation =   283.81(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   175.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   121.502(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.713(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.551(Ft.)
 Minor friction loss =      6.686(Ft.)  K-factor =   2.70
Pipe flow velocity =     12.63(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    20.84 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    49.594(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    49.594(CFS)
Normal flow depth in pipe =   31.13(In.)
Flow top width inside pipe =   36.80(In.)
Critical Depth =   26.41(In.)
Pipe flow velocity =      6.48(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    58.667(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    58.667(CFS)
Normal flow depth in pipe =   37.69(In.)
Flow top width inside pipe =   25.50(In.)
Critical Depth =   28.78(In.)
Pipe flow velocity =      6.45(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    71.154(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.643(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.875(Ft.)
 Minor friction loss =      2.293(Ft.)  K-factor =   2.70
Pipe flow velocity =      7.40(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    82.256(CFS)
Given pipe size =     42.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.709(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.169(Ft.)
 Minor friction loss =      3.065(Ft.)  K-factor =   2.70
Pipe flow velocity =      8.55(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       24.000 to Point       10.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     75.890(Ac.)
Runoff from this stream =    121.502(CFS)
Time of concentration =   20.84 min.
Rainfall intensity =     1.386(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1       25.943     22.43    0.038    0.846    1.322
2       32.169     17.75    0.038    0.846    1.539
3      121.502     20.84    0.038    0.846    1.386

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 25.943) +
       0.855 * 1.000 * 1.000 * 1.000 * 32.169) +
       0.952 * 1.000 * 1.000 * 1.000 * 121.502) + =     169.132
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.896 * 25.943) +
       1.000 * 1.000 * 1.000 * 1.000 * 32.169) +
       1.000 * 1.000 * 1.000 * 0.926 * 121.502) + =     167.876
Qmax(3) =
       1.000 * 1.000 * 1.000 * 0.965 * 25.943) +
       0.898 * 1.000 * 1.000 * 1.000 * 32.169) +
       1.000 * 1.000 * 1.000 * 1.000 * 121.502) + =     175.420

Total of 3 main streams to confluence:
Flow rates before confluence point:
      25.943      32.169     121.502
Maximum flow rates at confluence using above data:
      169.132      167.876      175.420
Area of stream before confluence:
       21.750       22.090       75.890
Effective area values after confluence:
      119.730      101.846      117.955
```

Results of confluence:
Total flow rate = 175.420(CFS)
Time of concentration = 20.845 min.
Effective stream area after confluence = 117.955(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.038(In/Hr)
Study area average yield Y = 0.846(In/Hr)
Study area average SCS CN = 80.000
Study area total = 119.73(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 118.0 | 25.01 | 0.76 | 0.04 | 0.83 | 66.7 | 76.5 | 76.5 |
| 10 | 118.0 | 23.76 | 0.89 | 0.04 | 0.83 | 78.7 | 90.5 | 90.5 |
| 25 | 118.0 | 22.30 | 1.07 | 0.04 | 0.84 | 95.3 | 109.8 | 109.8 |
| 50 | 118.0 | 21.47 | 1.23 | 0.04 | 0.84 | 110.2 | 126.9 | 126.9 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       10.000 to Point       25.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.81(Ft.)
Downstream point elevation =   283.69(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   123.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   175.420(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.294(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.558(Ft.)
 Minor friction loss =      1.859(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.93(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    21.07 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    76.498(CFS)
Given pipe size =     60.00(In.)
Calculated individual pipe flow  =    76.498(CFS)
Normal flow depth in pipe =   45.75(In.)
Flow top width inside pipe =   51.07(In.)
Critical Depth =   29.67(In.)
Pipe flow velocity =      4.76(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    90.498(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.520(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.148(Ft.)
 Minor friction loss =      0.495(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.61(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   109.767(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.823(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.218(Ft.)
 Minor friction loss =      0.728(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.59(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   126.898(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.142(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.292(Ft.)
 Minor friction loss =      0.973(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.46(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       10.000 to Point       25.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.053(In/Hr)
Minimum Q (Qmin=0.9YIA) = 124.428(CFS)
The area added to the existing stream causes a
a lower flow rate of Q =    143.092(CFS)
therefore the upstream flow rate of Q =    175.420(CFS) is being used
Time of concentration =    21.07 min.
Rainfall intensity =      1.376(In/Hr) for a 100 year storm
Subarea runoff =      0.000(CFS) for    0.830(Ac.)
Total runoff =    175.420(CFS)   Total area =      118.78(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5  118.8   25.29     0.75      0.04   0.83    66.7  76.5  76.5
  10  118.8   24.02     0.88      0.04   0.83    78.7  90.5  90.5
  25  118.8   22.55     1.06      0.04   0.84    95.3 109.7 109.8
  50  118.8   21.71     1.22      0.04   0.84   110.2 126.9 126.9
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       25.000 to Point       50.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.69(Ft.)
Downstream point elevation =   283.35(Ft.)
Pipe Slope = 0.0009 Ft/Ft
Pipe length  =   370.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   175.420(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.200(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.678(Ft.)
 Minor friction loss =      1.859(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.93(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    21.76 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    76.498(CFS)
Given pipe size =     60.00(In.)
Calculated individual pipe flow  =    76.498(CFS)
Normal flow depth in pipe =   47.81(In.)
Flow top width inside pipe =   48.28(In.)
Critical Depth =   29.67(In.)
Pipe flow velocity =      4.56(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    90.498(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.604(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.447(Ft.)
 Minor friction loss =      0.495(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.61(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   109.767(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.048(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.657(Ft.)
 Minor friction loss =      0.728(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.59(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   126.898(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.514(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.878(Ft.)
 Minor friction loss =      0.973(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.46(Ft/s)
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       25.000 to Point       50.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    118.785(Ac.)
Runoff from this stream =    175.420(CFS)
Time of concentration =   21.76 min.
Rainfall intensity =     1.348(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 45.000 to Point 46.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 430.000(Ft.)
Top (of initial area) elevation = 297.440(Ft.)
Bottom (of initial area) elevation = 290.990(Ft.)
Difference in elevation = 6.450(Ft.)
Slope = 0.01500 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.962 min.
Rainfall intensity = 2.591(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 14.869(CFS)
Subarea runoff = 17.327(CFS)
Total initial stream area = 7.540(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 7.5 | 7.96 | 1.60 | 0.04 | 0.83 | 9.0 | 10.6 | 10.6 |
| 10 | 7.5 | 7.96 | 1.81 | 0.04 | 0.83 | 10.2 | 12.0 | 12.0 |
| 25 | 7.5 | 7.96 | 2.09 | 0.04 | 0.84 | 11.9 | 14.0 | 14.0 |
| 50 | 7.5 | 7.96 | 2.35 | 0.04 | 0.84 | 13.4 | 15.7 | 15.7 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       46.000 to Point       47.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.99(Ft.)
Downstream point elevation =   285.25(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   248.49(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.327(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    10.050(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      6.759(Ft.)
 Minor friction loss =      4.031(Ft.)  K-factor =   2.70
Pipe flow velocity =      9.81(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =     8.38 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.575(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.279(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.518(Ft.)
 Minor friction loss =      1.502(Ft.)  K-factor =   2.70
Pipe flow velocity =      5.98(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.042(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.471(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.264(Ft.)
 Minor friction loss =      1.947(Ft.)  K-factor =   2.70
Pipe flow velocity =      6.81(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    13.951(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.255(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.382(Ft.)
 Minor friction loss =      2.613(Ft.)  K-factor =   2.70
Pipe flow velocity =      7.89(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    15.690(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.108(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.542(Ft.)
 Minor friction loss =      3.305(Ft.)  K-factor =   2.70
Pipe flow velocity =      8.88(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 46.000 to Point 47.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 25.686(CFS)
Time of concentration = 8.38 min.
Rainfall intensity = 2.506(In/Hr) for a 100 year storm
Subarea runoff = 12.589(CFS) for 5.930(Ac.)
Total runoff = 29.917(CFS) Total area = 13.47(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 13.5 | 10.06 | 1.37 | 0.04 | 0.83 | 13.8 | 16.2 | 16.2 |
| 10 | 13.5 | 9.56 | 1.61 | 0.04 | 0.83 | 16.2 | 19.1 | 19.1 |
| 25 | 13.5 | 8.97 | 1.94 | 0.04 | 0.84 | 19.7 | 23.0 | 23.0 |
| 50 | 13.5 | 8.64 | 2.23 | 0.04 | 0.84 | 22.8 | 26.6 | 26.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       47.000 to Point       48.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.25(Ft.)
Downstream point elevation =   284.02(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   411.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.917(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.068(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      7.185(Ft.)
 Minor friction loss =      2.112(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.52(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =     9.10 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    16.162(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.483(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.097(Ft.)
 Minor friction loss =      0.616(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.14(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    19.052(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.541(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.914(Ft.)
 Minor friction loss =      0.857(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.06(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    23.029(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.279(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.258(Ft.)
 Minor friction loss =      1.252(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.33(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    26.565(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.101(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.665(Ft.)
 Minor friction loss =      1.665(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.46(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       47.000 to Point       48.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  30.276(CFS)
Time of concentration =     9.10 min.
Rainfall intensity =      2.375(In/Hr) for a 100 year storm
Subarea runoff =      5.317(CFS) for    3.280(Ac.)
Total runoff =     35.234(CFS)   Total area =       16.75(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   16.8   10.92     1.30      0.04   0.83    16.2  19.0  19.0
  10   16.8   10.38     1.53      0.04   0.83    19.1  22.4  22.4
  25   16.8    9.74     1.84      0.04   0.84    23.2  27.1  27.1
  50   16.8    9.38     2.11      0.04   0.84    26.8  31.3  31.3
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       48.000 to Point       49.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   284.02(Ft.)
Downstream point elevation =   283.59(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   143.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    35.234(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.967(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.468(Ft.)
 Minor friction loss =      2.930(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.22(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =     9.32 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    19.021(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.434(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.011(Ft.)
 Minor friction loss =      0.854(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.05(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    22.427(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.162(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.405(Ft.)
 Minor friction loss =      1.187(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.14(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    27.115(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.359(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.054(Ft.)
 Minor friction loss =      1.735(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.63(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    31.283(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.613(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.734(Ft.)
 Minor friction loss =      2.310(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.96(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 48.000 to Point 49.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 36.378(CFS)
Time of concentration = 9.32 min.
Rainfall intensity = 2.340(In/Hr) for a 100 year storm
Subarea runoff = 7.091(CFS) for 3.680(Ac.)
Total runoff = 42.324(CFS) Total area = 20.43(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 20.4 | 11.18 | 1.28 | 0.04 | 0.83 | 19.5 | 22.8 | 22.8 |
| 10 | 20.4 | 10.62 | 1.50 | 0.04 | 0.83 | 23.0 | 26.9 | 26.9 |
| 25 | 20.4 | 9.97 | 1.81 | 0.04 | 0.84 | 27.9 | 32.6 | 32.6 |
| 50 | 20.4 | 9.60 | 2.08 | 0.04 | 0.84 | 32.2 | 37.6 | 37.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       49.000 to Point       50.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.59(Ft.)
Downstream point elevation =   283.15(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   146.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    42.324(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.896(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.109(Ft.)
 Minor friction loss =      4.228(Ft.)  K-factor =   1.50
Pipe flow velocity =     13.47(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =     9.50 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    22.844(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.280(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.488(Ft.)
 Minor friction loss =      1.232(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.27(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    26.936(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.342(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.069(Ft.)
 Minor friction loss =      1.712(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.57(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    32.569(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.089(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.025(Ft.)
 Minor friction loss =      2.503(Ft.)  K-factor =   1.50
Pipe flow velocity =     10.37(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    37.577(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.919(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.027(Ft.)
 Minor friction loss =      3.332(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.96(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       49.000 to Point       50.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     20.430(Ac.)
Runoff from this stream =     42.324(CFS)
Time of concentration =    9.50 min.
Rainfall intensity =     2.311(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      175.420     21.76    0.038    0.846    1.348
2       42.324      9.50    0.038    0.846    2.311

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 175.420) +
       0.576 * 1.000 * 1.000 * 1.000 * 42.324) + =     199.814
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.718 * 175.420) +
       1.000 * 1.000 * 1.000 * 1.000 * 42.324) + =     168.308

Total of 2 main streams to confluence:
Flow rates before confluence point:
     175.420      42.324
Maximum flow rates at confluence using above data:
      199.814      168.308
Area of stream before confluence:
      118.785       20.430
Effective area values after confluence:
      139.215       69.598


Results of confluence:
Total flow rate =    199.814(CFS)
Time of concentration =    21.764 min.
Effective stream area after confluence  =    139.215(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
```

Study area average yield Y = 0.846(In/Hr)
Study area average SCS CN = 80.000
Study area total = 139.21(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 139.2 | 26.12 | 0.74 | 0.04 | 0.83 | 76.5 | 87.7 | 87.7 |
| 10 | 139.2 | 24.81 | 0.87 | 0.04 | 0.83 | 90.3 | 103.7 | 103.7 |
| 25 | 139.2 | 23.29 | 1.04 | 0.04 | 0.84 | 109.4 | 125.8 | 125.8 |
| 50 | 139.2 | 22.42 | 1.20 | 0.04 | 0.84 | 126.5 | 145.5 | 145.5 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       50.000 to Point       26.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.15(Ft.)
Downstream point elevation =   282.18(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   326.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   199.814(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.071(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.365(Ft.)
 Minor friction loss =      3.676(Ft.)  K-factor =   1.50
Pipe flow velocity =     12.56(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    22.20 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    87.656(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =    87.656(CFS)
Normal flow depth in pipe =   37.13(In.)
Flow top width inside pipe =   50.06(In.)
Critical Depth =   32.95(In.)
Pipe flow velocity =      7.52(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   103.722(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   103.722(CFS)
Normal flow depth in pipe =   42.75(In.)
Flow top width inside pipe =   43.86(In.)
Critical Depth =   35.90(In.)
Pipe flow velocity =      7.68(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   125.834(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.822(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.334(Ft.)
 Minor friction loss =      1.458(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.91(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   145.493(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.763(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.784(Ft.)
 Minor friction loss =      1.949(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.15(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       50.000 to Point       26.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    139.215(Ac.)
Runoff from this stream =    199.814(CFS)
Time of concentration =   22.20 min.
Rainfall intensity =     1.331(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =  117.7138
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 27.000 to Point 30.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 600.000(Ft.)
Top (of initial area) elevation = 300.000(Ft.)
Bottom (of initial area) elevation = 298.800(Ft.)
Difference in elevation = 1.200(Ft.)
Slope = 0.00200 s(%)= 0.20
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.612 min.
Rainfall intensity = 1.829(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 15.197(CFS)
Subarea runoff = 17.600(CFS)
Total initial stream area = 10.920(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 10.9 | 13.61 | 1.13 | 0.04 | 0.83 | 9.2 | 10.7 | 10.7 |
| 10 | 10.9 | 13.61 | 1.28 | 0.04 | 0.83 | 10.5 | 12.2 | 12.2 |
| 25 | 10.9 | 13.61 | 1.48 | 0.04 | 0.84 | 12.2 | 14.1 | 14.1 |
| 50 | 10.9 | 13.61 | 1.66 | 0.04 | 0.84 | 13.7 | 15.9 | 15.9 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       30.000 to Point       31.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   284.73(Ft.)
Downstream point elevation =   284.14(Ft.)
Pipe Slope = 0.0025 Ft/Ft
Pipe length  =   235.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.600(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.566(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.422(Ft.)
 Minor friction loss =      0.731(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.60(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    14.31 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.699(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    10.699(CFS)
Normal flow depth in pipe =   18.61(In.)
Flow top width inside pipe =   20.03(In.)
Critical Depth =   14.06(In.)
Pipe flow velocity =      4.09(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.197(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.447(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.683(Ft.)
 Minor friction loss =      0.351(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.88(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    14.149(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.804(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.919(Ft.)
 Minor friction loss =      0.472(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.50(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    15.927(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.176(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.164(Ft.)
 Minor friction loss =      0.599(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.07(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 30.000 to Point 31.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 17.176(CFS)
Time of concentration = 14.31 min.
Rainfall intensity = 1.770(In/Hr) for a 100 year storm
Subarea runoff = 2.277(CFS) for 1.830(Ac.)
Total runoff = 19.877(CFS) Total area = 12.75(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 12.8 | 17.17 | 0.97 | 0.04 | 0.83 | 9.2 | 10.7 | 10.7 |
| 10 | 12.8 | 16.31 | 1.14 | 0.04 | 0.83 | 10.9 | 12.6 | 12.6 |
| 25 | 12.8 | 15.31 | 1.37 | 0.04 | 0.84 | 13.2 | 15.3 | 15.3 |
| 50 | 12.8 | 14.74 | 1.57 | 0.04 | 0.84 | 15.2 | 17.6 | 17.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       31.000 to Point       32.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   284.14(Ft.)
Downstream point elevation =   283.12(Ft.)
Pipe Slope = 0.0025 Ft/Ft
Pipe length  =   410.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.877(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.071(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.164(Ft.)
 Minor friction loss =      0.932(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.33(Ft/s)
Travel time through pipe =    1.08 min.
Time of concentration (TC) =    15.39 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.699(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    10.699(CFS)
Normal flow depth in pipe =   18.61(In.)
Flow top width inside pipe =   20.03(In.)
Critical Depth =   14.06(In.)
Pipe flow velocity =      4.10(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.611(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.624(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.274(Ft.)
 Minor friction loss =      0.375(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.01(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    15.271(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.393(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.868(Ft.)
 Minor friction loss =      0.550(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.86(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    17.635(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.200(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.491(Ft.)
 Minor friction loss =      0.734(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.61(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       31.000 to Point       32.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  26.995(CFS)
Time of concentration =    15.39 min.
Rainfall intensity =      1.688(In/Hr) for a 100 year storm
Subarea runoff =     11.331(CFS) for    8.260(Ac.)
Total runoff =     31.208(CFS)   Total area =       21.01(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   21.0   18.47     0.92      0.04   0.83    14.5  16.8  16.8
  10   21.0   17.55     1.08      0.04   0.83    17.1  19.8  19.8
  25   21.0   16.47     1.31      0.04   0.84    20.7  24.0  24.0
  50   21.0   15.85     1.50      0.04   0.84    23.9  27.7  27.7
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       32.000 to Point       26.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.12(Ft.)
Downstream point elevation =   282.18(Ft.)
Pipe Slope = 0.0051 Ft/Ft
Pipe length  =   185.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    31.208(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.254(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.519(Ft.)
 Minor friction loss =      5.669(Ft.)  K-factor =   3.70
Pipe flow velocity =      9.93(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    15.70 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    16.752(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    16.752(CFS)
Normal flow depth in pipe =   20.72(In.)
Flow top width inside pipe =   16.49(In.)
Critical Depth =   17.72(In.)
Pipe flow velocity =      5.81(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    19.789(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.760(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.415(Ft.)
 Minor friction loss =      2.280(Ft.)  K-factor =   3.70
Pipe flow velocity =      6.30(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    23.969(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.485(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.076(Ft.)
 Minor friction loss =      3.344(Ft.)  K-factor =   3.70
Pipe flow velocity =      7.63(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    27.685(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.296(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.770(Ft.)
 Minor friction loss =      4.462(Ft.)  K-factor =   3.70
Pipe flow velocity =      8.81(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 32.000 to Point 26.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 27.358(CFS)
Time of concentration = 15.70 min.
Rainfall intensity = 1.667(In/Hr) for a 100 year storm
Subarea runoff = 0.409(CFS) for 0.560(Ac.)
Total runoff = 31.617(CFS) Total area = 21.57(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 21.6 | 18.84 | 0.91 | 0.04 | 0.83 | 14.7 | 17.0 | 17.0 |
| 10 | 21.6 | 17.90 | 1.07 | 0.04 | 0.83 | 17.3 | 20.0 | 20.0 |
| 25 | 21.6 | 16.80 | 1.29 | 0.04 | 0.84 | 21.0 | 24.3 | 24.3 |
| 50 | 21.6 | 16.17 | 1.48 | 0.04 | 0.84 | 24.2 | 28.0 | 28.0 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       32.000 to Point       26.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     21.570(Ac.)
Runoff from this stream =     31.617(CFS)
Time of concentration =   15.70 min.
Rainfall intensity =     1.667(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      199.814     22.20    0.038   117.714    1.331
2       31.617     15.70    0.038    0.846    1.667

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 199.814) +
       0.794 * 1.000 * 1.000 * 1.000 * 31.617) + =     224.911
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.854 * 199.814) +
       1.000 * 1.000 * 1.000 * 1.000 * 31.617) + =     202.197

Total of 2 main streams to confluence:
Flow rates before confluence point:
     199.814      31.617
Maximum flow rates at confluence using above data:
      224.911      202.197
Area of stream before confluence:
      139.215       21.570
Effective area values after confluence:
      160.785      116.470


Results of confluence:
Total flow rate =    224.911(CFS)
Time of concentration =    22.197 min.
Effective stream area after confluence  =    160.785(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
```

Study area average yield Y = 102.035(In/Hr)
Study area average SCS CN = 80.000
Study area total = 160.78(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 160.8 | 26.64 | 0.73 | 0.04 | 0.83 | 87.3 | 99.9 | 99.9 |
| 10 | 160.8 | 25.30 | 0.85 | 0.04 | 0.83 | 103.0 | 118.2 | 118.2 |
| 25 | 160.8 | 23.75 | 1.03 | 0.04 | 0.84 | 124.7 | 143.4 | 143.4 |
| 50 | 160.8 | 22.86 | 1.18 | 0.04 | 0.84 | 144.2 | 165.8 | 165.8 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       26.000 to Point       54.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   282.18(Ft.)
Downstream point elevation =   280.75(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   470.75(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   224.911(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     9.384(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      6.156(Ft.)
 Minor friction loss =      4.658(Ft.)  K-factor =   1.50
Pipe flow velocity =     14.14(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    22.75 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    99.881(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =    99.881(CFS)
Normal flow depth in pipe =   40.88(In.)
Flow top width inside pipe =   46.32(In.)
Critical Depth =   35.23(In.)
Pipe flow velocity =      7.73(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   118.200(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.557(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.700(Ft.)
 Minor friction loss =      1.287(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.43(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   143.414(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.967(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.503(Ft.)
 Minor friction loss =      1.894(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.02(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   165.831(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.449(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.347(Ft.)
 Minor friction loss =      2.532(Ft.)  K-factor =   1.50
Pipe flow velocity =     10.43(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       26.000 to Point       54.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    160.785(Ac.)
Runoff from this stream =    224.911(CFS)
Time of concentration =   22.75 min.
Rainfall intensity =     1.310(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y = 16405.7486
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 51.000 to Point 52.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 520.000(Ft.)
Top (of initial area) elevation = 295.510(Ft.)
Bottom (of initial area) elevation = 287.700(Ft.)
Difference in elevation = 7.810(Ft.)
Slope = 0.01502 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.589 min.
Rainfall intensity = 2.467(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 14.455(CFS)
Subarea runoff = 16.832(CFS)
Total initial stream area = 7.700(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 7.7 | 8.59 | 1.52 | 0.04 | 0.83 | 8.7 | 10.3 | 10.3 |
| 10 | 7.7 | 8.59 | 1.73 | 0.04 | 0.83 | 10.0 | 11.7 | 11.7 |
| 25 | 7.7 | 8.59 | 1.99 | 0.04 | 0.84 | 11.6 | 13.6 | 13.6 |
| 50 | 7.7 | 8.59 | 2.24 | 0.04 | 0.84 | 13.1 | 15.2 | 15.2 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       52.000 to Point       53.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   282.70(Ft.)
Downstream point elevation =   281.16(Ft.)
Pipe Slope = 0.0028 Ft/Ft
Pipe length  =   552.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.832(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.362(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.055(Ft.)
 Minor friction loss =      0.847(Ft.)  K-factor =   1.90
Pipe flow velocity =      5.36(Ft/s)
Travel time through pipe =    1.72 min.
Time of concentration (TC) =    10.31 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.268(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    10.268(CFS)
Normal flow depth in pipe =   17.16(In.)
Flow top width inside pipe =   21.67(In.)
Critical Depth =   13.78(In.)
Pipe flow velocity =      4.28(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    11.694(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    11.694(CFS)
Normal flow depth in pipe =   19.22(In.)
Flow top width inside pipe =   19.17(In.)
Critical Depth =   14.72(In.)
Pipe flow velocity =      4.34(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    13.550(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.989(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.980(Ft.)
 Minor friction loss =      0.549(Ft.)  K-factor =   1.90
Pipe flow velocity =      4.31(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    15.241(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.659(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.505(Ft.)
 Minor friction loss =      0.694(Ft.)  K-factor =   1.90
Pipe flow velocity =      4.85(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 52.000 to Point 53.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 21.862(CFS)
Time of concentration = 10.31 min.
Rainfall intensity = 2.191(In/Hr) for a 100 year storm
Subarea runoff = 8.574(CFS) for 5.410(Ac.)
Total runoff = 25.406(CFS) Total area = 13.11(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 13.1 | 12.37 | 1.20 | 0.04 | 0.83 | 11.7 | 13.7 | 13.7 |
| 10 | 13.1 | 11.75 | 1.41 | 0.04 | 0.83 | 13.8 | 16.2 | 16.2 |
| 25 | 13.1 | 11.03 | 1.69 | 0.04 | 0.84 | 16.7 | 19.5 | 19.5 |
| 50 | 13.1 | 10.62 | 1.95 | 0.04 | 0.84 | 19.4 | 22.6 | 22.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       53.000 to Point       54.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   281.16(Ft.)
Downstream point elevation =   280.75(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   138.56(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.406(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.860(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.747(Ft.)
 Minor friction loss =      1.523(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    10.59 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    13.699(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.541(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.508(Ft.)
 Minor friction loss =      0.443(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.36(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    16.159(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.913(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.707(Ft.)
 Minor friction loss =      0.616(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.14(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    19.544(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.525(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.034(Ft.)
 Minor friction loss =      0.901(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.22(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    22.554(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.167(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.377(Ft.)
 Minor friction loss =      1.200(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.18(Ft/s)
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       53.000 to Point       54.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     13.110(Ac.)
Runoff from this stream =     25.406(CFS)
Time of concentration =   10.59 min.
Rainfall intensity =     2.153(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      224.911     22.75    0.038   16405.749    1.310
2       25.406     10.59    0.038    0.846    2.153

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 224.911) +
       0.601 * 1.000 * 1.000 * 1.000 * 25.406) + =     240.189
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.733 * 224.911) +
       1.000 * 1.000 * 1.000 * 1.000 * 25.406) + =     190.214

Total of 2 main streams to confluence:
Flow rates before confluence point:
     224.911      25.406
Maximum flow rates at confluence using above data:
      240.189      190.214
Area of stream before confluence:
      160.785       13.110
Effective area values after confluence:
      173.895       84.788


Results of confluence:
Total flow rate =    240.189(CFS)
Time of concentration =    22.752 min.
Effective stream area after confluence  =    173.895(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
```

Study area average yield Y = 15168.976(In/Hr)
Study area average SCS CN = 80.000
Study area total = 173.89(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 173.9 | 27.30 | 0.72 | 0.04 | 0.83 | 92.9 | 106.2 | 106.2 |
| 10 | 173.9 | 25.94 | 0.84 | 0.04 | 0.83 | 109.6 | 125.7 | 125.7 |
| 25 | 173.9 | 24.34 | 1.01 | 0.04 | 0.84 | 132.8 | 152.5 | 152.5 |
| 50 | 173.9 | 23.43 | 1.17 | 0.04 | 0.84 | 153.5 | 176.4 | 176.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       54.000 to Point       33.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   280.75(Ft.)
Downstream point elevation =   279.79(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   319.23(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   240.189(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     9.113(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.761(Ft.)
 Minor friction loss =      5.312(Ft.)  K-factor =   1.50
Pipe flow velocity =     15.10(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    23.10 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =   106.210(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   106.210(CFS)
Normal flow depth in pipe =   43.50(In.)
Flow top width inside pipe =   42.74(In.)
Critical Depth =   36.37(In.)
Pipe flow velocity =      7.73(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   125.708(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.799(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.304(Ft.)
 Minor friction loss =      1.455(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.90(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   152.544(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.103(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.920(Ft.)
 Minor friction loss =      2.143(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.59(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   176.402(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.473(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.568(Ft.)
 Minor friction loss =      2.865(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.09(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       54.000 to Point       33.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    173.895(Ac.)
Runoff from this stream =    240.189(CFS)
Time of concentration =   23.10 min.
Rainfall intensity =     1.297(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y = 2637806.1082
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 34.000 to Point 35.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 300.000(Ft.)
Bottom (of initial area) elevation = 298.000(Ft.)
Difference in elevation = 2.000(Ft.)
Slope = 0.00200 s(%)= 0.20
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.698 min.
Rainfall intensity = 1.601(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 2.291(CFS)
Subarea runoff = 2.645(CFS)
Total initial stream area = 1.880(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 1.9 | 16.70 | 0.99 | 0.04 | 0.83 | 1.4 | 1.6 | 1.6 |
| 10 | 1.9 | 16.70 | 1.12 | 0.04 | 0.83 | 1.6 | 1.8 | 1.8 |
| 25 | 1.9 | 16.70 | 1.29 | 0.04 | 0.84 | 1.8 | 2.1 | 2.1 |
| 50 | 1.9 | 16.70 | 1.45 | 0.04 | 0.84 | 2.1 | 2.4 | 2.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       35.000 to Point       36.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   286.78(Ft.)
Downstream point elevation =   285.14(Ft.)
Pipe Slope = 0.0026 Ft/Ft
Pipe length  =   625.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.645(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.645(CFS)
Normal flow depth in pipe =    8.91(In.)
Flow top width inside pipe =   18.00(In.)
Critical Depth =    7.40(In.)
Pipe flow velocity =      3.03(Ft/s)
Travel time through pipe =    3.44 min.
Time of concentration (TC) =    20.13 min.
WARNING: Travel time greater than 3 min. with TC less than 30 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     1.605(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.605(CFS)
Normal flow depth in pipe =    6.74(In.)
Flow top width inside pipe =   17.42(In.)
Critical Depth =    5.71(In.)
Pipe flow velocity =      2.66(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     1.831(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.831(CFS)
Normal flow depth in pipe =    7.24(In.)
Flow top width inside pipe =   17.65(In.)
Critical Depth =    6.10(In.)
Pipe flow velocity =      2.75(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     2.125(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.125(CFS)
Normal flow depth in pipe =    7.86(In.)
Flow top width inside pipe =   17.86(In.)
Critical Depth =    6.60(In.)
Pipe flow velocity =      2.87(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     2.393(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.393(CFS)
Normal flow depth in pipe =    8.41(In.)
Flow top width inside pipe =   17.96(In.)
Critical Depth =    7.02(In.)
Pipe flow velocity =      2.96(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 35.000 to Point 36.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 4.143(CFS)
Time of concentration = 20.13 min.
Rainfall intensity = 1.418(In/Hr) for a 100 year storm
Subarea runoff = 2.124(CFS) for 1.960(Ac.)
Total runoff = 4.769(CFS) Total area = 3.84(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 3.8 | 24.16 | 0.78 | 0.04 | 0.83 | 2.2 | 2.6 | 2.6 |
| 10 | 3.8 | 22.95 | 0.91 | 0.04 | 0.83 | 2.6 | 3.0 | 3.0 |
| 25 | 3.8 | 21.54 | 1.10 | 0.04 | 0.84 | 3.2 | 3.7 | 3.7 |
| 50 | 3.8 | 20.74 | 1.26 | 0.04 | 0.84 | 3.7 | 4.2 | 4.2 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       36.000 to Point       37.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.14(Ft.)
Downstream point elevation =   281.96(Ft.)
Pipe Slope = 0.0024 Ft/Ft
Pipe length  =  1345.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.769(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     4.769(CFS)
Normal flow depth in pipe =   13.78(In.)
Flow top width inside pipe =   15.25(In.)
Critical Depth =   10.07(In.)
Pipe flow velocity =      3.28(Ft/s)
Travel time through pipe =    6.83 min.
Time of concentration (TC) =    26.96 min.
WARNING: Travel time greater than 3 min. with TC less than 30 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     2.550(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.550(CFS)
Normal flow depth in pipe =    8.99(In.)
Flow top width inside pipe =   18.00(In.)
Critical Depth =    7.26(In.)
Pipe flow velocity =      2.89(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     3.016(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.016(CFS)
Normal flow depth in pipe =    9.95(In.)
Flow top width inside pipe =   17.90(In.)
Critical Depth =    7.92(In.)
Pipe flow velocity =      3.01(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     3.658(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.658(CFS)
Normal flow depth in pipe =   11.27(In.)
Flow top width inside pipe =   17.42(In.)
Critical Depth =    8.76(In.)
Pipe flow velocity =      3.14(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     4.228(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     4.228(CFS)
Normal flow depth in pipe =   12.49(In.)
Flow top width inside pipe =   16.59(In.)
Critical Depth =    9.46(In.)
Pipe flow velocity =      3.23(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 36.000 to Point 37.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 7.417(CFS)
Time of concentration = 26.96 min.
Rainfall intensity = 1.173(In/Hr) for a 100 year storm
Subarea runoff = 3.719(CFS) for 4.470(Ac.)
Total runoff = 8.487(CFS) Total area = 8.31(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 8.3 | 32.35 | 0.64 | 0.04 | 0.83 | 4.0 | 4.5 | 4.5 |
| 10 | 8.3 | 30.73 | 0.75 | 0.04 | 0.83 | 4.7 | 5.4 | 5.4 |
| 25 | 8.3 | 28.85 | 0.91 | 0.04 | 0.84 | 5.7 | 6.5 | 6.5 |
| 50 | 8.3 | 27.77 | 1.04 | 0.04 | 0.84 | 6.6 | 7.5 | 7.5 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       37.000 to Point       33.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   281.94(Ft.)
Downstream point elevation =   279.79(Ft.)
Pipe Slope = 0.0330 Ft/Ft
Pipe length  =    65.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.487(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     8.487(CFS)
Normal flow depth in pipe =    7.39(In.)
Flow top width inside pipe =   22.16(In.)
Critical Depth =   12.47(In.)
Pipe flow velocity =     10.31(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    27.07 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     4.516(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.516(CFS)
Normal flow depth in pipe =    5.37(In.)
Flow top width inside pipe =   20.00(In.)
Critical Depth =    8.96(In.)
Pipe flow velocity =      8.60(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     5.350(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     5.350(CFS)
Normal flow depth in pipe =    5.85(In.)
Flow top width inside pipe =   20.61(In.)
Critical Depth =    9.79(In.)
Pipe flow velocity =      9.04(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     6.499(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     6.499(CFS)
Normal flow depth in pipe =    6.45(In.)
Flow top width inside pipe =   21.28(In.)
Critical Depth =   10.84(In.)
Pipe flow velocity =      9.56(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     7.520(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     7.520(CFS)
Normal flow depth in pipe =    6.95(In.)
Flow top width inside pipe =   21.77(In.)
Critical Depth =   11.68(In.)
Pipe flow velocity =      9.96(Ft/s)
----------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       37.000 to Point       33.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.310(Ac.)
Runoff from this stream =      8.487(CFS)
Time of concentration =   27.07 min.
Rainfall intensity =     1.170(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      240.189     23.10    0.038   2637806.108    1.297
2        8.487     27.07    0.038    0.846    1.170

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 240.189) +
       1.000 * 1.000 * 1.000 * 0.927 * 8.487) + =     248.056
Qmax(2) =
       1.000 * 1.000 * 0.902 * 1.000 * 240.189) +
       1.000 * 1.000 * 1.000 * 1.000 * 8.487) + =     225.200

Total of 2 main streams to confluence:
Flow rates before confluence point:
     240.189       8.487
Maximum flow rates at confluence using above data:
      248.056      225.200
Area of stream before confluence:
      173.895        8.310
Effective area values after confluence:
      180.821      182.205


Results of confluence:
Total flow rate =    248.056(CFS)
Time of concentration =    23.104 min.
Effective stream area after confluence  =    180.821(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
```

Study area average yield Y = 2517501.036(In/Hr)
Study area average SCS CN = 80.000
Study area total = 182.20(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 180.8 | 27.72 | 0.71 | 0.04 | 0.83 | 95.6 | 109.3 | 109.3 |
| 10 | 180.8 | 26.34 | 0.83 | 0.04 | 0.83 | 112.8 | 129.4 | 129.4 |
| 25 | 180.8 | 24.72 | 1.00 | 0.04 | 0.84 | 136.7 | 157.0 | 157.0 |
| 50 | 180.8 | 23.80 | 1.15 | 0.04 | 0.84 | 158.1 | 181.5 | 181.5 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       33.000 to Point       57.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   279.79(Ft.)
Downstream point elevation =   278.80(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   330.67(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   248.056(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     9.936(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.260(Ft.)
 Minor friction loss =      5.666(Ft.)  K-factor =   1.50
Pipe flow velocity =     15.60(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =    23.46 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =   109.282(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   109.282(CFS)
Normal flow depth in pipe =   45.09(In.)
Flow top width inside pipe =   40.08(In.)
Critical Depth =   36.91(In.)
Pipe flow velocity =      7.71(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   129.355(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.981(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.430(Ft.)
 Minor friction loss =      1.541(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.13(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   156.982(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.386(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.107(Ft.)
 Minor friction loss =      2.269(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.87(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   181.544(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.862(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.817(Ft.)
 Minor friction loss =      3.035(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.41(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       33.000 to Point       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    180.821(Ac.)
Runoff from this stream =    248.056(CFS)
Time of concentration =   23.46 min.
Rainfall intensity =     1.284(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y = 455217409.3503
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 55.000 to Point 56.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 473.000(Ft.)
Top (of initial area) elevation = 291.890(Ft.)
Bottom (of initial area) elevation = 284.800(Ft.)
Difference in elevation = 7.090(Ft.)
Slope = 0.01499 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.273 min.
Rainfall intensity = 2.528(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 14.812(CFS)
Subarea runoff = 17.254(CFS)
Total initial stream area = 7.700(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 7.7 | 8.27 | 1.56 | 0.04 | 0.83 | 8.9 | 10.5 | 10.5 |
| 10 | 7.7 | 8.27 | 1.77 | 0.04 | 0.83 | 10.2 | 12.0 | 12.0 |
| 25 | 7.7 | 8.27 | 2.04 | 0.04 | 0.84 | 11.9 | 13.9 | 13.9 |
| 50 | 7.7 | 8.27 | 2.29 | 0.04 | 0.84 | 13.4 | 15.6 | 15.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       56.000 to Point       57.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   279.80(Ft.)
Downstream point elevation =   278.80(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   332.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.254(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    10.185(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      8.965(Ft.)
 Minor friction loss =      2.220(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.76(Ft/s)
Travel time through pipe =    0.57 min.
Time of concentration (TC) =     8.84 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.528(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.165(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.338(Ft.)
 Minor friction loss =      0.827(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.96(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    11.989(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.400(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.328(Ft.)
 Minor friction loss =      1.072(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.78(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    13.891(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.250(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.811(Ft.)
 Minor friction loss =      1.439(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.86(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    15.623(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.171(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      7.351(Ft.)
 Minor friction loss =      1.821(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.84(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       56.000 to Point       57.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.700(Ac.)
Runoff from this stream =     17.254(CFS)
Time of concentration =    8.84 min.
Rainfall intensity =     2.421(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      248.056     23.46    0.038   455217409.350    1.284
2       17.254      8.84    0.038    0.846    2.421

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 248.056) +
       0.523 * 1.000 * 1.000 * 1.000 * 17.254) + =     257.076
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.688 * 248.056) +
       1.000 * 1.000 * 1.000 * 1.000 * 17.254) + =     188.024

Total of 2 main streams to confluence:
Flow rates before confluence point:
     248.056      17.254
Maximum flow rates at confluence using above data:
      257.076      188.024
Area of stream before confluence:
      180.821        7.700
Effective area values after confluence:
      188.521       73.714


Results of confluence:
Total flow rate =    257.076(CFS)
Time of concentration =    23.457 min.
Effective stream area after confluence  =    188.521(Ac.)
Study area average Pervious fraction(Ap) =  0.100
Study area average soil loss rate(Fm) =    0.038(In/Hr)
```

Study area average yield Y = 436624406.835(In/Hr)
Study area average SCS CN = 80.000
Study area total = 188.52(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 188.5 | 28.15 | 0.70 | 0.04 | 0.83 | 98.7 | 112.8 | 112.8 |
| 10 | 188.5 | 26.74 | 0.82 | 0.04 | 0.83 | 116.5 | 133.5 | 133.5 |
| 25 | 188.5 | 25.10 | 0.99 | 0.04 | 0.84 | 141.1 | 162.0 | 162.0 |
| 50 | 188.5 | 24.16 | 1.14 | 0.04 | 0.84 | 163.2 | 187.4 | 187.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       57.000 to Point       58.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   278.80(Ft.)
Downstream point elevation =   276.86(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   646.49(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   257.076(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    15.190(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =     11.045(Ft.)
 Minor friction loss =      6.086(Ft.)  K-factor =   1.50
Pipe flow velocity =     16.16(Ft/s)
Travel time through pipe =    0.67 min.
Time of concentration (TC) =    24.12 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =   112.754(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   112.754(CFS)
Normal flow depth in pipe =   46.97(In.)
Flow top width inside pipe =   36.35(In.)
Critical Depth =   37.50(In.)
Pipe flow velocity =      7.68(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   133.476(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.678(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.977(Ft.)
 Minor friction loss =      1.641(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.39(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   161.997(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.862(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.386(Ft.)
 Minor friction loss =      2.417(Ft.)  K-factor =   1.50
Pipe flow velocity =     10.19(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   187.354(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     7.158(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.866(Ft.)
 Minor friction loss =      3.232(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.78(Ft/s)
-------------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       57.000 to Point       58.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) =     0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.022(In/Hr)
Minimum Q (Qmin=0.9YIA) = 184.082(CFS)
The area added to the existing stream causes a
a lower flow rate of Q =    211.144(CFS)
therefore the upstream flow rate of Q =    257.076(CFS) is being used
Time of concentration =    24.12 min.
Rainfall intensity =      1.261(In/Hr) for a 100 year storm
Subarea runoff =      0.000(CFS) for    3.350(Ac.)
Total runoff =    257.076(CFS)   Total area =      191.87(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5  191.9   28.95     0.69      0.04   0.83    98.6 112.6 112.8
  10  191.9   27.50     0.81      0.04   0.83   116.4 133.3 133.5
  25  191.9   25.81     0.97      0.04   0.84   141.0 161.8 162.0
  50  191.9   24.85     1.12      0.04   0.84   163.1 187.1 187.4
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       57.000 to Point       58.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    191.871(Ac.)
Runoff from this stream =    257.076(CFS)
Time of concentration =   24.12 min.
Rainfall intensity =     1.261(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       70.000 to Point       58.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Rainfall intensity =      1.574(In/Hr) for a 100 year storm
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) =     0.791
User specified values are as follows:
TC =  17.14 min.  Rain intensity =       1.57(In/Hr)
Total area =        33.04(Ac.)  Total runoff =     45.64(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point      70.000 to Point       58.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     33.040(Ac.)
Runoff from this stream =     45.640(CFS)
Time of concentration =   17.14 min.
Rainfall intensity =     1.574(In/Hr)
Area averaged loss rate (Fm) =    0.0760(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.2000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      257.076     24.12    0.038    0.846    1.261
2       45.640     17.14    0.076    0.846    1.574

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 257.076) +
       0.791 * 1.000 * 1.000 * 1.000 * 45.640) + =     293.163
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.855 * 257.076) +
       1.000 * 1.000 * 1.000 * 1.000 * 45.640) + =     265.504

Total of 2 main streams to confluence:
Flow rates before confluence point:
     257.076      45.640
Maximum flow rates at confluence using above data:
      293.163      265.504
Area of stream before confluence:
      191.871       33.040
Effective area values after confluence:
      224.911      163.639


Results of confluence:
Total flow rate =    293.163(CFS)
Time of concentration =    24.124 min.
Effective stream area after confluence  =    224.911(Ac.)
Study area average Pervious fraction(Ap) =  0.115
Study area average soil loss rate(Fm) =    0.044(In/Hr)
```

Study area average yield Y = 0.846(In/Hr)
Study area average SCS CN = 80.000
Study area total = 224.91(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 224.9 | 28.95 | 0.69 | 0.04 | 0.82 | 114.1 | 130.8 | 130.8 |
| 10 | 224.9 | 27.50 | 0.81 | 0.04 | 0.82 | 134.8 | 155.1 | 155.1 |
| 25 | 224.9 | 25.81 | 0.97 | 0.04 | 0.83 | 163.5 | 188.5 | 188.5 |
| 50 | 224.9 | 24.85 | 1.12 | 0.04 | 0.83 | 189.2 | 218.2 | 218.2 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       58.000 to Point       89.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   276.86(Ft.)
Downstream point elevation =   276.56(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   300.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   293.163(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    14.279(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      6.665(Ft.)
 Minor friction loss =      7.914(Ft.)  K-factor =   1.50
Pipe flow velocity =     18.43(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    24.40 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =   130.822(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.603(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.327(Ft.)
 Minor friction loss =      1.576(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.23(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   155.097(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.781(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.866(Ft.)
 Minor friction loss =      2.215(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.75(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   188.510(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.728(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.756(Ft.)
 Minor friction loss =      3.272(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.85(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   218.215(CFS)
Given pipe size =     54.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     7.778(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.693(Ft.)
 Minor friction loss =      4.385(Ft.)  K-factor =   1.50
Pipe flow velocity =     13.72(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       58.000 to Point       89.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    224.911(Ac.)
Runoff from this stream =    293.163(CFS)
Time of concentration =   24.40 min.
Rainfall intensity =     1.252(In/Hr)
Area averaged loss rate (Fm) =    0.0436(In/Hr)
Area averaged yield fraction Y =  190.1749
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1147
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point      101.000 to Point       89.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Rainfall intensity =      2.062(In/Hr) for a 100 year storm
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) =     0.846
User specified values are as follows:
TC =  11.32 min.  Rain intensity =       2.06(In/Hr)
Total area =        30.70(Ac.)  Total runoff =     49.73(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point      101.000 to Point       89.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     30.700(Ac.)
Runoff from this stream =     49.726(CFS)
Time of concentration =   11.32 min.
Rainfall intensity =     2.062(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =  190.1749
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1      293.163     24.40    0.044   190.175    1.252
2       49.726     11.32    0.038   190.175    2.062

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 293.163) +
       1.000 * 1.000 * 0.607 * 1.000 * 49.726) + =     323.351
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.732 * 293.163) +
       1.000 * 1.000 * 1.000 * 1.000 * 49.726) + =     264.325

Total of 2 main streams to confluence:
Flow rates before confluence point:
     293.163      49.726
Maximum flow rates at confluence using above data:
      323.351      264.325
Area of stream before confluence:
      224.911       30.700
Effective area values after confluence:
      255.611      130.650


Results of confluence:
Total flow rate =    323.351(CFS)
Time of concentration =    24.395 min.
Effective stream area after confluence  =    255.611(Ac.)
Study area average Pervious fraction(Ap) =  0.113
Study area average soil loss rate(Fm) =    0.043(In/Hr)
```

Study area average yield Y = 190.175(In/Hr)
Study area average SCS CN = 80.000
Study area total = 255.61(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 255.6 | 29.27 | 0.68 | 0.04 | 0.82 | 129.0 | 147.7 | 147.7 |
| 10 | 255.6 | 27.81 | 0.80 | 0.04 | 0.82 | 152.3 | 175.1 | 175.1 |
| 25 | 255.6 | 26.10 | 0.97 | 0.04 | 0.83 | 184.7 | 212.8 | 212.8 |
| 50 | 255.6 | 25.13 | 1.11 | 0.04 | 0.83 | 213.7 | 246.3 | 246.3 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       89.000 to Point       90.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   276.56(Ft.)
Downstream point elevation =   276.26(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   100.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   323.351(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     7.558(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.541(Ft.)
 Minor friction loss =      6.317(Ft.)  K-factor =   1.50
Pipe flow velocity =     16.47(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    24.50 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =   147.683(CFS)
Given pipe size =     60.00(In.)
Calculated individual pipe flow  =   147.683(CFS)
Normal flow depth in pipe =   51.38(In.)
Flow top width inside pipe =   42.10(In.)
Critical Depth =   41.77(In.)
Pipe flow velocity =      8.26(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =   175.073(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.003(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.452(Ft.)
 Minor friction loss =      1.852(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.92(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =   212.771(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.102(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.667(Ft.)
 Minor friction loss =      2.735(Ft.)  K-factor =   1.50
Pipe flow velocity =     10.84(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =   246.287(CFS)
Given pipe size =     60.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.259(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.894(Ft.)
 Minor friction loss =      3.665(Ft.)  K-factor =   1.50
Pipe flow velocity =     12.54(Ft/s)
----------------------------------------------------------------
End of computations, total study area =         258.770 (Ac.)
```

Kern County Rational Hydrology Program

(Hydrology Manual Dated 1992)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 2006 Version 7.2
Rational Hydrology Study Date: 06/27/14 File: 390gpvr.out

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GRAPEVINE RESIDENCIAL AREA (NORTH SIDE OF WOOLLOMES, WEST OF BELMONT, EAST OF STRADLEY
DETAILED REPORT

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Program License Serial Number 6027

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********* Hydrology Study Control Information **********

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ENGLISH UNITS USED FOR RAINFALL DATA

Rainfall map data:

| Year Storm | Hour | Rainfall |
|---|---|---|
| 2 | 6 | 0.745(In.) |
| 2 | 24 | 1.100(In.) |
| 100 | 6 | 1.650(In.) |
| 100 | 24 | 2.500(In.) |

Latitude in degrees = 35.75
SAN JOAQUIN VALLEY area of study
Y2 = 0.342, Y100 = 0.696 or Y100 = 0.697
Note: Larger value of Y100 = 0.697 used
Slope used for rainfall intensity curve b = 0.6500

Remaining year storm values:

| 1 Hour Rainfall - | Year Storm |
|---|---|
| 0.342 | 2 |
| 0.430 | 5 |
| 0.488 | 10 |
| 0.563 | 25 |
| 0.632 | 50 |
| 0.697 | 100 |

| 24 Hour Rainfall - | Year Storm |
|---|---|
| 1.100 | 2 |
| 1.446 | 5 |
| 1.675 | 10 |
| 1.973 | 25 |
| 2.244 | 50 |
| 2.500 | 100 |

Note: Computer estimated pipe sizes use 10 year storm flow rates
NOTE: ENGLISH (IN-LB) INPUT DATA UNITS USED
NOTE: ENGLISH (IN-LB) OUTPUT DATA UNITS USED

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 59.000 to Point 60.000
**** INITIAL AREA EVALUATION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 298.700(Ft.)
Bottom (of initial area) elevation = 295.700(Ft.)
Difference in elevation = 3.000(Ft.)
Slope = 0.00300 s(%)= 0.30
TC = k(0.324)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.410 min.
Rainfall intensity = 1.619(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 0.980(CFS)
Subarea runoff = 1.181(CFS)
Total initial stream area = 0.850(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 0.8 | 16.41 | 1.00 | 0.08 | 0.76 | 0.6 | 0.7 | 0.7 |
| 10 | 0.8 | 16.41 | 1.13 | 0.08 | 0.76 | 0.7 | 0.8 | 0.8 |
| 25 | 0.8 | 16.41 | 1.31 | 0.08 | 0.78 | 0.8 | 0.9 | 0.9 |
| 50 | 0.8 | 16.41 | 1.47 | 0.08 | 0.78 | 0.9 | 1.1 | 1.1 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       60.000 to Point       66.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   278.70(Ft.)
Downstream point elevation =   277.90(Ft.)
Pipe Slope = 0.0022 Ft/Ft
Pipe length  =   360.31(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.181(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.181(CFS)
Normal flow depth in pipe =    5.98(In.)
Flow top width inside pipe =   16.96(In.)
Critical Depth =    4.87(In.)
Pipe flow velocity =      2.30(Ft/s)
Travel time through pipe =    2.61 min.
Time of concentration (TC) =    19.02 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     0.705(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     0.705(CFS)
Normal flow depth in pipe =    4.59(In.)
Flow top width inside pipe =   15.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =      1.98(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     0.808(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     0.808(CFS)
Normal flow depth in pipe =    4.92(In.)
Flow top width inside pipe =   16.05(In.)
Critical Depth =    4.01(In.)
Pipe flow velocity =      2.06(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     0.943(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     0.943(CFS)
Normal flow depth in pipe =    5.33(In.)
Flow top width inside pipe =   16.43(In.)
Critical Depth =    4.33(In.)
Pipe flow velocity =      2.16(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     1.065(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.065(CFS)
Normal flow depth in pipe =    5.67(In.)
Flow top width inside pipe =   16.72(In.)
Critical Depth =    4.61(In.)
Pipe flow velocity =      2.23(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       60.000 to Point       66.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      0.850(Ac.)
Runoff from this stream =      1.181(CFS)
Time of concentration =   19.02 min.
Rainfall intensity =     1.471(In/Hr)
Area averaged loss rate (Fm) =    0.0760(In/Hr)
Area averaged yield fraction Y =    0.7911
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.2000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 61.000 to Point 62.000
**** INITIAL AREA EVALUATION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Initial subarea data:
Initial area flow distance = 462.000(Ft.)
Top (of initial area) elevation = 292.340(Ft.)
Bottom (of initial area) elevation = 291.300(Ft.)
Difference in elevation = 1.040(Ft.)
Slope = 0.00225 s(%)= 0.23
TC = k(0.324)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.762 min.
Rainfall intensity = 1.907(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 4.060(CFS)
Subarea runoff = 4.927(CFS)
Total initial stream area = 2.990(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 3.0 | 12.76 | 1.17 | 0.08 | 0.76 | 2.4 | 3.0 | 3.0 |
| 10 | 3.0 | 12.76 | 1.33 | 0.08 | 0.76 | 2.7 | 3.4 | 3.4 |
| 25 | 3.0 | 12.76 | 1.54 | 0.08 | 0.78 | 3.2 | 3.9 | 3.9 |
| 50 | 3.0 | 12.76 | 1.73 | 0.08 | 0.78 | 3.6 | 4.4 | 4.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       62.000 to Point       63.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   280.41(Ft.)
Downstream point elevation =   279.95(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   154.13(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.927(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     4.927(CFS)
Normal flow depth in pipe =   12.84(In.)
Flow top width inside pipe =   16.28(In.)
Critical Depth =   10.25(In.)
Pipe flow velocity =      3.65(Ft/s)
Travel time through pipe =    0.70 min.
Time of concentration (TC) =    13.47 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     2.957(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.957(CFS)
Normal flow depth in pipe =    9.16(In.)
Flow top width inside pipe =   18.00(In.)
Critical Depth =    7.83(In.)
Pipe flow velocity =      3.27(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     3.385(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.385(CFS)
Normal flow depth in pipe =    9.94(In.)
Flow top width inside pipe =   17.90(In.)
Critical Depth =    8.42(In.)
Pipe flow velocity =      3.38(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     3.942(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.942(CFS)
Normal flow depth in pipe =   10.96(In.)
Flow top width inside pipe =   17.57(In.)
Critical Depth =    9.11(In.)
Pipe flow velocity =      3.50(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     4.450(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     4.450(CFS)
Normal flow depth in pipe =   11.91(In.)
Flow top width inside pipe =   17.04(In.)
Critical Depth =    9.72(In.)
Pipe flow velocity =      3.59(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 62.000 to Point 63.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 11.578(CFS)
Time of concentration = 13.47 min.
Rainfall intensity = 1.842(In/Hr) for a 100 year storm
Subarea runoff = 9.104(CFS) for 5.840(Ac.)
Total runoff = 14.032(CFS) Total area = 8.83(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 8.8 | 16.16 | 1.01 | 0.08 | 0.76 | 6.1 | 7.4 | 7.4 |
| 10 | 8.8 | 15.35 | 1.18 | 0.08 | 0.76 | 7.2 | 8.8 | 8.8 |
| 25 | 8.8 | 14.41 | 1.42 | 0.08 | 0.78 | 8.8 | 10.7 | 10.7 |
| 50 | 8.8 | 13.87 | 1.64 | 0.08 | 0.78 | 10.2 | 12.4 | 12.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       63.000 to Point       64.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   279.95(Ft.)
Downstream point elevation =   279.26(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   230.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.032(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.886(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.108(Ft.)
 Minor friction loss =      1.469(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.94(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    13.95 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     7.405(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.863(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.144(Ft.)
 Minor friction loss =      0.409(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.19(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     8.797(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.502(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.615(Ft.)
 Minor friction loss =      0.577(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.98(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    10.713(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.561(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.395(Ft.)
 Minor friction loss =      0.856(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.06(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    12.417(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.677(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.217(Ft.)
 Minor friction loss =      1.150(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.03(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 63.000 to Point 64.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 18.416(CFS)
Time of concentration = 13.95 min.
Rainfall intensity = 1.800(In/Hr) for a 100 year storm
Subarea runoff = 8.264(CFS) for 5.540(Ac.)
Total runoff = 22.295(CFS) Total area = 14.37(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 14.4 | 16.74 | 0.98 | 0.08 | 0.76 | 9.6 | 11.8 | 11.8 |
| 10 | 14.4 | 15.90 | 1.16 | 0.08 | 0.76 | 11.4 | 14.0 | 14.0 |
| 25 | 14.4 | 14.93 | 1.39 | 0.08 | 0.78 | 14.0 | 17.0 | 17.0 |
| 50 | 14.4 | 14.37 | 1.60 | 0.08 | 0.78 | 16.2 | 19.7 | 19.7 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       64.000 to Point       65.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   279.26(Ft.)
Downstream point elevation =   278.52(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   248.89(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.295(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.850(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.417(Ft.)
 Minor friction loss =      1.173(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.10(Ft/s)
Travel time through pipe =    0.58 min.
Time of concentration (TC) =    14.53 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    11.755(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    11.755(CFS)
Normal flow depth in pipe =   18.73(In.)
Flow top width inside pipe =   19.87(In.)
Critical Depth =   14.78(In.)
Pipe flow velocity =      4.47(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    13.969(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.669(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.949(Ft.)
 Minor friction loss =      0.461(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.45(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    17.017(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.351(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.408(Ft.)
 Minor friction loss =      0.683(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.42(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    19.727(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.070(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.892(Ft.)
 Minor friction loss =      0.918(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.28(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       64.000 to Point       65.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) =     0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) =     0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) =  22.897(CFS)
Time of concentration =    14.53 min.
Rainfall intensity =      1.753(In/Hr) for a 100 year storm
Subarea runoff =      5.392(CFS) for    3.980(Ac.)
Total runoff =     27.688(CFS)   Total area =       18.35(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   18.4   17.44     0.96      0.08   0.76    12.0  14.6  14.6
  10   18.4   16.57     1.13      0.08   0.76    14.2  17.3  17.3
  25   18.4   15.55     1.36      0.08   0.78    17.4  21.1  21.1
  50   18.4   14.97     1.56      0.08   0.78    20.2  24.5  24.5
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       65.000 to Point       66.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   278.52(Ft.)
Downstream point elevation =   277.90(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   206.94(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.688(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.288(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.099(Ft.)
 Minor friction loss =      1.809(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.81(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    14.93 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    14.583(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.741(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.860(Ft.)
 Minor friction loss =      0.502(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.64(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    17.336(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.304(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.215(Ft.)
 Minor friction loss =      0.709(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.52(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    21.125(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.237(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.804(Ft.)
 Minor friction loss =      1.053(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.72(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    24.494(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.221(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.425(Ft.)
 Minor friction loss =      1.416(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.80(Ft/s)
-------------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       65.000 to Point       66.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     18.350(Ac.)
Runoff from this stream =     27.688(CFS)
Time of concentration =   14.93 min.
Rainfall intensity =     1.723(In/Hr)
Area averaged loss rate (Fm) =    0.0760(In/Hr)
Area averaged yield fraction Y =    0.7911
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.2000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1        1.181     19.02    0.076    0.791    1.471
2       27.688     14.93    0.076    0.791    1.723

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 1.181) +
       0.847 * 1.000 * 1.000 * 1.000 * 27.688) + =      24.642
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.892 * 1.181) +
       1.000 * 1.000 * 1.000 * 1.000 * 27.688) + =      28.741

Total of 2 main streams to confluence:
Flow rates before confluence point:
       1.181      27.688
Maximum flow rates at confluence using above data:
       24.642       28.741
Area of stream before confluence:
        0.850       18.350
Effective area values after confluence:
       19.200       18.993


Results of confluence:
Total flow rate =     28.741(CFS)
Time of concentration =    14.925 min.
Effective stream area after confluence  =     18.993(Ac.)
Study area average Pervious fraction(Ap) =  0.200
Study area average soil loss rate(Fm) =    0.076(In/Hr)
```

Study area average yield Y = 0.791(In/Hr)
Study area average SCS CN = 80.000
Study area total = 19.20(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 19.0 | 17.91 | 0.94 | 0.08 | 0.76 | 12.2 | 14.8 | 14.8 |
| 10 | 19.0 | 17.01 | 1.11 | 0.08 | 0.76 | 14.5 | 17.6 | 17.6 |
| 25 | 19.0 | 15.97 | 1.33 | 0.08 | 0.78 | 17.7 | 21.5 | 21.5 |
| 50 | 19.0 | 15.37 | 1.53 | 0.08 | 0.78 | 20.5 | 24.9 | 24.9 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       66.000 to Point       67.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   277.90(Ft.)
Downstream point elevation =   277.65(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   248.94(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.741(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.716(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.017(Ft.)
 Minor friction loss =      1.949(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.15(Ft/s)
Travel time through pipe =    0.45 min.
Time of concentration (TC) =    15.38 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    14.813(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.335(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.067(Ft.)
 Minor friction loss =      0.518(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.71(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    17.613(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.991(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.509(Ft.)
 Minor friction loss =      0.732(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.61(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    21.468(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.079(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.241(Ft.)
 Minor friction loss =      1.088(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.83(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    24.896(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.227(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.014(Ft.)
 Minor friction loss =      1.463(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.92(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       66.000 to Point       67.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) =     0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) =     0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.368(In/Hr)
Minimum Q (Qmin=0.9YIA) =  24.829(CFS)
Time of concentration =    15.38 min.
Rainfall intensity =      1.689(In/Hr) for a 100 year storm
Subarea runoff =      1.232(CFS) for    1.650(Ac.)
Total runoff =     29.973(CFS)   Total area =       20.64(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   20.6   18.45     0.92      0.08   0.76    13.0  15.8  15.8
  10   20.6   17.53     1.09      0.08   0.76    15.4  18.7  18.7
  25   20.6   16.46     1.31      0.08   0.78    18.8  22.9  22.9
  50   20.6   15.84     1.50      0.08   0.78    21.9  26.5  26.5
----------------------------------------------------------------
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Process from Point       67.000 to Point       68.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   277.65(Ft.)
Downstream point elevation =   277.53(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   121.72(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.973(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.136(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.136(Ft.)
 Minor friction loss =      2.120(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.54(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    15.59 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    15.762(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.057(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.591(Ft.)
 Minor friction loss =      0.586(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.02(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    18.748(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.545(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.836(Ft.)
 Minor friction loss =      0.829(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.97(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    22.857(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.355(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.242(Ft.)
 Minor friction loss =      1.233(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.28(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    26.510(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.209(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.671(Ft.)
 Minor friction loss =      1.659(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.44(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       67.000 to Point       68.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II  = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) =     0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) =     0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.369(In/Hr)
Minimum Q (Qmin=0.9YIA) =  25.538(CFS)
Time of concentration =    15.59 min.
Rainfall intensity =      1.674(In/Hr) for a 100 year storm
Subarea runoff =      0.843(CFS) for    0.780(Ac.)
Total runoff =     30.816(CFS)   Total area =       21.42(Ac.)
----------------------------------------------------------------
               *******  DATA FOR OTHER YEAR STORMS *******
  Year  Area    TC    Intensity  Fm Avg  Y Avg   Qmin  Qcalc Qtot
        (Ac)    (Min)  (In/Hr)   (In/Hr) (In/Hr) (cfs) (cfs) (cfs)
   5   21.4   18.71     0.92      0.08   0.76    13.4  16.2  16.2
  10   21.4   17.77     1.08      0.08   0.76    15.9  19.3  19.3
  25   21.4   16.68     1.29      0.08   0.78    19.4  23.5  23.5
  50   21.4   16.06     1.49      0.08   0.78    22.5  27.3  27.3
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       68.000 to Point       74.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   277.53(Ft.)
Downstream point elevation =   277.14(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   383.16(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    30.816(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.690(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.162(Ft.)
 Minor friction loss =      0.918(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    1.02 min.
Time of concentration (TC) =    16.61 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    16.199(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.461(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.597(Ft.)
 Minor friction loss =      0.254(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.30(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    19.270(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.814(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.845(Ft.)
 Minor friction loss =      0.359(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.93(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    23.497(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.401(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.257(Ft.)
 Minor friction loss =      0.534(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.79(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    27.254(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.019(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.691(Ft.)
 Minor friction loss =      0.718(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.55(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       68.000 to Point       74.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     21.423(Ac.)
Runoff from this stream =     30.816(CFS)
Time of concentration =   16.61 min.
Rainfall intensity =     1.607(In/Hr)
Area averaged loss rate (Fm) =    0.0760(In/Hr)
Area averaged yield fraction Y =    0.7911
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.2000
Program is now starting with Main Stream No. 2
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 69.000 to Point 70.000
**** INITIAL AREA EVALUATION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Initial subarea data:
Initial area flow distance = 271.000(Ft.)
Top (of initial area) elevation = 283.700(Ft.)
Bottom (of initial area) elevation = 283.100(Ft.)
Difference in elevation = 0.600(Ft.)
Slope = 0.00221 s(%)= 0.22
TC = k(0.324)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.344 min.
Rainfall intensity = 2.186(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 2.366(CFS)
Subarea runoff = 2.887(CFS)
Total initial stream area = 1.520(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 1.5 | 10.34 | 1.35 | 0.08 | 0.76 | 1.4 | 1.7 | 1.7 |
| 10 | 1.5 | 10.34 | 1.53 | 0.08 | 0.76 | 1.6 | 2.0 | 2.0 |
| 25 | 1.5 | 10.34 | 1.77 | 0.08 | 0.78 | 1.9 | 2.3 | 2.3 |
| 50 | 1.5 | 10.34 | 1.98 | 0.08 | 0.78 | 2.1 | 2.6 | 2.6 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       70.000 to Point       71.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   274.64(Ft.)
Downstream point elevation =   273.81(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   276.55(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.887(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.887(CFS)
Normal flow depth in pipe =    9.01(In.)
Flow top width inside pipe =   18.00(In.)
Critical Depth =    7.75(In.)
Pipe flow velocity =      3.26(Ft/s)
Travel time through pipe =    1.41 min.
Time of concentration (TC) =    11.76 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     1.738(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.738(CFS)
Normal flow depth in pipe =    6.79(In.)
Flow top width inside pipe =   17.45(In.)
Critical Depth =    5.95(In.)
Pipe flow velocity =      2.85(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     1.988(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     1.988(CFS)
Normal flow depth in pipe =    7.30(In.)
Flow top width inside pipe =   17.68(In.)
Critical Depth =    6.37(In.)
Pipe flow velocity =      2.96(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     2.312(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.312(CFS)
Normal flow depth in pipe =    7.93(In.)
Flow top width inside pipe =   17.87(In.)
Critical Depth =    6.89(In.)
Pipe flow velocity =      3.08(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     2.608(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     2.608(CFS)
Normal flow depth in pipe =    8.50(In.)
Flow top width inside pipe =   17.97(In.)
Critical Depth =    7.34(In.)
Pipe flow velocity =      3.18(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 70.000 to Point 71.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 7.203(CFS)
Time of concentration = 11.76 min.
Rainfall intensity = 2.011(In/Hr) for a 100 year storm
Subarea runoff = 5.874(CFS) for 3.510(Ac.)
Total runoff = 8.761(CFS) Total area = 5.03(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 5.0 | 14.11 | 1.10 | 0.08 | 0.76 | 3.8 | 4.6 | 4.6 |
| 10 | 5.0 | 13.41 | 1.29 | 0.08 | 0.76 | 4.5 | 5.5 | 5.5 |
| 25 | 5.0 | 12.58 | 1.56 | 0.08 | 0.78 | 5.5 | 6.7 | 6.7 |
| 50 | 5.0 | 12.11 | 1.79 | 0.08 | 0.78 | 6.3 | 7.8 | 7.8 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       71.000 to Point       72.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   273.81(Ft.)
Downstream point elevation =   273.23(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   193.21(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.761(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.336(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.344(Ft.)
 Minor friction loss =      0.572(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.96(Ft/s)
Travel time through pipe =    0.65 min.
Time of concentration (TC) =    12.41 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     4.638(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     4.638(CFS)
Normal flow depth in pipe =   12.25(In.)
Flow top width inside pipe =   16.79(In.)
Critical Depth =    9.91(In.)
Pipe flow velocity =      3.62(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     5.504(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     5.504(CFS)
Normal flow depth in pipe =   14.09(In.)
Flow top width inside pipe =   14.85(In.)
Critical Depth =   10.86(In.)
Pipe flow velocity =      3.71(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     6.697(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.539(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.785(Ft.)
 Minor friction loss =      0.334(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.79(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     7.756(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.922(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.053(Ft.)
 Minor friction loss =      0.449(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.39(Ft/s)
----------------------------------------------------------------
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Process from Point 71.000 to Point 72.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 13.192(CFS)
Time of concentration = 12.41 min.
Rainfall intensity = 1.942(In/Hr) for a 100 year storm
Subarea runoff = 7.262(CFS) for 4.510(Ac.)
Total runoff = 16.023(CFS) Total area = 9.54(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 9.5 | 14.89 | 1.06 | 0.08 | 0.76 | 6.9 | 8.5 | 8.5 |
| 10 | 9.5 | 14.15 | 1.25 | 0.08 | 0.76 | 8.2 | 10.1 | 10.1 |
| 25 | 9.5 | 13.28 | 1.50 | 0.08 | 0.78 | 10.0 | 12.2 | 12.2 |
| 50 | 9.5 | 12.78 | 1.73 | 0.08 | 0.78 | 11.6 | 14.2 | 14.2 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       72.000 to Point       73.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   273.23(Ft.)
Downstream point elevation =   227.57(Ft.)
Pipe Slope = 0.2077 Ft/Ft
Pipe length  =   219.87(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.023(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    16.023(CFS)
Normal flow depth in pipe =    7.17(In.)
Flow top width inside pipe =   17.62(In.)
Critical Depth =   17.10(In.)
Pipe flow velocity =     24.39(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    12.56 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     8.473(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     8.473(CFS)
Normal flow depth in pipe =    5.13(In.)
Flow top width inside pipe =   16.25(In.)
Critical Depth =   13.53(In.)
Pipe flow velocity =     20.43(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    10.059(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    10.059(CFS)
Normal flow depth in pipe =    5.60(In.)
Flow top width inside pipe =   16.67(In.)
Critical Depth =   14.67(In.)
Pipe flow velocity =     21.45(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    12.242(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    12.242(CFS)
Normal flow depth in pipe =    6.21(In.)
Flow top width inside pipe =   17.11(In.)
Critical Depth =   15.88(In.)
Pipe flow velocity =     22.67(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    14.183(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    14.183(CFS)
Normal flow depth in pipe =    6.71(In.)
Flow top width inside pipe =   17.41(In.)
Critical Depth =   16.64(In.)
Pipe flow velocity =     23.60(Ft/s)
-------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 72.000 to Point 73.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 14.530(CFS)
Time of concentration = 12.56 min.
Rainfall intensity = 1.927(In/Hr) for a 100 year storm
Subarea runoff = 1.619(CFS) for 1.050(Ac.)
Total runoff = 17.643(CFS) Total area = 10.59(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 10.6 | 15.07 | 1.05 | 0.08 | 0.76 | 7.6 | 9.3 | 9.3 |
| 10 | 10.6 | 14.32 | 1.24 | 0.08 | 0.76 | 9.0 | 11.1 | 11.1 |
| 25 | 10.6 | 13.44 | 1.49 | 0.08 | 0.78 | 11.0 | 13.5 | 13.5 |
| 50 | 10.6 | 12.94 | 1.71 | 0.08 | 0.78 | 12.8 | 15.6 | 15.6 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       73.000 to Point       74.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   277.57(Ft.)
Downstream point elevation =   276.14(Ft.)
Pipe Slope = 0.0100 Ft/Ft
Pipe length  =   142.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.643(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    17.643(CFS)
Normal flow depth in pipe =   15.91(In.)
Flow top width inside pipe =   22.69(In.)
Critical Depth =   18.17(In.)
Pipe flow velocity =      7.98(Ft/s)
Travel time through pipe =    0.30 min.
Time of concentration (TC) =    12.86 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     9.326(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     9.326(CFS)
Normal flow depth in pipe =   10.72(In.)
Flow top width inside pipe =   23.86(In.)
Critical Depth =   13.09(In.)
Pipe flow velocity =      6.86(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    11.073(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    11.073(CFS)
Normal flow depth in pipe =   11.84(In.)
Flow top width inside pipe =   24.00(In.)
Critical Depth =   14.31(In.)
Pipe flow velocity =      7.17(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    13.478(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    13.478(CFS)
Normal flow depth in pipe =   13.32(In.)
Flow top width inside pipe =   23.85(In.)
Critical Depth =   15.84(In.)
Pipe flow velocity =      7.53(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    15.616(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    15.616(CFS)
Normal flow depth in pipe =   14.64(In.)
Flow top width inside pipe =   23.41(In.)
Critical Depth =   17.08(In.)
Pipe flow velocity =      7.78(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       73.000 to Point       74.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     10.590(Ac.)
Runoff from this stream =     17.643(CFS)
Time of concentration =   12.86 min.
Rainfall intensity =     1.898(In/Hr)
Area averaged loss rate (Fm) =    0.0760(In/Hr)
Area averaged yield fraction Y =    0.7911
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.2000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1       30.816     16.61    0.076    0.791    1.607
2       17.643     12.86    0.076    0.791    1.898

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


       I2-Fm1    Y1*I2     I2   T2+T1
       ------    ----      --   -----   * Q1
       I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
       1.000 * 1.000 * 1.000 * 1.000 * 30.816) +
       0.840 * 1.000 * 1.000 * 1.000 * 17.643) + =      45.640
Qmax(2) =
       1.000 * 1.000 * 1.000 * 0.887 * 30.816) +
       1.000 * 1.000 * 1.000 * 1.000 * 17.643) + =      44.977

Total of 2 main streams to confluence:
Flow rates before confluence point:
      30.816      17.643
Maximum flow rates at confluence using above data:
       45.640       44.977
Area of stream before confluence:
       21.423       10.590
Effective area values after confluence:
       32.013       26.557


Results of confluence:
Total flow rate =     45.640(CFS)
Time of concentration =    16.608 min.
Effective stream area after confluence  =     32.013(Ac.)
Study area average Pervious fraction(Ap) =  0.200
Study area average soil loss rate(Fm) =    0.076(In/Hr)
```

Study area average yield Y = 0.791(In/Hr)
Study area average SCS CN = 80.000
Study area total = 32.01(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 32.0 | 19.93 | 0.88 | 0.08 | 0.76 | 19.2 | 23.1 | 23.1 |
| 10 | 32.0 | 18.93 | 1.03 | 0.08 | 0.76 | 22.7 | 27.5 | 27.5 |
| 25 | 32.0 | 17.77 | 1.24 | 0.08 | 0.78 | 27.8 | 33.6 | 33.6 |
| 50 | 32.0 | 17.11 | 1.43 | 0.08 | 0.78 | 32.3 | 39.0 | 39.0 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       74.000 to Point       75.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   277.14(Ft.)
Downstream point elevation =   276.97(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   172.11(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.640(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.974(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.130(Ft.)
 Minor friction loss =      2.014(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.30(Ft/s)
Travel time through pipe =    0.31 min.
Time of concentration (TC) =    16.92 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    23.145(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.896(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.548(Ft.)
 Minor friction loss =      0.518(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.71(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    27.549(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.340(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.776(Ft.)
 Minor friction loss =      0.734(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.61(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    33.610(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.077(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.155(Ft.)
 Minor friction loss =      1.092(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.85(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    39.000(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.856(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.555(Ft.)
 Minor friction loss =      1.470(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.94(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 74.000 to Point 75.000
**** SUBAREA FLOW ADDITION ****

APARTMENT subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.200 Loss rate, Fm = 0.076(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.8000; Subarea Yield Fraction(Y) = 0.791
Area Averaged (Ai) = 0.8000; Average Yield Fraction(Y) = 0.791
Area averaged Fm = 0.076(In/Hr), Area Averaged Fp = 0.132(In/Hr)
Minimum Q (Qmin=0.9YIA) = 37.118(CFS)
The area added to the existing stream causes a
a lower flow rate of Q = 44.673(CFS)
therefore the upstream flow rate of Q = 45.640(CFS) is being used
Time of concentration = 16.92 min.
Rainfall intensity = 1.588(In/Hr) for a 100 year storm
Subarea runoff = 0.000(CFS) for 0.820(Ac.)
Total runoff = 45.640(CFS) Total area = 32.83(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 32.8 | 20.30 | 0.87 | 0.08 | 0.76 | 19.4 | 23.4 | 23.4 |
| 10 | 32.8 | 19.29 | 1.02 | 0.08 | 0.76 | 23.1 | 27.9 | 27.9 |
| 25 | 32.8 | 18.10 | 1.23 | 0.08 | 0.78 | 28.1 | 34.0 | 34.0 |
| 50 | 32.8 | 17.42 | 1.41 | 0.08 | 0.78 | 32.7 | 39.5 | 39.5 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       75.000 to Point       76.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   276.97(Ft.)
Downstream point elevation =   276.85(Ft.)
Pipe Slope = 0.0010 Ft/Ft
Pipe length  =   123.39(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    45.640(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.421(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.527(Ft.)
 Minor friction loss =      2.014(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.30(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    17.14 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    23.428(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.813(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.402(Ft.)
 Minor friction loss =      0.531(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.77(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    27.892(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.202(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.570(Ft.)
 Minor friction loss =      0.752(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.68(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    34.035(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.849(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.849(Ft.)
 Minor friction loss =      1.120(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.93(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    39.496(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.532(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.144(Ft.)
 Minor friction loss =      1.508(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.05(Ft/s)
----------------------------------------------------------------
End of computations, total study area =          33.040 (Ac.)
```

Kern County Rational Hydrology Program

(Hydrology Manual Dated 1992)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 2006 Version 7.2
Rational Hydrology Study Date: 05/27/14 File: 390GPVS.out

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THIS COMPUTER MODEL IS FOR THE TRUNK LINE RUNNING ALONG THE SOUTH SIDE OF THE DMP WEST PAVILION PROJECT. THIS DATA IS INPUT INTO THE WOOLLOMES MODEL AT NODE 89. DW 6/27/2014

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Program License Serial Number 6027

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********* Hydrology Study Control Information **********

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ENGLISH UNITS USED FOR RAINFALL DATA

| Rainfall map data: Year Storm | Hour | Rainfall |
|---|---|---|
| 2 | 6 | 0.745(In.) |
| 2 | 24 | 1.100(In.) |
| 100 | 6 | 1.650(In.) |
| 100 | 24 | 2.500(In.) |

Latitude in degrees = 35.75
SAN JOAQUIN VALLEY area of study
Y2 = 0.342, Y100 = 0.696 or Y100 = 0.697
Note: Larger value of Y100 = 0.697 used
Slope used for rainfall intensity curve b = 0.6500

Remaining year storm values:

| 1 Hour Rainfall - | Year Storm |
|---|---|
| 0.342 | 2 |
| 0.430 | 5 |
| 0.488 | 10 |
| 0.563 | 25 |
| 0.632 | 50 |
| 0.697 | 100 |

| 24 Hour Rainfall - | Year Storm |
|---|---|
| 1.100 | 2 |
| 1.446 | 5 |
| 1.675 | 10 |
| 1.973 | 25 |
| 2.244 | 50 |
| 2.500 | 100 |

Note: Computer estimated pipe sizes use 10 year storm flow rates
NOTE: ENGLISH (IN-LB) INPUT DATA UNITS USED
NOTE: ENGLISH (IN-LB) OUTPUT DATA UNITS USED

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 77.000 to Point 78.000
**** INITIAL AREA EVALUATION ****
_____
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 645.000(Ft.)
Top (of initial area) elevation = 300.300(Ft.)
Bottom (of initial area) elevation = 290.630(Ft.)
Difference in elevation = 9.670(Ft.)
Slope = 0.01499 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.365 min.
Rainfall intensity = 2.332(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 8.909(CFS)
Subarea runoff = 10.364(CFS)
Total initial stream area = 5.020(Ac.)
---

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 5.0 | 9.37 | 1.44 | 0.04 | 0.83 | 5.4 | 6.3 | 6.3 |
| 10 | 5.0 | 9.37 | 1.63 | 0.04 | 0.83 | 6.1 | 7.2 | 7.2 |
| 25 | 5.0 | 9.37 | 1.88 | 0.04 | 0.84 | 7.1 | 8.3 | 8.3 |
| 50 | 5.0 | 9.37 | 2.11 | 0.04 | 0.84 | 8.0 | 9.4 | 9.4 |

---

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       78.000 to Point       79.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.63(Ft.)
Downstream point elevation =   285.25(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   126.85(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.364(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.656(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.234(Ft.)
 Minor friction loss =      0.801(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.86(Ft/s)
Travel time through pipe =    0.36 min.
Time of concentration (TC) =     9.73 min.
-----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.319(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.377(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.459(Ft.)
 Minor friction loss =      0.298(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.58(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.197(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.602(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.595(Ft.)
 Minor friction loss =      0.386(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.07(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     8.341(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.939(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.800(Ft.)
 Minor friction loss =      0.519(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.72(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     9.383(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

```
     1.289(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.012(Ft.)
 Minor friction loss =      0.657(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.31(Ft/s)
----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       79.000 to Point       80.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   285.25(Ft.)
Downstream point elevation =   283.44(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   602.47(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.364(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.854(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.863(Ft.)
 Minor friction loss =      0.801(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.86(Ft/s)
Travel time through pipe =    1.71 min.
Time of concentration (TC) =    11.44 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.319(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.667(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.179(Ft.)
 Minor friction loss =      0.298(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.58(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.197(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.404(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.827(Ft.)
 Minor friction loss =      0.386(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.07(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     8.341(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.507(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.798(Ft.)
 Minor friction loss =      0.519(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.72(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     9.383(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

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     3.653(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.806(Ft.)
 Minor friction loss =      0.657(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.31(Ft/s)
----------------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 79.000 to Point 80.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 13.558(CFS)
Time of concentration = 11.44 min.
Rainfall intensity = 2.048(In/Hr) for a 100 year storm
Subarea runoff = 5.373(CFS) for 3.680(Ac.)
Total runoff = 15.737(CFS) Total area = 8.70(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 8.7 | 13.73 | 1.12 | 0.04 | 0.83 | 7.3 | 8.5 | 8.5 |
| 10 | 8.7 | 13.04 | 1.32 | 0.04 | 0.83 | 8.6 | 10.0 | 10.0 |
| 25 | 8.7 | 12.24 | 1.58 | 0.04 | 0.84 | 10.4 | 12.1 | 12.1 |
| 50 | 8.7 | 11.78 | 1.82 | 0.04 | 0.84 | 12.0 | 14.0 | 14.0 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       80.000 to Point       84.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.44(Ft.)
Downstream point elevation =   282.11(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   442.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.737(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    10.434(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      9.917(Ft.)
 Minor friction loss =      1.847(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.91(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =    12.27 min.
----------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     8.476(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.083(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.877(Ft.)
 Minor friction loss =      0.536(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.80(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    10.002(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.422(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.006(Ft.)
 Minor friction loss =      0.746(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.66(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    12.101(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.626(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.864(Ft.)
 Minor friction loss =      1.092(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.85(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    13.967(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
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```
     7.937(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      7.812(Ft.)
 Minor friction loss =      1.455(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.90(Ft/s)
-------------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       80.000 to Point       84.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.700(Ac.)
Runoff from this stream =     15.737(CFS)
Time of concentration =   12.27 min.
Rainfall intensity =     1.957(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 81.000 to Point 82.000
**** INITIAL AREA EVALUATION ****
_____
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 306.000(Ft.)
Top (of initial area) elevation = 293.120(Ft.)
Bottom (of initial area) elevation = 288.530(Ft.)
Difference in elevation = 4.590(Ft.)
Slope = 0.01500 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.949 min.
Rainfall intensity = 2.831(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 7.756(CFS)
Subarea runoff = 9.049(CFS)
Total initial stream area = 3.600(Ac.)
---

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 3.6 | 6.95 | 1.74 | 0.04 | 0.83 | 4.7 | 5.5 | 5.5 |
| 10 | 3.6 | 6.95 | 1.98 | 0.04 | 0.83 | 5.3 | 6.3 | 6.3 |
| 25 | 3.6 | 6.95 | 2.29 | 0.04 | 0.84 | 6.2 | 7.3 | 7.3 |
| 50 | 3.6 | 6.95 | 2.57 | 0.04 | 0.84 | 7.0 | 8.2 | 8.2 |

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       82.000 to Point       83.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   283.53(Ft.)
Downstream point elevation =   282.65(Ft.)
Pipe Slope = 0.0037 Ft/Ft
Pipe length  =   239.59(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.049(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.508(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.778(Ft.)
 Minor friction loss =      0.611(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.12(Ft/s)
Travel time through pipe =    0.78 min.
Time of concentration (TC) =     7.73 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     5.528(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     5.528(CFS)
Normal flow depth in pipe =   12.96(In.)
Flow top width inside pipe =   16.16(In.)
Critical Depth =   10.87(In.)
Pipe flow velocity =      4.06(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     6.292(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     6.292(CFS)
Normal flow depth in pipe =   14.58(In.)
Flow top width inside pipe =   14.13(In.)
Critical Depth =   11.63(In.)
Pipe flow velocity =      4.11(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     7.289(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.669(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.153(Ft.)
 Minor friction loss =      0.396(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.12(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =     8.196(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.079(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.458(Ft.)
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 Minor friction loss =      0.501(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.64(Ft/s)
----------------------------------------------------------------
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 82.000 to Point 83.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 13.290(CFS)
Time of concentration = 7.73 min.
Rainfall intensity = 2.642(In/Hr) for a 100 year storm
Subarea runoff = 6.441(CFS) for 3.010(Ac.)
Total runoff = 15.491(CFS) Total area = 6.61(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 6.6 | 9.27 | 1.45 | 0.04 | 0.83 | 7.1 | 8.4 | 8.4 |
| 10 | 6.6 | 8.81 | 1.70 | 0.04 | 0.83 | 8.4 | 9.9 | 9.9 |
| 25 | 6.6 | 8.27 | 2.04 | 0.04 | 0.84 | 10.2 | 11.9 | 11.9 |
| 50 | 6.6 | 7.96 | 2.35 | 0.04 | 0.84 | 11.8 | 13.8 | 13.8 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       83.000 to Point       84.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   282.65(Ft.)
Downstream point elevation =   282.11(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   179.25(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.491(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.147(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.897(Ft.)
 Minor friction loss =      1.790(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.77(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =     8.07 min.
----------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     8.374(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.122(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.139(Ft.)
 Minor friction loss =      0.523(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.74(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     9.869(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.768(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.582(Ft.)
 Minor friction loss =      0.727(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.58(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    11.927(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.831(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.310(Ft.)
 Minor friction loss =      1.061(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.75(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    13.757(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

```
     3.945(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.073(Ft.)
 Minor friction loss =      1.412(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.78(Ft/s)
-------------------------------------------------------------------
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       83.000 to Point       84.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.610(Ac.)
Runoff from this stream =     15.491(CFS)
Time of concentration =    8.07 min.
Rainfall intensity =     2.569(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1       15.737     12.27    0.038    0.846    1.957
2       15.491      8.07    0.038    0.846    2.569

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


      I2-Fm1    Y1*I2     I2   T2+T1
      ------    ----      --   -----   * Q1
      I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
      1.000 * 1.000 * 1.000 * 1.000 * 15.737) +
      0.758 * 1.000 * 1.000 * 1.000 * 15.491) + =      27.482
Qmax(2) =
      1.000 * 1.000 * 1.000 * 0.829 * 15.737) +
      1.000 * 1.000 * 1.000 * 1.000 * 15.491) + =      28.536

Total of 2 main streams to confluence:
Flow rates before confluence point:
      15.737      15.491
Maximum flow rates at confluence using above data:
       27.482       28.536
Area of stream before confluence:
        8.700        6.610
Effective area values after confluence:
```

15.310 12.078

Results of confluence:
Total flow rate = 28.536(CFS)
Time of concentration = 8.070 min.
Effective stream area after confluence = 12.078(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.038(In/Hr)
Study area average yield Y = 0.846(In/Hr)
Study area average SCS CN = 80.000
Study area total = 15.31(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 12.1 | 9.68 | 1.41 | 0.04 | 0.83 | 12.7 | 14.9 | 14.9 |
| 10 | 12.1 | 9.20 | 1.65 | 0.04 | 0.83 | 14.9 | 17.5 | 17.5 |
| 25 | 12.1 | 8.63 | 1.99 | 0.04 | 0.84 | 18.1 | 21.2 | 21.2 |
| 50 | 12.1 | 8.31 | 2.29 | 0.04 | 0.84 | 20.9 | 24.4 | 24.4 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       84.000 to Point       88.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   282.11(Ft.)
Downstream point elevation =   280.08(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   676.18(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.536(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    10.647(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =     10.756(Ft.)
 Minor friction loss =      1.922(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.08(Ft/s)
Travel time through pipe =    1.24 min.
Time of concentration (TC) =     9.31 min.
----------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    14.867(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.411(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.920(Ft.)
 Minor friction loss =      0.522(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.73(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    17.524(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.751(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.056(Ft.)
 Minor friction loss =      0.725(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.58(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    21.180(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.954(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.925(Ft.)
 Minor friction loss =      1.059(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.74(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    24.430(CFS)
Given pipe size =     24.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

```
     7.262(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      7.883(Ft.)
 Minor friction loss =      1.409(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.78(Ft/s)
-------------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       84.000 to Point       88.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     12.078(Ac.)
Runoff from this stream =     28.536(CFS)
Time of concentration =    9.31 min.
Rainfall intensity =     2.341(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =   10.2128
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 85.000 to Point 86.000
**** INITIAL AREA EVALUATION ****
_____
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Initial subarea data:
Initial area flow distance = 495.000(Ft.)
Top (of initial area) elevation = 293.860(Ft.)
Bottom (of initial area) elevation = 286.430(Ft.)
Difference in elevation = 7.430(Ft.)
Slope = 0.01501 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.422 min.
Rainfall intensity = 2.498(In/Hr) for a 100 year storm
Minimum Q (Qmin=0.9YIA) = 9.773(CFS)
Subarea runoff = 11.382(CFS)
Total initial stream area = 5.140(Ac.)
---

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 5.1 | 8.42 | 1.54 | 0.04 | 0.83 | 5.9 | 6.9 | 6.9 |
| 10 | 5.1 | 8.42 | 1.75 | 0.04 | 0.83 | 6.7 | 7.9 | 7.9 |
| 25 | 5.1 | 8.42 | 2.02 | 0.04 | 0.84 | 7.8 | 9.2 | 9.2 |
| 50 | 5.1 | 8.42 | 2.27 | 0.04 | 0.84 | 8.8 | 10.3 | 10.3 |

---

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       86.000 to Point       87.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   281.43(Ft.)
Downstream point elevation =   280.47(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   319.88(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.382(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.761(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.754(Ft.)
 Minor friction loss =      0.966(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.44(Ft/s)
Travel time through pipe =    0.83 min.
Time of concentration (TC) =     9.25 min.
----------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =     6.944(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     0.797(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.398(Ft.)
 Minor friction loss =      0.360(Ft.)  K-factor =   1.50
Pipe flow velocity =      3.93(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =     7.908(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.319(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.812(Ft.)
 Minor friction loss =      0.466(Ft.)  K-factor =   1.50
Pipe flow velocity =      4.48(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =     9.163(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.100(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.433(Ft.)
 Minor friction loss =      0.626(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.19(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    10.306(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

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     2.911(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.078(Ft.)
 Minor friction loss =      0.792(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.83(Ft/s)
----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 86.000 to Point 87.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.380(In/Hr)
Minimum Q (Qmin=0.9YIA) = 16.619(CFS)
Time of concentration = 9.25 min.
Rainfall intensity = 2.351(In/Hr) for a 100 year storm
Subarea runoff = 7.955(CFS) for 4.150(Ac.)
Total runoff = 19.337(CFS) Total area = 9.29(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 9.3 | 11.10 | 1.29 | 0.04 | 0.83 | 8.9 | 10.4 | 10.4 |
| 10 | 9.3 | 10.55 | 1.51 | 0.04 | 0.83 | 10.5 | 12.3 | 12.3 |
| 25 | 9.3 | 9.90 | 1.82 | 0.04 | 0.84 | 12.7 | 14.9 | 14.9 |
| 50 | 9.3 | 9.53 | 2.09 | 0.04 | 0.84 | 14.7 | 17.2 | 17.2 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       87.000 to Point       88.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   280.47(Ft.)
Downstream point elevation =   280.08(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =   131.32(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.337(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     6.848(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      4.449(Ft.)
 Minor friction loss =      2.789(Ft.)  K-factor =   1.50
Pipe flow velocity =     10.94(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     9.45 min.
----------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    10.437(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.719(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.296(Ft.)
 Minor friction loss =      0.813(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.91(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    12.307(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.542(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.802(Ft.)
 Minor friction loss =      1.130(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.96(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    14.881(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     3.896(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      2.634(Ft.)
 Minor friction loss =      1.652(Ft.)  K-factor =   1.50
Pipe flow velocity =      8.42(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    17.168(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
```

```
     5.315(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      3.507(Ft.)
 Minor friction loss =      2.198(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.72(Ft/s)
-----------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       87.000 to Point       88.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      9.290(Ac.)
Runoff from this stream =     19.337(CFS)
Time of concentration =    9.45 min.
Rainfall intensity =     2.318(In/Hr)
Area averaged loss rate (Fm) =    0.0380(In/Hr)
Area averaged yield fraction Y =    0.8456
Area averaged SCS CN =  80.00
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream Flow rate    TC      Fm       Y     Rainfall Intensity
 No.    (CFS)     (min)   (In/Hr)  (In/Hr)  (In/Hr)


Summary of stream data:

Stream Flow rate      TC      Fm    Y     Rainfall Intensity
 No.       (CFS)       (min)  (In/Hr) (In/Hr)    (In/Hr)


1       28.536      9.31    0.038   10.213    2.341
2       19.337      9.45    0.038    0.846    2.318

The following analysis considers each stream individually as the
Q2,T2 (largest stream).  If equations do not apply, 1.000 is used.
The largest resulting flow rate is selected as governing flow.


      I2-Fm1    Y1*I2     I2   T2+T1
      ------    ----      --   -----   * Q1
      I1-Fm1    Y1*I1     I1    2*T1
Qmax(1) =
      1.000 * 1.000 * 1.000 * 1.000 * 28.536) +
      1.000 * 1.000 * 1.000 * 0.993 * 19.337) + =      47.730
Qmax(2) =
      1.000 * 1.000 * 0.990 * 1.000 * 28.536) +
      1.000 * 1.000 * 1.000 * 1.000 * 19.337) + =      47.599

Total of 2 main streams to confluence:
Flow rates before confluence point:
      28.536      19.337
Maximum flow rates at confluence using above data:
       47.730       47.599
Area of stream before confluence:
       12.078        9.290
Effective area values after confluence:
```

21.209 21.368

Results of confluence:
Total flow rate = 47.730(CFS)
Time of concentration = 9.311 min.
Effective stream area after confluence = 21.209(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.038(In/Hr)
Study area average yield Y = 6.140(In/Hr)
Study area average SCS CN = 80.000
Study area total = 21.37(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 21.2 | 11.17 | 1.28 | 0.04 | 0.83 | 20.2 | 23.7 | 23.7 |
| 10 | 21.2 | 10.61 | 1.50 | 0.04 | 0.83 | 23.9 | 28.0 | 28.0 |
| 25 | 21.2 | 9.96 | 1.81 | 0.04 | 0.84 | 28.9 | 33.8 | 33.8 |
| 50 | 21.2 | 9.59 | 2.08 | 0.04 | 0.84 | 33.5 | 39.0 | 39.0 |

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point       88.000 to Point       89.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point elevation =   280.08(Ft.)
Downstream point elevation =   276.56(Ft.)
Pipe Slope = 0.0030 Ft/Ft
Pipe length  =  1174.51(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.730(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    14.581(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =     15.899(Ft.)
 Minor friction loss =      2.202(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.72(Ft/s)
Travel time through pipe =    2.01 min.
Time of concentration (TC) =    11.32 min.
-------------------------------------------------------------------
       ******  OTHER STORM YEAR PIPE DATA  ******
** 5 year storm **
No. of pipes = 1  Required pipe flow  =    23.725(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    23.725(CFS)
Normal flow depth in pipe =   26.53(In.)
Flow top width inside pipe =   19.19(In.)
Critical Depth =   19.90(In.)
Pipe flow velocity =      5.17(Ft/s)
** 10 year storm **
No. of pipes = 1  Required pipe flow  =    27.976(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     2.699(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.462(Ft.)
 Minor friction loss =      0.757(Ft.)  K-factor =   1.50
Pipe flow velocity =      5.70(Ft/s)
** 25 year storm **
No. of pipes = 1  Required pipe flow  =    33.826(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     5.571(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      7.985(Ft.)
 Minor friction loss =      1.106(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.89(Ft/s)
** 50 year storm **
No. of pipes = 1  Required pipe flow  =    39.027(CFS)
Given pipe size =     30.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     8.582(Ft.)  at the headworks or inlet of the pipe(s)
```

```
 Pipe friction loss =     10.630(Ft.)
 Minor friction loss =      1.472(Ft.)  K-factor =   1.50
Pipe flow velocity =      7.95(Ft/s)
-----------------------------------------------------------------
```

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point 88.000 to Point 89.000
**** SUBAREA FLOW ADDITION ****

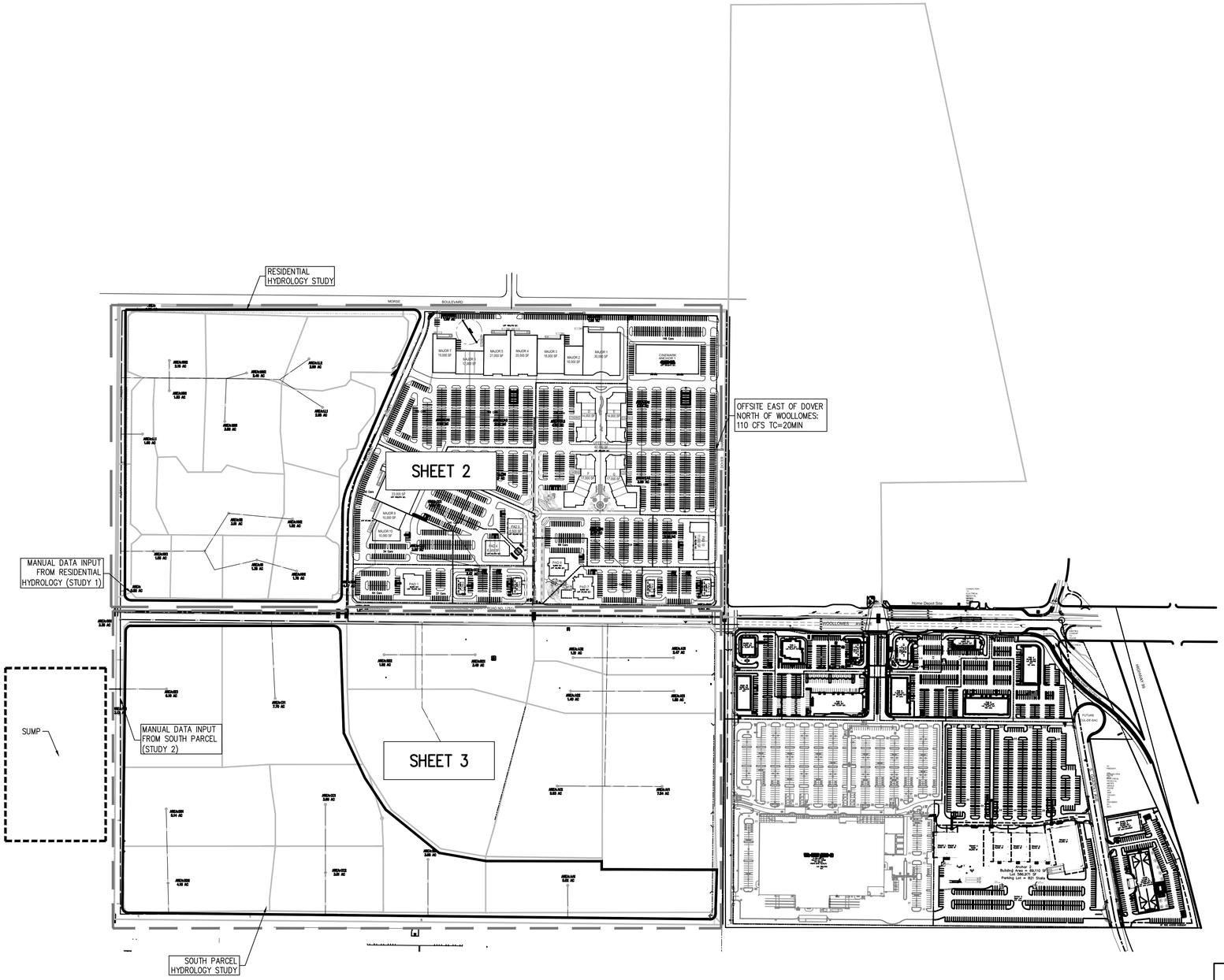
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil AMC II = 80.00
Pervious (Ap) = 0.100 Loss rate, Fm = 0.038(In/Hr), Fp = 0.380(In/Hr)
Subarea (Ai) = 0.9000; Subarea Yield Fraction(Y) = 0.846
Area Averaged (Ai) = 0.9000; Average Yield Fraction(Y) = 0.846
Area averaged Fm = 0.038(In/Hr), Area Averaged Fp = 0.214(In/Hr)
Minimum Q (Qmin=0.9YIA) = 42.836(CFS)
Time of concentration = 11.32 min.
Rainfall intensity = 2.061(In/Hr) for a 100 year storm
Subarea runoff = 1.996(CFS) for 6.100(Ac.)
Total runoff = 49.726(CFS) Total area = 27.31(Ac.)

******* DATA FOR OTHER YEAR STORMS *******

| Year | Area (Ac) | TC (Min) | Intensity (In/Hr) | Fm Avg (In/Hr) | Y Avg (In/Hr) | Qmin (cfs) | Qcalc (cfs) | Qtot (cfs) |
|---|---|---|---|---|---|---|---|---|
| 5 | 27.3 | 13.59 | 1.13 | 0.04 | 0.83 | 23.0 | 26.8 | 26.8 |
| 10 | 27.3 | 12.91 | 1.32 | 0.04 | 0.83 | 27.1 | 31.6 | 31.6 |
| 25 | 27.3 | 12.12 | 1.59 | 0.04 | 0.84 | 32.8 | 38.2 | 38.2 |
| 50 | 27.3 | 11.66 | 1.83 | 0.04 | 0.84 | 37.9 | 44.1 | 44.1 |

End of computations, total study area = 30.700 (Ac.)

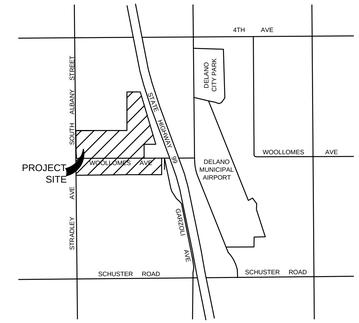
# DELANO GRAPEVINE
## EXHIBIT A
# PRELIMINARY HYDROLOGY




GRAPHIC SCALE

100' 50' 0' 50' 100'

( IN FEET )
1 inch = 100 ft.




VICINITY MAP
NO SCALE

LEGEND

DRAINAGE AREA

D60 D60
PIPE DIAMETER

X PIPE DIAMETER
X 10-YEAR EVENT FLOWRATE
X 10-YEAR VELOCITY
X NORMAL DEPTH

| REV. | DESCRIPTION | CK'D | DATE |
|---|---|---|---|
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FAX: (661) 322-0129

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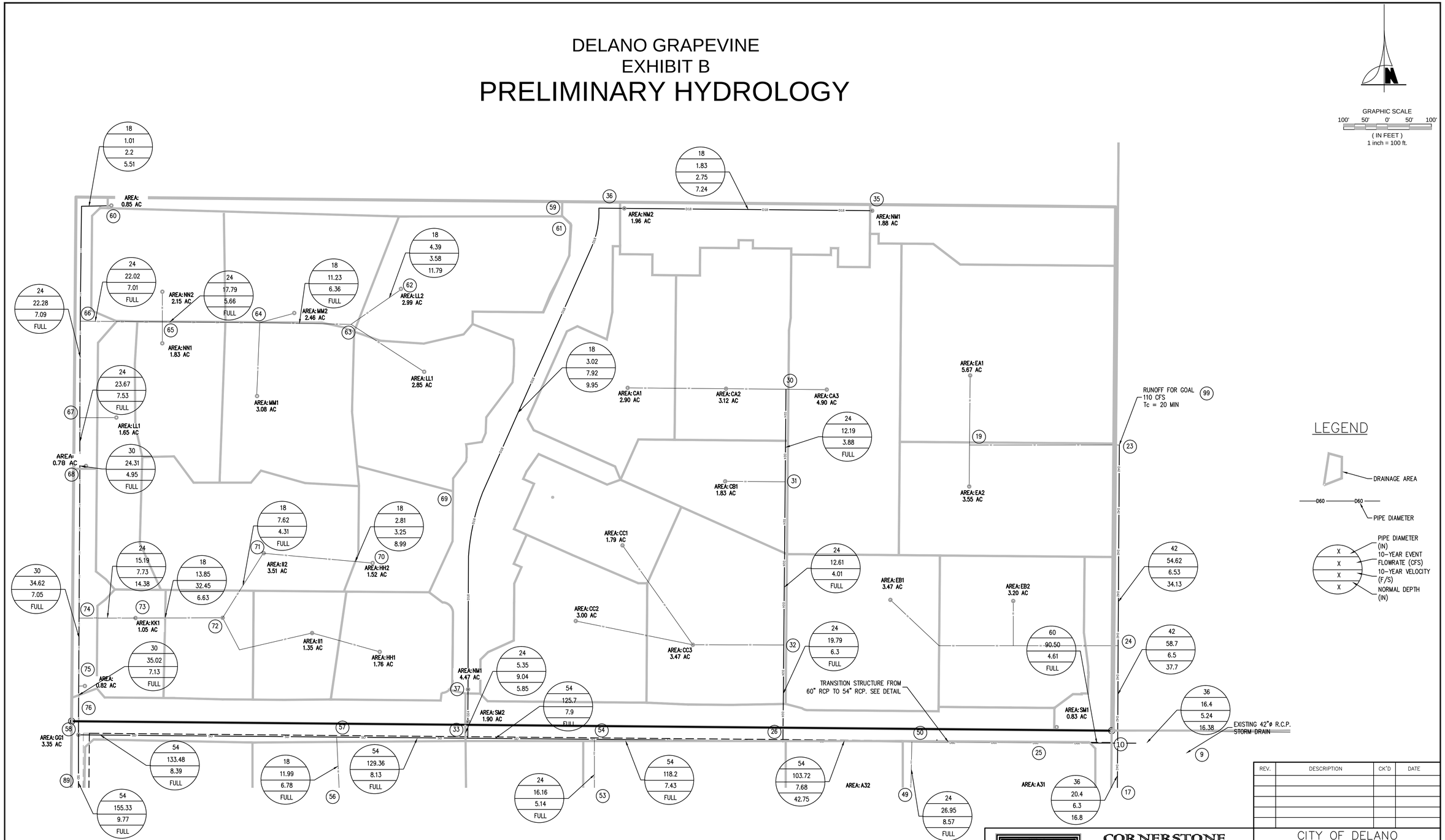
CITY OF DELANO
DELANO GRAPEVINE

EXHIBIT A – PRELIMINARY HYDROLOGY

# DELANO GRAPEVINE
## EXHIBIT B
# PRELIMINARY HYDROLOGY




| REV. | DESCRIPTION | CK'D | DATE |
|---|---|---|---|
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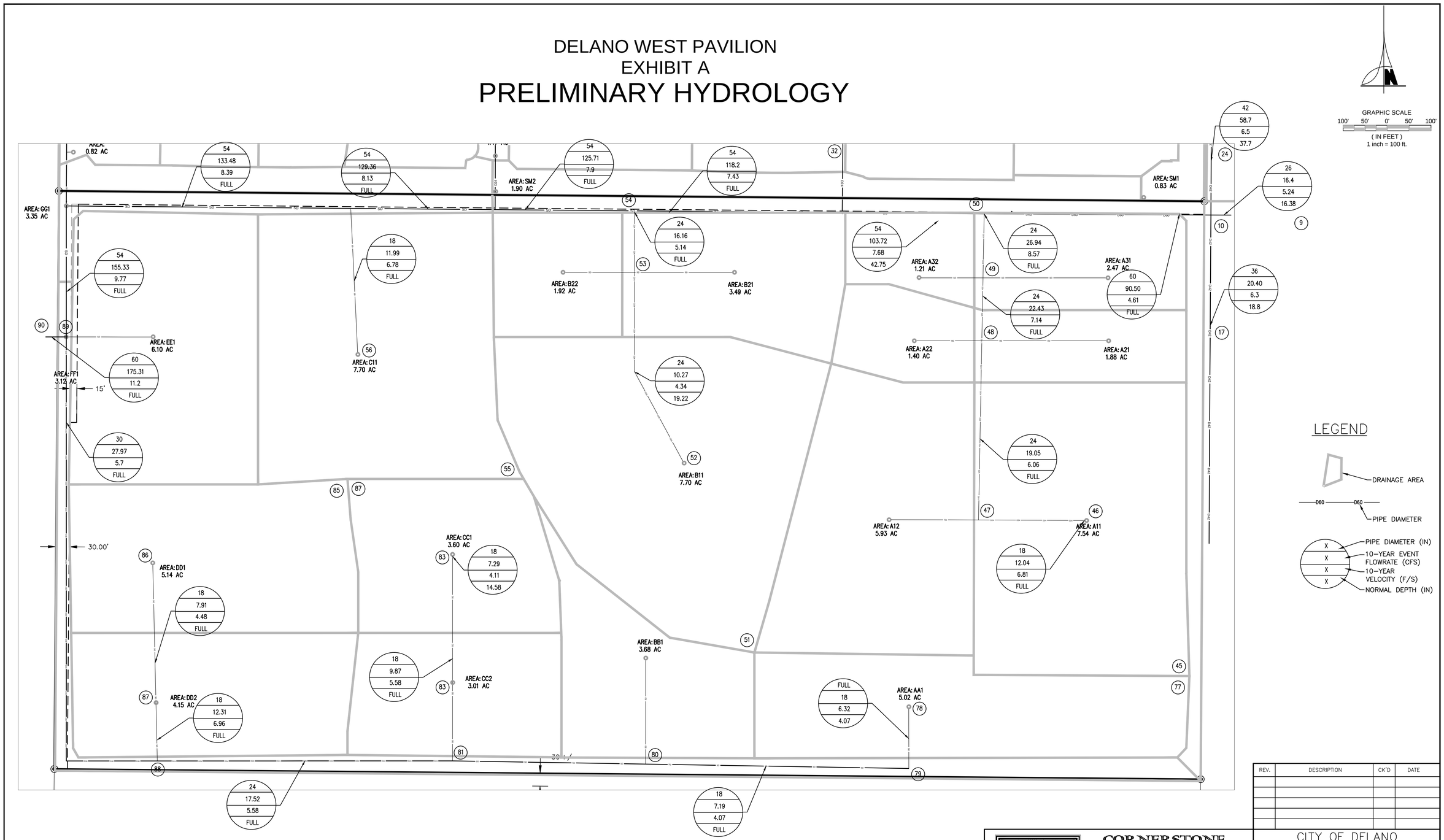
CITY OF DELANO
DELANO GRAPEVINE
EXHIBIT A – PRELIMINARY HYDROLOGY

# DELANO WEST PAVILION
## EXHIBIT A
# PRELIMINARY HYDROLOGY




| REV. | DESCRIPTION | CK'D | DATE |
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CITY OF DELANO
DELANO GRAPEVINE

EXHIBIT A – PRELIMINARY HYDROLOGY

SHEET 3 OF 3

# APPENDIX 4.9-B
## FLOOD SUMMARY REPORT AND DRAINAGE BASIN MEMO

CORNERSTONE
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS & LAND SURVEYORS

Job No:390-04-00

# MEMO

**TO:** **Rick Beason,** Project Manager YK America

**FROM:** Derrill Whitten PE, PLS
Cornerstone Engineering Inc.

**DATE:** September 10, 2014

**RE:** YK America, Delano Marketplace Development, Terminal Sump Size and Engineering

---

The purpose of this memo is to address the construction site impacts associated with the installation of the terminal drainage sump for the YK America Delano Marketplace developments. These developments include the Delano Marketplace, The Delano Grapevine, and the West Pavilion Projects. In support of these projects, Cornerstone Engineering Inc. (Cornerstone) has prepared a preliminary drainage study to demonstrate how the drainage from these three projects will be handled. A drainage master plan has been prepared which conveys all of the project stormwater to a terminal sump located on City and County land at the SW corner of Woollomes and Stradley. An existing city sump is located on this corner. The project developer will enlarge the existing sump to create the storage capacity needed for the project storm water containment. Earthwork spoils from the sump enlargement will be exported to be used as fill for the West Pavilion project.

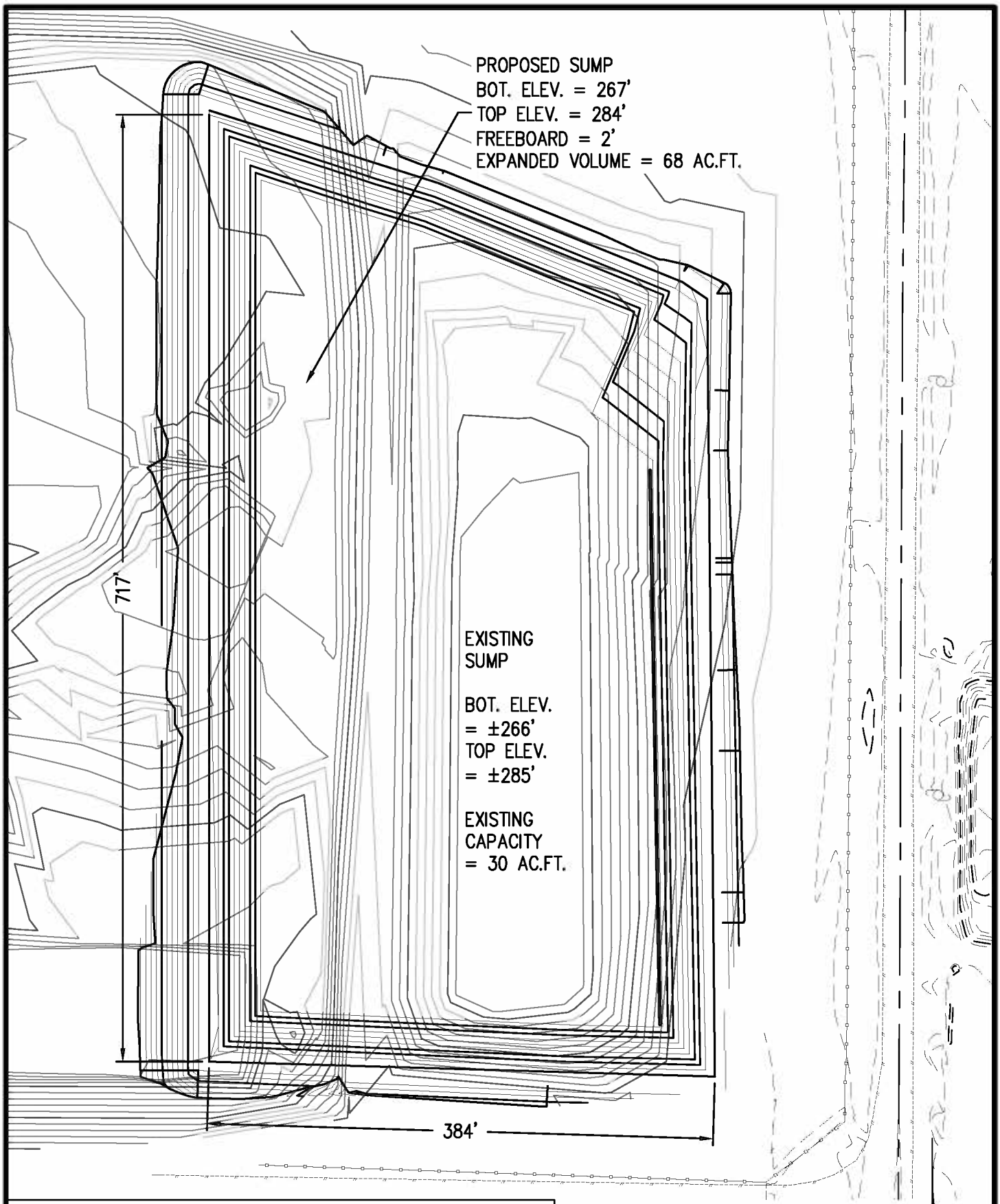
**Volume Required:** The existing city sump has a stormwater containment capacity of approximately 30 ac-ft. The preliminary analysis done by Cornerstone indicates that an additional 33.4 ac-ft of volume will be required to accommodate the proposed projects. The proposed sump will be designed to accommodate approximately 68 ac-ft and will be an expansion of the existing city sump.

**Earthwork**: The construction of this sump will entail the movement of approximately 74,000 cy of dirt. 24,000 cy will be graded and compacted on the sump site to construct the expanded sump. Approximately 50,000 cy will be excavated and transported to the West Pavilion site for use as site fill.

See attached Exhibit showing the limits of the existing sump and the proposed expansion.

Derrill Whitten, PE, PLS
J:\Projects\390 YK America\390-01-00 Delano Market Place\Docs\Memo 03-15-2012 Landmark Drainage.Doc

208 Oak Street
Bakersfield, CA 93304
Tel: 661.325.9474 - Fax 661.322.0129
**www.cornerstoneeng.com**

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GRAPHIC SCALE

100' 50' 0' 50' 100'

( IN FEET )
1 inch = 100 ft.

N

DATE: 09-10-14 | DRAFTER: LRR | DWG. NO.: 3900400_SUMP.dwg

CORNERSTONE
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS & LAND SURVEYORS

Job No:390-04-00

# MEMO

**TO:** **Rick Beason,** Project Manager YK America

**FROM:** Derrill Whitten PE, PLS
Cornerstone Engineering Inc.

**DATE:** September 12, 2014

**RE:** YK America, West Pavilion Flood Impacts and Mitigation

---

Attached is a flood analysis prepared by West Consulting to evaluate the flood impacts and mitigation which might be encountered with the development of the West Pavilion Project. The project is located on the south side of Woollomes just west of Dover Parkway in Delano. The site is currently shown to be within flood zone A on the FEMA flood insurance map (FIRM). However, the West Consulting flood model shows that only about 1/3 of the site, in the SW corner is subject parcel to flood depth greater than 1'(see Figure 4 attached).

For the purpose of evaluating the impacts that the project might have upon adjoining properties, we asked West to do a worse-case flood model. Since most of the flood water on the site comes onto the site from the south, the "Worse-case model would have a flood wall along the southern border of the Pavilion site, impeding the path of the flood flow and forcing it to move to the west and off the site. The project will not include a flood wall, in fact the southern boundary of the site will most likely have a street on it and the development will be designed to pass the flood waters around the project buildings. However, it was prudent to evaluate the impact this approach would have on the properties south and west of the project site with the understanding that the final project would have much less of an impact than this model shows.

**Results**: On figure 8 of the West Report (attached) it can be noted that the flood depth along the south boundary of the Pavilion project increases by about a foot on the property south of the project site and it increases about 0.6-0.8' on the property to the west of Stradley. The property to the south is owned by the County of Kern and serves as a buffer to development around the Delano County Landfill (now closed) This buffer area is used as a soccer park. There are no inhabited structures on this site. An increase of flood depth would have no impact to this site since the County of Kern has no intention to develop it. The property to the west of Stradley is zoned for agriculture and under the existing conditions would see flood water up to 2 feet deep. In the proposed (worse case) condition this depth increases to approximately 2.8' max.

**Conclusions**: The FEMA standard for development on a flood plane is for all structures to be elevated a minimum of one-foot above the Base Flood Elevation (BFE) as approved by the flood plane manager. The pre project BFE(s) have been evaluated by West Consulting and the worse case post development model shows that flood depths would be increased by no more than a foot at any point on the model. Thus it can be assumed that when the project is developed and the site is fully open to flood waters passing through the site (with some structures elevated above the BFE), the offsite impacts will be reduced to a level well below the allowable FEMA standard of a 1' BFE increase.

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The western portion of the Pavilion site will be developed with multi-family residential units. These units will by constructed well to the north of the southern project boundary, leaving ample room for flood waters to pass from east to west across the site without creating a significant net increase in the offsite BFE.

**Mitigation:**

1) All Structures shall be elevated a minimum of one-foot above the Base Flood Elevation (BFE) as approved by the City of Delano. The BFE(s) shall be determined based upon an analysis prepared for the Developer, at the Developer's expense, utilizing methods and procedures approved by the National Flood Insurance Program (NFIP) and shall be based upon a fully developed project condition.

2) The Developer shall have prepared an analysis of the Floodplain Encroachment resulting from this project (in conjunction with all existing, proposed and future developments), subject to the approval of the City of Delano. The resultant maximum encroachment shall not exceed one-foot at any point within the floodplain.

3) The floodplain analysis prepared for this Environmental Impact Report (EIR) should be considered preliminary as it is based upon a conservative hydrologic determination of peak flows that may impact the project and the surrounding area. The base flood elevations may be revised upon submittal to, review by, and approval of revised hydrologic and hydraulic analysis by the City of Delano.

4) Any fencing or walls along the southern side of the project shall be designed to pass floodwaters through the fence structures.

Derrill Whitten, PE, PLS
J:\Projects\390 YK America\390-01-00 Delano Market Place\Docs\Memo 03-15-2012 Landmark Drainage.Doc

**MEMORANDUM**

| | |
|---|---|
| Project: | West Pavilion Development |
| Subject: | Hydraulic Modeling Summary |
| Date: | August 14, 2014 |
| To: | Mimi Chang, YK America Group<br>Martin Hsu, YK America Group |
| From: | David S. Smith, P.E., WEST Consultants, Inc. |

REGISTERED PROFESSIONAL ENGINEER
David S. Smith
No. C056132
EXP. 12/31/14
CIVIL
STATE OF CALIFORNIA

This memo summarizes the hydraulic analysis completed by WEST Consultants, Inc. (WEST) for the YK America Group to determine the 1-percent annual chance exceedance (100-year) event depths and velocities in the vicinity of the West Pavilion development. This analysis is based on the WEST FLO-2D model developed for the Grapevine site evaluation. The proposed West Pavilion development is located in the City of Delano, Kern County, California, south of Woollomes Avenue, east of Albany Street, and west of the Delano Marketplace (see Figure 1).

*Figure 1. West Pavilion site location*

A regional view of the proposed conditions 100-year simulation is shown in Figure 2 to provide some context of the flow patterns at the site. Flow directional arrows have been added to the graphic for clarification and should be considered approximate.

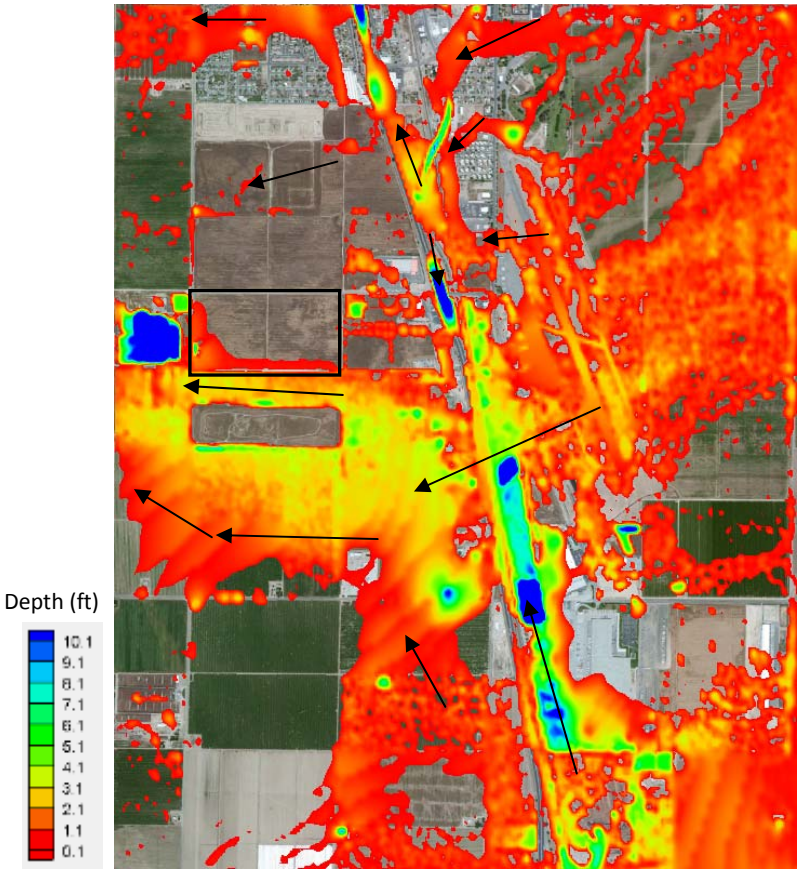


*Figure 2. Proposed 100-year FLO-2D Results in Vicinity of Pavilion Site*

The grading of the West Pavilion site has not yet been determined, therefore a site configuration was modeled that minimizes flow across the site to provide a conservative estimate of the 100-year water surface elevations and velocities around the south and west site perimeters. This was accomplished by adding a levee feature in FLO-2D across the south edge of the site (see red line representing the levee in Figure 2) to prevent the main flow path south of the site from spreading to the north as it currently does in existing conditions. Flow lines (see pink lines in Figure 3) were included in FLO-2D to determine the flow rate at two locations: 1) in the soccer field between the south edge of the West Pavilion site and the landfill, and 2) across the soccer field and the site.

The majority of the flow in the vicinity of the West Pavilion development is south of the site, flowing from east to west (approximately 1,700 cfs). A small amount of flow approaches the West Pavilion site from the east (approximately 100 cfs).

*Figure 3. FLO-2D grid with levee and flow line locations*

Results are provided in Figures 4 and 5 for existing conditions and in Figures 6 and 7 for proposed conditions. The differences between proposed and existing conditions are illustrated in Figures 8 and 9. In each figure, model cells with no flow and/or cells with ponding depths less than 0.2 feet or velocities less than 0.5 feet per second are not shown. The aerial image will be all that is seen in these areas.

The depth increase with proposed conditions for the property west of the landfill and soccer field is a maximum of 0.8 feet (see Figure 8). There are some unusual FLO-2D results in the detention area west of the Pavilion site due to known limitations of the model within deep ponded areas. The fluctuating depths and velocities from one cell to the next in the detention area west of the Pavilion site should be disregarded.

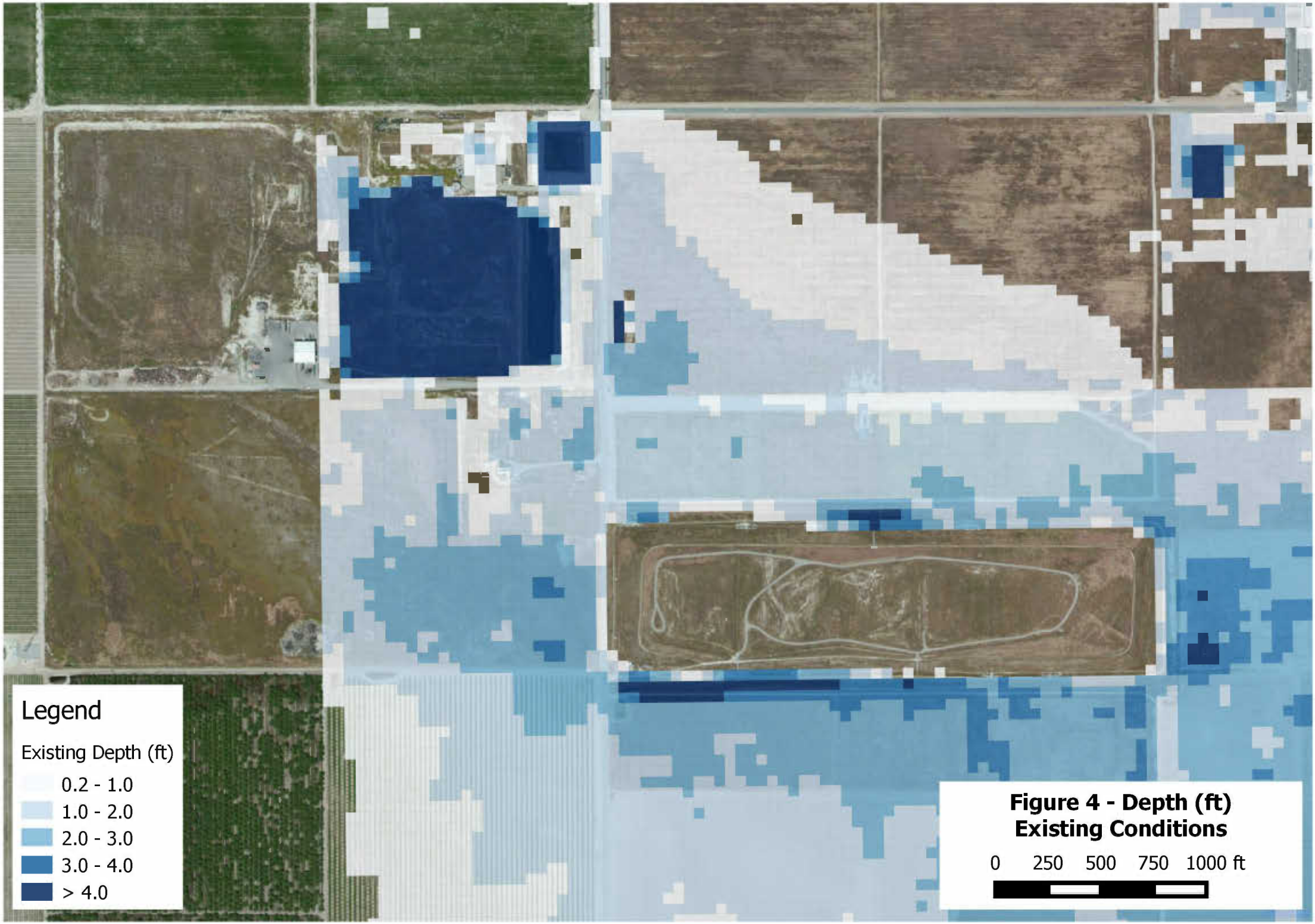


**Figure 4 - Depth (ft)**
**Existing Conditions**

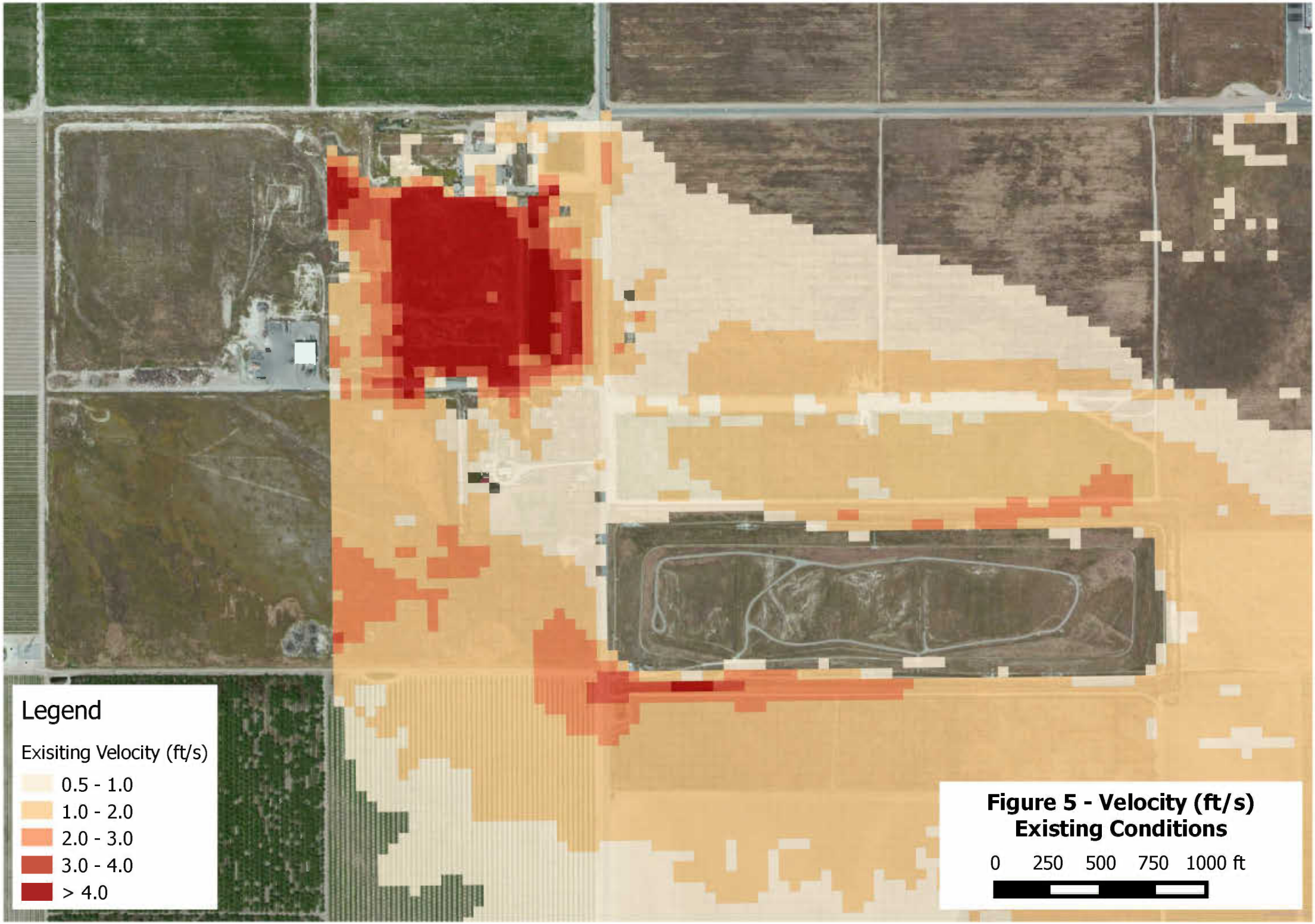


**Figure 5 - Velocity (ft/s)**
**Existing Conditions**

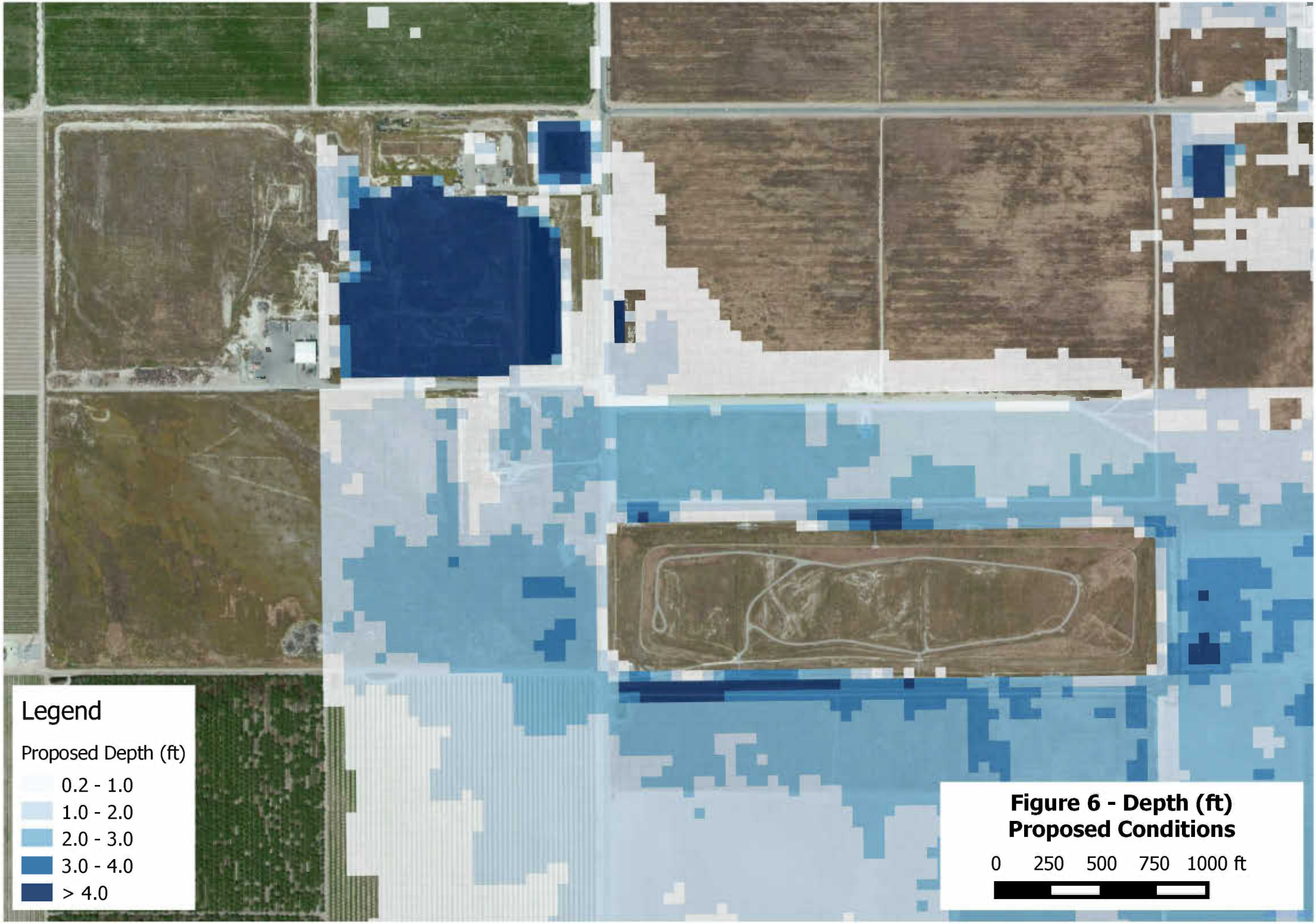


**Figure 6 - Depth (ft)**
**Proposed Conditions**

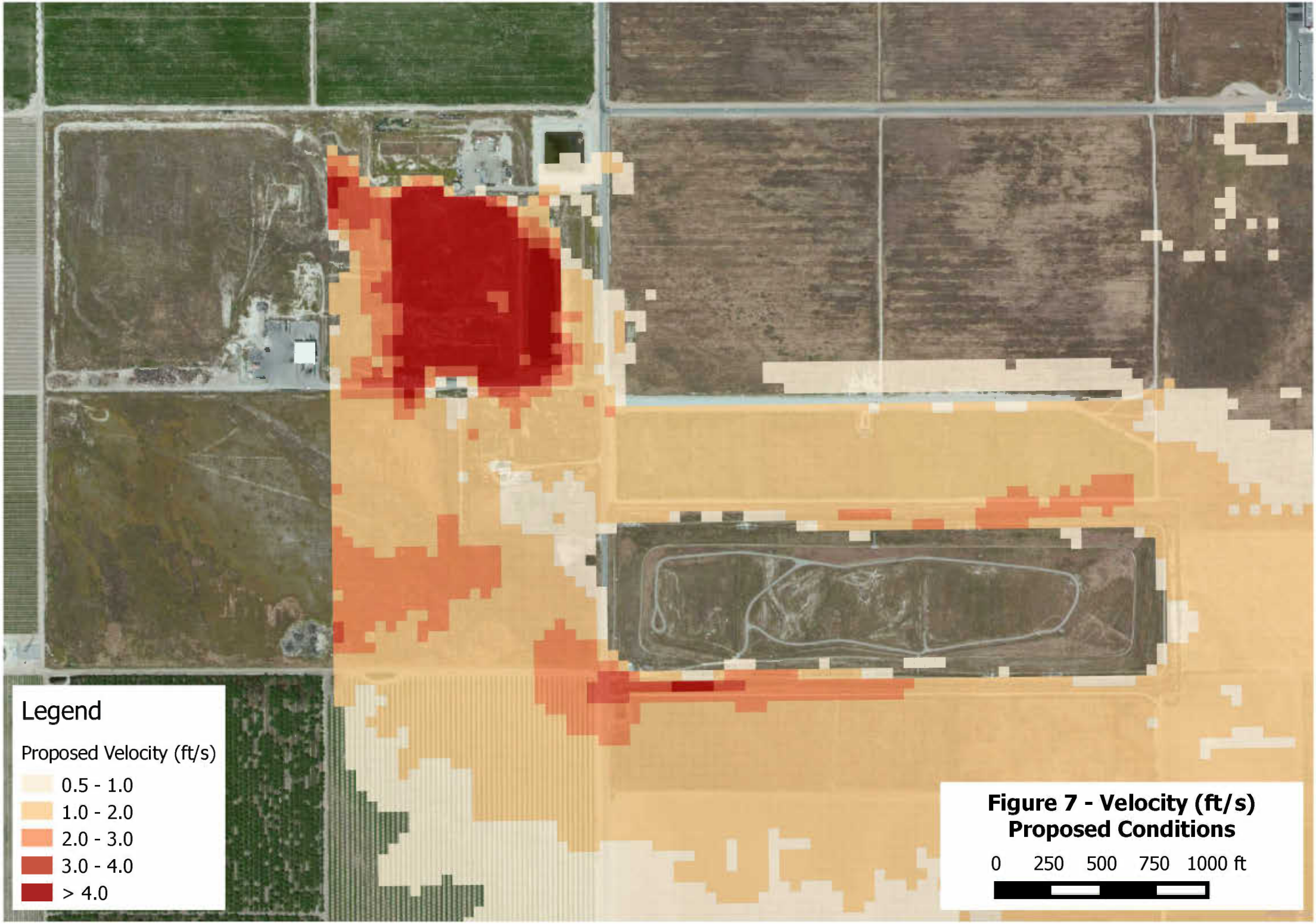


**Figure 7 - Velocity (ft/s)**
**Proposed Conditions**

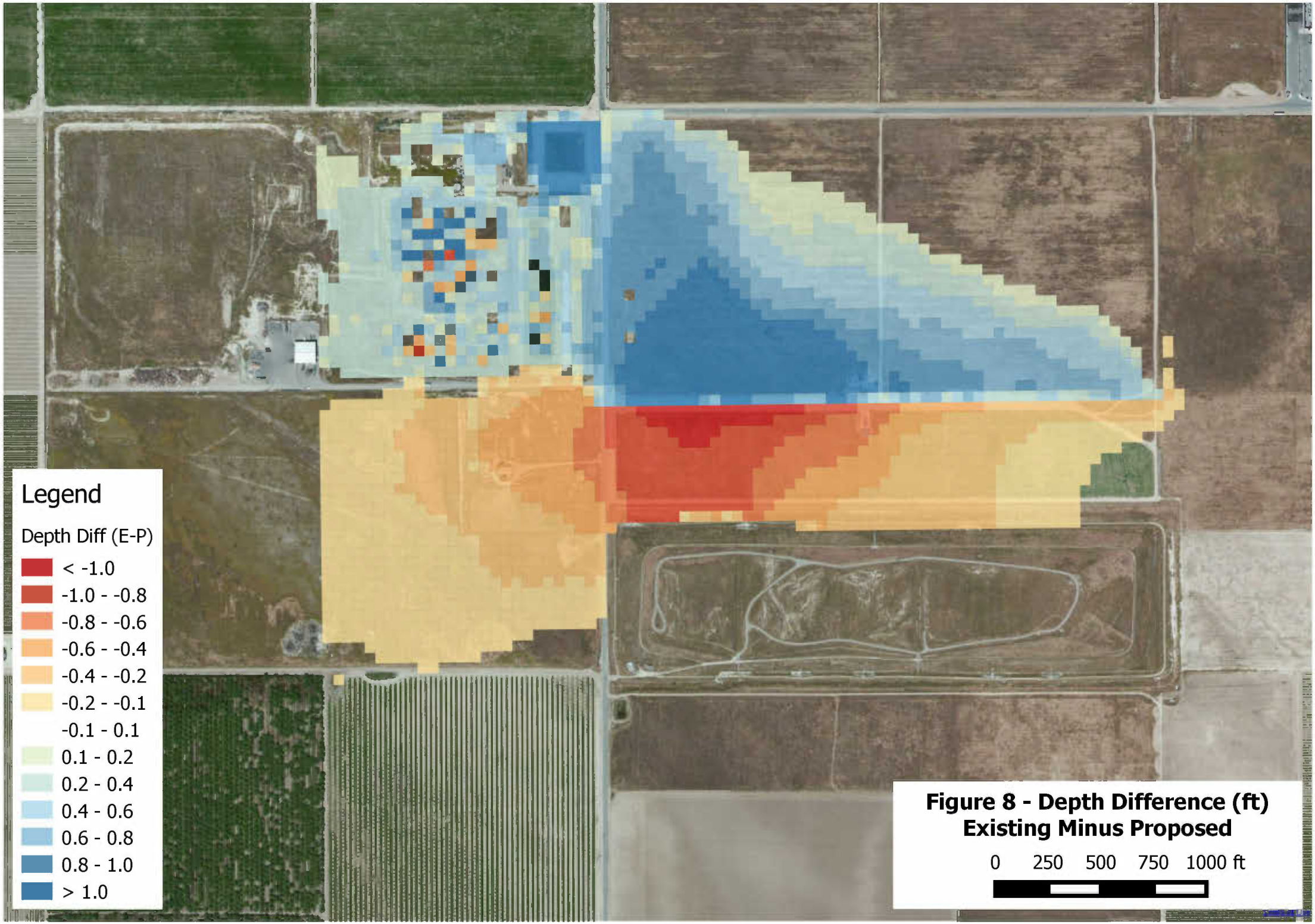


**Figure 8 - Depth Difference (ft)**
**Existing Minus Proposed**

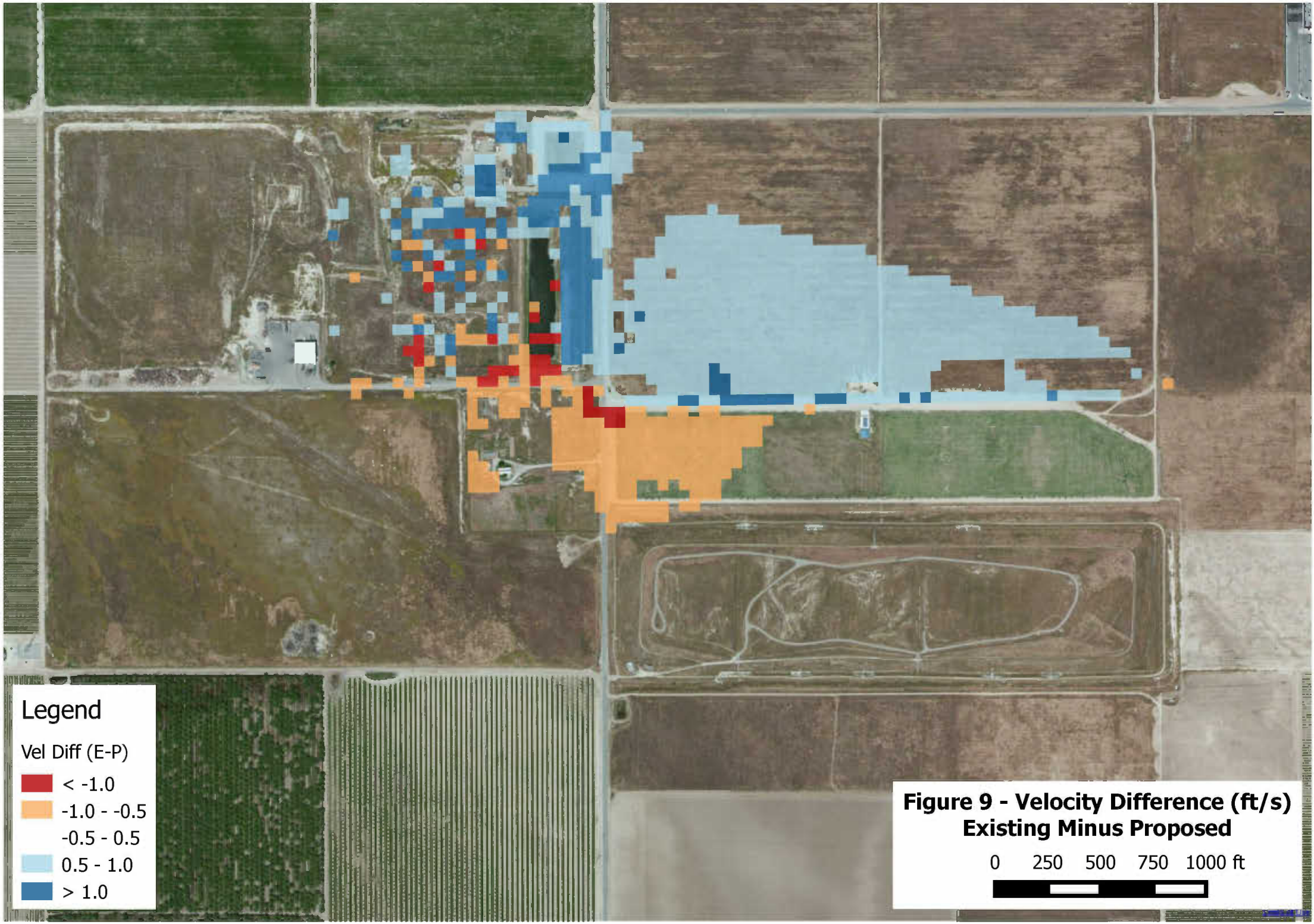


**Figure 9 - Velocity Difference (ft/s)**
**Existing Minus Proposed**

# APPENDIX 4.11-A
## Noise Measurement and Model

## General Information

| | |
|---|---|
| Serial Number | 03788 |
| Model | SoundExpert™ LxT |
| Firmware Version | 2.206 |
| Filename | DEL_____.001 |
| User | PMC Staff |
| Job Description | Noise Study |
| Location | Delano Vinyards_1 |

| | |
|---|---|
| Measurement Description | |
| Start Time | Wednesday, 2014 October 08 09:06:51 |
| Stop Time | Wednesday, 2014 October 08 09:21:51 |
| Duration | 00:15:00.0 |
| Run Time | 00:15:00.0 |
| Pause | 00:00:00.0 |
| Pre Calibration | Wednesday, 2014 October 08 08:58:03 |
| Post Calibration | None |
| Calibration Deviation | --- |

## Note

Woollomes east of Albany
2-lane roade, fallow Ag Land
68, clear SW@4mph
Traffic on Woollomes

## Overall Data

| | | | |
|---|---|---|---|
| LASeq | | 65.4 | dB |
| LASmax | 2014 Oct 08 09:20:18 | 88.2 | dB |
| LZpeak (max) | 2014 Oct 08 09:20:17 | 112.1 | dB |
| LASmin | 2014 Oct 08 09:12:40 | 39.1 | dB |
| LCSeq | | 76.6 | dB |
| LASeq | | 65.4 | dB |
| LCSeq - LASeq | | 11.2 | dB |
| LAIeq | | 69.1 | dB |
| LAeq | | 65.4 | dB |
| LAIeq - LAeq | | 3.7 | dB |
| Ldn | | 65.4 | dB |
| LDay 07:00-23:00 | | 65.4 | dB |
| LNight 23:00-07:00 | | --- | dB |
| Lden | | 65.4 | dB |
| LDay 07:00-19:00 | | 65.4 | dB |
| LEvening 19:00-23:00 | | --- | dB |
| LNight 23:00-07:00 | | --- | dB |
| LASE | | 94.9 | dB |
| # Overloads | | 0 | |
| Overload Duration | | 0.0 | s |
| # OBA Overloads | | 0 | |
| OBA Overload Duration | | 0.0 | s |

## Statistics

| | | |
|---|---|---|
| LAS5.00 | 69.8 | dBA |
| LAS10.00 | 65.5 | dBA |
| LAS33.30 | 49.3 | dBA |
| LAS50.00 | 45.6 | dBA |
| LAS66.60 | 43.2 | dBA |
| LAS90.00 | 41.4 | dBA |
| LAS > 85.0 dB (Exceedence Counts / Duration) | 2 / 3.5 | s |
| LAS > 115.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |

## Settings

| | |
|---|---|
| RMS Weight | A Weighting |
| Peak Weight | Z Weighting |
| Detector | Slow |
| Preamp | PRMLxT1L |
| Microphone Correction | Off |
| Integration Method | Exponential |
| OBA Range | Normal |
| OBA Bandwidth | 1/1 and 1/3 |
| OBA Freq. Weighting | Z Weighting |
| OBA Max Spectrum | At Lmax |

| | | |
|---|---|---|
| Under Range Limit | 25.9 | dB |
| Under Range Peak | 79.8 | dB |
| Noise Floor | 16.2 | dB |
| Overload | 121.6 | dB |

## 1/1 Spectra

| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 56.0 | 57.7 | 60.3 | 68.2 | 75.1 | 67.3 | 62.7 | 58.8 | 53.0 | 47.4 | 40.3 | 32.4 |
| LZSmax | 58.2 | 63.6 | 79.1 | 91.6 | 96.0 | 91.7 | 88.0 | 80.2 | 70.4 | 66.9 | 60.9 | 52.0 |
| LZSmin | 47.0 | 52.3 | 52.2 | 55.6 | 49.8 | 41.0 | 32.9 | 28.9 | 20.7 | 16.2 | 18.6 | 22.0 |

## 1/3 Spectra

| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 52.2 | 51.4 | 50.2 | 51.1 | 54.0 | 53.4 | 53.4 | 55.9 | 56.7 | 58.6 | 60.4 | 67.0 |
| LZSmax | 52.6 | 53.1 | 54.3 | 53.6 | 60.9 | 62.1 | 61.4 | 61.2 | 79.1 | 75.5 | 77.1 | 91.8 |
| LZSmin | 39.2 | 38.2 | 40.6 | 42.6 | 46.1 | 46.5 | 45.6 | 47.0 | 45.7 | 46.4 | 49.0 | 50.9 |

| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 67.5 | 72.5 | 69.0 | 63.9 | 62.0 | 60.3 | 59.8 | 57.8 | 55.5 | 55.0 | 54.7 | 52.2 |
| LZSmax | 92.8 | 89.5 | 89.1 | 89.1 | 86.6 | 85.0 | 85.5 | 83.2 | 78.5 | 76.1 | 78.0 | 71.0 |
| LZSmin | 46.4 | 43.7 | 40.1 | 38.2 | 34.6 | 30.2 | 28.9 | 28.2 | 26.4 | 25.5 | 24.1 | 21.5 |

| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 49.9 | 47.6 | 46.7 | 44.7 | 41.7 | 39.9 | 37.6 | 35.0 | 32.3 | 29.4 | 27.2 | 24.9 |
| LZSmax | 66.9 | 65.1 | 64.6 | 63.0 | 62.3 | 60.2 | 58.6 | 55.8 | 51.9 | 49.1 | 46.7 | 44.3 |
| LZSmin | 17.7 | 14.7 | 11.9 | 11.0 | 11.2 | 11.8 | 12.7 | 13.7 | 14.8 | 15.8 | 16.6 | 18.9 |

## Calibration History

| Preamp | Date | dB re. 1V/Pa |
|---|---|---|
| Direct | 01 Jul 2014 09:45:44 | -27.0 |
| PRMLxT1L | 08 Oct 2014 08:57:55 | -27.8 |
| PRMLxT1L | 08 Jul 2014 13:30:19 | -27.7 |
| PRMLxT1L | 08 Jul 2014 09:22:52 | -27.7 |
| PRMLxT1L | 25 Jun 2014 11:41:42 | -27.8 |
| PRMLxT1L | 16 Jun 2014 23:15:06 | -27.9 |
| PRMLxT1L | 15 Jun 2014 21:43:57 | -27.9 |
| PRMLxT1L | 14 Jun 2014 19:34:17 | -27.8 |
| PRMLxT1L | 12 Jun 2014 15:55:40 | -27.9 |
| PRMLxT1L | 11 Jun 2014 14:34:51 | -27.9 |
| PRMLxT1L | 10 Jun 2014 11:53:17 | -27.8 |
| PRMLxT1L | 04 Jun 2014 13:36:28 | -27.8 |

## General Information

| | |
|---|---|
| Serial Number | 03788 |
| Model | SoundExpert™ LxT |
| Firmware Version | 2.206 |
| Filename | DEL_____.002 |
| User | PMC Staff |
| Job Description | Noise Study |
| Location | Delano Vineyards_2 |

| | |
|---|---|
| Measurement Description | |
| Start Time | Wednesday, 2014 October 08 09:27:14 |
| Stop Time | Wednesday, 2014 October 08 09:42:14 |
| Duration | 00:15:00.0 |
| Run Time | 00:15:00.0 |
| Pause | 00:00:00.0 |
| Pre Calibration | Wednesday, 2014 October 08 08:57:55 |
| Post Calibration | None |
| Calibration Deviation | --- |

## Note

Albany St., s of Woollomes
2-lane road. Park, fallow AG, Industrial to the west. Active Ag operations to the SW
71, clear SW@4mph
Traffic on Albany, AG operations

## Overall Data

| | | | |
|---|---|---|---|
| LASeq | | 67.9 | dB |
| LASmax | 2014 Oct 08 09:36:06 | 87.1 | dB |
| LZpeak (max) | 2014 Oct 08 09:40:30 | 111.4 | dB |
| LASmin | 2014 Oct 08 09:30:25 | 37.9 | dB |
| LCSeq | | 72.2 | dB |
| LASeq | | 67.9 | dB |
| LCSeq - LASeq | | 4.4 | dB |
| LAIeq | | 72.0 | dB |
| LAeq | | 67.9 | dB |
| LAIeq - LAeq | | 4.1 | dB |
| Ldn | | 67.9 | dB |
| LDay 07:00-23:00 | | 67.9 | dB |
| LNight 23:00-07:00 | | --- | dB |
| Lden | | 67.9 | dB |
| LDay 07:00-19:00 | | 67.9 | dB |
| LEvening 19:00-23:00 | | --- | dB |
| LNight 23:00-07:00 | | --- | dB |
| LASE | | 97.4 | dB |
| # Overloads | | 0 | |
| Overload Duration | | 0.0 | s |
| # OBA Overloads | | 0 | |
| OBA Overload Duration | | 0.0 | s |

## Statistics

| | | |
|---|---|---|
| LAS5.00 | 74.8 | dBA |
| LAS10.00 | 68.8 | dBA |
| LAS33.30 | 52.8 | dBA |
| LAS50.00 | 45.6 | dBA |
| LAS66.60 | 43.3 | dBA |
| LAS90.00 | 40.7 | dBA |
| | | |
| LAS > 85.0 dB (Exceedence Counts / Duration) | 2 / 2.6 | s |
| LAS > 115.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |

## Settings

| | |
|---|---|
| RMS Weight | A Weighting |
| Peak Weight | Z Weighting |
| Detector | Slow |
| Preamp | PRMLxT1L |
| Microphone Correction | Off |
| Integration Method | Exponential |
| OBA Range | Normal |
| OBA Bandwidth | 1/1 and 1/3 |
| OBA Freq. Weighting | Z Weighting |
| OBA Max Spectrum | At Lmax |

| | | |
|---|---|---|
| Under Range Limit | 25.9 | dB |
| Under Range Peak | 79.8 | dB |
| Noise Floor | 16.2 | dB |
| Overload | 121.6 | dB |

## 1/1 Spectra

| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 63.3 | 62.1 | 60.2 | 67.5 | 64.6 | 63.2 | 62.4 | 64.8 | 61.1 | 51.8 | 42.9 | 34.9 |
| LZSmax | 81.2 | 72.0 | 73.4 | 77.8 | 80.0 | 79.5 | 81.5 | 84.7 | 79.6 | 71.1 | 61.5 | 52.9 |
| LZSmin | 45.9 | 50.0 | 50.7 | 54.0 | 50.8 | 39.0 | 27.9 | 24.3 | 18.7 | 16.7 | 18.1 | 22.3 |

## 1/3 Spectra

| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 60.0 | 58.5 | 55.9 | 58.1 | 57.4 | 56.5 | 55.1 | 54.5 | 56.9 | 55.9 | 57.9 | 66.6 |
| LZSmax | 49.2 | 52.8 | 64.5 | 70.0 | 66.5 | 67.3 | 65.6 | 70.9 | 68.8 | 73.2 | 68.6 | 73.8 |
| LZSmin | 36.4 | 38.6 | 40.1 | 42.3 | 44.5 | 45.6 | 45.2 | 44.1 | 46.0 | 47.2 | 49.2 | 48.6 |

| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 60.3 | 58.0 | 60.7 | 59.5 | 58.4 | 57.4 | 57.1 | 56.9 | 58.7 | 60.1 | 60.1 | 59.8 |
| LZSmax | 74.0 | 76.8 | 74.6 | 72.9 | 75.8 | 75.8 | 74.7 | 75.2 | 79.4 | 80.5 | 80.3 | 77.9 |
| LZSmin | 47.5 | 43.4 | 38.0 | 35.4 | 33.7 | 26.6 | 23.7 | 22.3 | 21.2 | 20.7 | 19.1 | 12.5 |

| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 58.4 | 56.0 | 53.2 | 49.6 | 46.0 | 43.0 | 40.5 | 37.1 | 34.5 | 31.9 | 30.1 | 26.4 |
| LZSmax | 76.6 | 74.4 | 71.8 | 68.5 | 65.7 | 63.0 | 59.0 | 56.1 | 52.5 | 50.2 | 48.0 | 43.6 |
| LZSmin | 15.0 | 13.3 | 10.6 | 11.6 | 11.4 | 11.7 | 12.7 | 11.0 | 14.8 | 15.7 | 16.7 | 19.0 |

## Calibration History

| Preamp | Date | dB re. 1V/Pa |
|---|---|---|
| Direct | 01 Jul 2014 09:45:44 | -27.0 |
| PRMLxT1L | 08 Oct 2014 08:57:55 | -27.8 |
| PRMLxT1L | 08 Jul 2014 13:30:19 | -27.7 |
| PRMLxT1L | 08 Jul 2014 09:22:52 | -27.7 |
| PRMLxT1L | 25 Jun 2014 11:41:42 | -27.8 |
| PRMLxT1L | 16 Jun 2014 23:15:06 | -27.9 |
| PRMLxT1L | 15 Jun 2014 21:43:57 | -27.9 |
| PRMLxT1L | 14 Jun 2014 19:34:17 | -27.8 |
| PRMLxT1L | 12 Jun 2014 15:55:40 | -27.9 |
| PRMLxT1L | 11 Jun 2014 14:34:51 | -27.9 |
| PRMLxT1L | 10 Jun 2014 11:53:17 | -27.8 |
| PRMLxT1L | 04 Jun 2014 13:36:28 | -27.8 |

## General Information

| | |
|---|---|
| Serial Number | 03788 |
| Model | SoundExpert™ LxT |
| Firmware Version | 2.206 |
| Filename | DEL_____.003 |
| User | PMC Staff |
| Job Description | Noise Study |
| Location | Delano Vineyards_3 |

| | |
|---|---|
| Measurement Description | |
| Start Time | Wednesday, 2014 October 08 09:47:23 |
| Stop Time | Wednesday, 2014 October 08 10:02:23 |
| Duration | 00:15:00.0 |
| Run Time | 00:15:00.0 |
| Pause | 00:00:00.0 |
| Pre Calibration | Wednesday, 2014 October 08 08:57:55 |
| Post Calibration | None |
| Calibration Deviation | --- |

## Note

Albany St at Casa Hernandez
2-lane, Residential, Ag use
78, clear SW@6mph
Traffic on Albany, Residential HVAC

## Overall Data

| | | | |
|---|---|---|---|
| LASeq | | 63.7 | dB |
| LASmax | 2014 Oct 08 10:00:24 | 83.3 | dB |
| LZpeak (max) | 2014 Oct 08 10:00:23 | 103.6 | dB |
| LASmin | 2014 Oct 08 10:02:23 | 35.9 | dB |
| LCSeq | | 68.3 | dB |
| LASeq | | 63.7 | dB |
| LCSeq - LASeq | | 4.6 | dB |
| LAIeq | | 65.8 | dB |
| LAeq | | 63.7 | dB |
| LAIeq - LAeq | | 2.1 | dB |
| Ldn | | 63.7 | dB |
| LDay 07:00-23:00 | | 63.7 | dB |
| LNight 23:00-07:00 | | --- | dB |
| Lden | | 63.7 | dB |
| LDay 07:00-19:00 | | 63.7 | dB |
| LEvening 19:00-23:00 | | --- | dB |
| LNight 23:00-07:00 | | --- | dB |
| LASE | | 93.2 | dB |
| # Overloads | | 0 | |
| Overload Duration | | 0.0 | s |
| # OBA Overloads | | 0 | |
| OBA Overload Duration | | 0.0 | s |

## Statistics

| | | |
|---|---|---|
| LAS5.00 | 70.2 | dBA |
| LAS10.00 | 66.8 | dBA |
| LAS33.30 | 54.0 | dBA |
| LAS50.00 | 48.2 | dBA |
| LAS66.60 | 44.0 | dBA |
| LAS90.00 | 40.6 | dBA |

| | | |
|---|---|---|
| LAS > 85.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LAS > 115.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |

## Settings

| | |
|---|---|
| RMS Weight | A Weighting |
| Peak Weight | Z Weighting |
| Detector | Slow |
| Preamp | PRMLxT1L |
| Microphone Correction | Off |
| Integration Method | Exponential |
| OBA Range | Normal |
| OBA Bandwidth | 1/1 and 1/3 |
| OBA Freq. Weighting | Z Weighting |
| OBA Max Spectrum | At Lmax |

| | | |
|---|---|---|
| Under Range Limit | 25.9 | dB |
| Under Range Peak | 79.8 | dB |
| Noise Floor | 16.2 | dB |
| Overload | 121.6 | dB |

## 1/1 Spectra

| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 55.7 | 58.4 | 60.3 | 61.7 | 62.3 | 58.9 | 59.7 | 61.3 | 54.6 | 45.1 | 39.0 | 27.9 |
| LZSmax | 55.0 | 58.5 | 60.8 | 75.1 | 81.7 | 77.6 | 80.5 | 81.4 | 71.9 | 57.1 | 51.0 | 44.3 |
| LZSmin | 45.7 | 50.0 | 50.1 | 52.6 | 46.9 | 37.4 | 28.8 | 25.5 | 20.7 | 21.0 | 19.1 | 22.3 |

## 1/3 Spectra

| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 51.3 | 51.2 | 50.6 | 52.1 | 53.4 | 55.0 | 55.6 | 55.1 | 56.0 | 56.6 | 57.8 | 56.2 |
| LZSmax | 45.6 | 48.8 | 51.7 | 53.7 | 55.5 | 53.9 | 55.5 | 58.4 | 57.0 | 59.1 | 74.2 | 69.9 |
| LZSmin | 34.8 | 38.5 | 39.0 | 41.4 | 43.3 | 41.5 | 43.1 | 43.7 | 43.5 | 44.6 | 49.0 | 45.9 |

| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 57.2 | 55.6 | 59.2 | 55.5 | 52.8 | 53.0 | 54.7 | 54.4 | 56.0 | 57.1 | 56.8 | 55.3 |
| LZSmax | 61.1 | 70.3 | 81.7 | 73.9 | 67.4 | 71.8 | 73.7 | 76.8 | 77.5 | 77.5 | 76.7 | 75.4 |
| LZSmin | 43.1 | 41.5 | 37.8 | 34.5 | 31.7 | 27.0 | 25.1 | 23.7 | 22.0 | 21.3 | 20.8 | 19.0 |

| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 52.5 | 48.9 | 45.5 | 42.6 | 39.5 | 37.7 | 37.6 | 31.5 | 29.3 | 25.4 | 21.5 | 20.9 |
| LZSmax | 70.6 | 64.1 | 58.7 | 54.5 | 51.4 | 49.6 | 47.2 | 46.5 | 44.5 | 42.2 | 38.8 | 33.9 |
| LZSmin | 17.1 | 14.7 | 15.1 | 16.1 | 15.9 | 14.7 | 13.2 | 13.9 | 15.4 | 15.7 | 15.9 | 19.1 |

## Calibration History

| Preamp | Date | dB re. 1V/Pa |
|---|---|---|
| Direct | 01 Jul 2014 09:45:44 | -27.0 |
| PRMLxT1L | 08 Oct 2014 08:57:55 | -27.8 |
| PRMLxT1L | 08 Jul 2014 13:30:19 | -27.7 |
| PRMLxT1L | 08 Jul 2014 09:22:52 | -27.7 |
| PRMLxT1L | 25 Jun 2014 11:41:42 | -27.8 |
| PRMLxT1L | 16 Jun 2014 23:15:06 | -27.9 |
| PRMLxT1L | 15 Jun 2014 21:43:57 | -27.9 |
| PRMLxT1L | 14 Jun 2014 19:34:17 | -27.8 |
| PRMLxT1L | 12 Jun 2014 15:55:40 | -27.9 |
| PRMLxT1L | 11 Jun 2014 14:34:51 | -27.9 |
| PRMLxT1L | 10 Jun 2014 11:53:17 | -27.8 |
| PRMLxT1L | 04 Jun 2014 13:36:28 | -27.8 |

## General Information

| | |
|---|---|
| Serial Number | 03788 |
| Model | SoundExpert™ LxT |
| Firmware Version | 2.206 |
| Filename | DEL_____.005 |
| User | PMC Staff |
| Job Description | Noise Study |
| Location | Delano Vineyards_4 |

| | |
|---|---|
| Measurement Description | |
| Start Time | Wednesday, 2014 October 08 10:22:17 |
| Stop Time | Wednesday, 2014 October 08 10:37:17 |
| Duration | 00:15:00.0 |
| Run Time | 00:15:00.0 |
| Pause | 00:00:00.0 |
| Pre Calibration | Wednesday, 2014 October 08 08:57:55 |
| Post Calibration | None |
| Calibration Deviation | --- |

## Note

Dover Parkway, s of Woollomes
2-Lane, Walmart/Shopping Center, project site
84, clear SW@6mph
Delivery Truck idling, traffic on Dover

## Overall Data

| | | | |
|---|---|---|---|
| LASeq | | 62.2 | dB |
| LASmax | 2014 Oct 08 10:24:08 | 80.1 | dB |
| LZpeak (max) | 2014 Oct 08 10:32:58 | 107.3 | dB |
| LASmin | 2014 Oct 08 10:24:26 | 55.2 | dB |
| LCSeq | | 72.2 | dB |
| LASeq | | 62.2 | dB |
| LCSeq - LASeq | | 10.1 | dB |
| LAIeq | | 64.6 | dB |
| LAeq | | 62.4 | dB |
| LAIeq - LAeq | | 2.2 | dB |
| Ldn | | 62.2 | dB |
| LDay 07:00-23:00 | | 62.2 | dB |
| LNight 23:00-07:00 | | --- | dB |
| Lden | | 62.2 | dB |
| LDay 07:00-19:00 | | 62.2 | dB |
| LEvening 19:00-23:00 | | --- | dB |
| LNight 23:00-07:00 | | --- | dB |
| LASE | | 91.7 | dB |
| # Overloads | | 0 | |
| Overload Duration | | 0.0 | s |
| # OBA Overloads | | 0 | |
| OBA Overload Duration | | 0.0 | s |

## Statistics

| | | |
|---|---|---|
| LAS5.00 | 66.3 | dBA |
| LAS10.00 | 61.4 | dBA |
| LAS33.30 | 56.9 | dBA |
| LAS50.00 | 56.6 | dBA |
| LAS66.60 | 56.3 | dBA |
| LAS90.00 | 55.8 | dBA |

| | | |
|---|---|---|
| LAS > 85.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LAS > 115.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 135.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 137.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |
| LZpeak > 140.0 dB (Exceedence Counts / Duration) | 0 / 0.0 | s |

## Settings

| | |
|---|---|
| RMS Weight | A Weighting |
| Peak Weight | Z Weighting |
| Detector | Slow |
| Preamp | PRMLxT1L |
| Microphone Correction | Off |
| Integration Method | Exponential |
| OBA Range | Normal |
| OBA Bandwidth | 1/1 and 1/3 |
| OBA Freq. Weighting | Z Weighting |
| OBA Max Spectrum | At Lmax |

| | | |
|---|---|---|
| Under Range Limit | 25.9 | dB |
| Under Range Peak | 79.8 | dB |
| Noise Floor | 16.2 | dB |
| Overload | 121.6 | dB |

## 1/1 Spectra

| Freq. (Hz): | 8.0 | 16.0 | 31.5 | 63.0 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | 16k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 60.8 | 64.2 | 65.4 | 68.5 | 67.4 | 58.5 | 59.3 | 58.1 | 53.6 | 46.4 | 39.0 | 31.7 |
| LZSmax | 73.4 | 84.8 | 85.0 | 76.6 | 75.4 | 73.4 | 79.6 | 75.5 | 70.2 | 63.2 | 58.5 | 48.8 |
| LZSmin | 49.0 | 53.7 | 59.3 | 55.9 | 51.8 | 47.8 | 50.8 | 49.8 | 44.3 | 33.6 | 23.8 | 21.5 |

## 1/3 Spectra

| Freq. (Hz): | 6.3 | 8.0 | 10.0 | 12.5 | 16.0 | 20.0 | 25.0 | 31.5 | 40.0 | 50.0 | 63.0 | 80.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 57.0 | 55.9 | 55.0 | 55.5 | 60.1 | 61.0 | 60.1 | 61.6 | 60.3 | 61.1 | 61.8 | 66.1 |
| LZSmax | 54.4 | 61.7 | 69.4 | 72.9 | 78.0 | 83.9 | 83.9 | 78.1 | 74.3 | 73.4 | 72.2 | 72.3 |
| LZSmin | 38.6 | 42.1 | 43.7 | 43.6 | 48.2 | 48.7 | 46.3 | 56.3 | 53.9 | 49.2 | 50.5 | 49.7 |

| Freq. (Hz): | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | 1k | 1.25k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 67.2 | 58.5 | 55.4 | 55.2 | 53.4 | 51.9 | 50.5 | 56.8 | 54.3 | 54.6 | 53.5 | 52.0 |
| LZSmax | 69.8 | 71.9 | 69.9 | 69.0 | 69.8 | 67.2 | 68.3 | 77.7 | 74.9 | 72.6 | 70.1 | 69.1 |
| LZSmin | 48.5 | 45.2 | 38.1 | 40.0 | 38.9 | 44.9 | 41.3 | 43.1 | 43.5 | 47.4 | 44.9 | 41.6 |

| Freq. (Hz): | 1.6k | 2k | 2.5k | 3.15k | 4k | 5k | 6.3k | 8k | 10k | 12.5k | 16k | 20k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LZSeq | 50.3 | 48.7 | 46.8 | 44.0 | 40.6 | 38.2 | 35.8 | 34.4 | 31.5 | 28.0 | 26.2 | 26.6 |
| LZSmax | 66.4 | 65.5 | 63.8 | 59.9 | 58.2 | 55.6 | 52.8 | 55.9 | 51.0 | 46.2 | 44.4 | 35.2 |
| LZSmin | 39.5 | 35.8 | 35.1 | 31.8 | 27.0 | 22.9 | 20.1 | 18.5 | 17.8 | 16.0 | 15.8 | 18.2 |

## Calibration History

| Preamp | Date | dB re. 1V/Pa |
|---|---|---|
| Direct | 01 Jul 2014 09:45:44 | -27.0 |
| PRMLxT1L | 08 Oct 2014 08:57:55 | -27.8 |
| PRMLxT1L | 08 Jul 2014 13:30:19 | -27.7 |
| PRMLxT1L | 08 Jul 2014 09:22:52 | -27.7 |
| PRMLxT1L | 25 Jun 2014 11:41:42 | -27.8 |
| PRMLxT1L | 16 Jun 2014 23:15:06 | -27.9 |
| PRMLxT1L | 15 Jun 2014 21:43:57 | -27.9 |
| PRMLxT1L | 14 Jun 2014 19:34:17 | -27.8 |
| PRMLxT1L | 12 Jun 2014 15:55:40 | -27.9 |
| PRMLxT1L | 11 Jun 2014 14:34:51 | -27.9 |
| PRMLxT1L | 10 Jun 2014 11:53:17 | -27.8 |
| PRMLxT1L | 04 Jun 2014 13:36:28 | -27.8 |

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Existing Condition (Saturday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 2 | 0 | 0 | 3,110 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 61.8 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 2 | 0 | 0 | 2,690 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 61.1 |
| Stradley Ave - Schuster Rd to Woolom | Agricultural | 2 | 0 | 0 | 1,410 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 58.3 |
| Woollomes - Albany St to Dover St | Residential | 2 | 0 | 0 | 2,690 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 60.0 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 1,180 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 56.4 |
| Graces Hwy - Albany St to Dover St | Residential | 2 | 0 | 0 | 3,230 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 60.8 |
| Dover St - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 800 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 54.7 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Existing Condition (Weekday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 2 | 0 | 0 | 4,149 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.0 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 2 | 0 | 0 | 3,760 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 62.6 |
| Stradley Ave - Schuster Rd to Woolom | Agricultural | 2 | 0 | 0 | 1,702 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 59.2 |
| Woollomes - Albany St to Dover St | Residential | 2 | 0 | 0 | 3,748 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 61.4 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 1,440 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 57.3 |
| Graces Hwy - Albany St to Dover St | Residential | 2 | 0 | 0 | 4,970 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 62.6 |
| Dover St - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 980 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 55.6 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Existing+Project Condition (Saturday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 3 | 0 | 0 | 8,250 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 66.0 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 2 | 0 | 0 | 8,070 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.9 |
| Stradley Ave - Schuster Rd to Woolom | Agricultural | 3 | 0 | 0 | 4,650 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.6 |
| Woollomes - Albany St to Dover St | Residential | 4 | 0 | 0 | 16,170 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 67.9 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 900 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 55.2 |
| Graces Hwy - Albany St to Dover St | Residential | 2 | 0 | 0 | 5,370 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.0 |
| Dover St - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 1,980 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 58.6 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

| | |
|---|---|
| Model Description: | FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels. |
| Analysis Scenario(s): | Existing+Project Condition (Weekday) |
| Source of Traffic Volumes: | Arch Beach Consulting |
| Community Noise Descriptor: | $L_{dn}$: _____ CNEL: x |

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 3 | 0 | 0 | 9,034 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 66.4 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 2 | 0 | 0 | 7,160 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.4 |
| Stradley Ave - Schuster Rd to Woolom | Agricultural | 3 | 0 | 0 | 3,823 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 62.7 |
| Woollomes - Albany St to Dover St | Residential | 4 | 0 | 0 | 20,123 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 68.8 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 1,440 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 57.3 |
| Graces Hwy - Albany St to Dover St | Residential | 2 | 0 | 0 | 6,570 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.8 |
| Dover St - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 1,840 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 58.3 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Future 2040 with Project Condition (Weekday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 4 | 0 | 0 | 15,500 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 68.9 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 4 | 0 | 0 | 7,590 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.8 |
| Stradley Ave - Schuster Rd to Woolom | Residential | 4 | 0 | 0 | 17,800 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 69.5 |
| Woollomes - Albany St to Dover Prkwa | Residential | 6 | 15 | 0 | 7,960 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.3 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 2,070 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 58.8 |
| Bellmont Street - Woollomes to Morse | Residential | 2 | 0 | 0 | 3,440 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 58.3 |
| Morse Blvd - Bellmont St to Dover Prk | Residential | 2 | 0 | 0 | 450 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 49.5 |
| Garces Hwy - Albany St to Dover Prkv | Residential | 2 | 0 | 0 | 5,480 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.1 |
| Dover Prkwy - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 9,190 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.3 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Future 2040 No Project Condition (Weekday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 4 | 0 | 0 | 9,200 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 66.6 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 4 | 0 | 0 | 7,770 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.9 |
| Stradley Ave - Schuster Rd to Woolom | Residential | 4 | 0 | 0 | 3,700 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 62.6 |
| Woollomes - Albany St to Dover Prkwa | Residential | 6 | 15 | 0 | 25,500 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 70.3 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 3,340 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 60.9 |
| Bellmont Street - Woollomes to Morse | Residential | 2 | 0 | 0 | 1,650 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 55.1 |
| Morse Blvd - Bellmont St to Dover Prk | Residential | 2 | 0 | 0 | 520 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 50.1 |
| Garces Hwy - Albany St to Dover Prkv | Residential | 2 | 0 | 0 | 6,940 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 64.1 |
| Dover Prkwy - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 7,680 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 64.5 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Future 2040 with Project Condition (Weekday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 4 | 0 | 0 | 14,600 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 68.6 |
| Albany Street - 1st Ave to Garces Hwy | Residential | 4 | 0 | 0 | 10,060 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 67.0 |
| Stradley Ave - Schuster Rd to Woolom | Residential | 4 | 0 | 0 | 6,310 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 65.0 |
| Woollomes - Albany St to Dover Prkwa | Residential | 6 | 15 | 0 | 41,490 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 72.5 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 3,340 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 60.9 |
| Bellmont Street - Woollomes to Morse | Residential | 2 | 0 | 0 | 2,070 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 56.1 |
| Morse Blvd - Bellmont St to Dover Prk | Residential | 2 | 0 | 0 | 750 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 51.7 |
| Garces Hwy - Albany St to Dover Prkv | Residential | 2 | 0 | 0 | 5,480 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 63.1 |
| Dover Prkwy - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 13,860 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 67.1 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

## TRAFFIC NOISE LEVELS

**Project Number:** 14-0087
**Project Name:** Delano Vineyard/Delano West Pavillion

### Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s): Future 2040 with Project Condition (Weekday)
Source of Traffic Volumes: Arch Beach Consulting
Community Noise Descriptor: $L_{dn}$: _____ CNEL: x

| Assumed 24-Hour Traffic Distribution: | Day | Evening | Night |
|---|---|---|---|
| Total ADT Volumes | 56.40% | 39.06% | 4.54% |
| Medium-Duty Trucks | 56.40% | 39.06% | 4.54% |
| Heavy-Duty Trucks | 56.40% | 39.06% | 4.54% |

### Traffic Noise Levels

| **Analysis Condition** Roadway Segment | Land Use | Lanes | Median Width | Peak Hour Volume | ADT Volume | Design Speed (mph) | Dist. from Center to Receptor[1] | Alpha Factor | Barrier Attn. dB(A) | Vehicle Mix Medium Trucks | Vehicle Mix Heavy Trucks | Peak Hou dB(A) $L_{eq}$ | 24-Hour dB(A) CNEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany Street - Woollomes to 1st Aver | Residential | 4 | 0 | 0 | 14,085 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 68.4 |
| Albany Street - 1st Ave to Garces Hw | Residential | 4 | 0 | 0 | 9,880 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 66.9 |
| Stradley Ave - Schuster Rd to Woolon | Residential | 4 | 0 | 0 | 5,820 | 50 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 64.6 |
| Woollomes - Albany St to Dover Prkw | Residential | 6 | 15 | 0 | 41,875 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 72.5 |
| 1st Ave - Albany St to Dover St | Residential | 2 | 0 | 0 | 3,340 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 60.9 |
| Bellmont Street - Woollomes to Morse | Residential | 2 | 0 | 0 | 2,800 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 57.4 |
| Morse Blvd - Bellmont St to Dover Prk | Residential | 2 | 0 | 0 | 740 | 35 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 51.7 |
| Garces Hwy - Albany St to Dover Prkv | Residential | 2 | 0 | 0 | 6,940 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 64.1 |
| Dover Prkwy - Grace Hwy to 1st Ave | Residential | 2 | 0 | 0 | 11,190 | 45 | 75 | 0 | 0 | 1.8% | 0.7% | 0.0 | 66.2 |

[1] Distance is from the centerline of the roadway segment to the receptor location.

# APPENDIX 4.13-A
## WATER SUPPLY ASSESSMENT

# WATER SUPPLY ASSESSSMENT

# YK AMERICA PROJECT

## (Vineyard at Delano & Delano West Pavilion)

Prepared for: City of Delano Planning Department
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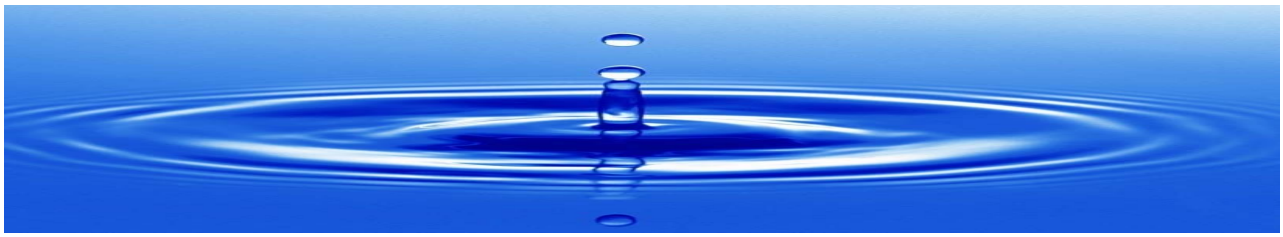

December 2014

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REFERENCES

1. Notice of Preparation Environmental Impact Report, Vineyard at Delano & West Pavilion Projects
2. City of Delano 2010 Urban Water Management Plan
3. California Department of Water Resources "Guide Book for Implementation of SB 610 and SB 221 of 2001"
4. California Department of Water Resources "Bulletin 118-Update 2003"
5. California Department of Water Resources "The California Water Plan Update 2005, Volume 3, Chapter 8"
6. City of Delano 2005 General Plan

APPENDIX

A – Lines of Equal Elevation of Water in Wells, Unconfined Aquifer (2002-2006), Kern Groundwater Basin

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AC | Acre |
| ADD | Average Day Demand |
| AF | Acre-Feet |
| AF/yr | Acre-Feet per year |
| CEQA | California Environmental Quality Act |
| CWC | California Water Code |
| DWR | California Department of Water Resources |
| EIR | Environmental Impact Report |
| ft/ac/yr | Feet per acre per year |
| gal/day/$ft^2$ | Gallons per day per square foot |
| GPCD (gpcd) | Gallons per capita per day |
| GPM | Gallons per minute |
| MDD | Maximum Day Demand |
| MG | Million Gallons |
| MGD (mgd) | Million Gallons per day |
| MG/yr | Million Gallons per year |
| PHD | Peak Hour Demand |
| UWMP | Urban Water Management Plan |
| SB | Senate Bill |
| Sq Ft | Square Feet |
| State Water Board | State Water Resources Control Board |
| WSA | Water Supply Assessment |

## Executive Summary

YK America submitted an application to the City of Delano for the development of "Vineyard at Delano and Delano West Pavilion Projects" (Project). The project will be phased over an estimated 10 year period. The project total approximately 110 acres and include parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future. The project includes pre-zoning of this parcel for community retail and residential uses. The City of Delano is currently preparing an environmental impact report in accordance with the requirements of the California Environmental Quality Act.

In accordance with the requirements of Senate Bill 610 and Senate Bill 221, effective January 1, 2002, a water supply assessment is required for the combined project since the proposed residential development is more than 500 dwelling units. Under SB 221, approval by the City or County of certain residential subdivisions requires an affirmative written verification of sufficient water supply from the City Public Works Department, Water Division. The City of Delano as the proposed water supplier, must prepare the assessment within 90 days of the initial request.

### Vineyard at Delano

The Vineyard at Delano project site is 33 acres in size. This land was used for agricultural purposes in the past; however, it is no longer used for that purpose and is in a fallow undeveloped state. The Vineyard at Delano project includes 432 multi-family low-rise apartment units (one- and two-story). Other amenities within the residential development would include a swimming pool, community athletic field, community building and leasing center. Table 1 identifies the phasing and unit count for the Vineyard at Delano Project.

TABLE 1

Vineyard at Delano Project

| Phase | Number of Buildings | Residential Units | | |
|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR |
| 1 | 9 | 108 | 24 | 84 |
| 2 | 9 | 108 | 20 | 88 |
| 3 | 9 | 108 | 20 | 88 |
| 4 | 9 | 108 | 20 | 88 |
| Project Totals | 36 | 432 | 84 | 348 |

Delano West Pavilion

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past; however, it is no longer used for that purpose and is in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of retail and restaurant space as shown in Table 2. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

TABLE 2

Delano West Pavilion Project

| Phase | Number of Buildings | Residential Units | | | Commercial (Sq. Ft.) |
|---|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR | |
| 1 | 24 | 220 | 48 | 172 | - |
| 2 | 23 | 220 | 44 | 176 | - |
| 3 | 12 | - | - | - | 170,000 |
| 4 | 9 | - | - | - | 170,000 |
| Project Totals | 68 | 440 | 92 | 348 | 340,000 |

Construction Period

It is anticipated that construction of the project will be phased over an approximately 10-year period, according to the Planning Department Notice of Preparation Environmental Impact Report, for a build-out within the year 2030 horizon.

The first phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard at Delano site. As shown in Table 1, residences would be constructed in four phases, each phase development 108 units. It is estimated that construction of each phase would last approximately 15 months. Thus, the Vineyard at Delano site would be completed in approximately five years.

The Delano West Pavilion site would begin construction following completion of the Vineyard at Delano site and last approximately five years. This site will be similarly developed in four phases as shown in Table 2, with the residential components established in the first three years, and two phases of commercial development (340,000 sq ft) following over the next two years.

Following are the findings of the water supply assessment for the Vineyard at Delano and Delano West Pavilion projects:

1. The proposed project is in the southwestern portion of the City and has not been subject to any assessment in prior years.

2. The projected water demand associated with the proposed project was not accounted for in the adopted 2010 Urban Water Management Plan.

3. The projected average water demand for the projects is 639 AF/yr at full project build-out.

4. The existing average water demand for the projects is zero AF/yr.

5. At full project build-out (2030), the total net increase in water system demand is estimated to be 15,029 AF/yr. Considering that the proposed project will be constructed in eight-phase spread, the projected water demand will not be fully realized until 2030.

6. The City of Delano Domestic Water System's total projected water supplies available during normal, single dry, and multiple dry water years in a 20-year projection *does not* meet the projected water demand of the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses. Additional wells need to be developed in the future to rectify this deficiency.

7. The Tulare Lake Hydrologic Region is overdraft in average year and dry year conditions. About 70 percent of the region's overdraft occurs in the Kings-Kaweah-Tule Rivers planning sub-area. The City's underlying subbasin is not overdraft. The City's local groundwater, which is its solely source of supply, has reliably allowed the City to meet its historical water demands. The local aquifer yields are good. The City has never experienced a severe shortage of water supply. It is anticipated that this condition will remain in the following years, even with the experience of having the most severe drought in state recorded history in the past three years.

8. The groundwater supply will be sufficient in a normal year, single dry year, and multiple dry year scenarios.

9. The proposed project will be developed in eight phases over a period of approximately ten years. The extended time to build-out will provide the City with greater flexibility regarding projected water demands and to utilize sources that will become available in the future.

10. In a normal water year, the proposed project will not have a significant impact on the overall water balance in the City's underlying subbasin.

11. In a drought scenario similar to the water years 2007, 2008, 2009, the proposed project will have a significant impact on the City's Water System. As shown in Table 14, there will be a water supply deficiency in a single dry year and multiple years mentioned in the magnitude of -1456 AC-Ft/Yr. Since the project will be served by groundwater through the City's water system, it is imperative that the City construct a new groundwater well to abate this deficiency by developing a 1,000 GPM capacity well on or about project built-out date.

12. The project will be served by groundwater through the City's water system. The City reserves the right to determine the need to construct new groundwater wells to serve the project during the tentative tract phase.

13. The average subbasin water level is essentially unchanged from 1970 to 2000, after experiencing cumulative changes of approximately minus 15 feet through 1978, a 15-foot increase through 1988, and an 8-foot decrease through 1997. However, net water level changes in different portions of the subbasin were quite variable through the period 1970-2000. These changes ranged from increases of over 30 feet at the southeast valley margin and in the Lost Hills/Buttonwillow areas to decreases of over 25 and 50 feet in the Bakersfield area and McFarland/Shafter areas, respectively. These changes demonstrate the ability of the aquifer to recover from dry year and multiple dry year periods.

14. This WSA concludes that the City of Delano Domestic Water System's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection *does not* meet the projected water demand of the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

Recommendation: It is recommended that the City council approved this WSA and direct the City clerk to forward the package to the City Planning Department for inclusion to the EIR with the following conditions:

a. YK America shall dedicate a 125 ft by 125 ft lot to the City, preferably within the Vineyard Project for development of a 1,000 GPM well. The City will credit YK America the cost of the proposed well site from the development impact fees.

b. City will acquire additional water supplies by 2030. The estimated cost to develop a 1,000 GPM capacity well at today's (2015) price is $1 million. This includes Fed/State/local permits to be required at that time.

## Section 1. Introduction

YK America submitted an application to the City of Delano for the development of Vineyard at Delano and Delano West Pavilion, consisting of two separate projects to be phased over an estimated 10 year period. Together, the total project area is approximately 110 acres and includes parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future. The project includes pre-zoning of this parcel for community retail and residential uses. The proposed project will include residential development of over 500 dwelling units within the City domestic water service area. The City of Delano has determined that an environmental impact report (EIR) is required in accordance with the requirements of the California Environmental Quality Act (CEQA).

The proposed development fits the definition of a project as defined by California Water Code section 10912 (a); therefore, it has to comply with SB 610. As such, the City of Delano, as the proposed water supplier, must prepare the assessment within 90 days of the initial request. This evaluation complies with all applicable requirements of the water code for a water supply assessment (WSA).

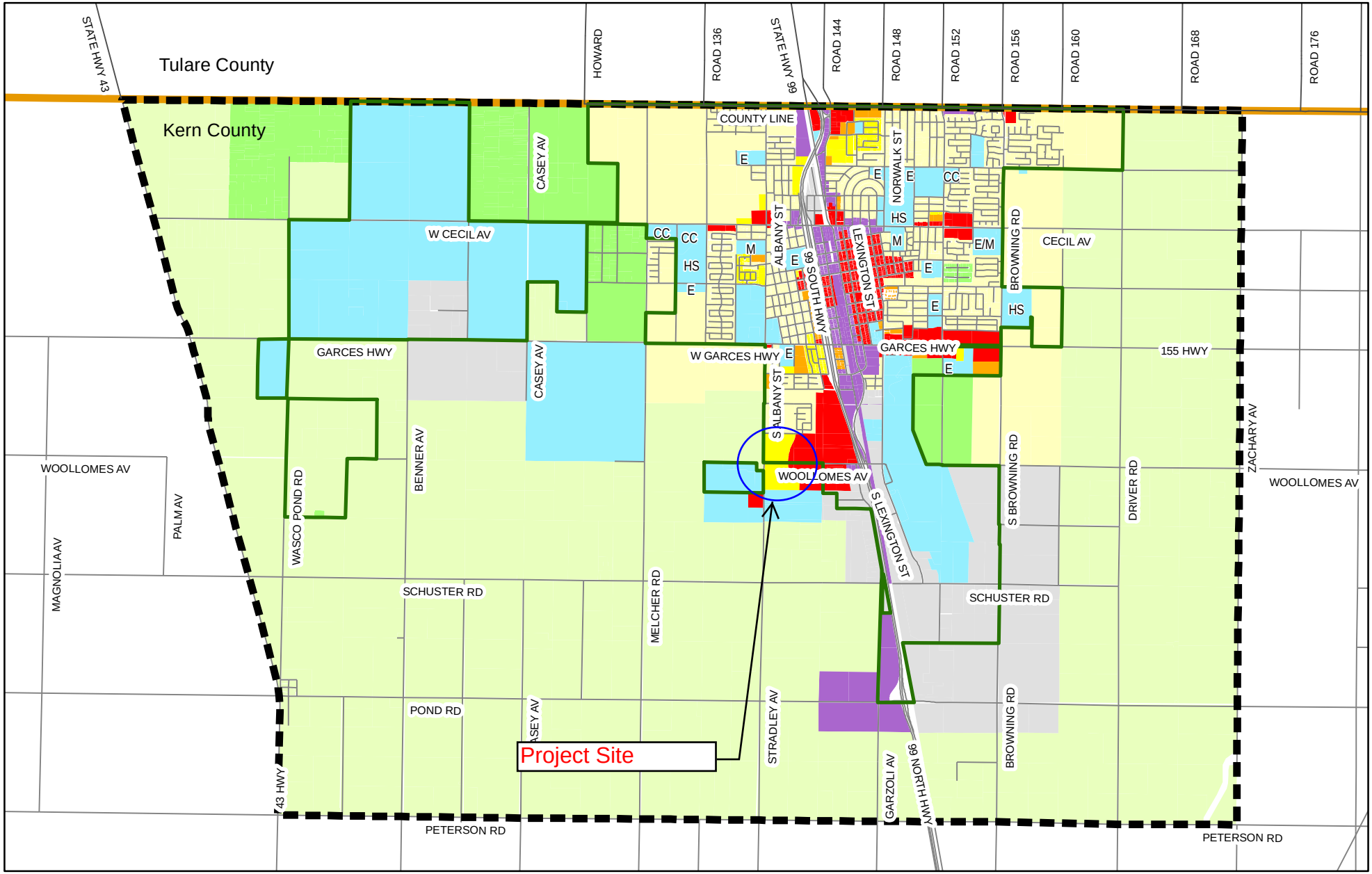
The Guide Book for Implementation of SB 610 and SB 221 of 2001, prepared by the California Department of Water Resources identifies the key question to be answered by the water supply assessment as: "*Will the water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses?"*

A fundamental document to be referenced for compliance with both SB 610 and SB 221 is the City of Delano 2010 Urban Water Management Plan (UWMP), prepared by the City of Delano Public Works Department, Water Division. The proposed project is located within the City of Delano Water Division service area; therefore, it is located within the UWMP service area. The UWMP is updated at a minimum of every five years as required by the California Water Code.

## Section 2. Project Description

The projects include the Vineyard at Delano residential development and the Delano West Pavilion residential, commercial, and office space development. The project sites are located adjacent to each other on Stradley Avenue/Albany Street and Woollomes Avenue, (see Figure 1). State Route 99 is located approximately 0.5 miles east of the project sites.

Together, the area is approximately 110 acres and includes parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the city in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future. The project includes pre-zoning of this parcel for community retail and residential uses.




Miles

0 0.5 1 2

Legend

- Delano City Limit
- Sphere of influence
- Kern County
- Roads
- Agricultural
- Commercial
- Service Commercial
- Industrial
- Low Residential
- Medium Residential
- High Residential
- Rural Residential
- Community Facilities

N

**Figure 1**

General Plan Land Use

2010 Urban Water Management Plan

Contact: Public Works - Water Division

## 2.1 Vineyard at Delano

The Vineyard at Delano project site is 33 acres in size. In the past, this land was used for agricultural purposes; however, it is no longer used for that purpose and is in a fallow undeveloped state. The Vineyard at Delano project includes 432 multi-family low-rise apartment units (one- and two-story) along with other amenities within the residential development including a swimming pool, community athletic field, community building and leasing center. Table 1 identifies the phasing and unit count for the Vineyard at Delano Project.

TABLE 1
Vineyard at Delano Project

| Phase | Number of Buildings | Residential Units | | |
|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR |
| 1 | 9 | 108 | 24 | 84 |
| 2 | 9 | 108 | 20 | 88 |
| 3 | 9 | 108 | 20 | 88 |
| 4 | 9 | 108 | 20 | 88 |
| Project Totals | 36 | 432 | 84 | 348 |

## 2.2 Delano West Pavilion

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes; however, it is currently in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000 square feet of retail and restaurant space as shown in Table 2. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

TABLE 2
Delano West Pavilion Project

| Phase | Number of Buildings | Residential Units | | | Commercial (Sq. Ft.) |
|---|---|---|---|---|---|
| | | Total Units | 1 BR | 2 BR | |
| 1 | 24 | 220 | 48 | 172 | - |
| 2 | 23 | 220 | 44 | 176 | - |
| 3 | 12 | - | - | - | 170,000 |
| 4 | 9 | - | - | - | 170,000 |
| Project Totals | 68 | 440 | 92 | 348 | 340,000 |

### 2.3 Construction Period

It is anticipated that construction of the projects will be phased over an approximately 10-year period, according to Planning Department Notice of Preparation EIR, for a build-out within the year 2030 horizon.

The first phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard at Delano site. As shown in Table 1, residences would be constructed in four phases; each phase development would last approximately 15 months and consist of 108 units. Thus, the Vineyard at Delano site would be completed in approximately five years.

The Delano West Pavilion site would begin construction following the completion of the Vineyard at Delano site and would last approximately five years. This site will be similarly developed in four phases as shown in Table 2, with the residential components established in the first three years, and two phases of commercial development (340,000 sq ft) following over the next two years.

## Section 3. Water Supply Availability

### 3.1 Project Historical Water Demand

No historical or current activity has been recorded of the project sites in the past ten years. The water demand in the past is years therefore, is zero, as shown in Table 3.

TABLE 3
Project Historical Water Demand (2005-2015)

| Project | Gross Area (Acres) | Person/ Unit | Average Daily Unit Use (gpcd) | Average Daily Unit Use (g/day/ft$^2$) | Annual Use (MG/yr) |
|---|---|---|---|---|---|
| Vineyard at Delano | 33 | 0 | 0 | 0 | 0 |
| Delano West Pavilion | 77 | 0 | 0 | 0 | 0 |
| Gross Total | 110 | | | | 0 |

*Note: Data from Public Works Department, Water Division prior to 2014.*

3.2 Project Water Demand

The water demand for the project has been estimated based on City of Delano's service area past yearly domestic use, the number of domestic connections and the average persons per unit. The City of Delano 2010 Urban Water Management Plan has established an interim urban water use target of 176 gallons per capita per day (gpcd) in order to meet future requirements and conservation efforts per Water Conservation Bill of 2009.

In this WSA, the following water demand factors were used:

| Land Use | Persons per Unit | Average Use |
|---|---|---|
| Medium Density Residential (MR) | 3 | 176 gpcd |
| Service Commercial (SC) | 1.5 | 176 gpcd |
| Community Facility, Park (P) | | 3 ft/ac/yr |
| General Commercial (GC) | | 0.20 gal/day/ft$^2$ |

The Vineyard at Delano project has an average water demand of 88 MG/yr (271 AF/yr) at project build-out (2024).

The Delano West Pavilion project has an average water demand of 120 MG/yr (368 AF/yr) at project build-out (2030).

Combined, the average water demand is 208 MG/yr (639 AF/yr) as shown in Table 4. A net increase in onsite water demand of approximately 208 MG/yr (639 AF/yr) due to increase in future uses.

TABLE 4
Projected Water Demand Per Land Use and Phase
Vineyard at Delano

| Project Land Use | Gross Area (Acres) | Comm'l Area (sq ft) | Number of Units | Person per Unit | Avg. Daily Unit Use (gpcd) | Avg. Daily Unit Use (gal/day/ft$^2$) | Avg. Daily Unit Use (ft/yr) | Annual Use (MG/yr) | Annual Use (AF/yr) |
|---|---|---|---|---|---|---|---|---|---|
| Phase 1 (2020[1]) | | | | | | | | | |
| Service Commercial (SC) | | | 9 | 1.5 | 176 | | | 1 | 3 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 108 | 3 | 176 | | | 21 | 64 |
| Community Facility, Park (P) | 1.65 | | | | | | 3 | 2 | 5 |
| Phase 2 (2021) | | | | | | | | | |
| Service Commercial (SC) | | | 9 | 1.5 | 176 | | | 1 | 3 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 108 | 3 | 176 | | | 21 | 64 |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| Phase 3 (2022) | | | | | | | | | |
| Service Commercial (SC) | | | 9 | 1.5 | 176 | | | 1 | 3 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 108 | 3 | 176 | | | 21 | 64 |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| Phase 4 (2024) | | | | | | | | | |
| Service Commercial (SC) | | | 9 | 1.5 | 176 | | | 1 | 3 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 108 | 3 | 176 | | | 21 | 64 |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| *[1]Assumed project start* | | | | | | | Subtotal = | 88 | 271 |

TABLE 4 (Cont.)
Projected Water Demand Per Land Use and Phase
Delano West Pavilion

| Project Land Use | Gross Area (Acres) | Comm'l Area (sq ft) | Number of Units | Person Per Unit | Avg. Daily Unit Use (gpcd) | Avg. Daily Unit Use (gal/day/ft$^2$) | Avg. Daily Use (ft/ac/yr) | Annual Use (MG/yr) | Annual Use (AF/yr) |
|---|---|---|---|---|---|---|---|---|---|
| Phase 1 (2025) | | | | | | | | | |
| Service Commercial (SC) | | | 24 | 1.5 | 176 | | | 2 | 7 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 220 | 3 | 176 | | | 42 | 130 |
| Community Facility, Park (P) | 3.85 | | | | | | 3 | 4 | 12 |
| Phase 2 (2026) | | | | | | | | | |
| Service Commercial (SC) | | | 23 | 1.5 | 176 | | | 2 | 7 |
| General Commercial (GC) | | | | | | | | | |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | 220 | 3 | 176 | | | 42 | 130 |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| Phase 3 (2027) | | | | | | | | | |
| Service Commercial (SC) | | | 12 | 1.5 | 176 | | | 1 | 4 |
| General Commercial (GC) | | 170,000 | | | | 0.2 | | 12 | 38 |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | | 3 | 176 | | | 0 | |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| Phase 4 (2030) | | | | | | | | | |
| Service Commercial (SC) | | | 9 | 1.5 | 176 | | | 1 | 3 |
| General Commercial (GC) | | 170,000 | | | | 0.2 | | 12 | 38 |
| Low Density Residential (LR) | | | | | | | | | |
| Medium Density Residential (MR) | | | | 3 | 176 | | | 0 | |
| Community Facility, Park (P) | | | | | | | 3 | 0 | |
| | | | | | | Subtotal = | | 120 | 368 |
| | | | | | | Grand Total = | | 208 | 639 |

## Section 4. Water Supply Additional Information

California Code section 10910, subdivision (f) states: If a water supply for a proposed project includes groundwater, additional information shall be included in the water assessment.

4.1 Review of information contained in the Urban Water Management Plan relevant to the identified water supply for the proposed project.

The UWMP Act (California Water Code §10610 et seq.) requires urban water suppliers to report, describe, and evaluate: Water deliveries and uses; Water supply sources, Efficient water uses, Demand Management Measures; including implementation strategy and schedule. In addition, the Water Conservation Bill of 2009 requires urban water suppliers to report in their UWMPs base daily per capita water use (baseline), urban water use target, interim urban water use target, and compliance daily per capita water use. The UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands (CWC 10612 (b)). Urban water suppliers are required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. UWMPs are to be prepared every five years by urban water suppliers with 3,000 or more service connections or supplying 3,000 or more acre-feet of water per year.

4.1.1 City Facts. The City was founded in 1873 as a railroad town and was later incorporated in 1915. Delano has experienced continuous growth over the past 20 years and as the City grows, the water system service area is anticipated to grow as well. In 2010, the California Department of Finance has reported the City population at approximately 54,447 residents, and represents approximately 10 percent of Kern County's population. The Kern Valley State Prison is not served by the City with potable water, therefore, the actual service area population is 48,957 (54,447 minus 5,490, the average number of inmates in the Kern Valley State Prison from 2006 to 2010).

Population projections, shown in Table 5 are used to forecast water requirements for the City. For planning purposes, population projections up to 2035 were derived using an annual growth rate of 2.1 percent estimated in the 2005 General Plan

Table 5
Population — current and projected
2010 Urban Water Management Plan
City of Delano

| Projection Years | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| Service Area Population[1, 2] | 48,957 | 54,097 | 59,778 | 66,054 | 72,990 | 80,654 |
| Average annual growth rate[3] | | 2.1% | 2.1% | 2.1% | 2.1% | 2.1% |

*[1] Service area population is defined as the population served by the distribution system. See Technical Methodology 2: Service Area Population (2010 UWMP Guidebook, Section M).*

*[2] Source: State Department of Finance Annual Estimate (1/01/10)*

*[3] Projections based on annual growth rate 2005 City of Delano General Plan*

The City's public water system extracts water from underground aquifers via 15 groundwater wells scattered throughout the City, (see Figure 2). The total pumping capacity of the City wells is at 15,400 GPM (24,842 AF/yr), see Table 6. Water is conveyed from the wells to the consumers via approximately 110 miles of distribution system with pipe sizes ranging between 4 and 16 inches in diameter.

Table 6
2014 Groundwater Wells
City of Delano

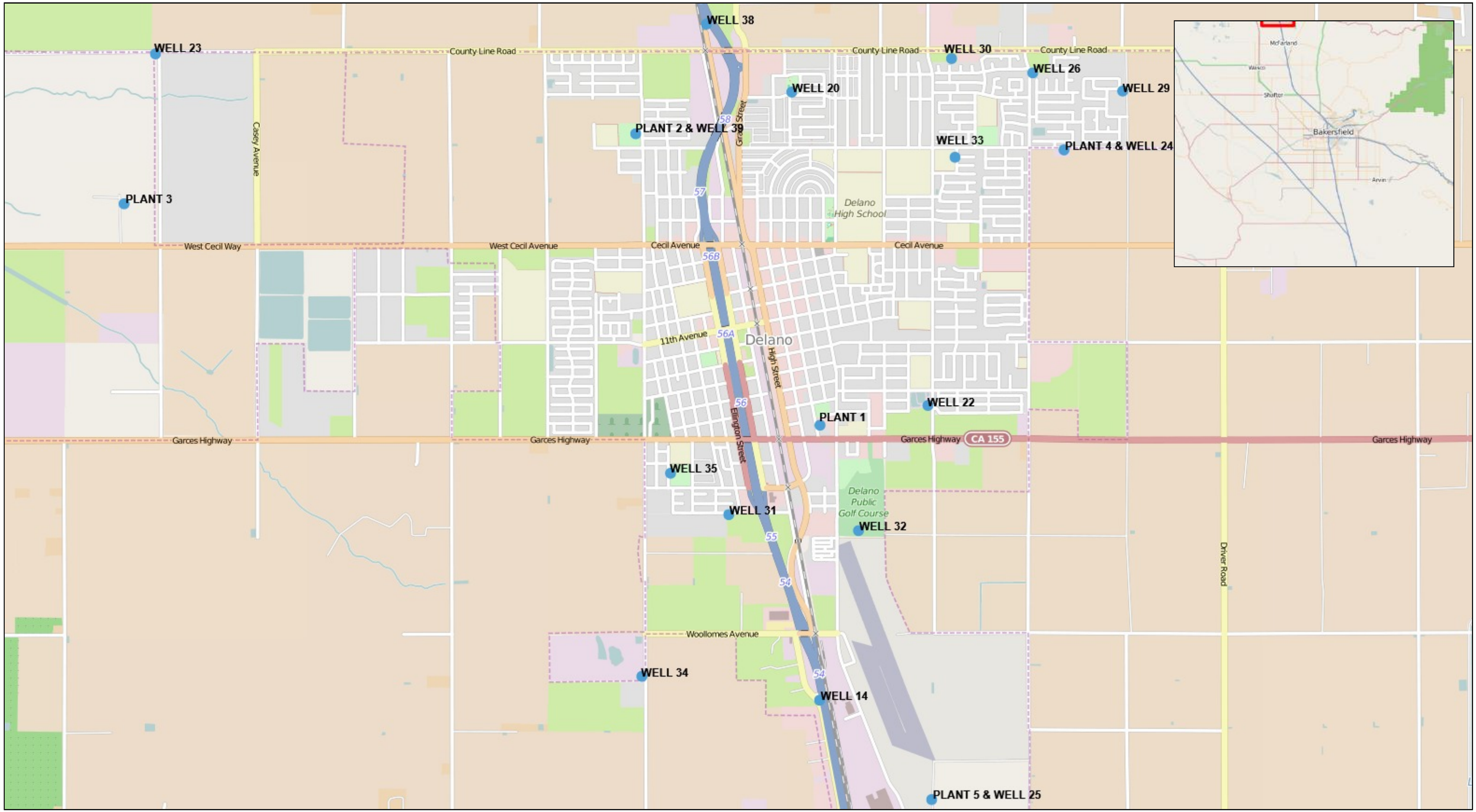
| Well No. | 2010 Well Capacity[1], GPM | 2014 Well Capacity[2], GPM | 2014 Well Capacity[2], MG/yr | 2014 Well Capacity[2], AF/yr |
|---|---|---|---|---|
| 4 | 700 | 0 | 0 | 0 |
| 12 | 550 | 0 | 0 | 0 |
| 19 | 985 | 0 | 0 | 0 |
| 21 | 1,500 | 0 | 0 | 0 |
| 23 | 2,100 | 0 | 0 | 0 |
| 24 | 1,150 | 1,200 | 631 | 1,936 |
| 20 | 850 | 1,100 | 578 | 1,774 |
| 22 | 1,600 | 1,500 | 788 | 2,420 |
| 26 | 800 | 1,000 | 526 | 1,613 |
| 29 | 0 | 500 | 263 | 807 |
| 30 | 0 | 600 | 315 | 968 |
| 31 | 0 | 1,000 | 526 | 1,613 |
| 32 | 0 | 1,300 | 683 | 2,097 |
| 33 | 0 | 1,200 | 631 | 1,936 |
| 34 | 0 | 800 | 420 | 1,290 |
| 35 | 0 | 650 | 342 | 1,049 |
| 38 | 0 | 650 | 342 | 1,049 |
| 14 | 650 | 800 | 420 | 1,290 |
| 25 | 1,550 | 1,600 | 841 | 2,581 |
| 39 | 0 | 1,500 | 788 | 2,420 |
| **Total** | **12,435** | **15,400** | **8,094** | 24,842 |

*[1] Data from City Public Works Department, Water Division*

*[2] Updated 11/30/2014*

Kern County GIS

# Groundwater Wells City of Delano




1.14 0 0.57 1.14 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

© Latitude Geographics Group Ltd.

1: 36,112

**Figure 2**

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

The City currently maintains five storage reservoirs within the service area with a total capacity of 10.6 MG, and a total boosting capacity of 8,950 GPM. All facilities are monitored by a Supervisory Control and Data Acquisition (SCADA) system, which activates wells and booster pump facilities based on storage tank water levels or pressure at selected locations in the distribution system. The 2010 UWMP indicates that "major future development within the City Water System service area is anticipated to extend from the southwestern to the northwestern portions of the City. These include single-family residential, commercial, and industrial developments. Additional water will be needed to meet the growth of the service area and population. These demands will be met with additional groundwater wells developed towards the end of 2014".

The proposed project is in the southwestern portion of the City and has not been subject to any assessment in prior years. *The projected water demand associated with the proposed project was not accounted for in the adopted 2010 Urban Water Management Plan*.

4.1.2. Groundwater Management Plan. The City has not adopted a groundwater management plan at this time.

4.1.3 Groundwater Basin Description. The groundwater body from which the City extracts water is labeled the Kern County Subbasin (5-22.14) by the California Department of Water Resources Bulletin 118-Update 2003 and is a subbasin of the Tulare Lake Groundwater Basin, Figure 3.

The Kern County subbasin is bounded on the north by the Kern County line and the Tule subbasin, on the east and southeast by granitic bedrock of the Sierra Nevada foothills and Tehachapi mountains, and on the southwest and west by the marine sediments of the San Emigdio Mountains and Coast Ranges. Principal rivers and streams include Kern River and Poso Creek. Active faults include the Edison, Pond-Poso, and White Wolf faults. Average precipitation values range from 5 in. at the subbasin interior to 9 to 13 in. at the subbasin margins to the east, south, and west.

4.1.3.1 Description of the depth and type of aquifer. The aquifers are generally quite thick in the San Joaquin Valley subbasins with groundwater wells commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the San Joaquin Valley. Typical well yields in the San Joaquin Valley range from 300 GPM to 2,000 GPM with yields of 4,000 GPM possible. The smaller basins in the mountains surrounding the San Joaquin Valley have thinner aquifers and generally lower well yields averaging less than 500 GPM. Typical well yields within the City's service area range from 500 GPM to 2,100 GPM, with depths ranging from 800 feet to 1,400 feet.

4.1.4 Adjudication. The Kern County subbasin is not adjudicated. There are no restrictions on the City's beneficial use of groundwater to supply domestic water for urban use; however, the City pumps only the amount of groundwater needed to meet demand.

4.1.5 Groundwater Subbasin Natural Recharge Areas. According to the California Department of Water Resources Bulletin 118-Update 2003, natural recharge is primarily from stream seepage along the eastern subbasin and the Kern River. Recharge of applied irrigation water; however, is the largest contributor.

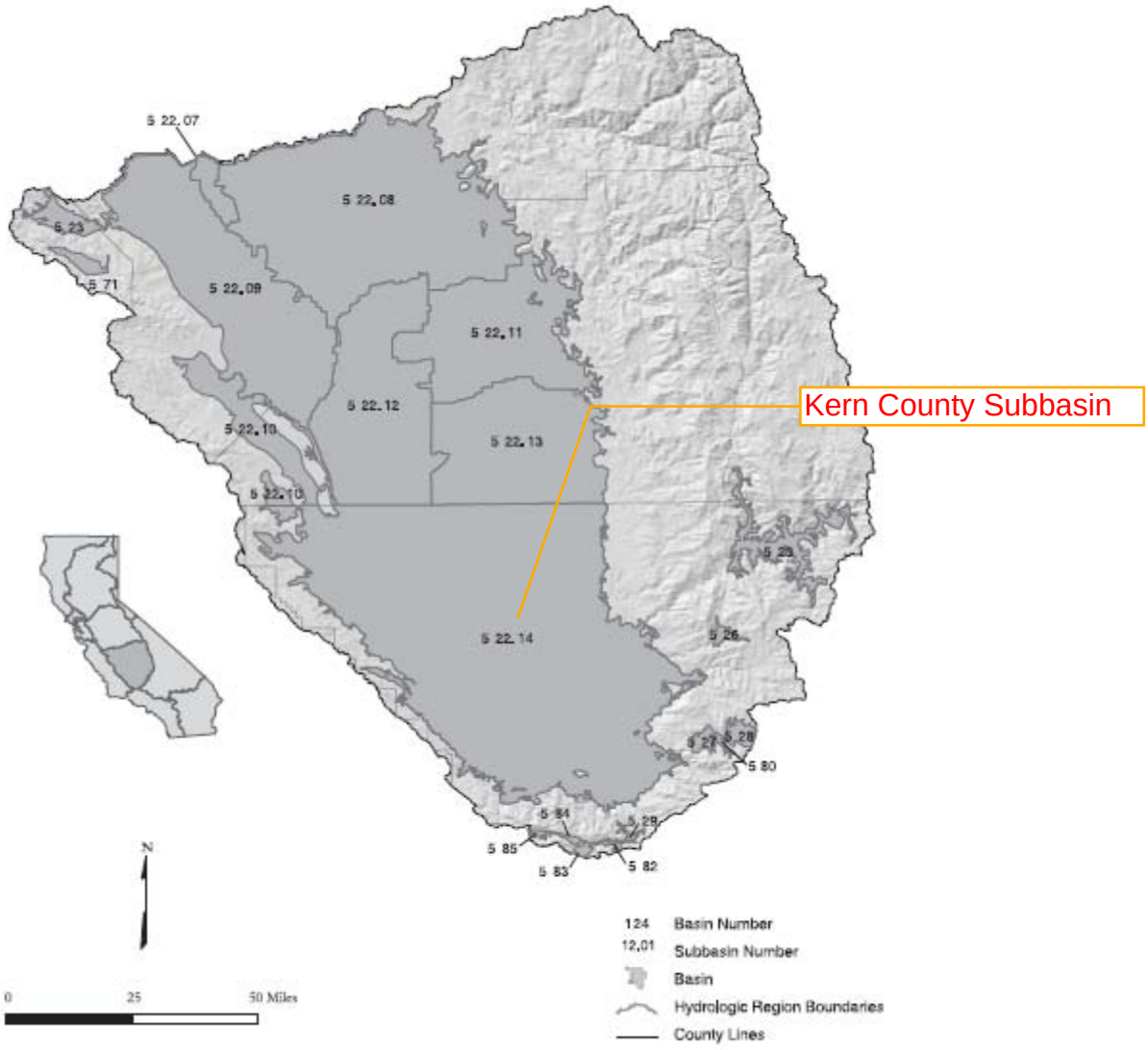



**Figure 3**
**Tulare Lake Hydrologic Region**

4.1.6 Groundwater Level Trends. According to the California Department of Water Resources Bulletin 118-Update 2003, the average subbasin water level is essentially unchanged from 1970 to 2000, after experiencing cumulative changes of approximately minus 15 feet through 1978, a 15-foot increase through 1988, and an 8-foot decrease through 1997. However, net water level changes in different portions of the subbasin were quite variable through the period 1970-2000. These changes ranged from increases of over 30 feet at the southeast valley margin and in the Lost Hills/ Buttonwillow areas to decreases of over 25 and 50 feet in the Bakersfield area and McFarland/Shafter areas, respectively.

A major determining factor in the groundwater elevation of the Kern County subbasin is the amount of surface water that is available for agricultural use. During drought years, the agricultural entitlements from the State Water Project and the Central Valley Project are sharply curtailed, which requires farmers to use groundwater for irrigation purposes. Groundwater generally flows southwest through the City. Based on current and historical groundwater elevation maps , Appendix A, horizontal groundwater barriers do not appear to exist in the subbasin. In spring 2006, groundwater was at approximately 200 ft above mean sea level, which is approximately 115 ft below the ground surface.

4.1.7 Groundwater Overdraft. Groundwater overdraft occurs when the amount of water removed from a groundwater basin exceeds the amount of water added to the groundwater basin. According to the California Water Plan Update 2005, Volume 3, Chapter 8, prepared by the California Department of Water Resources, the Tulare Lake Hydrologic Region is overdraft in average year and dry year conditions. Analysis was reported for wet years 1998 (wet), 2000 (average), and 2001 (dry). The total storage change recorded a plus 701,000 AF in the wet year, a deficit of minus 1,682,000 AF in the average year, and a deficit of minus 4,256,000 AF in a dry year.

4.1.8 Programs to Limit Groundwater Overdraft. The City recycles secondary-treated wastewater effluent for agricultural irrigation on City-owned land. This irrigation practice helps to replenish the area groundwater table through deep percolation and reduces groundwater overdraft.

Currently, the City has an active water conservation program including year-round watering restrictions, and prohibition of water waste. The implementation of a “No-Waste” Ordinance, voluntary rationing on the part of the community, and effective water conservation programs, the City helps in the reduction of groundwater overdraft.

4.1.9 Groundwater in Storage. A 1977 groundwater model developed by DWR and the Kern County Water Agency (KCWA) indicates inflows to the subbasin include natural recharge of 150,000 AF/yr, artificial recharge of 308,000 AF/yr, applied water recharge 843,000 AF/yr, and a 1958-1966 average estimated subsurface inflow of 233,000 AF/yr (DWR 1977), for a total subbasin inflow of 1,534,000 AF/yr. Subbasin outflows are urban extraction of 154,000 AF/yr, agricultural extraction of 1,160,000 AF/yr, other extractions (oil industry related) of 86,333, and subsurface outflow was considered minimal, for a total subbasin outflow of 1,400,300 AF/yr.

In addition to the above budget, KCWA has prepared a detailed long-term water balance from 1970 to 1998 which shows an average change in storage of minus 325,000 AF/yr (Fryer 2002). This analysis does not consider subsurface inflow of 233,000 AF/yr mentioned above.

4.1.10 Reclaimed Water. Although reclaimed water is not used within the City's water system, the completion in 2011 of the Waste Water Treatment (WWTP) Expansion Project has allowed percolation of an estimated 5,328 AF/yr secondary treated effluent water to the groundwater by way of irrigating 1,402 acres of agriculture lands surrounding the WWTP.

4.1.11 Groundwater Extractions. The City provides potable water service to its residential, commercial, industrial, and governmental/institutional customers within the City limits and Sphere of Influence (SOI). In 2010, the City extracted approximately 3.02 billion gallons or 9,272 acre-feet (AF) of water servicing a population of approximately 48,957. Table 7 lists the available historical annual water production from 2005 to 2010. During this period, DWR announced that 2007, 2008 and 2009 as one of the most severe drought years in California's recorded history, thus implementing a number of actions in preparation for a potentially dry 2009 and beyond. The challenge for the City was how to maintain water sufficiency during the drought years.

To meet the challenge, in 2008, the City aggressively implemented water conservation programs. The City has made great strides in the water conservation effort and is continuing these programs even with tight budget. The general impact of the water conservation program in terms of water use is the significant drop in City's water demand. .

The 2010 UWMP provides information on projected extractions up to the 2035 horizon, see Table 8.

Table 7
Groundwater — volume pumped
2010 Urban Water Management Plan
City of Delano

| Basin/Subbasin | Metered or Unmetered[1] | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| San Joaquin Valley Basin/Kern County Subbasin | Metered | 9,744 | 10,128 | 10,742 | 10,343 | 9,999 | 9,272 |
| Total groundwater pumped | | 9,744 | 10,128 | 10,742 | 10,343 | 9,999 | 9,272 |
| Groundwater as a percent of total water supply | | 100% | 100% | 100% | 100% | 100% | 100% |
| | | | | | | | |
| *Units (circle one): acre-feet per year* | | | | | | | |
| *[1]Indicate whether volume is based on volumetric meter data or another method* | | | | | | | |

Table 8
Groundwater — projected volume to be pumped
2010 Urban Water Management Plan
City of Delano

| Basin/Subbasin | Metered or Unmetered[1] | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| San Joaquin Valley Basin/Kern County Subbasin | Metered | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Projected groundwater to be pumped[2] | | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Groundwater as a percent of total water supply | | 100% | 100% | 100% | 100% | 100% |
| | | | | | | |
| *Units (circle one): acre-feet per year*<br>*[1]Indicate whether volume is based on volumetric meter data or another method*<br>*[2] Based on a demand factor of 176 gpcd (2015 Interim Urban Water Use Target) applied to the projected population in Table 5.* | | | | | | |

## Section 5. Supply and Demand Discussion

The City's local groundwater, which is the only source of supply, has reliably allowed the City to meet its historical water demands. The local aquifer yields are good. The City has never experienced a severe shortage of water supply. It is anticipated that this condition will remain in the following years, even with the experience of having the most severe drought in state recorded history in the past three years.

Since the City groundwater supply relies on Kern County Subbasin alone, it is not directly affected by the reduction of the surface water deliveries in drought years and is buffered from the effects of potential short water shortages. Supplies are not expected to be impacted by long-term shortages due to legal or environmental factors. The available supply therefore, is directly proportional to the total pumping capacity of the system wells, at 24,842 AF/yr.

The average day demand of the project translated in annual terms is estimated to be 639 AF/yr. At full project build-out, the total net increase in water system demand is estimated to be 15,029 AF/yr. Considering that the proposed project will be constructed in eight-phase spread, the projected water demand will not be fully realized until 2030.

Table 9 provides a summary of the supply and demand figures for comparison.

Table 9

Supply and Demand[1, 4] Comparison in Acre-Ft

| Water Source | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| Supply: | | | | | | |
| Groundwater Storage[2] | 20,059 | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Treated Surface Water | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 20,059 | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| | | | | | | |
| Demand[1]: | | | | | | |
| Excluding Project[3] | 9,272 | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Including Project | 9,272 | 10,666 | 11,857 | 13,442 | 15,029 | 16,540 |
| Projected Excess Supply Including Project | 10,787 | 14,176 | 12,985 | 11,400 | 9,813 | 8,302 |
| *[1]Average day demand* | *[2]Well System Capacity* | | | | | |
| | | | | | | |
| Demand[4]: | | | | | | |
| Excluding Project | 13,908 | 15,999 | 17,679 | 19,535 | 21,586 | 23,852 |
| Including Project | 13,908 | 15,999 | 17,785 | 20,163 | 22,543 | 24,809 |
| Projected Excess Supply Including Project | 6,151 | 8,843 | 7,057 | 4,679 | 2,299 | 33 |
| *[4]Maximum day demand = Average day demand * ( 1.5)* | | | | | | |

## Section 6. Normal Year, Single Dry Year, Multiple Dry Year Supply Analysis

It was mentioned in Section 4.1.1 that the projected water demand associated with this project was not accounted for in the 2010 UWMP. As such, Water Code section 10910 (c)(3) requires that a discussion with regard to whether the City's projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the propose project, in addition to the City's existing and planned future uses, including agriculture and manufacturing uses.

6.1 Drought Planning. According to the 2010 UWMP, drought planning is to consider water supplies during single-dry and multiple-dry years. Single-dry and multiple-dry year conditions are usually based on historical records of annual runoff from a particular watershed.

The following guidelines are used for drought conditions:

- *Average Year* — a year or an averaged range of years in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.

- *Single-dry year* — generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903.

- *Multiple-dry year period* — generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903.

6.1.1 Three-Year Minimum Water Supply. The City's three year drought sequence has been identified as water years 2007, 2008, and 2009 base on historical data in the last thirty years (1980-2010) from California Data Exchange Center (CDEC). Table 10 shows the basis of water year data. During those years, the City's historic annual demand was respectively 3,500 MG (10,742 AF/yr), 3,370 MG (10,343 AF/yr), and 3,258 MG (9,999 AF/yr). The average water year (2004) in the 30-year historical sequence had an annual demand of 3,292 MG (10,103 AF/yr). Table 11 shows what percentage the dry year water supply was, as compared to the "average normal" year.

Table 10
Basis of water year data
2010 UWMP
City of Delano

| Water Year Type | Base Year(s) | Historical Sequence |
|---|---|---|
| Average Water Year | 2004 | 1980-2010 |
| Single-Dry Water Year | 2007 | |
| Multiple-Dry Water Years | 2007-2009 | |
| *Source: DWR CDEC Historical Data: Wasco (Tulare Lake Basin) is the nearest weather station* | | |

Table 11
Supply reliability — historic conditions
2010 UWMP
City of Delano

| Average Normal Water Year (2004) | Single Dry Water Year (2007) | Multiple Dry Water Years | | |
|---|---|---|---|---|
| | | 2007 | 2008 | 2009 |
| 10,103 | 10,742 | 10,742 | 10,343 | 9,999 |
| Percent of Average Normal Year: | 106% | 106% | 102% | 99% |
| *Units: acre-feet/yr* | | | | |
| *Source: Table 3-4* | | | | |

6.2 Dry Year Supply Analysis. Not all Hydrologic dry years lead to water supply shortages and groundwater overdraft. In an average or wet year, the water supply sources may exceed or equal the water needs. The annual quantity of groundwater available to the City is not expected to vary significantly in relation to wet or dry years. This assumes that the groundwater yield is not reduced due to water quality issues. During extended drought periods, groundwater levels generally decline and will require more aggressive demand management practices and continued implementation of recycled water reuse for agriculture irrigation.

In determining the adequacy of the water supply facilities, the source must be large enough to meet the varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural disasters.

In accordance with industry standard practices and the California Department of Health Services (DHS) criteria for "Adequate Source Capacity" on water supply, the source should be sized to serve the maximum day demand (MDD). MDD is the highest water demand during a 24-hour period of the year. The MDD peaking factor is expressed as a multiplier applied to the average day demand (ADD). Water system sources are typically sized to meet the anticipated MDD of a water system.

A 2006 Water Model Update Report used a factor of 1.5 to establish the MDD of the City's water system. On the day of maximum demand, it is desirable to maintain a water supply rate equal to the MDD rate. Water required for peak hour demands (PHD) or for fire flows would come from storage.

6.2.1 Standby Production Capacity for System Reliability. Under normal operating conditions, it is possible that one or two of the City's wells can be placed out of service during MDD conditions due to equipment malfunction, for servicing, or water quality concerns. The DHS criterion recommends counting the capacity of the largest well being out of service. The City's ADD and MDD from 2010 through 2035 are shown in Table 12.

Table 12
Projected Water Use
2010 Urban Water Management Plan
City of Delano

| Projection Years | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|---|---|---|
| Service Area Population[1, 2] | 48,957 | 54,097 | 59,778 | 66,054 | 72,990 | 80,654 |
| Interim Urban Water Use Target, GPCD | | 176 | 176 | 176 | 176 | 176 |
| Average Day Demand, Total | | | | | | |
| GPM | 5,748 | 6,612 | 7,306 | 8,073 | 8,921 | 9,858 |
| AFY | 9,272 | 10,666 | 11,786 | 13,023 | 14,391 | 15,902 |
| Maximum Day Demand, Total | | | | | | |
| GPM | 8,622 | 9,918 | 10,959 | 12,110 | 13,382 | 14,787 |
| AFY | 13,908 | 15,999 | 17,679 | 19,535 | 21,586 | 23,852 |
| *[1] Service area population is defined as the population served by the distribution system.* | | | | | | |
| *[2] Source: State Department of Finance Annual Estimate (1/01/10).* | | | | | | |

The 2010 UWMP, stated that water supply within the service area will not vary significantly with the normal year, dry year, and multiple dry year scenarios. Table 13 shows the reliability of water supply using the ADD as basis for water demand during normal year, dry year, and multiple dry year in the next 20 years.

Table 13
Normal Year, Dry Year, Multiple Dry Year Assessment in Acre-Feet

| | | | Multiple Dry Years | | |
|---|---|---|---|---|---|
| | Normal Year | Single Dry Year | Year 1 | Year 2 | Year 3 |
| 2015 | | | | | |
| Water Demand[1] | 10,666 | 11,306 | 11,306 | 10,879 | 10,559 |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 14,176 | 13,536 | 13,536 | 13,963 | 14,283 |
| Adequate Supply? | YES | YES | YES | YES | YES |
| 2020 | | | | | |
| Water Demand[1] | 11,857 | 12,568 | 12,568 | 12,094 | 11,738 |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 12,985 | 12,274 | 12,274 | 12,748 | 13,104 |
| Adequate Supply? | YES | YES | YES | YES | YES |
| 2025 | | | | | |
| Water Demand[1] | 13,442 | 14,249 | 14,249 | 13,711 | 13,308 |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 11,400 | 10,593 | 10,593 | 11,131 | 11,534 |
| Adequate Supply? | YES | YES | YES | YES | YES |
| 2030 | | | | | |
| Water Demand[1] | 15,029 | 15,931 | 15,931 | 15,330 | 14,879 |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 9,813 | 8,911 | 8,911 | 9,512 | 9,963 |
| Adequate Supply? | YES | YES | YES | YES | YES |
| 2035 | | | | | |
| Water Demand[1] | 16,540 | 17,532 | 17,532 | 16,871 | 16,375 |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 |
| Excess Supply | 8,302 | 7,310 | 7,310 | 7,971 | 8,467 |
| Adequate Supply? | YES | YES | YES | YES | YES |

*[1]Average Day Demand (ADD) based on projected water demand, including project.*

Table 14 shows the reliability of water supply using the MDD as basis for water demand during normal year, dry year, and multiple dry year in the next 20 years.

Table 14
Normal Year, Dry Year, Multiple Dry Year Assessment in Acre-Feet

| | | | Multiple Dry Years | | | |
|---|---|---|---|---|---|---|
| | Normal Year | Single Dry Year | Year 1 | Year 2 | Year 3 | |
| 2015 | | | | | | |
| Water Demand[1] | 15,999 | 16,959 | 16,959 | 16,319 | 15,839 | |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 | |
| Excess Supply | 8,843 | 7,883 | 7,883 | 8,523 | 9,003 | |
| Adequate Supply? | YES | YES | YES | YES | YES | |
| 2020 | | | | | | |
| Water Demand[1] | 17,786 | 18,853 | 18,853 | 18,142 | 17,608 | Vineyard Project |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 | |
| Excess Supply | 7,056 | 5,989 | 5,989 | 6,700 | 7,234 | |
| Adequate Supply? | YES | YES | YES | YES | YES | |
| 2025 | | | | | | |
| Water Demand[1] | 20,164 | 21,373 | 21,373 | 20,567 | 19,962 | West Pavilion Project |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 | |
| Excess Supply | 4,679 | 3,469 | 3,469 | 4,275 | 4,880 | |
| Adequate Supply? | YES | YES | YES | YES | YES | |
| 2030 | | | | | | |
| Water Demand[1] | 22,543 | 23,896 | 23,896 | 22,994 | 22,318 | |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 | |
| Excess Supply | 2,299 | 946 | 946 | 1,848 | 2,524 | |
| Adequate Supply? | YES | YES | YES | YES | YES | |
| 2035 | | | | | | |
| Water Demand[1] | 24,809 | 26,298 | 26,298 | 25,305 | 24,561 | |
| Groundwater Supply | 24,842 | 24,842 | 24,842 | 24,842 | 24,842 | |
| Excess Supply | 33 | -1,456 | -1,456 | -463 | 281 | |
| Adequate Supply? | YES | NO | NO | NO | YES | |

*[1]Maximum Day Demand (MDD) based on projected water demand, including project.*

Citing the system sizing requirements discussed in Section 6.2, it is apparent that the City of Delano Domestic Water System's total projected water supplies available during normal, single dry, and multiple dry water years in a 20-year projection *does not* meet the projected water demand of the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

## Section 7. Findings and Recommendation

Following are the findings of the water supply assessment for the Vineyard at Delano and Delano West Pavilion projects:

1. The proposed project is in the southwestern portion of the City and has not been subject to any assessment in prior years.

2. The projected water demand associated with the proposed project was not accounted for in the adopted 2010 Urban Water Management Plan.

3. The projected average water demand for the projects is 639 AF/yr at full project build-out.

4. The existing average water demand for the projects is zero AF/yr.

5. At full project build-out (2030), the total net increase in water system demand is estimated to be 15,029 AF/yr. Considering that the proposed project will be constructed in eight-phase spread, the projected water demand will not be fully realized until 2030.

6. The City of Delano Domestic Water System's total projected water supplies available during normal, single dry, and multiple dry water years in a 20-year projection *does not* meet the projected water demand of the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses. Additional wells need to be developed in the future to rectify this deficiency.

7. The Tulare Lake Hydrologic Region is overdraft in average year and dry year conditions. About 70 percent of the region's overdraft occurs in the Kings-Kaweah-Tule Rivers planning sub-area. The City's underlying subbasin is not overdraft. The City's local groundwater, which is its solely source of supply, has reliably allowed the City to meet its historical water demands. The local aquifer yields are good. The City has never experienced a severe shortage of water supply. It is anticipated that this condition will remain in the following years, even with the experience of having the most severe drought in state recorded history in the past three years.

8. The groundwater supply will be sufficient in a normal year, single dry year, and multiple dry year scenarios.

9. The proposed project will be developed in eight phases over a period of approximately ten years. The extended time to build-out will provide the City with greater flexibility regarding projected water demands and to utilize sources that will become available in the future.

10. In a normal water year, the proposed project will not have a significant impact on the overall water balance in the City's underlying subbasin.

11. In a drought scenario similar to the water years 2007, 2008, 2009, the proposed project will have a significant impact on the City's Water System. As shown in Table 14, there will be a water supply deficiency in a single dry year and multiple years mentioned in the magnitude of -1456 AC-Ft/Yr. Since the project will be served by groundwater through the City's water system, it is imperative that the City construct a new groundwater well to abate this deficiency by developing a 1,000 GPM capacity well on or about project built-out date.

12. The project will be served by groundwater through the City's water system. The City reserves the right to determine the need to construct new groundwater wells to serve the project during the tentative tract phase.

13. The average subbasin water level is essentially unchanged from 1970 to 2000, after experiencing cumulative changes of approximately minus 15 feet through 1978, a 15-foot increase through 1988, and an 8-foot decrease through 1997. However, net water level changes in different portions of the subbasin were quite variable through the period 1970-2000. These changes ranged from increases of over 30 feet at the southeast valley margin and in the Lost Hills/ Buttonwillow areas to decreases of over 25 and 50 feet in the Bakersfield area and McFarland/Shafter areas, respectively. These changes demonstrate the ability of the aquifer to recover from dry year and multiple dry year periods.

14. This WSA concludes that the City of Delano Domestic Water System's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection *does not* meet the projected water demand of the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

Recommendation: It is recommended that the City council approved this WSA and direct the City clerk to forward the package to the City Planning Department for inclusion to the EIR with the following conditions:

a. YK America shall dedicate a 125 ft by 125 ft lot to the City, preferably within the Vineyard Project for development of a 1,000 GPM well. The City will credit YK America the cost of the proposed well site from the development impact fees.

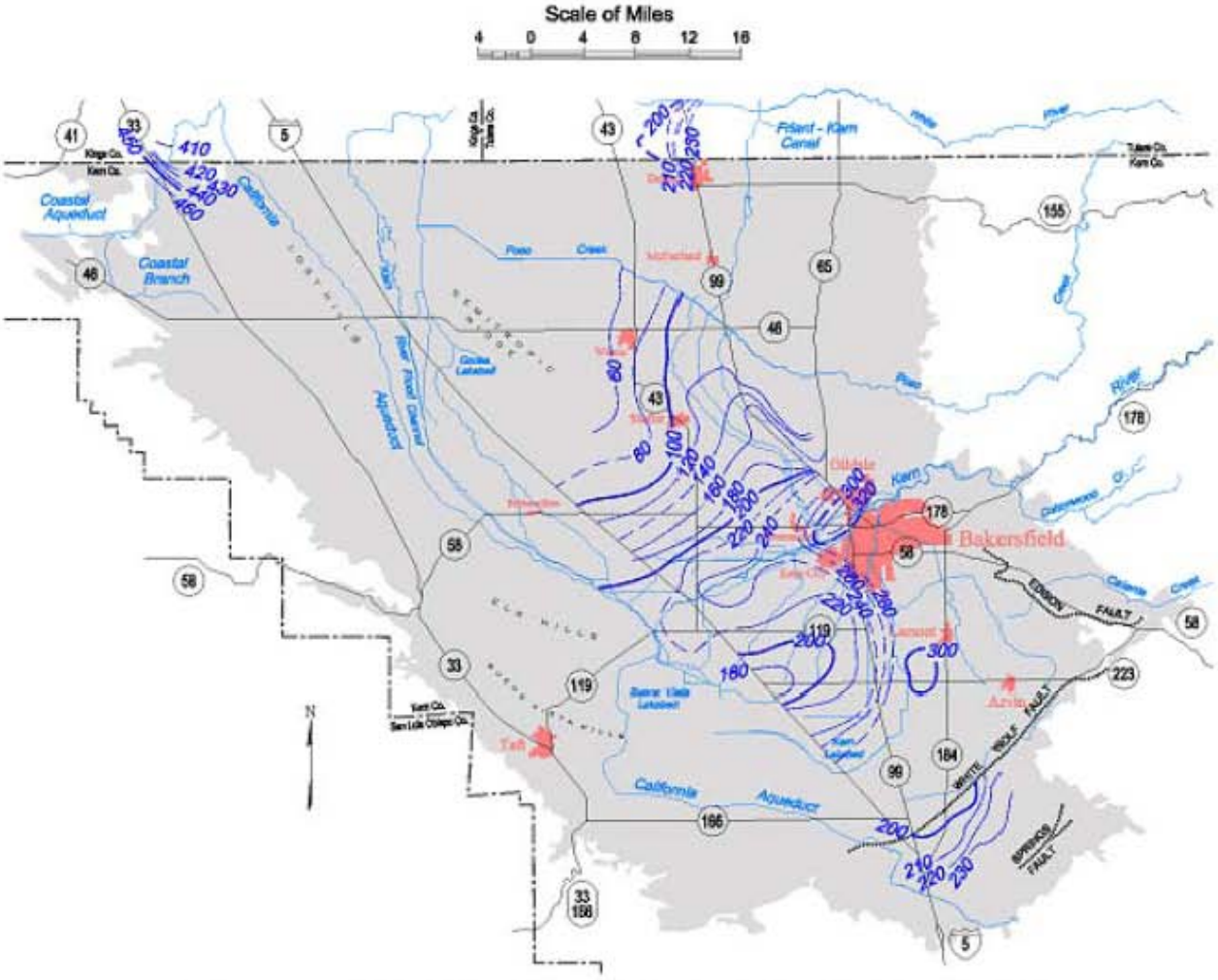
b. City will acquire additional water supplies by 2030. The estimated cost to develop a 1,000 GPM capacity well at today's (2015) price is $1 million. This includes Fed/State/local permits to be required at that time.

# APPENDIX A

*South Central Region*
*Groundwater Basin Contour Map*

# Kern Groundwater Basin

## Spring 2002, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

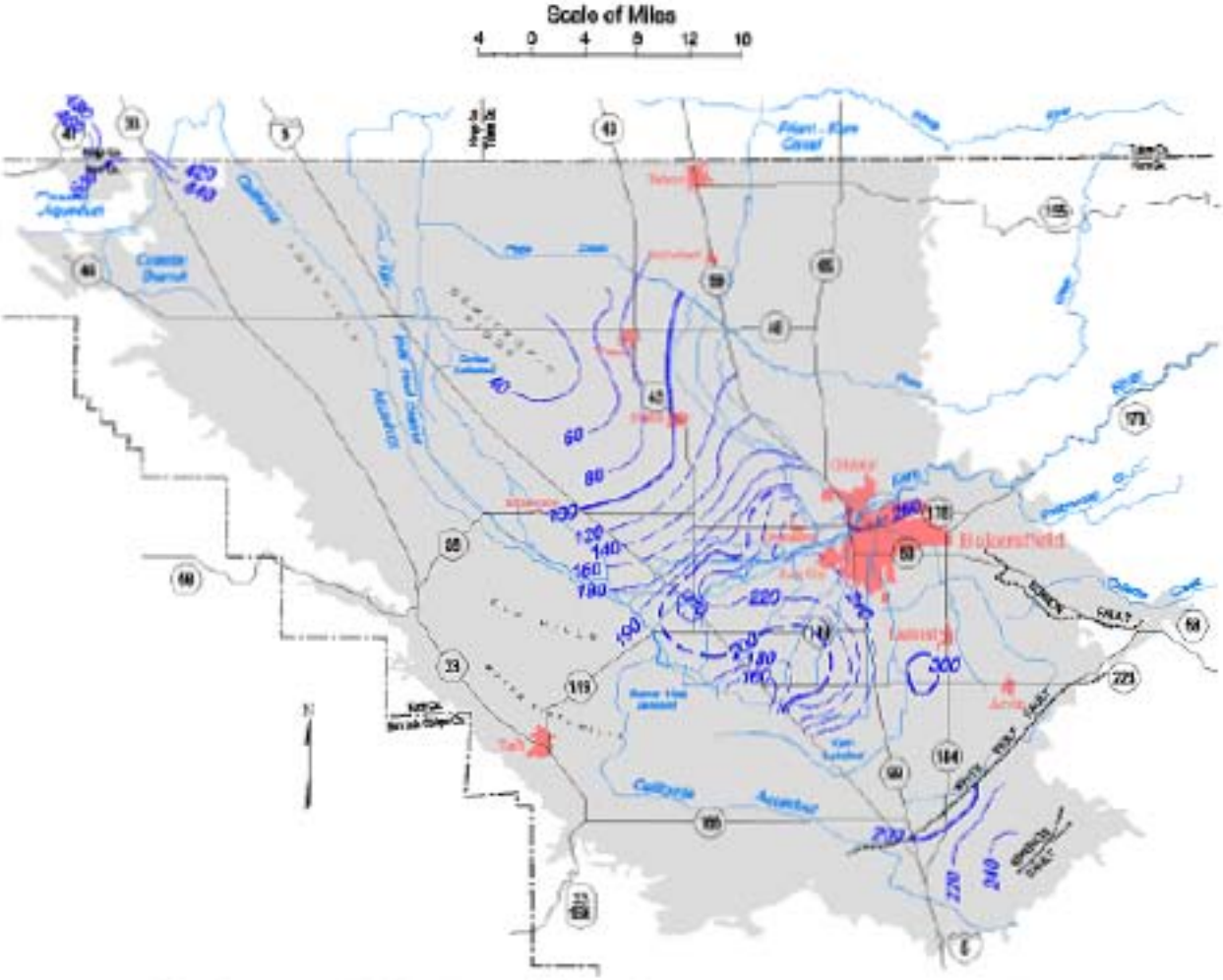



Contours are dashed where inferred. Contour interval is 10 and 20 feet.

*South Central Region*
*Groundwater Basin Contour Map*

# Kern Groundwater Basin

## Spring 2003, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

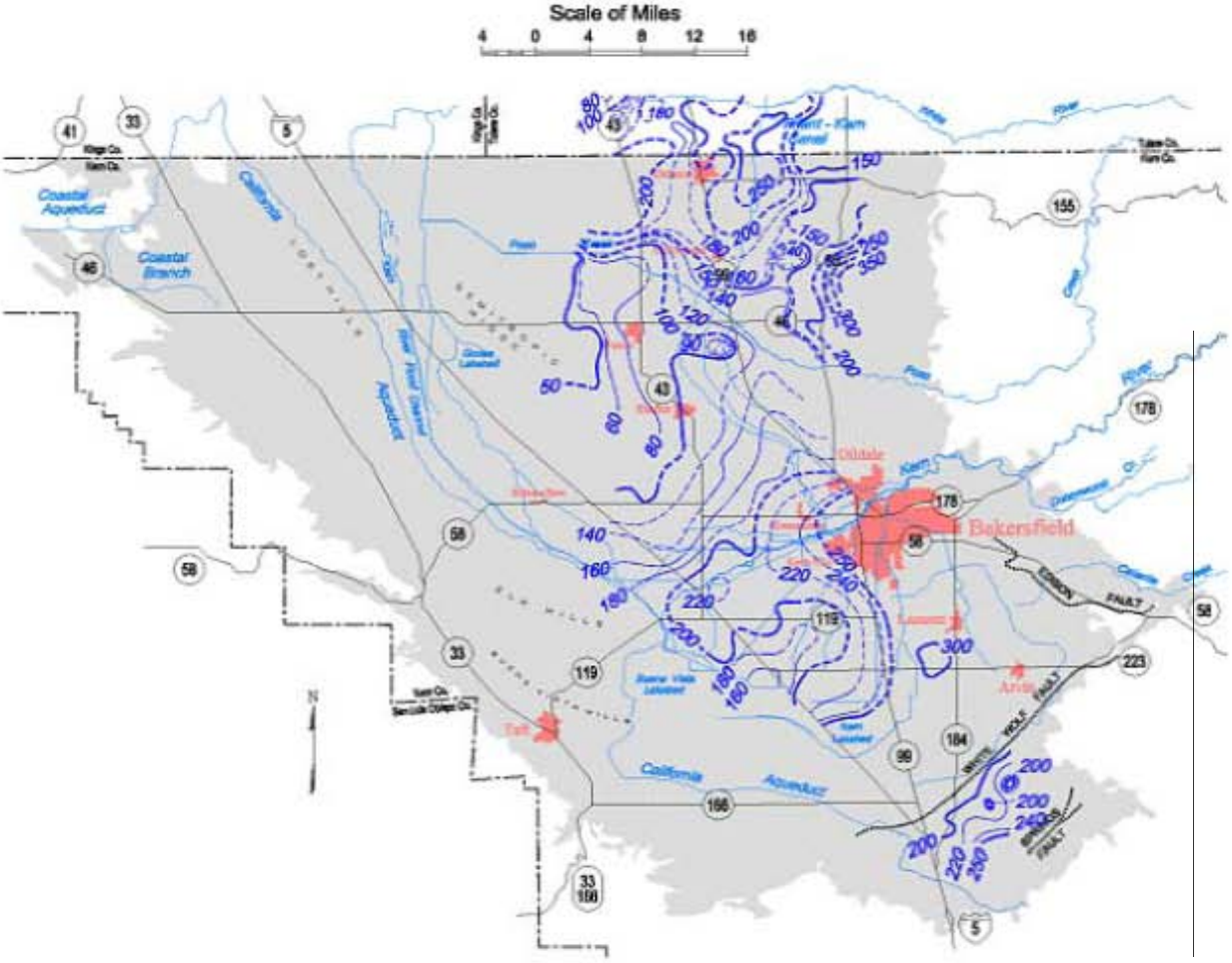



Contours are dashed where inferred. Contour interval is 10 and 20 feet.

*South Central Region*
*Groundwater Basin Contour Map*

# Kern Groundwater Basin

## Spring 2004, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

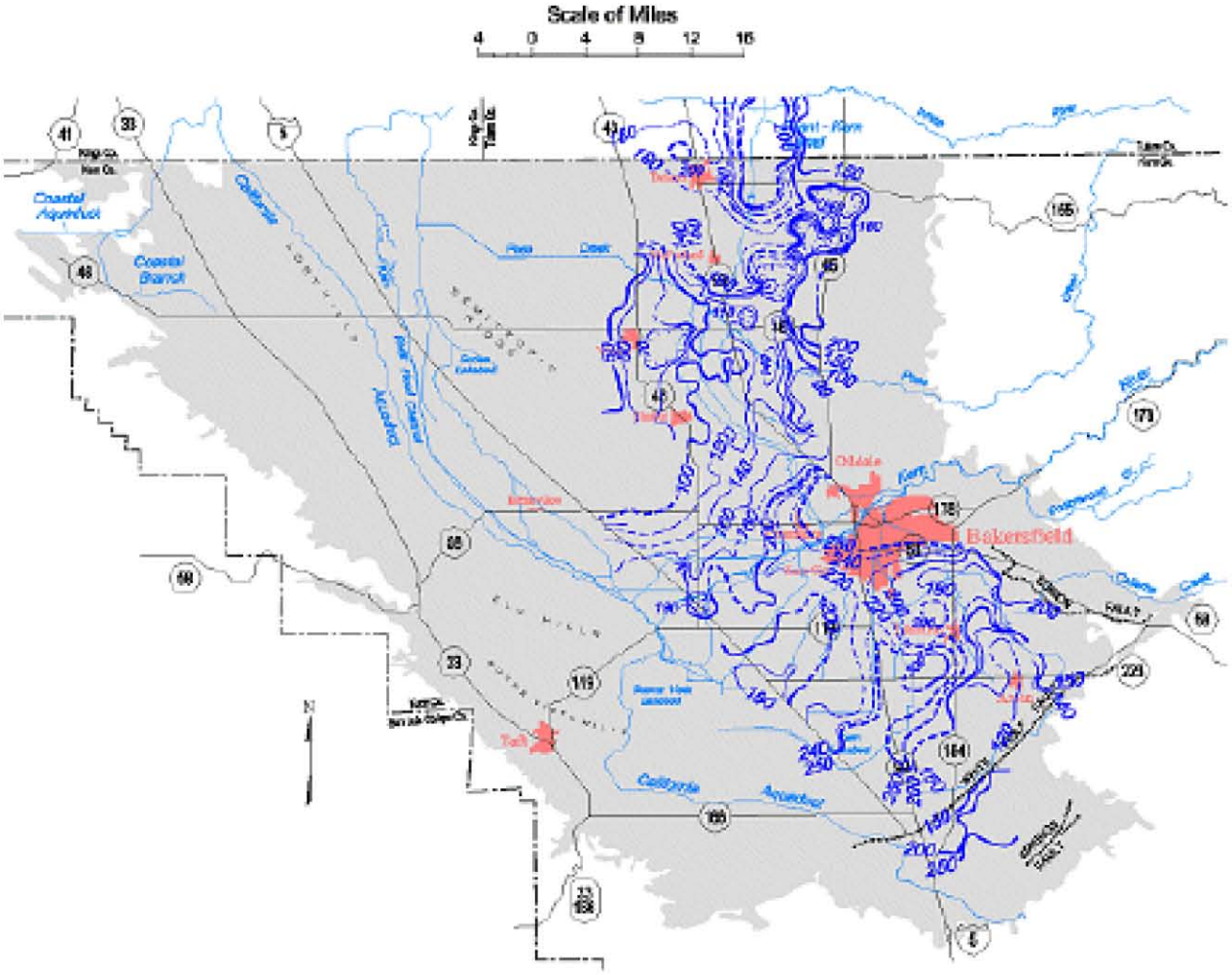



Contours are dashed where inferred. Contour interval is 10, 20 and 50 feet.

*South Central Region*
*Groundwater Basin Contour Map*

# Kern Groundwater Basin

## Spring 2005, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

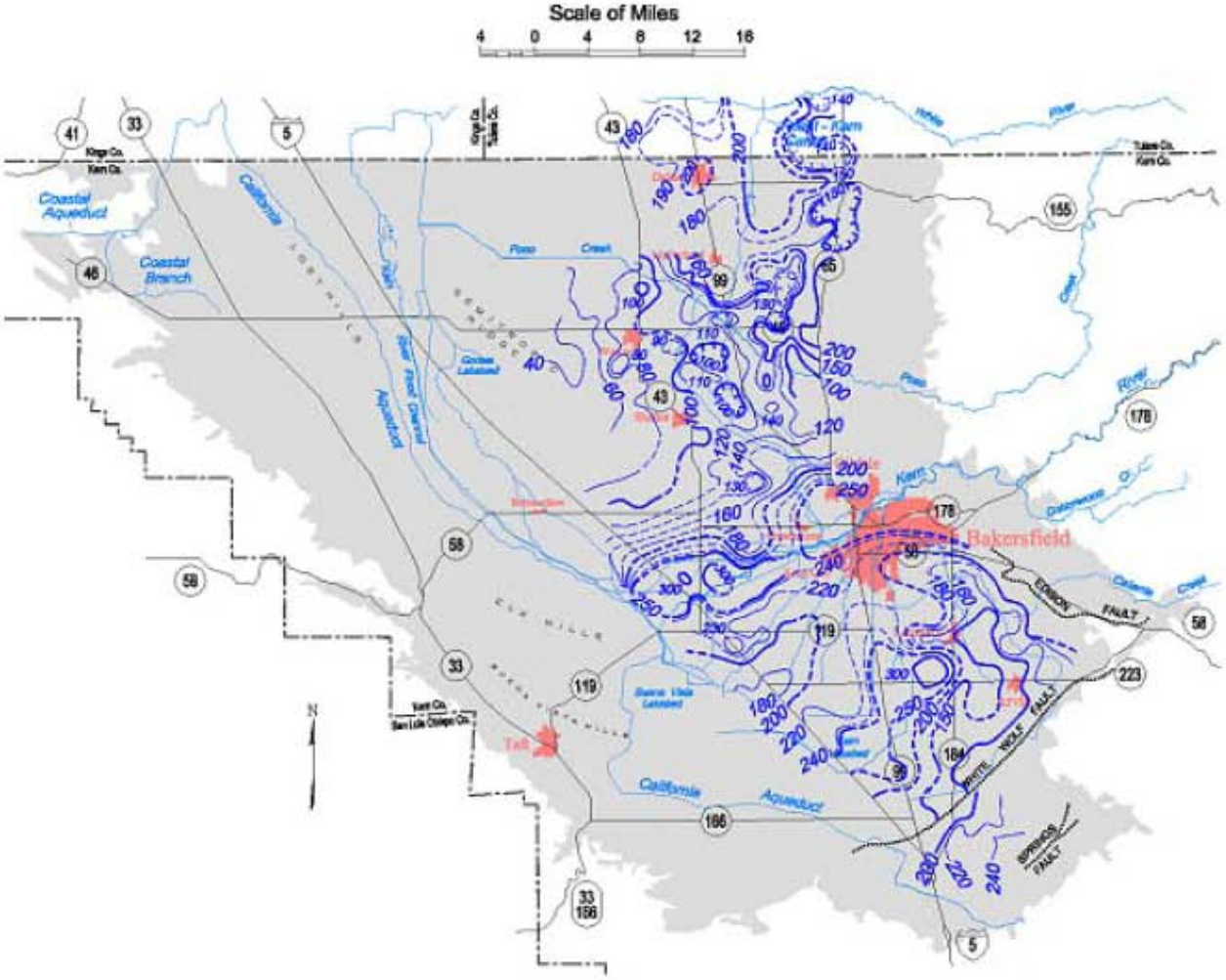



Contours are dashed where inferred. Contour interval is 10, 20 and 50 feet.

***South Central Region***
***Groundwater Basin Contour Map***

# Kern Groundwater Basin

## Spring 2006, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer




Contours are dashed where inferred. Contour interval is 10, 20 and 50 feet.

# APPENDIX 4.14-A
## TRAFFIC STUDY

# TRAFFIC IMPACT STUDY

## VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

**City of Delano, CA**

***arch beach***

C O N S U L T I N G

**July 2015**

# TRAFFIC IMPACT STUDY

# VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

## City of Delano, California

***Prepared by***

arch beach
CONSULTING

Project No. 14-015
July 2015

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# 1.0 INTRODUCTION

The following presents the Traffic Impact Study (TIS) prepared by Arch Beach Consulting for two proposed development projects: 1) Vineyard at Delano which is the development of 432 multi-family apartments; and, 2) Delano West Pavilion which is the development of 440 multi-family apartments and 340,000 square feet (SF) of retail/commercial and restaurant space. The "proposed project" analyzed in this TIS is a combination of the two development projects described above. All traffic analyses in this TIS are based on the development aspects/attributes of the combined projects.

The project sites are located adjacent to each other on the eastern side of the Stradley Avenue – Albany Street/Woollomes Avenue intersection in the City of Delano (City). Delano is located in Kern County, approximately 30 miles northwest of Bakersfield on State Route 99 (SR 99). Regional access to the project site would be provided via SR 99, while local access would be provided by Woollomes Avenue, Stradley Avenue – Albany Street, and the future-planned streets of Belmont Street, Dover Parkway, and Morse Boulevard.

The Lead Agency of the proposed project is the City of Delano. The following TIS has been prepared based on consultation with the City's Planning and Public Works Departments for which a *Memorandum of Understanding and Scoping Agreement* (MOU) was developed for this TIS. A copy of the MOU is provided in Appendix A. The TIS has been prepared consistent with the methodologies and requirements of the City, the Kern County Council of Governments (COG), and Caltrans.

## *Purpose and Objectives of the Traffic Study*

The purpose of this TIS is to evaluate the traffic and circulation impacts of the proposed project. The study objectives of this traffic study include:

- Establish the existing baseline traffic conditions.
- Develop the projected future Cumulative Buildout baseline conditions without the project by considering the cumulative effects of regional growth and traffic generated by other development projects in the study vicinity.
- Estimate the level of traffic that would be generated by the proposed development.
- Conduct a comparative analysis of traffic conditions with and without the project.
- Analyze on-site circulation and queuing with project traffic.
- Identify potential mitigation measures/roadway improvements.

This analysis is based on the weekday a.m. and p.m. peak hours of commute traffic on the adjacent street network. Also, because of the relatively large retail/commercial component of the project, a Saturday midday peak hour analysis was also conducted.

Per the project applicant, the proposed project would be constructed within a 10 year timeframe with several phases of development within each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion will be analyzed at full buildout (i.e., one single phase – buildout of project) to determine the total traffic mitigation measures required at full buildout of the project.

The applicant will be notified that separate *Focused Traffic Analyses* will be required, after certification of the EIR, for each phase of development (when specific numbers of DUs and retail square footages are determined) to determine the specific mitigation measures required for that

level of development. Those mitigation measures will be consistent with the measures required for the buildout of the project.

## *Site Location and Study Area*

The project site is located in the southwestern portion of the City. The project site is roughly L-shaped and approximately 110 acres in size and includes parcels within the City (Vineyard; APNs 521-010-019 and 521-010-20) and outside the southwest boundary of the City in an unincorporated area of Kern County (West Pavilion; APN 521-040-43). The Vineyard project site is currently designated in the Delano General Plan as Medium Residential and zoned General Commercial (GC). The West Pavilion project site is currently within the jurisdiction of Kern County, with a Kern County General Plan land use designation of Intensive Agriculture and zoned as Exclusive Agriculture. The Delano General Plan identifies the West Pavilion site as Medium Residential and Commercial.

Surrounding land uses include agriculture, commercial, and public facilities. To the west of the 33-acre Vineyard at Delano site is fallow agriculture land under the jurisdiction of Kern County. These lands are designated by Kern County as Intensive Agriculture. The areas east and north of the project site are located in the City of Delano. To the north is a combination of vacant and residential land, with a City General Plan designation of Low Residential and zoning of Single-Family Residential (R-1). The land to the east of the Vineyard site is also vacant, but has recently been approved for commercial land uses by the City as the future Grapevine commercial development project. To the south is the 77-acre West Pavilion site. Areas east of the Vineyard site include General Plan designations of Commercial and zoning designations of Community Retail Commercial.

Regional access to the project site would be provided via SR 99, while local access would be provided by Woollomes Avenue, Stradley Avenue – Albany Street, and the future-planned streets of Belmont Street, Dover Parkway, and Morse Boulevard.

Figure 1 illustrates the project site location at regional and local views. The study area intersections, roadway segments, and freeway mainline segments are as follows:

### Intersections

1. Albany Street/Garces Highway
2. Dover Place/Garces Highway
3. Albany Street/1st Avenue
4. Dover Place/1st Avenue
5. Ellington Street – SR 99 southbound on-ramp/1st Avenue
6. Fremont Street – SR 99 northbound off-ramp/1st Avenue
7. Belmont Street/Morse Boulevard *(future intersection)*
8. Dover Parkway/Morse Boulevard *(future intersection)*
9. Woollomes Avenue/Stradley Avenue – Albany Street
10. Woollomes Avenue/Belmont Street *(future intersection)*
11. Woollomes Avenue/Grapevine – West Pavilion Driveway *(future intersection)*
12. Woollomes Avenue/Dover Parkway
13. Woollomes Avenue/Marketplace Drive
14. Woollomes Avenue/Home Depot East

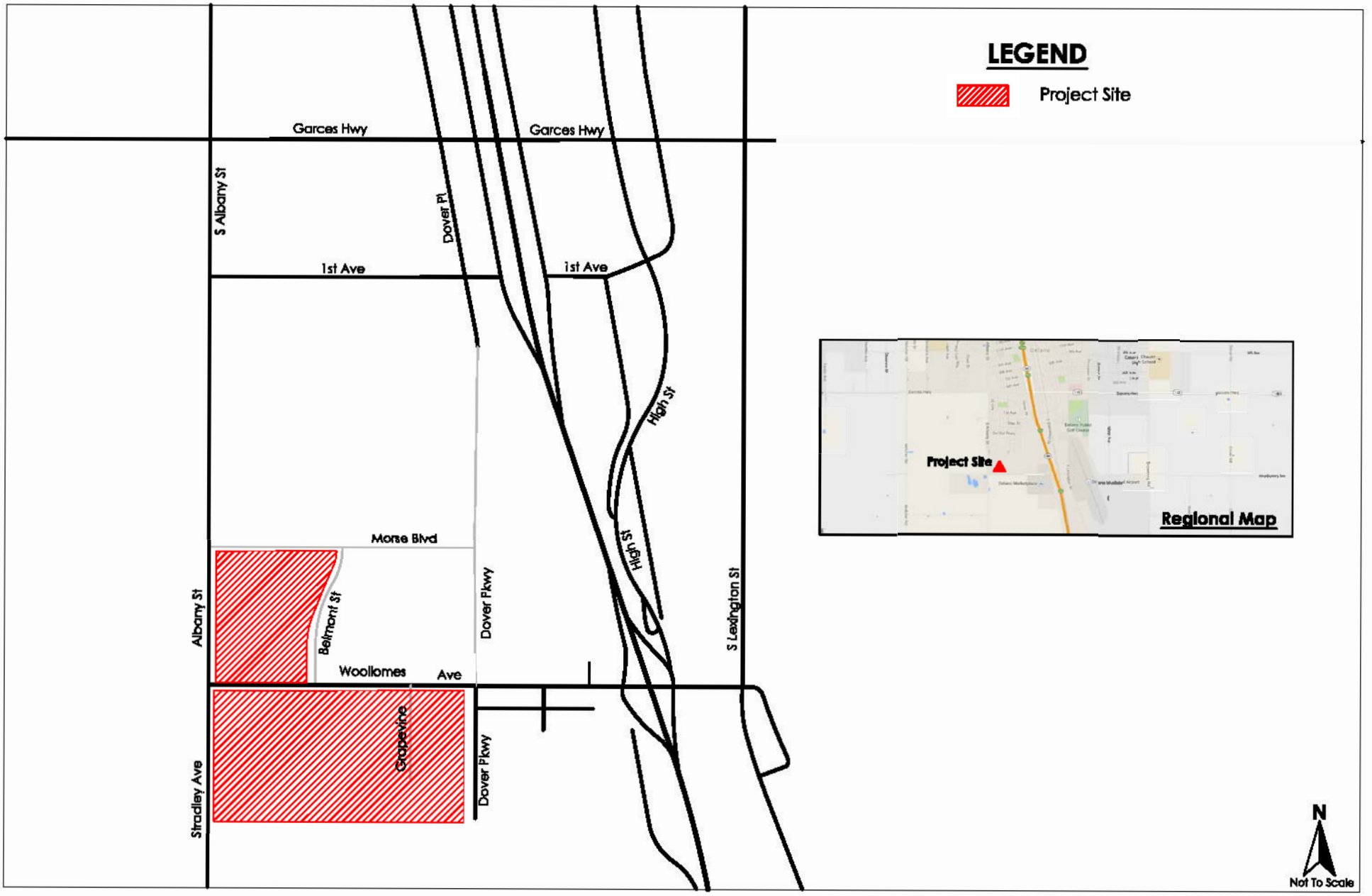


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Figure 1
Site Location (Regional and Local)

15. Woollomes Avenue/SR 99 southbound ramps
16. Woollomes Avenue/SR 99 northbound ramps
17. Woollomes Avenue/S. Lexington Street

### Roadway Segments

1. Woollomes Avenue, Stradley Avenue – Albany Street to Belmont Street *(future street)*
2. Woollomes Avenue, Belmont Street *(future street)* to Grapevine – West Pavilion Driveway *(future street)*
3. Woollomes Avenue, Grapevine – Pavilion Driveway *(future street)* to Dover Parkway
4. Woollomes Avenue, Dover Parkway to Home Depot East
5. Woollomes Avenue, Home Depot East to SR 99 southbound ramps
6. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps
7. Woollomes Avenue, SR 99 northbound ramps to S. Lexington Street
8. Albany Street, north of Woollomes Avenue
9. Stradley Avenue, south of Woollomes Avenue
10. Belmont Street *(future street)*, north of Woollomes Avenue
11. Belmont Street *(future street)*, south of Woollomes Avenue
12. Lexington Street, north of Woollomes Avenue
13. Lexington Street, south of Woollomes Avenue

### Freeway Mainline Segments

1. SR 99 northbound, north of Woollomes Avenue
2. SR 99 southbound, north of Woollomes Avenue
3. SR 99 northbound, south of Woollomes Avenue
4. SR 99 southbound, south of Woollomes Avenue

Figure 2 illustrates the project study area intersections and roadway segments.

## *Methodology*

### Intersections

The assessment of intersection conditions in this TIS addresses LOS in terms of vehicle control delay (in seconds per vehicle) for signalized and unsignalized intersections. The level of service grades (LOS A – LOS F), as reported in *Highway Capacity Manual* (HCM), are dependent on vehicle control delay (in seconds) at the signalized and unsignalized intersections. Both signalized and unsignalized study area intersections have been analyzed using the HCM Operations method. The Synchro LOS software was used to determine intersection LOS for all study scenarios. Synchro is consistent with the HCM methodologies as well as the City's requirements.

The degree of congestion at an intersection is described by the level of service, which ranges from LOS A to LOS F, with LOS A representing free-flow conditions with little delay and LOS F representing over-saturated traffic flow throughout the peak hour. A complete description of the meaning of level of service can be found in the Highway Research Board Special Report 209, *Highway Capacity Manual* (HCM). Brief descriptions of the six levels of service for signalized intersections are shown in Table A. Table B below provides detailed descriptions of each level of service.

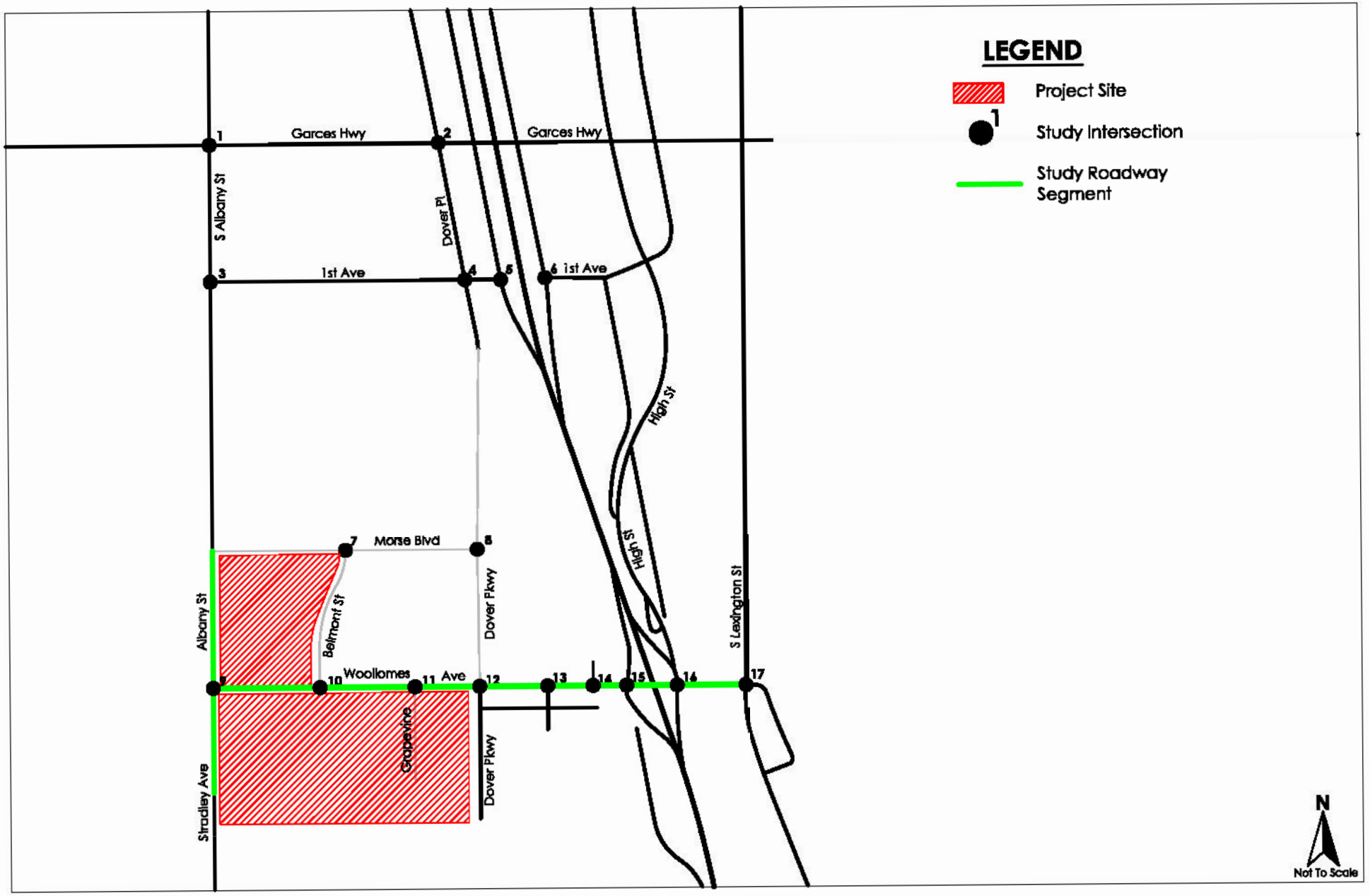


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Figure 2
Project Study Area
Intersections and Roadway Segments

**Table A – Level of Service Definitions**

| Level of Service | V/C Ratio or ICU (signalized) | Control Delay in Seconds (unsignalized) |
|---|---|---|
| A | 0.00 – 0.60 | 0.0 – 10.0 seconds |
| B | 0.61 – 0.70 | 10.1 – 15.0 seconds |
| C | 0.71 – 0.80 | 15.1 – 25.0 seconds |
| D | 0.81 – 0.90 | 25.1 – 35.0 seconds |
| E | 0.91 – 1.00 | 35.1 – 50.0 seconds |
| F | 1.01 or greater | 50.1 seconds or greater |

**Table B – Level of Service Descriptions**

| LOS | Description |
|---|---|
| A | No approach phase is fully utilized by traffic, and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily, and nearly all drivers find freedom of operation. |
| B | This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are nearing full use. Many drivers begin to feel restricted within platoons of vehicles. |
| C | This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. |
| D | This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups. |
| E | Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand. |
| F | This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially, and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero. |

Source: Highway Capacity Manual, Transportation Research Board, Special Report No. 209, Washington, D.C., 2000.

## Roadway Segments

Consistent with the City of Delano Circulation Element, the Florida Department of Transportation's *Florida's Level of Service Standards and Guidelines Manual for Planning* was used to evaluate roadway segments on a volume-to-capacity basis. Table C presents the roadway segment LOS thresholds by facility type in the study area.

**Table C – Daily Roadway Segment LOS Thresholds**

| | LOS A | LOS B | LOS C | LOS D | LOS E |
|---|---|---|---|---|---|
| All Roadway Facilities Volume-to-Capacity (V/C) | < 0.60 | 0.6 – 0.7 | 0.7 – 0.8 | 0.8 – 0.9 | 0.9 – 1.0 |
| | **Two-way Average Daily Traffic (ADT) Threshold** | | | | |
| **Roadway Segment Type** | **LOS A** | **LOS B** | **LOS C** | **LOS D** | **LOS E** |
| 6-lane Divided (>4.5 signals/mile) | -- | -- | 17,730 | 39,330 | 43,380 |
| 4-lane Divided (>4.5 signals/mile) | -- | -- | 11,340 | 25,380 | 28,710 |
| 2-lane Undivided (>4.5 signals/mile) | -- | -- | 4,845 | 11,305 | 14,155 |
| 6-lane Divided (2 to 4.5 signals/mile) | -- | -- | 35,100 | 45,270 | 47,790 |
| 4-lane Divided (2 to 4.5 signals/mile) | -- | -- | 22,500 | 29,880 | 31,590 |
| 2-lane Divided (2 to 4.5 signals/mile) | -- | -- | 9,450 | 13,680 | 14,580 |
| 4-lane Undivided (<2 signals/mile) | -- | 19,045 | 23,075 | 23,855 | -- |
| 2-lane Undivided (<2 signals/mile) | -- | 8,640 | 13,860 | 14,850 | -- |

Notes: [1] Thresholds based on 2009 FDOT Quality/Level of Service Handbook, Florida Department of Transportation. Adjustments made according to appropriate area conditions, following FDOT guidelines.

[2] All volumes are approximate and assume typical roadway characteristics. Actual threshold volumes for each LOS listed above may vary depending on a variety of factors including (but not limited to) roadway curvature and grade, intersection or interchange spacing, driveway spacing, percentage of trucks and other heavy vehicles, travel lane widths, signal timing characteristics, on-street parking, volume of cross traffic and pedestrians, etc.

Per the *FDOT Quality/Level of Service Handbook*, if a roadway segment has an uneven number of lanes (e.g., 5-lane Divided, 3 in eastbound direction and 2 in westbound direction), the lower roadway segment type capacity threshold (e.g., 4-lane Divided) should be used.

### Freeway Mainline Segments

Existing (2013) Annual Average Daily Traffic (AADT) volumes were obtained from the Caltrans *Traffic and Vehicle Data Systems Unit* webpage. The "K" and "D" factors used to get the peak hour directional volumes for the weekday a.m. and p.m. peak hours, and Saturday midday peak hour, were obtained from the *Peak Hour Volume Data Report* on the Caltrans Traffic Data Branch website. Future traffic volume forecasts were post-processed in accordance to Kern COG modeling procedures. The delay and LOS was calculated using the HCM methodology for basic freeway segments. The *Highway Capacity Software* (HCS) program was used to perform these calculations.

## *Significance Criteria*

### Intersections and Roadway Segments

The *City of Delano 2030 General Plan Circulation Element* establishes LOS C or LOS D as the threshold for satisfactory operations on intersections and roadway segments in the City:

> "*Achieve and maintain Level of Service "C" at all intersections throughout the City, with the exception of freeway interchanges and high volume intersections where the City's objective is to achieve and maintain Level of Service "D".*"

Consistent with the General Plan policy above, LOS D will be the minimum acceptable LOS standard for all study intersections and roadway segments along Woollomes Avenue as it's developed and planned as a high-volume, commercial corridor and freeway interchange with SR 99. Therefore, for all intersections and roadway segments on Woollomes Avenue, the minimum acceptable LOS will be LOS D. For all other intersections and roadway segments in the study area, the minimum acceptable LOS will be LOS C.

### Freeway Mainline Segments and On-/Off Ramps

As required by Caltrans District 6, and consistent with the *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002), LOS C will be the minimum acceptable LOS for SR 99 mainline segments and on- and off ramps.

## *Traffic Analysis Scenarios*

This traffic study analyzed the following traffic scenarios:

### Existing Condition

Existing weekday daily, a.m. and p.m. peak hour peak hour, and Saturday midday peak hour traffic volumes were collected at the study area intersections and roadway segments in late-August 2014 from 7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m. for a typical weekday, and 11:00 a.m. to 1:00 p.m. for a typical Saturday. The only school in the study area, the Nueva Vista Language Academy School, was in session during the weekday traffic counts. The existing traffic scenario constitutes the environmental setting in accordance with the CEQA analysis at the time that the hearing body reviews the proposed project.

### Existing plus Project Condition

The Existing plus Project Condition traffic was developed by adding the proposed project traffic to the Existing Baseline Condition. This scenario is the basis for determining project-specific impacts and mitigation measures to the existing conditions.

### Cumulative Buildout (2040) Baseline Condition

The proposed project would be constructed within a 10 year timeframe with several phases of development within each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion was analyzed at full buildout (i.e., one single phase – buildout of project) to determine the total traffic mitigation measures required at full buildout of the project. The Cumulative Buildout Baseline condition represents buildout of the General Plan land uses in the study area based on traffic growth up to year 2040 in the Kern COG travel demand model; plus, traffic from cumulative (approved/pending) projects in the study area as provided by the City.

### Cumulative Buildout (2040) plus Project Condition

The Cumulative Buildout (2040) plus Project Condition traffic was developed by adding the proposed project traffic to the Cumulative Buildout (2040) Baseline Condition. This scenario is also the basis for determining project-specific impacts, mitigation measures, and project contributions to impacted facilities.

# 2.0 PROJECT DESCRIPTION AND TRAFFIC GENERATION

The following section provides information on the proposed project relative to the local and regional circulation network.

## *Project Description*

Figure 3 illustrates the conceptual site plan of the proposed project. At this point, there is no specific development plan in terms of detailed layouts of structures and access driveway locations. As discussed above, the project analyzed in this TIS is a combination of two development projects. One, the Vineyard at Delano project, is an all-residential project, while the other, the Delano West Pavilion project, is a combination residential and commercial project. While each of the projects is described separately, the actual "project" analyzed in this TIS is the combination of both projects. All traffic analyses are based on the development aspects/attributes of the combined projects.

The Vineyard at Delano project site is 33 acres in size and is currently fallow land. The Vineyard at Delano project proposes 432 multi-family low-rise apartment (one- and two-story) units in 36 separate apartment buildings. Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center. All parking for the project would be accommodated on-site.

The Delano West Pavilion project site is approximately 77 acres in size and is also currently fallow land. The project proposes 440 apartment units and approximately 340,000 square feet of commercial and restaurant space. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

The project site would be served by Woollomes Avenue, Stradley Avenue – Albany Street, and Dover Parkway. New street segments of Belmont Street and Morse Boulevard would also be constructed as part of the project. Woollomes Avenue runs between the Vineyard and West Pavilion sites in an east–west manner, and Dover Parkway runs along the eastern border of the sites. Woollomes Avenue provides access to SR 99.

The project proposes a new street, Belmont Street, which would bisect the project sites in a north–south direction, forming a new intersection at Woollomes Avenue and providing access between the Vineyard development and the West Pavilion development.

### Project Street Improvements

Based on discussions with the City, it is anticipated that the proposed project would be conditioned to construct the following street improvements (from east side of project to west side of project):

- Construct the half-(street) section of Dover Parkway (west side of center line)), from Woollomes Avenue to its southern project boundary to have two lanes in the southbound direction. The east side has already been constructed to its ultimate width. Dover Parkway has an ultimate right-of-way (ROW) of 90 feet.
- Construct the half-section of Woollomes Avenue (south side of center line), from the future Belmont Street to Dover Parkway to have two lanes in the eastbound direction. Woollomes Avenue has an ultimate ROW of 110 feet.
- Connect a primary access driveway on the West Pavilion site to the future Grapevine Shopping Center primary access driveway. This intersection will be signalized.

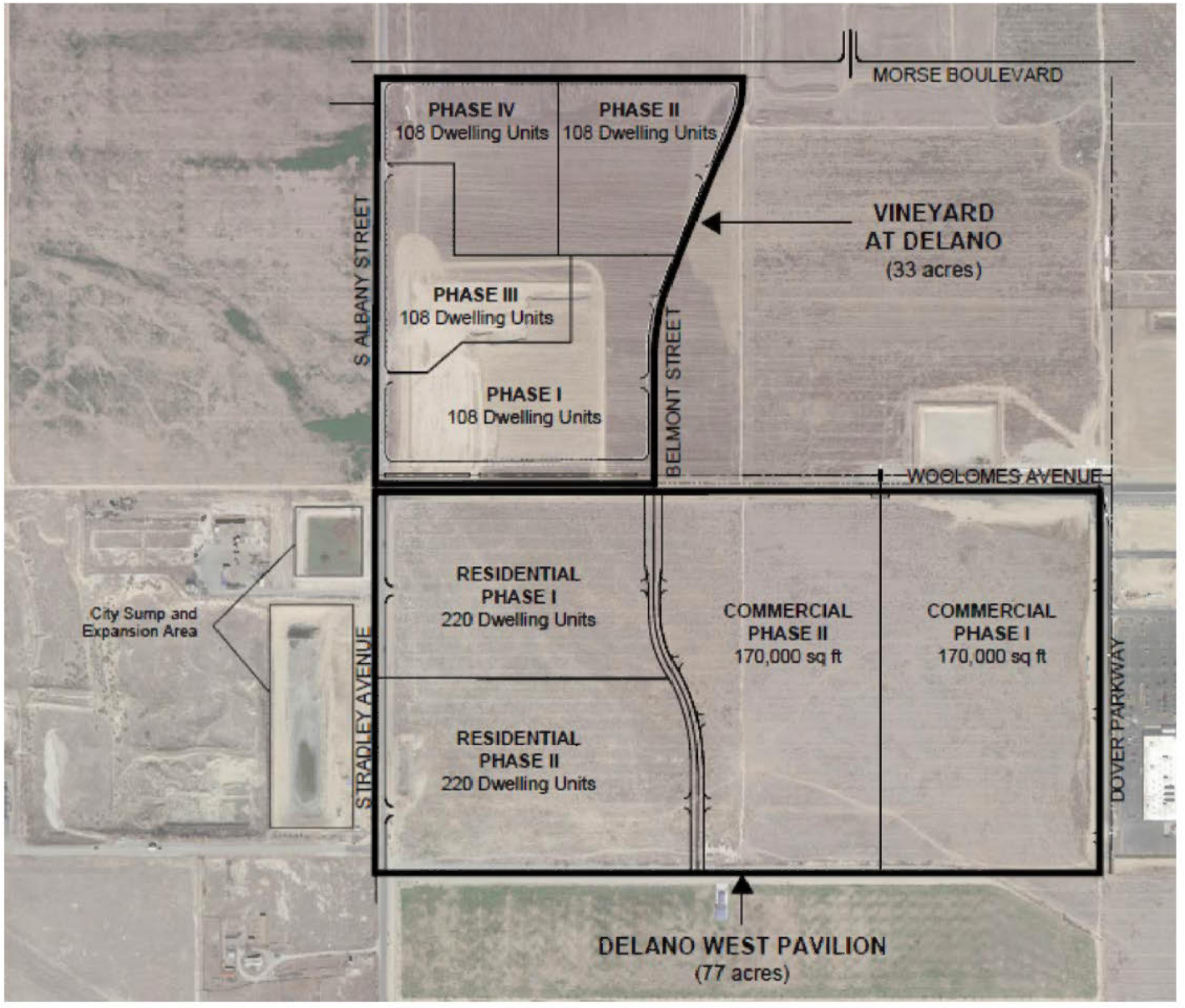


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Figure 3
Conceptual Proposed
Site Plan

- Construct the half-section of Belmont Street (west side of center line), from the future Morse Boulevard to Woollomes Avenue to have two lanes in the southbound direction. Belmont Street has an ultimate ROW of 90 feet.
- Construct the full section of Belmont Street (both sides of center line), from Woollomes Avenue to its southern project boundary to have four total lanes (two lanes in each direction) plus a median. Belmont Street has an ultimate ROW of 90 feet.
- Install a traffic signal at the Belmont Street/Woollomes Avenue intersection.
- Construct the full section of Woollomes Avenue (both sides of center line), from Stradley Avenue – Albany Street to Belmont Street to have four total lanes (two lanes in each direction) plus a median. Woollomes Avenue has an ultimate ROW of 110 feet.
- Construct the half-section of Morse Boulevard (south side of center line), from Albany Street to the future Belmont Street to have two lanes in the eastbound direction. Morse Boulevard has an ultimate ROW of 90 feet.
- Construct the half-section of Stradley Avenue – Albany Street (east side of center line), from the northern project boundary to the southern project boundary to have two lanes in the northbound direction. Stradley Avenue – Albany Street has an ultimate ROW of 90 feet.

It is anticipated that construction of the projects would be phased over an approximately 10-year time frame. The first phases of the project would consist of the residential development, amenities, and associated infrastructure on the Vineyard site. The residences would be constructed in four phases, each phase resulting in the development of 108 units. It is estimated that construction of each phase would last approximately 18 months. Thus, the Vineyard site would be completed in approximately three to four years.

The Delano West Pavilion site would begin construction following the completion of the Vineyard at Delano site and last approximately six years. The Delano West Pavilion site would similarly be developed in four phases as the Vineyard site. However, overlap and timing of the phases may also occur subject to market conditions at that time.

## *Project Traffic*

This section describes the trip generation, distribution, and assignment of the proposed project's traffic volumes on the study area transportation network facilities.

### Trip Generation

Trip generation rates for the proposed apartment and shopping center land uses were obtained from *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE) in 2012. Per ITE, a "Shopping Center" and its trip rates are defined as:

> "*…an integrated group of commercial establishments that is planned, developed, owned and managed as a unit. A shopping center's composition is related to its market area in terms of size, location and type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands…*
>
> *…Shopping centers, including neighborhood centers, community centers, regional centers and super regional centers, were surveyed for this land use. Some of these centers contained non-merchandising facilities, such as office buildings, movie theaters, restaurants, post offices, banks, health clubs and recreational facilities (for example, ice skating rinks or indoor miniature golf courses)…*"

Table D presents the proposed project's trip generation estimates for weekday and Saturday daily trips; and, weekday a.m. and p.m. peak hour, and Saturday midday peak hour project trips.

**Table D – Project Trip Generation Estimates**

| Land Use | Size/Units | | Daily | Weekday AM Peak Hour OR Saturday Midday Peak Hour In | Out | Total | Weekday PM Peak Hour In | Out | Total |
|---|---|---|---|---|---|---|---|---|---|
| ***TRIP RATES*** | | | | | | | | | |
| Apartment (ITE 220) - WEEKDAY | per DU | | 6.65 | 0.10 | 0.41 | 0.51 | 0.40 | 0.22 | 0.62 |
| Apartment (ITE 220) - SATURDAY | per DU | | 6.39 | 0.26 | 0.26 | 0.52 | -- | – | -- |
| Shopping Center (ITE 820) - WEEKDAY & SATURDAY | per TSF | | *ITE* [1] | *ITE equation* [1] | | | *ITE equation* [1] | | |
| ***WEEKDAY TRIP GENERATION*** | | | | | | | | | |
| Apartments at Vineyard at Delano (phases I - IV) | 432 | DUs | 2,873 | 44 | 176 | 220 | 174 | 94 | 268 |
| Apartments at Delano West Pavilion (phases I & II) | 440 | DUs | 2,926 | 45 | 180 | 224 | 177 | 95 | 273 |
| Shopping Center at Delano West Pavilion (phase III) | 170,000 | TSF | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| *pass-by trips (8%)* [2] | | | *-802* | *-11* | *-7* | *-18* | *-34* | *-37* | *-72* |
| | **Subtotal** | | **8,786** | **122** | **75** | **197** | **376** | **407** | **783** |
| Shopping Center at Delano West Pavilion (phase IV) | 170,000 | TSF | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| *pass-by trips (8%)* [2] | | | *-802* | *-11* | *-7* | *-18* | *-34* | *-37* | *-72* |
| | **Subtotal** | | **8,786** | **122** | **75** | **197** | **376** | **407** | **783** |
| **PROJECT NET EFFECTIVE TRIP GENERATION** | | | **23,370** | **334** | **506** | **840** | **1,103** | **1,004** | **2,107** |
| ***SATURDAY TRIP GENERATION*** | | | | | | | | | |
| Apartments at Vineyard at Delano | 432 | DUs | 2,760 | 112 | 112 | 225 | | | |
| Apartments at Delano West Pavilion | 440 | DUs | 2,812 | 114 | 114 | 229 | | | |
| Shopping Center at Delano West Pavilion (phase III) | 170,000 | TSF | 12,907 | 642 | 592 | 1,234 | | | |
| *pass-by trips (9%)* [2] | | | *-1,136* | *-56* | *-52* | *-109* | | | |
| | Subtotal | | 11,772 | 585 | 540 | 1,126 | | | |
| Shopping Center at Delano West Pavilion (phase IV) | 170,000 | TSF | 12,907 | 642 | 592 | 1,234 | | | |
| *pass-by trips (9%)* [2] | | | *-1,136* | *-56* | *-52* | *-109* | | | |
| | Subtotal | | 11,772 | 585 | 540 | 1,126 | | | |
| **PROJECT NET EFFECTIVE TRIP GENERATION** | | | **29,116** | **1,397** | **1,307** | **2,705** | | | |

Notes: Trip generation rates based on *Trip Generation, 9th Edition*, Institute of Transportation Engineers (ITE), 2012.

[1] Shopping Center trip generation estimates are based on the logrithmic equations contained in *Trip Generation, 9th Edition*.

[2] Per the ITE *Trip Generation Handbook, Second Edition* (ITE 2004), the calculated pass-by trip percentage for this size of Shopping Center Use is approximately 33% for the weekday and 35% for Saturday. A conservative estimate of one-quarter of that percentage (8% and 9%, respectively) was used in this analysis.

According to the table, the proposed project would generate approximately 23,370 weekday daily trips, 840 a.m. peak hour trips (334 inbound and 506 outbound), and 2,107 p.m. peak hour trips (1,103 inbound and 1,004 outbound). For a typical Saturday, the proposed project would generate 29,116 daily trips and 2,705 midday peak hour trips (1,397 inbound and 1,307 outbound).

Pass-by trips are defined as existing trips already on a roadway that divert into the project driveway(s) between their original origin and destination. Per the ITE *Trip Generation Handbook*

(ITE 2004), the surveyed pass-by trip percentages for the shopping center uses is approximately 33 percent for the weekday and 35 percent for a Saturday. However, since Woollomes Avenue is not major commuter corridor, a conservative pass-by trip rate of one-quarter of the 33 percent (weekday)and 35 percent (Saturday) was used, and equated to a pass-by percentage of 8 percent (weekday) and 9 percent (Saturday).

No additional trip reductions for internal trip capture were taken as they have already been accounted for in the Shopping Center trip rates (equations).

## *Trip Distribution and Assignment*

Project trip distribution estimates were based on unique trip distribution patterns for residential land uses and retail/commercial land uses. Because of the regional location of the proposed project on the southern end of the City, a majority of project trips are expected to travel on SR 99 rather than local surface streets. Project trips destined to/from the northwest portion of the City are anticipated to use Albany Street and the future Dover Parkway.

Figures 4 and 5 illustrate the weekday and Saturday project residential component trip distribution and assignments on the future roadway network (with Dover Parkway, Belmont Street, and Morse Boulevard), respectively. Figures 6 and 7 illustrate the weekday and Saturday project retail/commercial component trip distribution and assignment on the future roadway network, respectively.

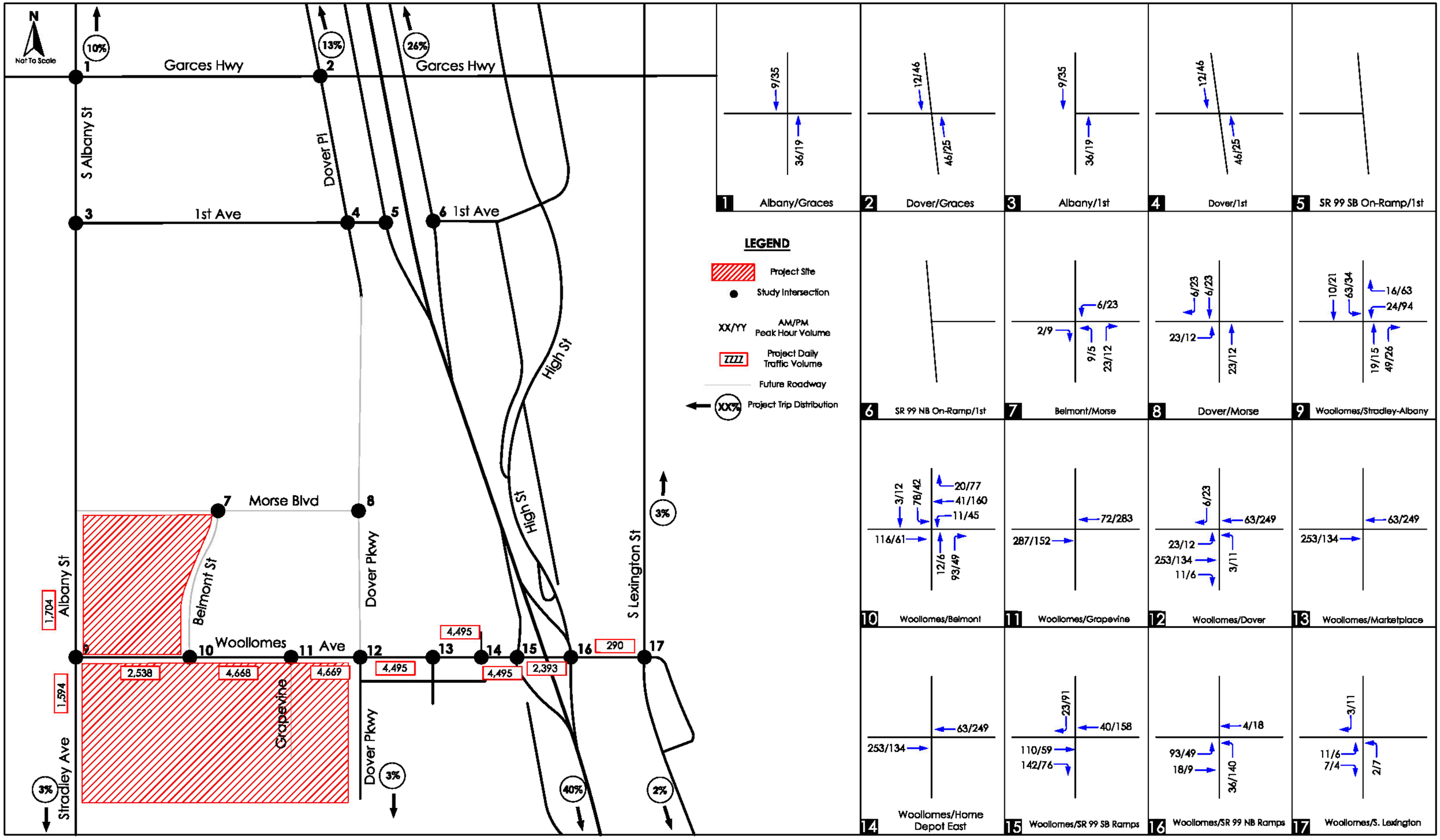


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Figure 4
Weekday Project Residential Component Trip Distribution and Assignment (Future Roadway Network)

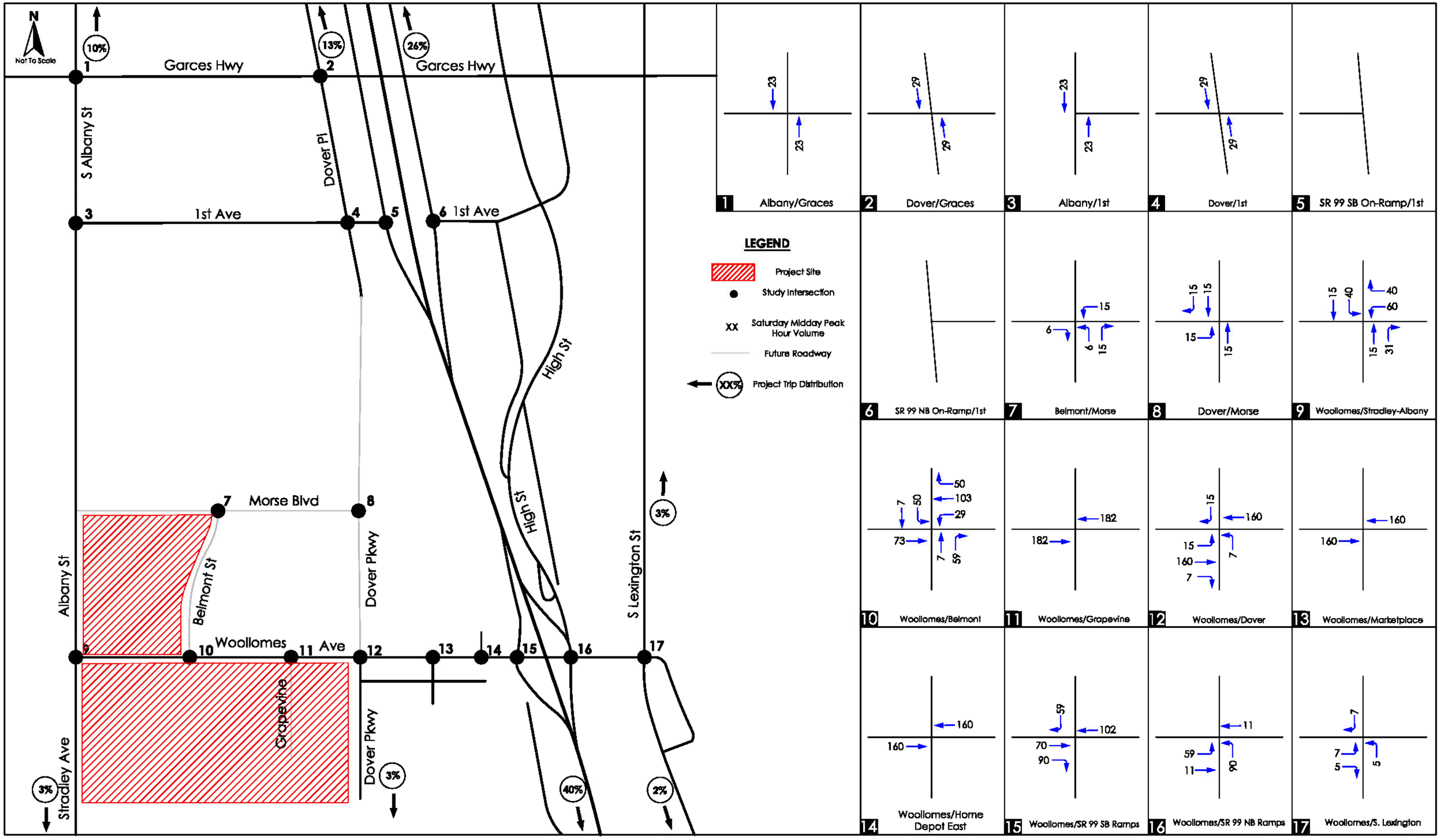


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Figure 5

Saturday Project Residential Component Trip Assignment (Future Roadway Network)

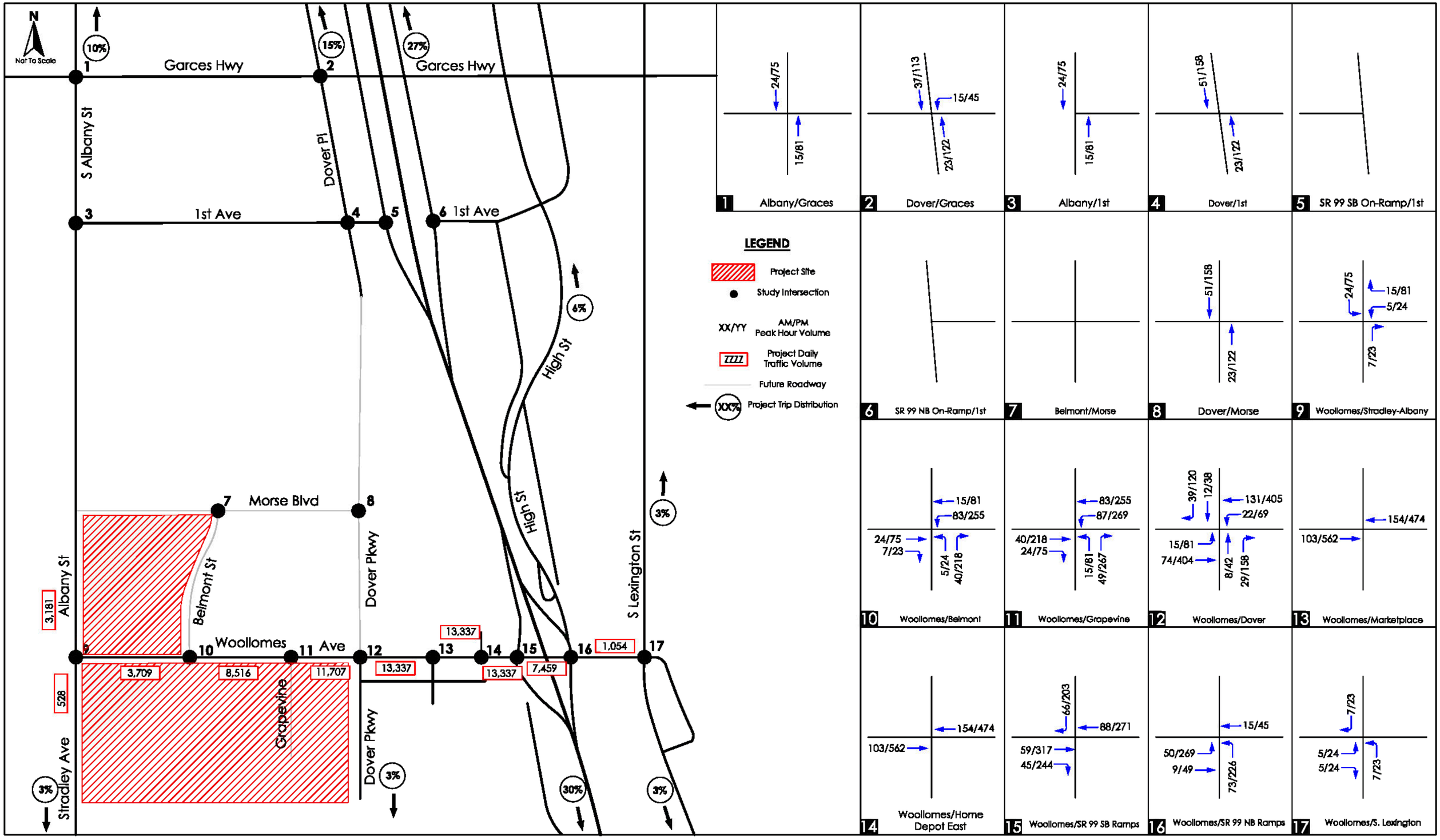


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Figure 6
Weekday Project Retail-Commercial Component Trip Distribution and Assignment (Future Roadway Network)

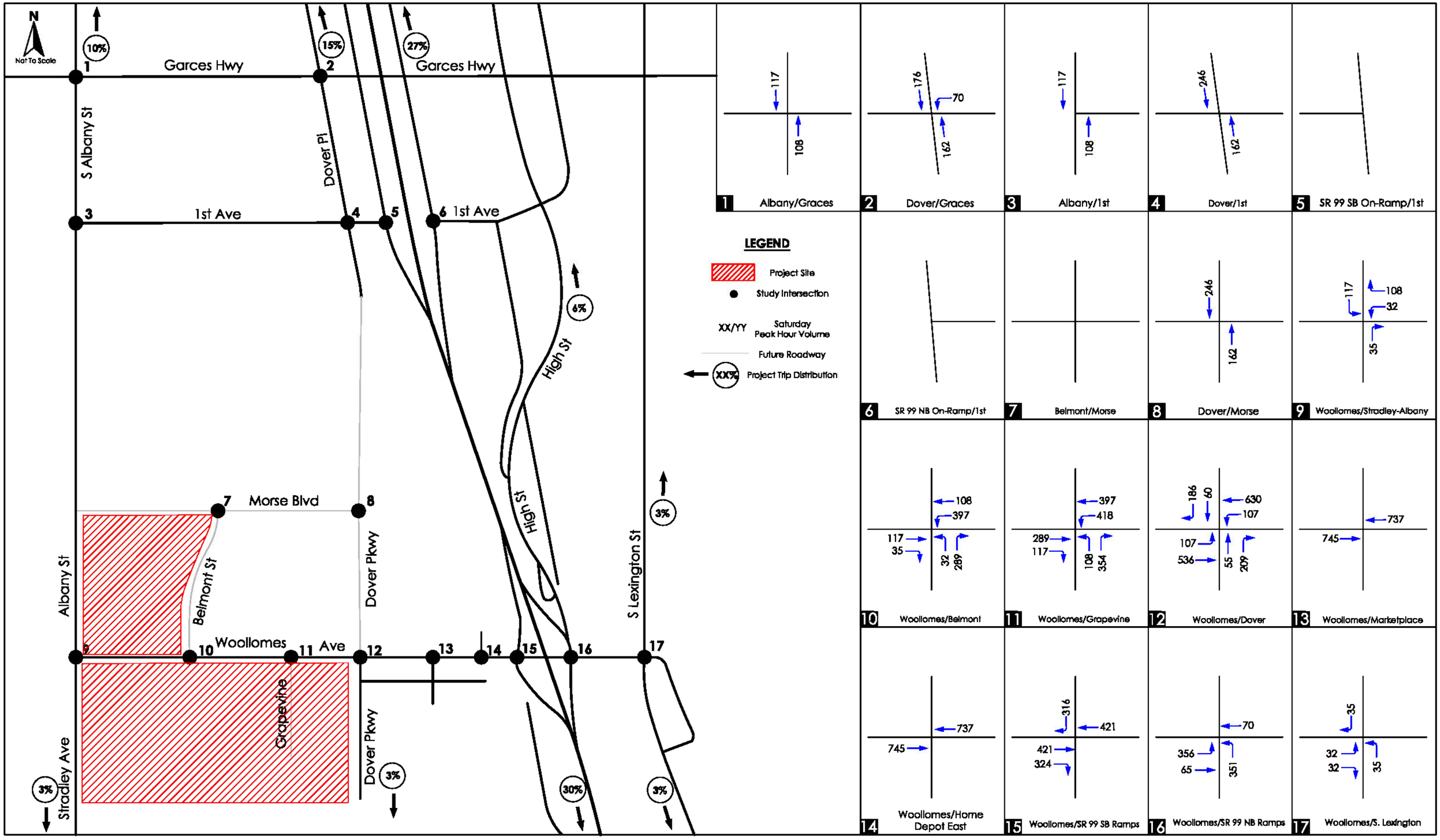


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Figure 7
Saturday Project Retail-Commercial Component Trip Distribution and Assignment (Future Roadway Network)

# 3.0 EXISTING CONDITIONS ANALYSIS

The following section describes the existing traffic conditions in the project study area. Existing weekday a.m. and p.m. peak hour, and Saturday midday peak hour traffic volumes were collected in late-August 2014 at the study area intersections and roadway segments.

## *Existing Conditions*

### Roadways

#### State Route 99 (SR 99)

State Route 99 (SR 99) is a major State freeway facility that traverses in the north-south direction through Central and Northern California. Regionally, SR 99 serves as the primary inter-regional auto and truck travel route that connects the Central Valley cities of Tulare, Visalia, and Fresno to the north; and, Bakersfield, Interstate 5 (I-5), and the greater Los Angeles region to the south. Within Kern County, SR 99 serves as a vital north-south artery, and is a six-lane divided freeway (three travel lanes in each direction) with a posted speed limit of 70 miles per hour (MPH) in the project vicinity. Based on 2013 Caltrans traffic volumes, the average daily traffic (ADT) volume on SR 99 in the project vicinity is 54,000 ADT.

#### Woollomes Avenue

Woollomes Avenue is an east-west arterial in the southern portion of the City that extends from Stradley Avenue – Albany Street to the west, over SR 99, and ending at Lexington Street to the east. Per the City's General Plan Circulation Element, Woollomes Avenue is designated as an Arterial. Between Stradley Avenue – Albany Street and Dover Parkway, Woollomes Avenue is a two-lane, undivided roadway with no curb and gutter on either side of the road. East of Dover Parkway to SR 99, Woollomes Avenue is a five-lane, divided roadway (three eastbound lanes and two westbound lanes with raised median) that provides access to recently constructed retail/commercial shopping centers. East of SR 99 to Lexington Street, it is a wide two-lane undivided roadway. Based on daily traffic counts collected in late-August 2014, the ADT volumes on Woollomes Avenue range from 3,700 ADT west of Dover Parkway to 11,000 ADT west of SR 99.

#### Dover Parkway

Dover Parkway is a north-south roadway that currently provides access to the western side of the Marketplace shopping center on the south side of Woollomes Avenue. Per the City's General Plan Circulation Element, Dover Parkway will be extended to the north to connect to the existing roadway segment of Dover Place, just south of Diaz Street. This new roadway extension would provide a new four-lane, divided north-south corridor for the western side of the City.

#### Stradley Avenue – Albany Street

Stradley Avenue (south of Woollomes Avenue) – Albany Street (north of Woollomes Avenue) is a two-lane, undivided north-south roadway that provides local access to the western part of the City and the City of McFarland to the south. Albany Street terminates at County Line Road to the north. Per the City's General Plan Circulation Element, Albany Street (north of Woollomes Avenue) is designated as an Arterial.

### Transit, Rail and Airport Services

Delano Area Rapid Transit (DART) provides fixed route bus service on four routes and Dial-A-Ride service to the City of Delano and surrounding areas, within the boundaries of State Route 43 (SR

43) to the west, County Line Road to the north, Pond Road to the south, and Kyte Avenue to the east. DART Route 2 provides service in the project study area with a stop at the Home Depot on Woollomes Avenue. At this time, Route 2 does not travel further west on Woollomes Avenue beyond the stop at Home Depot. Route 2's route includes stops on Lexington Street, High Street, Garces Highway, 1st Avenue, and Albany Street.

Delano is currently served by the main line of the Union Pacific Railroad (UPRR). The railroad run in a north-south direction, parallel to SR 99 (east of SR 99 in the project study area). The railroad crossing at Woollomes Avenue, east of SR 99, is one of seven crossings in the City. Currently, there is no Amtrak passenger train service that serves Delano. The closest Amtrak station is in Wasco, approximately 15 miles southeast of the City.

The Delano Municipal Airport is located at the eastern terminus of Woollomes Avenue in the southeast portion of the City. Currently, there is no commercial passenger air service operating at the Delano Municipal Airport.

## Bicycle and Pedestrian Facilities

Per the City's Circulation Element, the City currently has no designated bicycle routes. Most of the bicycle activity in the City occurs near schools by school-aged children. Pedestrian facilities in the City are limited to sidewalks, crosswalks, and pedestrian crossing lights. Curb cuts and ramps are being required for all new construction in the City. In the project study area, sidewalks have been constructed on the developed segments of Woollomes Avenue, and the signalized intersections at Dover Parkway, Marketplace Drive, and the SR 99 interchange contain crosswalks with pedestrian phases.

The Delano Bicycle Master Plan (2007) was developed to: 1) set a proactive course toward making bicycling an integral part of daily life in Delano; and, 2) enhance the safety of bicyclists. In the area of the proposed project, the Master Plan indicated that bike lanes or routes should connect Woollomes Avenue to areas of Delano north of the project site via Albany Street west of SR 99, and Lexington Street east of SR 99.

## Intersection/Roadway Geometrics and Traffic Volumes

Figure 8 illustrates the existing traffic controls and lane geometrics at the study area intersections and roadway segments. Existing weekday daily, a.m. and p.m. peak hour peak hour, and Saturday midday peak hour traffic volumes were collected at the study area intersections and roadway segments in late-August 2014 from 7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m. for a typical weekday, and 11:00 a.m. to 1:00 p.m. for a typical Saturday. The only school in the study area, the Nueva Vista Language Academy School, was in session during the weekday traffic counts. Figures 9 and 10 illustrate the existing weekday daily and a.m. and p.m. peak hour traffic volumes; and, the Saturday midday peak hour traffic volumes, respectively. The raw traffic volume count sheets are provided in Appendix B.

## Levels of Service

### Intersections

Based on the analysis methodology described in Section 1.0, the existing weekday a.m. and p.m. peak hour, and Saturday midday peak hour traffic volumes were input into the *Synchro* LOS software to determine the existing intersection delays and resulting LOS values. Table E presents the results of the existing intersection LOS analysis for the weekday a.m. and p.m., and Saturday midday peak hours. The LOS calculation sheets are provided in Appendix C.

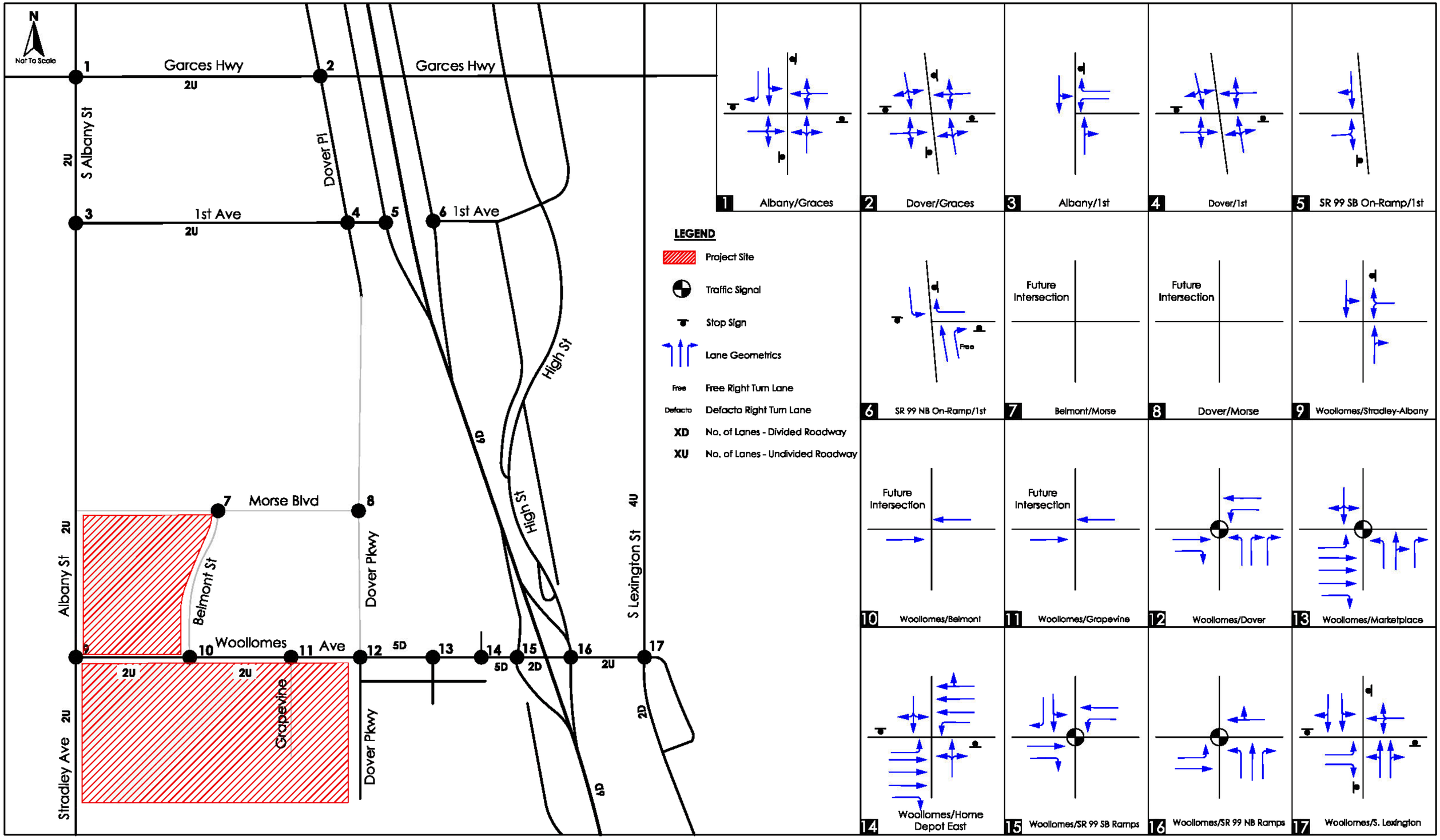


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Figure 8
Existing Traffic Controls and Geometrics

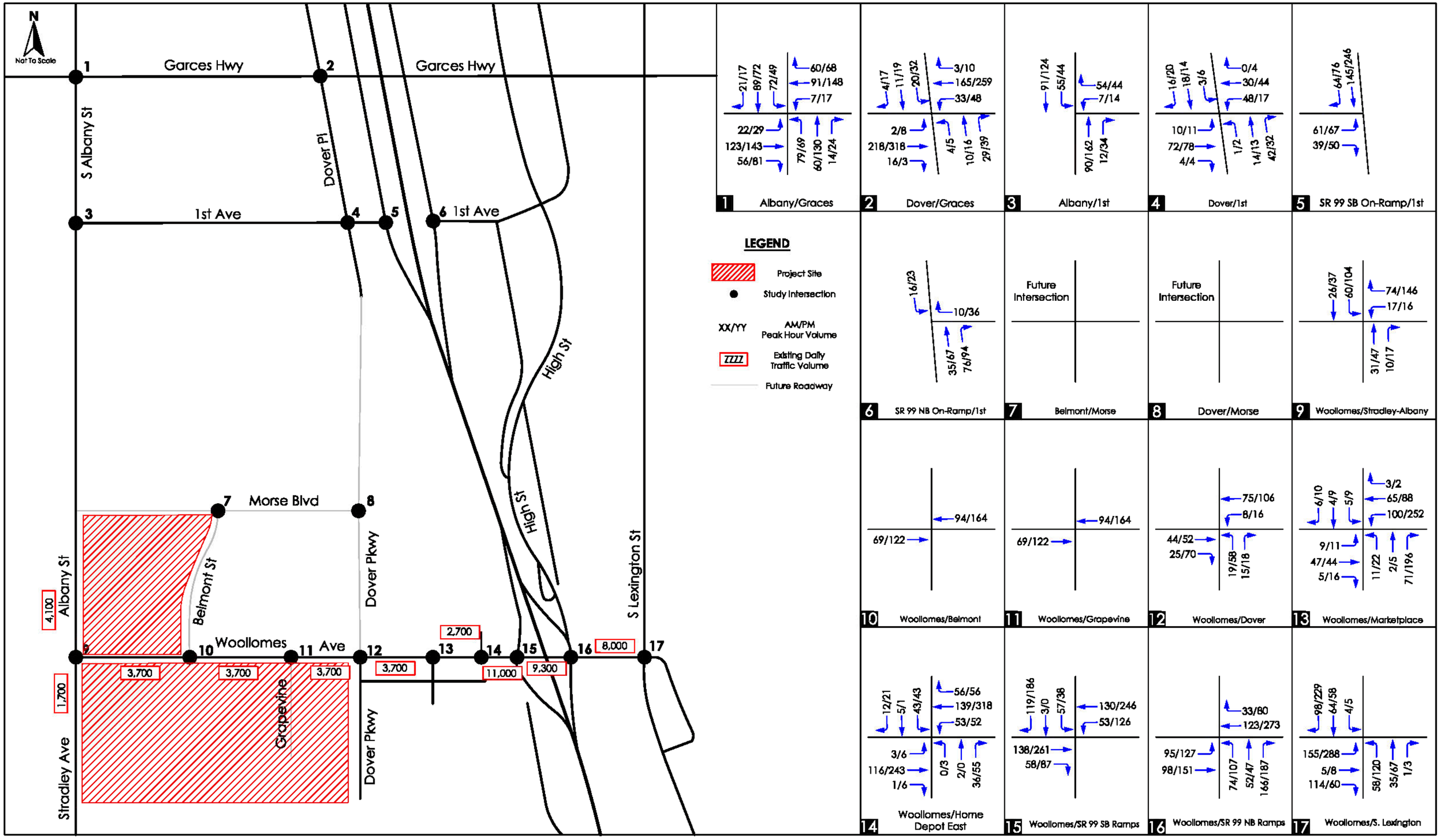


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Figure 9
Existing Weekday Daily and Peak Hour Traffic Volumes

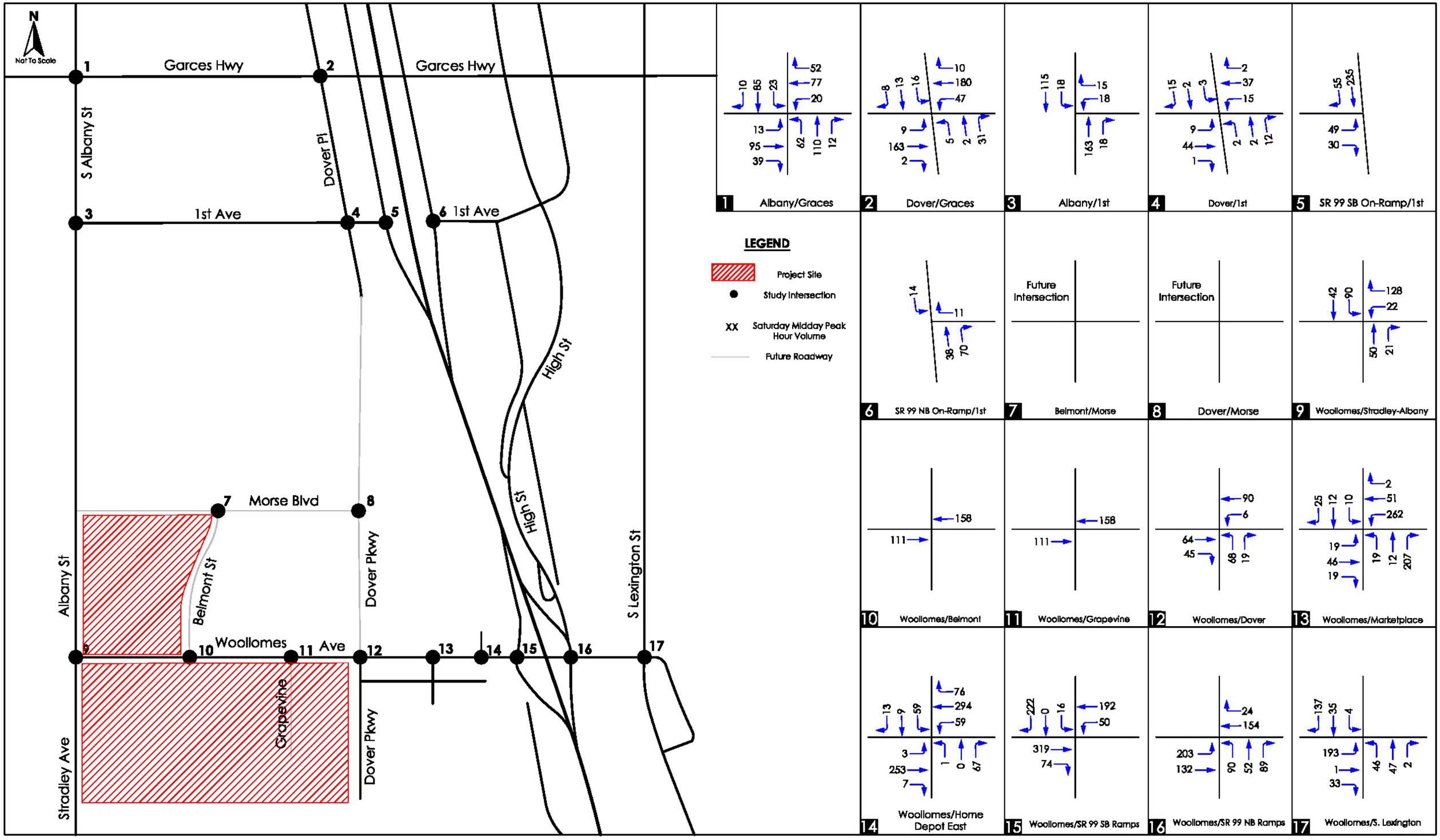


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Figure 10
Existing Saturday Midday Peak Hour Traffic Volumes

**Table E – Existing Peak Hour Intersection Level of Service Summary**

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS |
| 1. Garces Highway/Albany Street | AWSC | C | 10.1 sec | B | 11.8 sec | B | 9.4 sec | A |
| 2. Garces Highway/Dover Place | AWSC | C | 9.0 sec | A | 11.4 sec | B | 8.9 sec | A |
| 3. 1st Avenue/Albany Street | 1-way S | C | 9.3 sec | A | 10.2 sec | B | 10.3 sec | B |
| 4. 1st Avenue/Dover Place | 2-way S | C | 10.0 sec | B | 9.7 sec | A | 8.9 sec | A |
| 5. 1st Ave/Ellington St–SR 99 on-ramp | 1-way S | C | 10.1 sec | B | 11.2 sec | B | 10.7 sec | B |
| 6. 1st Ave/Fremont St-SR 99 off-ramp | AWSC | C | 6.7 sec | A | 7.3 sec | A | 6.7 sec | A |
| 7. Morse Boulevard/Belmont Street | *future int* | C | -- | -- | -- | -- | -- | -- |
| 8. Morse Boulevard/Dover Parkway | *future int* | C | -- | -- | -- | -- | -- | -- |
| 9. Woollomes Ave/Stradley-Albany | 1-way S | D | 9.1 sec | A | 9.7 sec | A | 9.7 sec | A |
| 10. Woollomes Ave/Belmont Street | *future int* | D | -- | -- | -- | -- | -- | -- |
| 11. Woollomes Ave/Grapevine Dwy | *future int* | D | -- | -- | -- | -- | -- | -- |
| 12. Woollomes Ave/Dover Parkway | signal | D | 12.4 sec | B | 13.0 sec | B | 13.7 sec | B |
| 13. Woollomes/Home Depot West | signal | D | 23.4 sec | C | 9.3 sec | A | 12.6 sec | B |
| 14. Woollomes/Home Depot East | 2-way S | D | 11.1 sec | B | 12.8 sec | B | 14.1 sec | B |
| 15. Woollomes Ave/SR 99 SB ramps | signal | D | 10.1 sec | B | 13.1 sec | B | 13.5 sec | B |
| 16. Woollomes Ave/SR 99 NB ramps | signal | D | 7.7 sec | A | 14.5 sec | B | 6.9 sec | A |
| 17. Woollomes Ave/Lexington St | AWSC | D | 8.3 sec | A | 12.2 sec | B | 8.8 sec | A |

Notes: LOS determined using HCM method in the *Synchro* LOS software.
**BOLD** value indicates unsatisfactory LOS.
*future int* = future intersection
AWSC = all-way stop control
1-way S = 1-way stop control
2-way S = 2-way stop control

Based on the existing weekday a.m. and p.m., and Saturday midday peak hour LOS analysis, all of the study area intersections are currently operating with satisfactory LOS at LOS C or D, or better in the weekday a.m. and p.m., and Saturday midday peak hours.

**Roadway Segments**

Based on the analysis methodology described in Section 1.0, the existing weekday daily traffic volumes that were counted in late-August 2014 were compared with the roadway capacities in Table C – Daily Roadway Segment LOS Thresholds to determine the existing roadway segment LOS values. Table F presents the results of the existing weekday daily roadway LOS. The existing daily traffic counts are provided in Appendix B.

Based on the table, all roadway segments in the study area have daily traffic volumes within their acceptable daily capacities (at LOS D capacities or better).

**Table F – Existing Daily Roadway Segment Levels of Service**

| Roadway Segment | Capacity Configuration | Target LOS | Existing ADT | Existing LOS |
|---|---|---|---|---|
| 1. Woollomes Ave, Stradley to Belmont | 2-lane Undivided (<2 signals/mi) | D | 3,750 | A-B |
| 2. Woollomes Ave, Belmont to Grapevine | 2-lane Undivided (2 to 4.5 signals/mi) | D | 3,750 | A-C |
| 3. Woollomes Ave, Grapevine Dwy to Dover | 2-lane Undivided (2 to 4.5 signals/mi) | D | 3,750 | A-C |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane Divided (>4.5 signals/mi) | D | 2,690 | A-C |
| 5. Woollomes Ave, Home Depot E to SR 99 | 4-lane Divided (>4.5 signals/mi) | D | 10,990 | A-C |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 2-lane Undivided (>4.5 signals/mi) | D | 9,290 | D |
| 7. Woollomes Ave, SR 99 to Lexington | 2-lane Undivided (>4.5 signals/mi) | D | 7,990 | D |
| 8. Albany St, north of Woollomes | 2-lane Undivided (<2 signals/mi) | C | 4,150 | A-B |
| 9. Stradley Ave, south of Woollomes | 2-lane Undivided (<2 signals/mi) | C | 1,700 | A-B |
| 10. Belmont St, north of Woollomes | *future segment* | C | -- | -- |
| 11. Belmont St, south of Woollomes | *future segment* | C | -- | -- |

Note: Thresholds based on 2009 FDOT Quality/Level of Service Handbook, Florida Department of Transportation. Adjustments made according to appropriate area conditions, following FDOT guidelines.

### Freeway Mainline and Ramps

Based on the analysis methodology described in Section 1.0, the existing weekday and Saturday midday peak hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into the *Highway Capacity Software* (HCS) to determine the existing mainline segment and ramp LOS values. Table G presents the results of the existing weekday peak hours and Saturday midday peak hour freeway mainline LOS. The LOS calculation sheets are provided in Appendix D.

**Table G – Existing Freeway Mainline Segment Peak Hour Levels of Service**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour Volume | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Volume | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Peak Hour Volume | Saturday Peak Hour Density pc/mi/ln | Saturday Peak Hour LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,073 | 5.6 | A | 2,384 | 12.5 | B | 2,670 | 14.0 | B |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,136 | 6.0 | A | 2,524 | 13.2 | B | 2,826 | 14.8 | B |
| SR 99 SB n/o Woollomes Ave | 3 | C | 1,788 | 9.4 | A | 2,145 | 11.2 | B | 1,997 | 10.5 | A |
| SR 99 SB s/o Woollomes Ave | 3 | C | 1,893 | 9.9 | A | 2,271 | 11.9 | B | 2,115 | 11.1 | B |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

Based on the table, all freeway mainline segments in the study area are currently operating with satisfactory LOS, at LOS C or better, per Caltrans criteria.

Table H presents the results of the existing weekday peak hours and Saturday midday peak hour freeway ramp LOS. The LOS calculation sheets are provided in Appendix E. Based on the table, the SR 99 northbound off-ramp at Woollomes Avenue currently operates with unsatisfactory LOS (LOS D) per Caltrans criteria during the Saturday midday peak hour.

**Table H – Existing Freeway Ramps Peak Hour Levels of Service**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Midday Peak Density pc/mi/ln | Saturday Midday Peak LOS |
|---|---|---|---|---|---|---|---|---|
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 10.2 | B | 17.3 | B | 18.9 | B |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 9.7 | A | 18.3 | B | **19.8** | **D** |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 12.0 | B | 14.7 | B | 13.2 | B |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 13.1 | B | 15.4 | B | 14.5 | B |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

## *Existing plus Project Conditions*

Traffic generated by the proposed project was added to the Existing Baseline scenario and the project impacts on the circulation system were analyzed. This scenario would determine project-specific impacts and mitigation measures (if required).

### Intersection/Roadway Geometrics and Traffic Volumes

As previously discussed in the Project Description, the intersections and roadway segments surrounding the project site would be improved by the proposed project. Based on discussions with the City, it is anticipated that the proposed project would be conditioned to construct the following street improvements (from east side of project to west side of project):

- Construct the half-(street) section of Dover Parkway (west side of center line)), from Woollomes Avenue to its southern project boundary to have two lanes in the southbound direction. The east side has already been constructed to its ultimate width. Dover Parkway has an ultimate right-of-way (ROW) of 90 feet.
- Construct the half-section of Woollomes Avenue (south side of center line), from the future Belmont Street to Dover Parkway to have two lanes in the eastbound direction. Woollomes Avenue has an ultimate ROW of 110 feet.
- Connect a primary access driveway on the West Pavilion site to the future Grapevine Shopping Center primary access driveway. This intersection will be signalized.
- Construct the half-section of Belmont Street (west side of center line), from the future Morse Boulevard to Woollomes Avenue to have two lanes in the southbound direction. Belmont Street has an ultimate ROW of 90 feet.
- Construct the full section of Belmont Street (both sides of center line), from Woollomes Avenue to its southern project boundary to have four total lanes (two lanes in each direction) plus a median. Belmont Street has an ultimate ROW of 90 feet.
- Install a traffic signal at the Belmont Street/Woollomes Avenue intersection.
- Construct the full section of Woollomes Avenue (both sides of center line), from Stradley Avenue – Albany Street to Belmont Street to have four total lanes (two lanes in each direction) plus a median. Woollomes Avenue has an ultimate ROW of 110 feet.
- Construct the half-section of Morse Boulevard (south side of center line), from Albany Street to the future Belmont Street to have two lanes in the eastbound direction. Morse Boulevard has an ultimate ROW of 90 feet.

- Construct the half-section of Stradley Avenue – Albany Street (east side of center line), from the northern project boundary to the southern project boundary to have two lanes in the northbound direction. Stradley Avenue – Albany Street has an ultimate ROW of 90 feet.

These improvements were assumed in the base roadway network for the Existing plus Project condition traffic analysis.

The proposed project trip assignments for the weekday peak hours, and Saturday midday peak hour, of the residential and retail/commercial land uses were added to the Existing Baseline weekday a.m. and p.m. peak hour, and Saturday midday peak hour, traffic volumes (Figures 9 and 10, respectively). This resulted in the Existing plus Project traffic volumes. Figure 11 illustrates the Existing plus Project weekday daily, a.m. and p.m. peak hour traffic volumes, and Figure 12 illustrates the Saturday midday peak hour traffic volumes at the study intersections and roadway segments.

## Levels of Service

### Intersections

Based on the analysis methodology described in Section 1.0, the Existing plus Project weekday a.m. and p.m. peak hour, and Saturday midday peak hour traffic volumes were input into the *Synchro* LOS software to determine the Existing plus Project intersection delays and resulting LOS values. Table I presents the results of the Existing plus Project intersection LOS analysis for the weekday a.m. and p.m., and, and Table J for the Saturday midday peak hours. The LOS calculation sheets are provided in Appendix C.

Based on the Existing plus Project LOS analysis, and the significance criteria of the City, the proposed project would create significant impacts at the following study area intersections:

- Garces Highway/Albany Street (LOS B to LOS D in weekday p.m. peak hour)
- Woollomes Avenue/Home Depot Driveway East (LOS B to LOS E in weekday p.m. peak hour, and LOS B to LOS F in Saturday midday peak hour)
- Woollomes Avenue/SR 99 northbound ramps (LOS A to LOS F in Saturday midday peak hour)

Mitigation measures will be required of the project to mitigate these impacted intersections back to satisfactory levels of service.

### Roadway Segments

Based on the analysis methodology described in Section 1.0, the Existing plus Project weekday daily traffic volumes (shown in Figure 11) were compared with the roadway capacities in Table C – Daily Roadway Segment LOS Thresholds to determine the Existing plus Project roadway segment LOS values. Table K presents the results of the Existing plus Project weekday daily roadway LOS.

Based on the table, the proposed project would significantly impact the following roadway segments in the study area per the City's significance criteria:

- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS A-C to LOS F)
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (LOS D to LOS F)

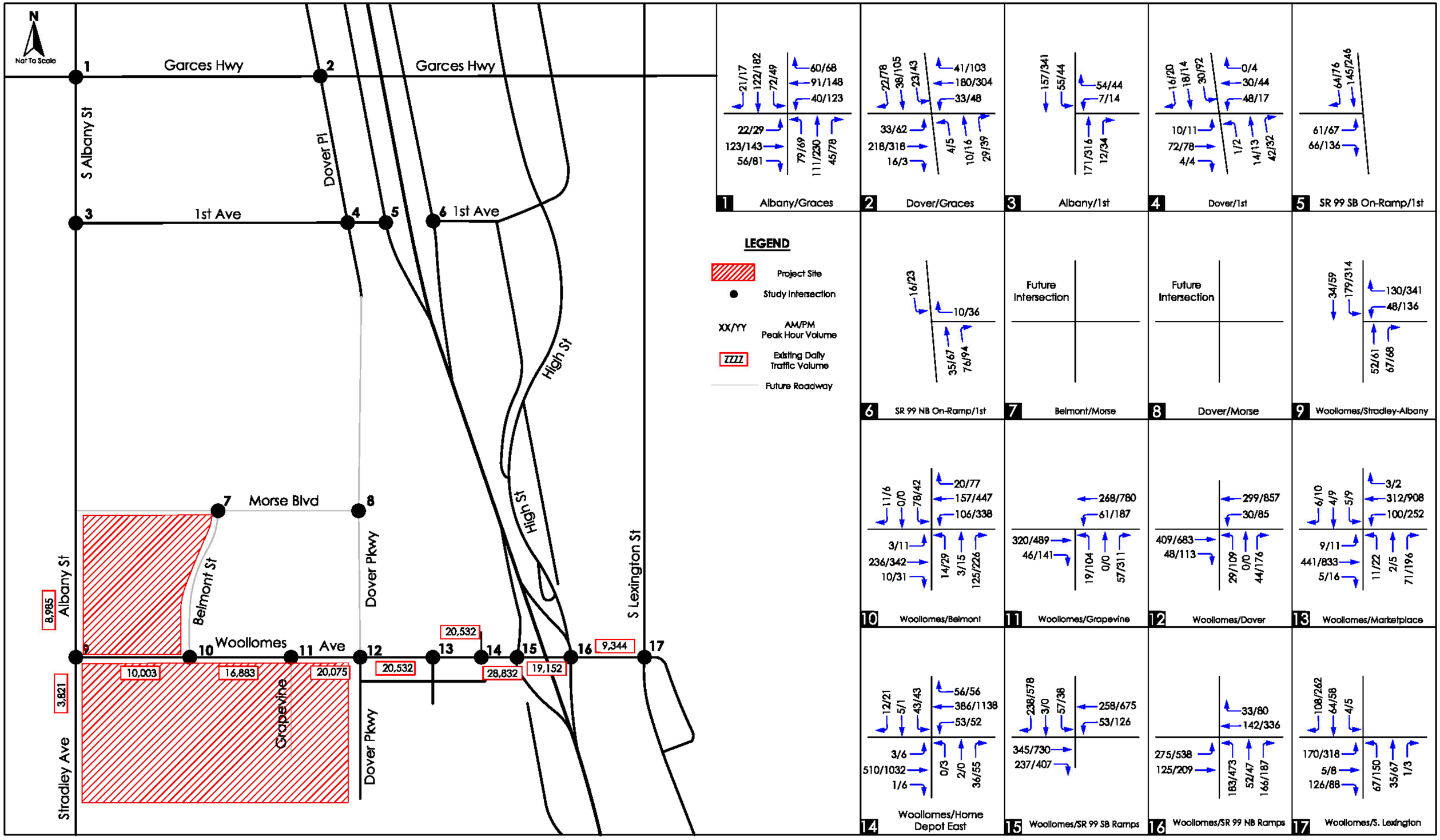


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Figure 11
Existing plus Project Weekday Daily and Peak Hour Traffic Volumes

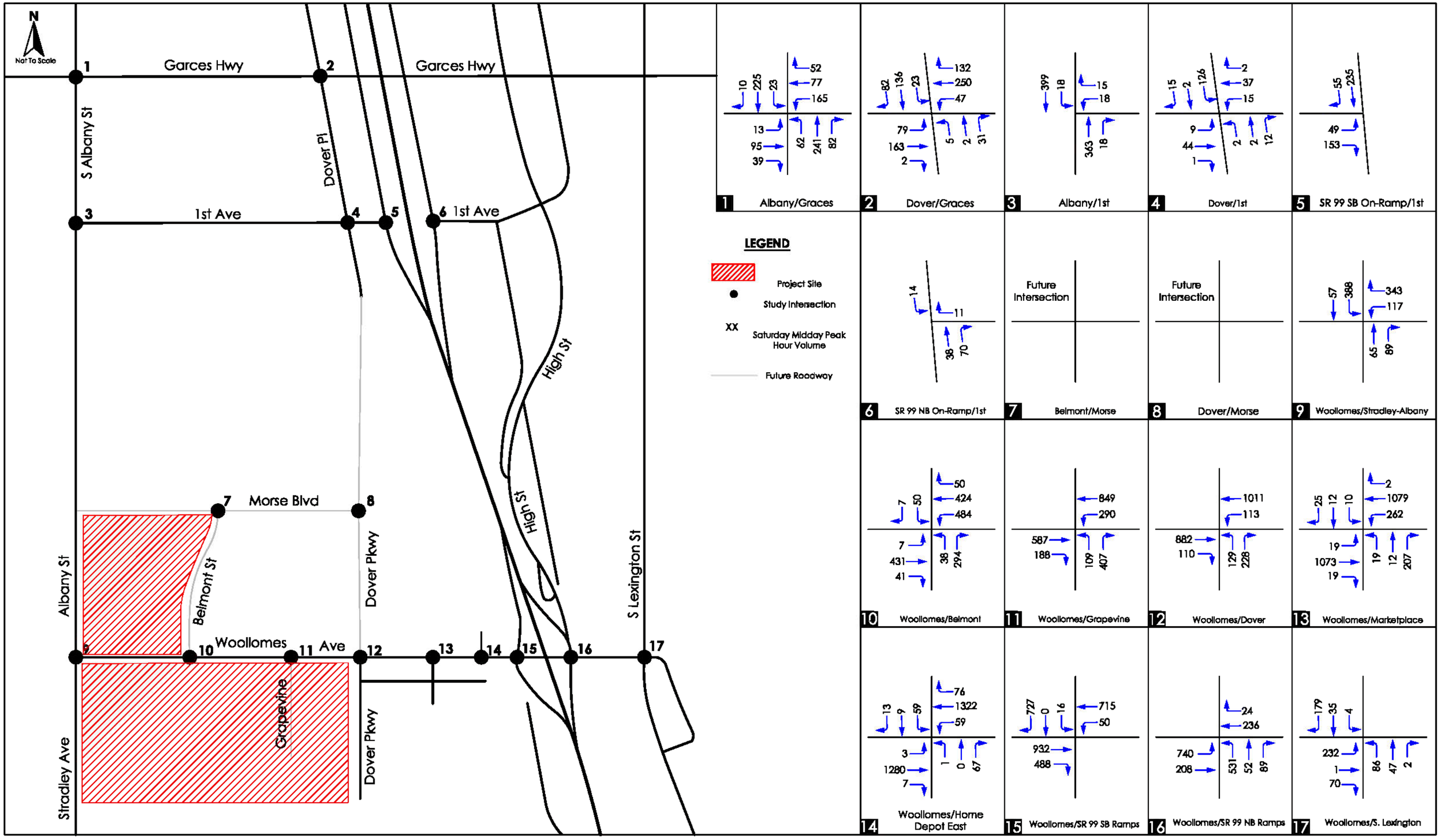


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Figure 12
Existing plus Project Saturday Midday Peak Hour Traffic Volumes

## Table I – Existing plus Project Weekday Intersection Level of Service Summary

| | | | | Existing Condition | | | | | | Existing + Project | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Target | AM Peak Hour | | | PM Peak Hour | | | AM Peak Hour | | | | | PM Peak Hour | | | | | |
| | Intersection | Control | LOS | Delay | | LOS | Delay | | LOS | Delay | | LOS | Difference | | Delay | | LOS | Difference | | |
| 1 . | Garces Highway/Albany Street | all-way stop | C | 10.1 | sec | B | 11.8 | sec | B | 11.7 | sec | B | 1.6 | sec | **27.9** | **sec** | **D** | **16.1** | **sec** | |
| 2 . | Garces Highway/Dover Place | all-way stop | C | 9.0 | sec | A | 11.4 | sec | B | 9.9 | sec | A | 0.9 | sec | 20.7 | sec | C | 9.3 | sec | |
| 3 . | 1st Avenue/Albany Street | one-way stop | C | 9.3 | sec | A | 10.2 | sec | B | 10.0 | sec | A | 0.7 | sec | 12.5 | sec | B | 2.3 | sec | |
| 4 . | 1st Avenue/Dover Place | two-way stop | C | 10.0 | sec | B | 9.7 | sec | A | 10.9 | sec | B | 0.9 | sec | 11.3 | sec | B | 1.6 | sec | |
| 5 . | 1st Ave/Ellington St - SR 99 SB on-ramp | one-way stop | C | 10.1 | sec | B | 11.2 | sec | B | 10.3 | sec | B | 0.2 | sec | 12.3 | sec | B | 1.1 | sec | |
| 6 . | 1 st Ave/Fremont St - SR 99 NB off-ramp | all-way stop | C | 6.7 | sec | A | 7.3 | sec | A | 6.7 | sec | A | 0.0 | sec | 6.9 | sec | A | -0.4 | sec | |
| 7 . | Morse Avenue/Belmont Street | *future int.* | C | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 8 . | Morse Avenue/Dover Parkway | *future int.* | C | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| 9 . | Woollomes Ave/Albany St - Stradley Ave | one-way stop | D | 9.1 | sec | A | 9.7 | sec | A | 10.7 | sec | B | 1.6 | sec | 20.8 | sec | C | 11.1 | sec | |
| 10 . | Woollomes Avenue/Belmont Street | *future int.* | D | -- | -- | -- | -- | -- | -- | 18.5 | sec | B | 18.5 | sec | 19.3 | sec | B | 19.3 | sec | |
| 11 . | Woollomes Avenue/Grapevine Driveway | *future int.* | D | -- | -- | -- | -- | -- | -- | 13.2 | sec | B | 13.2 | sec | 13.4 | sec | B | 13.4 | sec | |
| 12 . | Woollomes Avenue/Dover Parkway | signal | D | 12.4 | sec | B | 13.0 | sec | B | 14.3 | sec | B | 1.9 | sec | 7.8 | sec | A | -5.2 | sec | |
| 13 . | Woollomes Ave/Home Depot Dwy West | signal | D | 23.4 | sec | C | 9.3 | sec | A | 12.4 | sec | B | -11.0 | sec | 15.5 | sec | B | 6.2 | sec | |
| 14 . | Woollomes Ave/Home Depot Dwy East | two-way stop | D | 11.1 | sec | B | 12.8 | sec | B | 14.0 | sec | B | 2.9 | sec | **40.0** | **sec** | **E** | **27.2** | **sec** | |
| 15 . | Woollomes Avenue/SR 99 SB ramps | signal | D | 10.1 | sec | B | 13.1 | sec | B | 7.6 | sec | A | -2.5 | sec | 21.8 | sec | C | 8.7 | sec | |
| 16 . | Woollomes Avenue/SR 99 NB ramps | signal | D | 7.7 | sec | A | 14.5 | sec | B | 8.1 | sec | A | 0.4 | sec | 53.1 | sec | D | 38.6 | sec | |
| 17 . | Woollomes Avenue/Lexington Street | all-way stop | D | 8.3 | sec | A | 12.2 | sec | B | 8.6 | sec | A | 0.3 | sec | 14.2 | sec | B | 2.0 | sec | |

Notes:

**XX** - Unsatisfactory LOS per the City's General Plan Circculation Element.

**XX** - Significant project impact per the City's General Plan Circculation Element.

**Table J – Existing plus Project Saturday Intersection Level of Service Summary**

| | | | | Existing Condition | | | Existing + Project | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Target | Saturday Midday Peak | | | Saturday Midday Peak Hour | | | | |
| | Intersection | Control | LOS | Delay | | LOS | Delay | | LOS | Difference | |
| 1 . | Garces Highway/Albany Street | all-way stop | C | 9.4 | sec | A | 19.4 | sec | C | 10.0 | sec |
| 2 . | Garces Highway/Dover Place | all-way stop | C | 8.9 | sec | A | 14.8 | sec | B | 5.9 | sec |
| 3 . | 1st Avenue/Albany Street | one-way stop | C | 10.3 | sec | B | 14.6 | sec | B | 4.3 | sec |
| 4 . | 1st Avenue/Dover Place | two-way stop | C | 8.9 | sec | A | 10.5 | sec | B | 1.6 | sec |
| 5 . | 1st Ave/Ellington St - SR 99 SB on-ramp | one-way stop | C | 10.7 | sec | B | 11.9 | sec | B | 1.2 | sec |
| 6 . | 1 st Ave/Fremont St - SR 99 NB off-ramp | all-way stop | C | 6.7 | sec | A | 6.7 | sec | A | 0.0 | sec |
| 7 . | Morse Avenue/Belmont Street | *future int.* | C | -- | -- | -- | -- | -- | -- | -- | -- |
| 8 . | Morse Avenue/Dover Parkway | *future int.* | C | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 . | Woollomes Ave/Albany St - Stradley Ave | one-way stop | D | 9.7 | sec | A | 28.6 | sec | D | 18.9 | sec |
| 10 . | Woollomes Avenue/Belmont Street | *future int.* | D | -- | -- | -- | 23.3 | sec | C | 23.3 | sec |
| 11 . | Woollomes Avenue/Grapevine Driveway | *future int.* | D | -- | -- | -- | 15.7 | sec | B | 15.7 | sec |
| 12 . | Woollomes Avenue/Dover Parkway | signal | D | 13.7 | sec | B | 10.1 | sec | B | -3.6 | sec |
| 13 . | Woollomes Ave/Home Depot Dwy West | signal | D | 12.6 | sec | B | 17.2 | sec | B | 4.6 | sec |
| 14 . | Woollomes Ave/Home Depot Dwy East | two-way stop | D | 14.1 | sec | B | **115.6** | **sec** | **F** | **101.5** | **sec** |
| 15 . | Woollomes Avenue/SR 99 SB ramps | signal | D | 13.5 | sec | B | 48.5 | sec | D | 35.0 | sec |
| 16 . | Woollomes Avenue/SR 99 NB ramps | signal | D | 6.9 | sec | A | **85.3** | **sec** | **F** | **78.4** | **sec** |
| 17 . | Woollomes Avenue/Lexington Street | all-way stop | D | 8.8 | sec | A | 9.8 | sec | A | 1.0 | sec |

Notes:

XX - Unsatisfactory LOS per the City's General Plan Circculation Element.

XX - Significant project impact per the City's General Plan Circculation Element.

Mitigation measures will be required of the project to mitigate these impacted roadway segments back to satisfactory levels of service.

### Freeway Mainline and Ramps

Based on the analysis methodology described in Section 1.0, the Existing plus Project weekday and Saturday midday peak hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into HCS to determine the Existing plus Project mainline segment and ramp LOS values. Table L presents the results of the Existing plus Project weekday peak hours and Saturday midday peak hour freeway mainline LOS. The LOS calculation sheets are provided in Appendix D.

Based on the table, all freeway mainline segments in the study area would continue to operate with satisfactory LOS with addition of project traffic volumes, at LOS C or better, per Caltrans criteria.

Table M presents the results of the Existing plus Project weekday peak hours and Saturday midday peak hour freeway ramp LOS. The LOS calculation sheets are provided in Appendix E. Based on the table, the addition of project trips to the SR 99 ramps at Woollomes Avenue would not create any significant impacts to the merge and diverge areas of the interchange. No mitigation measures are required.

**Table K – Existing plus Project Daily Roadway Segment Levels of Service**

| Roadway Segment | Capacity Configuration | Target LOS | Existing plus Project ADT | Existing plus Project LOS |
|---|---|---|---|---|
| 1. Woollomes Ave, Stradley to Belmont | 4-lane Divided (>4.5 signals/mi) | D | 10,051 | A-C |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane Divided (>4.5 signals/mi) | D | 16,931 | A-C |
| 3. Woollomes Ave, Grapevine Dwy to Dover | 4-lane Divided (>4.5 signals/mi) | D | 20,123 | D |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane Divided (>4.5 signals/mi) | D | 20,521 | A-C |
| 5. Woollomes Ave, Home Depot E to SR 99 | 4-lane Divided (>4.5 signals/mi) | D | **28,817** | **F** |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 2-lane Undivided (>4.5 signals/mi) | D | **19,140** | **F** |
| 7. Woollomes Ave, SR 99 to Lexington | 2-lane Undivided (>4.5 signals/mi) | D | 9,332 | D |
| 8. Albany St, north of Woollomes | 2-lane Undivided (<2 signals/mi) | C | 9,034 | C |
| 9. Stradley Ave, south of Woollomes | 2-lane Undivided (<2 signals/mi) | C | 3,823 | A-C |
| 10. Belmont St, north of Woollomes | *future segment* | C | -- | -- |
| 11. Belmont St, south of Woollomes | *future segment* | C | -- | -- |

Note: Thresholds based on 2009 FDOT Quality/Level of Service Handbook, Florida Department of Transportation. Adjustments made according to appropriate area conditions, following FDOT guidelines.

**Table L – Existing plus Project Freeway Mainline Segment Peak Hour Levels of Service**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour Volume | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Volume | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Peak Hour Volume | Saturday Peak Hour Density pc/mi/ln | Saturday Peak Hour LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,215 | 6.4 | A | 2,442 | 12.8 | B | 3,085 | 16.2 | B |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,245 | 6.5 | A | 2,890 | 15.1 | B | 3,267 | 17.1 | B |
| SR 99 SB n/o Woollomes Ave | 3 | C | 1,877 | 9.9 | A | 2,439 | 12.8 | B | 2,372 | 12.4 | B |
| SR 99 SB s/o Woollomes Ave | 3 | C | 2,080 | 10.9 | A | 2,591 | 13.6 | B | 2,529 | 13.2 | B |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

**Table M – Existing plus Project Freeway Ramps Peak Hour Levels of Service**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Midday Peak Density pc/mi/ln | Saturday Midday Peak LOS |
|---|---|---|---|---|---|---|---|---|
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 12.1 | B | 20.9 | C | 25.3 | C |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 10.6 | B | 21.1 | C | 23.1 | C |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 14.1 | B | 18.9 | B | 18.6 | B |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 13.9 | B | 17.9 | B | 17.8 | C |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

# 4.0 CUMULATIVE BUILDOUT (2040) TRAFFIC CONDITIONS

This section describes the future traffic conditions related to the following traffic scenarios:

- Cumulative Buildout (2040) Baseline
- Cumulative Buildout (2040) plus Project

## *Cumulative Buildout (2040) Baseline Condition*

The proposed project would be constructed within a 10 year timeframe with several phases of development within each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion was analyzed at full buildout (i.e., one single phase – buildout of project) to determine the total traffic mitigation measures required at full buildout of the project. The Cumulative Buildout Baseline condition represents buildout of the General Plan land uses in the study area based on traffic growth up to year 2040 in the Kern COG travel demand model; plus, traffic from cumulative (approved/pending) projects in the study area as provided by the City.

### Traffic Controls and Intersection Geometrics

Figure 13 illustrates the Cumulative Buildout (2040) Baseline traffic controls and roadway/intersection geometrics for the study area. The Baseline traffic controls and roadway/intersection geometrics for the Cumulative Buildout Baseline condition were based on the following sources:

- The City of Delano *Traffic Impact Fee Program* (TIF)
- The *Grapevine Commercial Transportation Impact Analysis Report* (TIAR), Omni-Means, Ltd., March 2014
- The Kern County Council of Governments (COG) Travel Demand Model for 2040, Kern COG, September 2014.

The following roadway network geometrics are included in the City's TIF:

- Stradley Avenue – Albany Street/Woollomes Avenue
    - Install traffic signal
    - Northbound approach: 2 through lanes and 1 right turn lane
    - Southbound approach: 2 left turn lanes and 1 through lane
    - Westbound approach: 1 left turn lane and 1 right turn lane
- SR 99 southbound ramps/Woollomes Avenue
    - Southbound approach: 2 left turn lanes, 1 through lane, and 2 right turn lanes
    - Eastbound approach: 3 through lanes and 1 right turn lane
    - Westbound approach: 2 left turn lanes and 2 through lanes
- SR 99 northbound ramps/Woollomes Avenue
    - Northbound approach: 1 left turn lane, 1 through lane, and 1 right turn lane
    - Southbound approach: 1 right turn lane
    - Eastbound approach: 2 left turn lanes and 3 through lanes
    - Westbound approach: 3 through lanes and 1 right turn lane

However, per the approved/certified *Grapevine Project DEIR* (March 2014) and *Grapevine Commercial Traffic Impact Analysis Report* (TIAR, March 2014) the following additions and modifications were needed to support the forecast cumulative buildout traffic volumes and

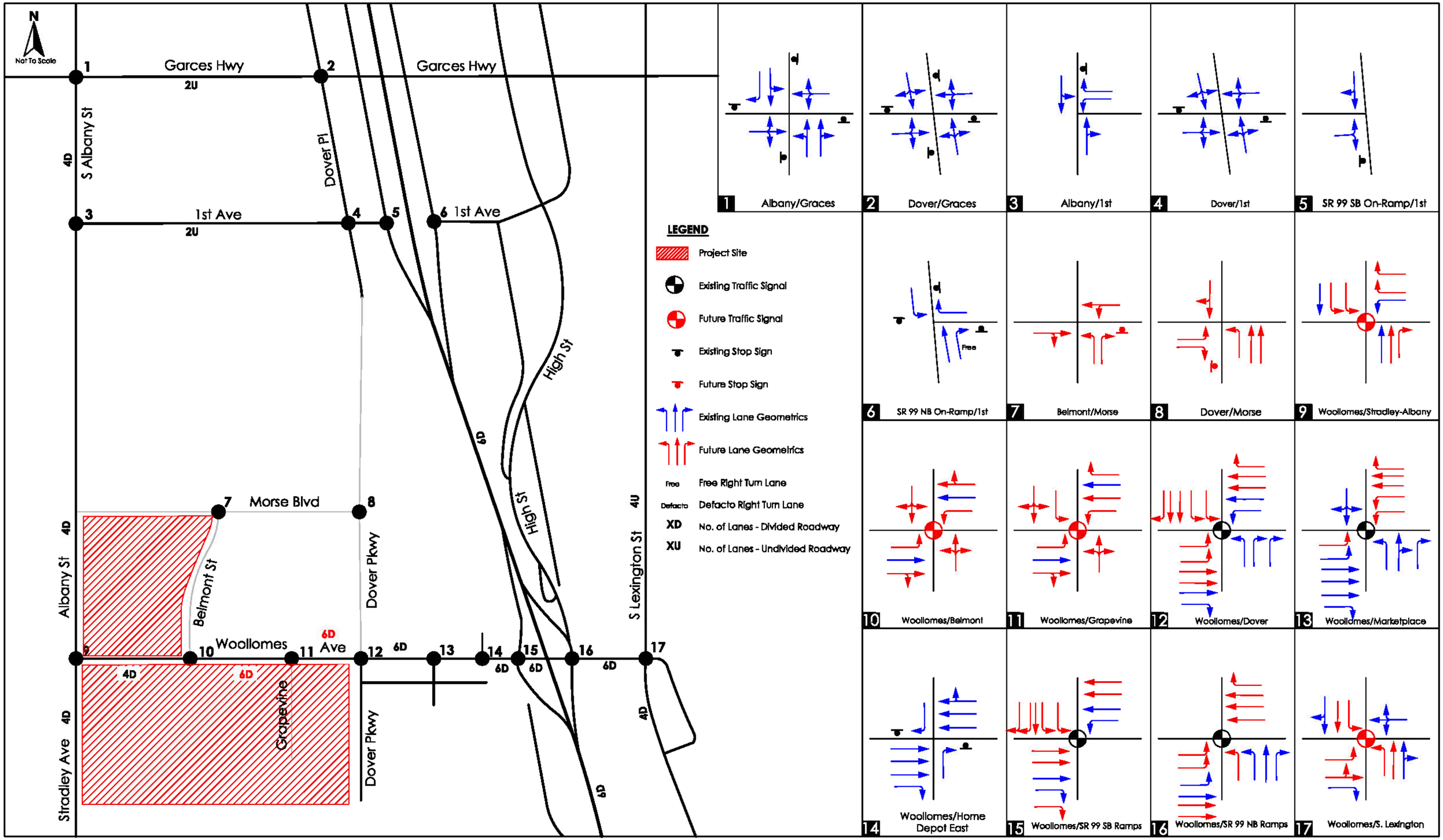


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Figure 13
Cumulative Buildout Baseline Traffic Controls and Geometrics

future Caltrans Project Study Report (PSR) that would be required to improve/upgrade the SR 99/Woollomes Avenue interchange:

- SR 99 southbound ramps/Woollomes Avenue
    - Southbound approach: 2 left turn lanes, 1 through lane, and 2 right turn lanes
    - Eastbound approach: 3 through lanes and 2 right turn lanes
    - Westbound approach: 1 left turn lane and 3 through lanes
- SR 99 northbound ramps/Woollomes Avenue
    - Northbound approach: 2 left turn lanes, 1 through lane, and 1 right turn lane
    - Remove southbound approach
    - Eastbound approach: 3 left turn lanes and 3 through lanes
    - Westbound approach: 3 through lanes and 1 right turn lane

In addition, roadway lane geometrics for the other study area roadways were taken from model lane plots from the Kern COG 2040 Travel Demand Model. The geometric improvements from the three sources above have been assumed to be in place as the baseline traffic control and geometrics for the Cumulative Buildout Baseline condition.

## Traffic Volumes

Traffic volumes for the Cumulative Buildout Baseline condition were developed by applying 26 years of ambient growth (2040 – 2014) in traffic plotted from the Kern COG Travel Demand Model (for year 2040), and traffic from cumulative (approved/pending) projects that would generate traffic in the study area, to the existing 2014 daily and peak hour traffic volumes.

First, to determine the ambient growth in the study area from the Kern COG Travel Demand Model, validation year (2008) and buildout year 2040 ADT plots were post-processed with the existing daily and peak hour traffic volumes using the "increment method" outlined in National Cooperative Highway Research Program's (NCHRP) *Circular 255*. The travel demand model estimated the growth increment in traffic volumes, which were added to existing traffic counts thereby correcting for any small differences between actual traffic counts and the model's estimated Existing Conditions (validation year) traffic volumes. Once the model growth was applied to the existing traffic volumes, the volumes were manually balanced to ensure consistency of traffic traveling through the corridor (Woollomes Avenue). Appendix F contains the Kern COG model plots and the 2040 volume forecast worksheets.

Next, traffic volumes from cumulative projects in the study area were added. Table N shows the list of cumulative projects in the study area and their trip generation estimates. This list of projects were taken from the approved and constructed *Delano Marketplace Traffic Impact Study* (Peters Engineering 2007) and updated by City Planning Department staff. Figure 14 shows the locations of the cumulative projects. Trip distribution and assignment information was provided for Cumulative Projects #1 – Grapevine Commercial (shopping center) from its TIAR (Omni-Means, Ltd. 2014). All other cumulative projects' traffic was taken from the *Delano Marketplace Traffic Impact Study*, and distributed through logical travel/commute corridors and routes. Per Table N, the cumulative projects would generate approximately 49,240 weekday daily trips, 1,557 weekday a.m. peak hour trips, 4,490 weekday p.m. peak hour trips, and 5,709 Saturday midday peak hour trips. Appendix G contains the cumulative projects traffic information.

The ambient growth determined from the post-processed model volumes and traffic from the cumulative projects were added to the existing traffic volumes to derive the Cumulative Buildout (2040) Baseline traffic volumes. Figures 15 and 16 illustrate the resulting Cumulative Buildout

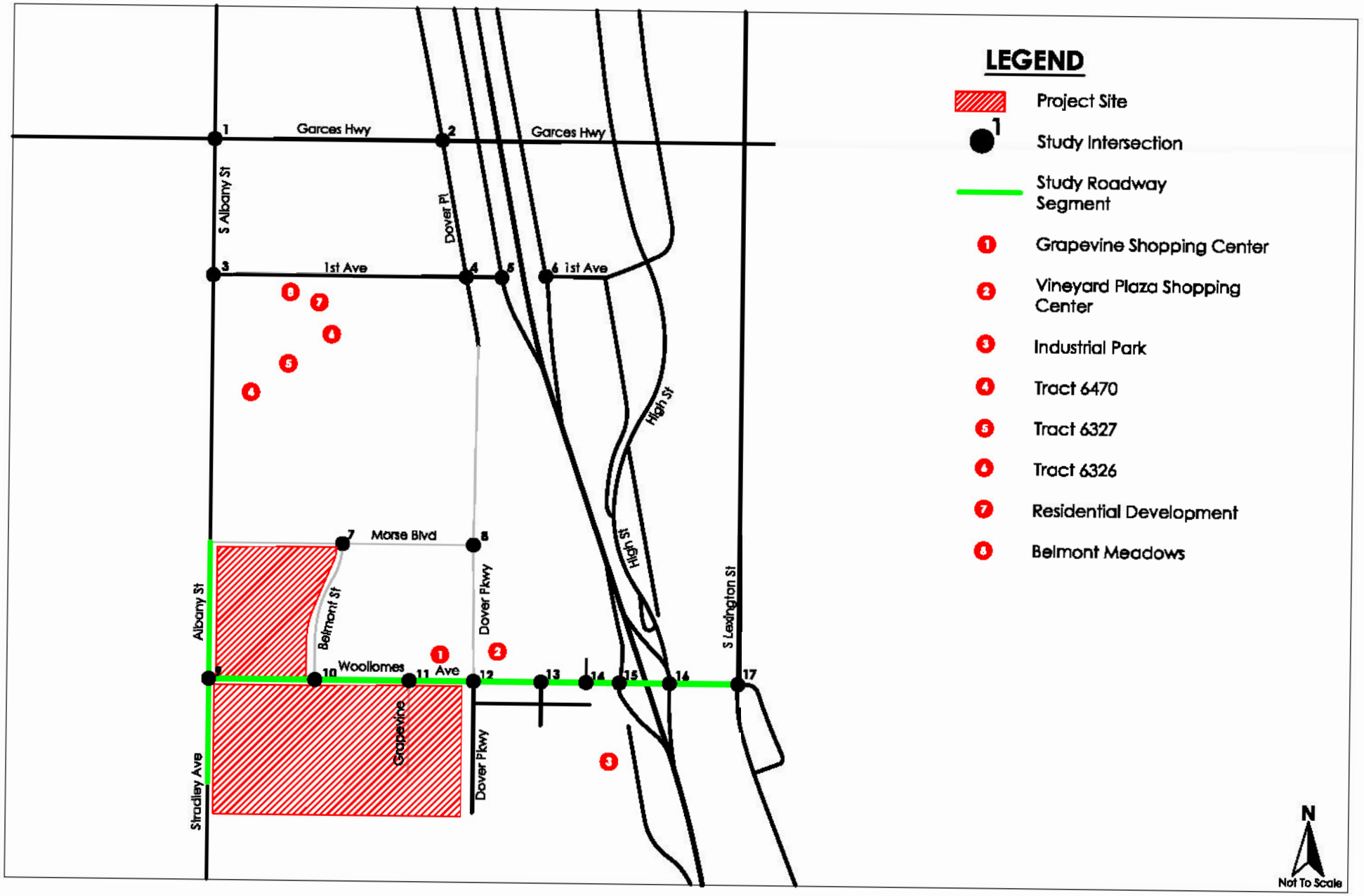


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Figure 14
Cumulative Projects Location Map

## Table N – Cumulative Projects Trip Generation Estimates

| | Project | ITE Code | Unit/Size | | Daily | AM Peak Hour In | AM Peak Hour Out | AM Peak Hour Total | PM Peak Hour In | PM Peak Hour Out | PM Peak Hour Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***WEEKDAY TRIP GENERATION*** | | | | | | | | | | | |
| 1. | ***Grapevine Commercial*** | | | | | | | | | | |
| | Shopping Center | 820 | 329.000 | TSF | 14,712 | 200 | 122 | 322 | 638 | 691 | 1,329 |
| 2. | ***Delano Vineyard Plaza Shopping Center Phases I & II*** | | | | | | | | | | |
| | Shopping Center | 820 | 657.342 | TSF | 28,228 | 414 | 265 | 679 | 1,185 | 1,283 | 2,468 |
| 3. | ***Commercial-Industrial Parcels (Millenium III, LLC)*** | | | | | | | | | | |
| | General Light Industrial | 110 | 17.65 | acres | 916 | 111 | 23 | 134 | 29 | 100 | 129 |
| 4. | ***Pacific Holt Corporation (Tract 6470)*** | | | | | | | | | | |
| | Single-Family Detached | 210 | 165 | DUs | 1,580 | 31 | 93 | 124 | 105 | 62 | 167 |
| 5. | ***Ennis Homes (Tract 6327)*** | | | | | | | | | | |
| | Single-Family Detached | 210 | 128 | DUs | 1,226 | 25 | 73 | 98 | 82 | 48 | 130 |
| 6. | ***Ennis Homes (Tract 6326)*** | | | | | | | | | | |
| | Single-Family Detached | 210 | 137 | DUs | 1,312 | 26 | 78 | 104 | 88 | 52 | 140 |
| 7. | ***Kern County Housing Authority/Self-Help Enterprises*** | | | | | | | | | | |
| | Single-Family Detached | 210 | 84 | DUs | 804 | 16 | 47 | 63 | 54 | 31 | 85 |
| 8. | ***Belmont Meadows Apartments*** | | | | | | | | | | |
| | Low-Rise Apartment | 221 | 70 | DUs | 462 | 7 | 26 | 33 | 27 | 15 | 42 |
| | **TOTAL WEEKDAY TRIP GENERATION** | | | | **49,240** | **830** | **727** | **1,557** | **2,208** | **2,282** | **4,490** |

| | Project | ITE Code | Unit/Size | | Midday Peak Hour In | Midday Peak Hour Out | Midday Peak Hour Total |
|---|---|---|---|---|---|---|---|
| ***SATURDAY TRIP GENERATION*** | | | | | | | |
| 1. | ***Grapevine Commercial*** | | | | | | |
| | Shopping Center | 820 | 329.000 | TSF | 985 | 909 | 1,894 |
| 2. | ***Delano Vineyard Plaza Shopping Center Phases I & II*** | | | | | | |
| | Shopping Center | 820 | 657.342 | TSF | 1,700 | 1,569 | 3,269 |
| 3. | ***Commercial-Industrial Parcels (Millenium III, LLC)*** | | | | | | |
| | General Light Industrial | 110 | 17.65 | acres | 15 | 3 | 18 |
| 4. | ***Pacific Holt Corporation (Tract 6470)*** | | | | | | |
| | Single-Family Detached | 210 | 165 | DUs | 84 | 72 | 156 |
| 5. | ***Ennis Homes (Tract 6327)*** | | | | | | |
| | Single-Family Detached | 210 | 128 | DUs | 65 | 56 | 121 |
| 6. | ***Ennis Homes (Tract 6326)*** | | | | | | |
| | Single-Family Detached | 210 | 137 | DUs | 70 | 60 | 130 |
| 7. | ***Kern County Housing Authority/Self-Help Enterprises*** | | | | | | |
| | Single-Family Detached | 210 | 84 | DUs | 43 | 36 | 79 |
| 8. | ***Belmont Meadows Apartments*** | | | | | | |
| | Low-Rise Apartment | 221 | 70 | DUs | 9 | 33 | 42 |
| | **TOTAL SATURDAY TRIP GENERATION** | | | | **2,971** | **2,738** | **5,709** |

Notes:

Cumulative projects traffic information obtained from:

*Grapevine Commerical Transportation Impact Analysis Report*, Omni-Means, Ltd., March 2014.

*Delano Marketplace Traffic Impact Study,* Peters Engineering, 2007,

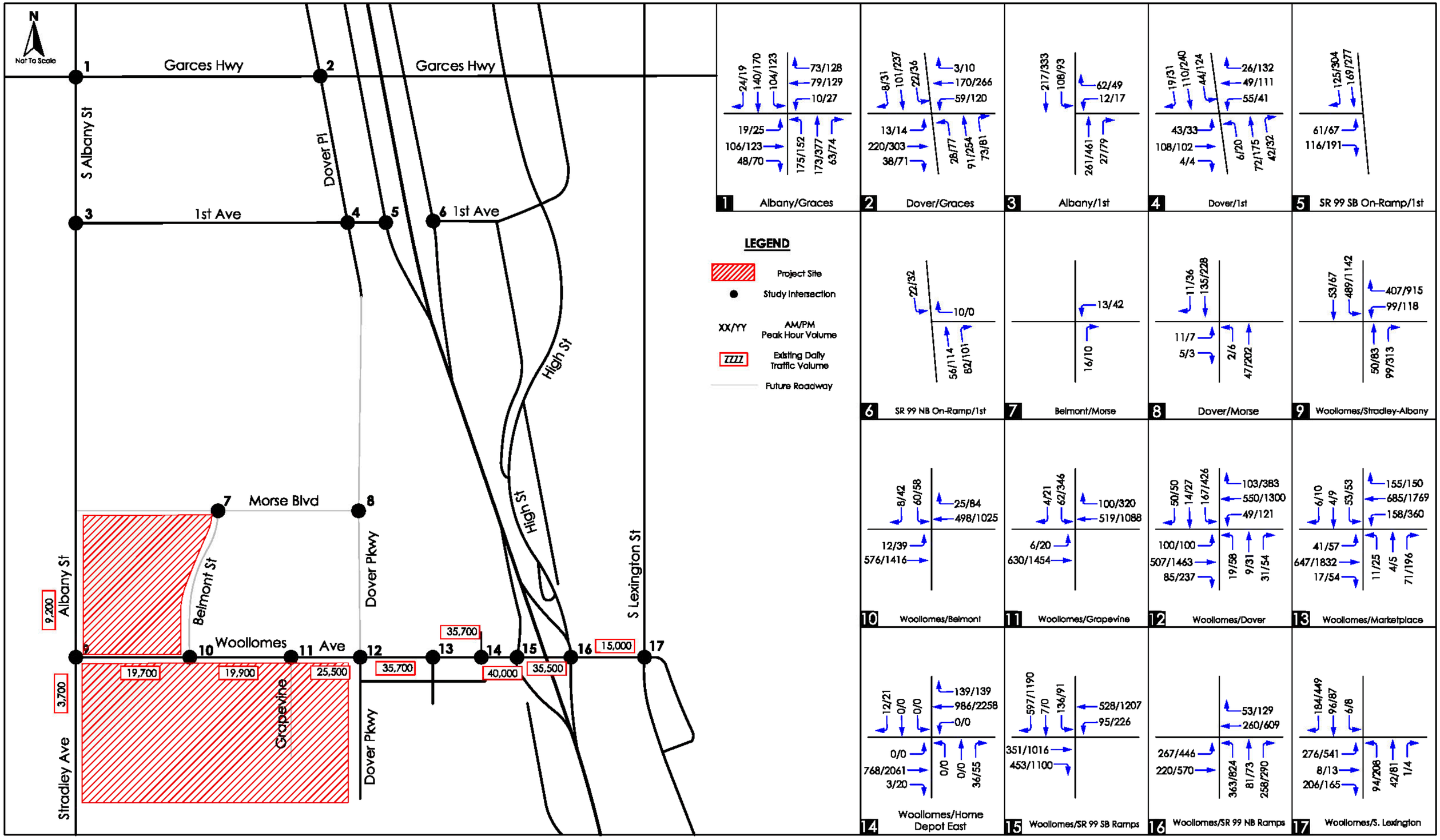


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Figure 15
Cumulative Buildout Baseline Weekday Daily and Peak Hour Traffic Volumes

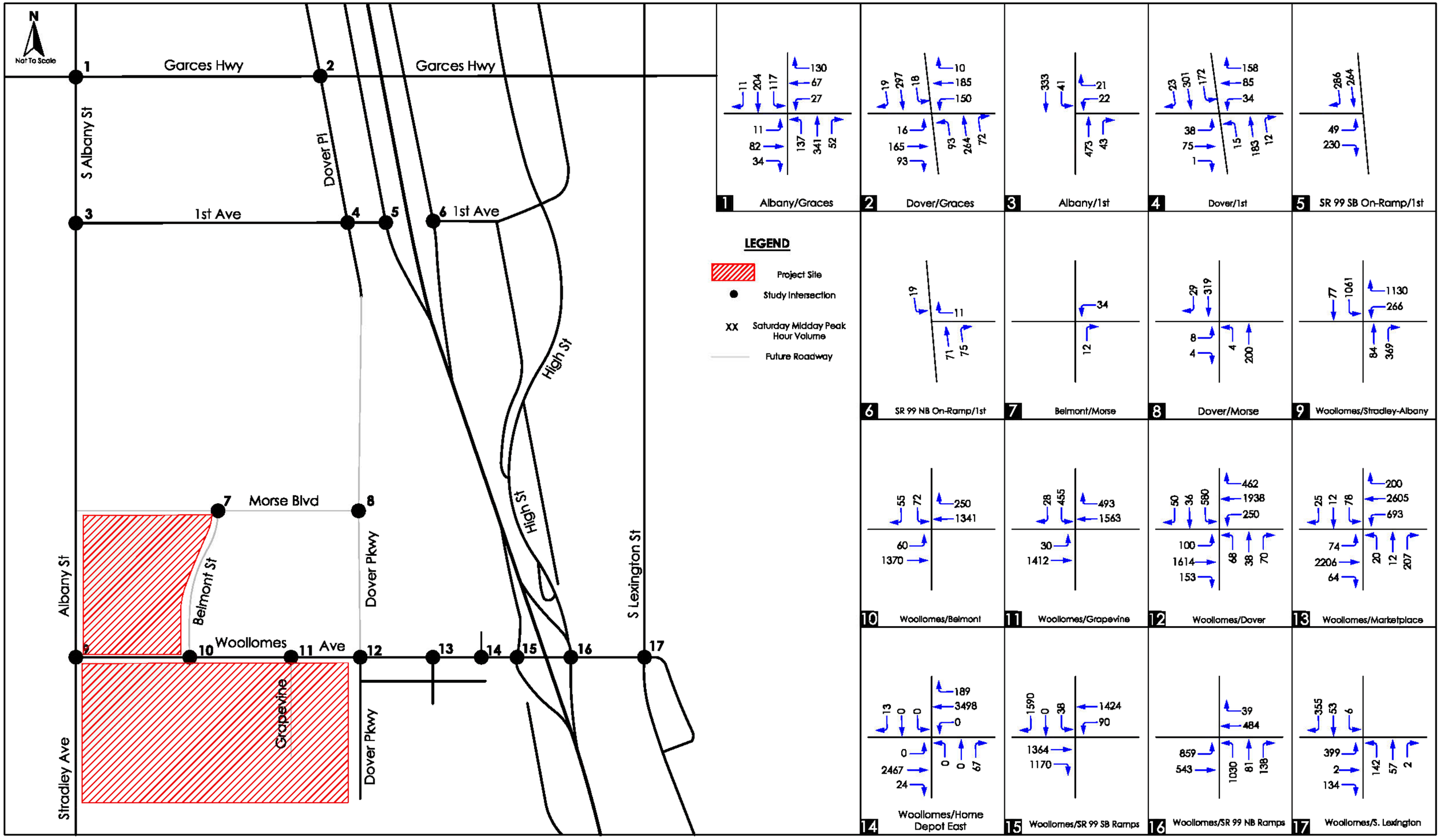


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Figure 16
Cumulative Buildout Baseline Saturday Midday Peak Hour Traffic Volumes

(2040) Baseline weekday a.m. and p.m. peak hour traffic volumes, and Saturday midday peak hour traffic volumes, respectively.

## Levels of Service

### Intersections

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout Baseline weekday a.m. and p.m. peak hour, and Saturday midday peak hour traffic volumes were input into the *Synchro* LOS software to determine the Cumulative Buildout Baseline intersection delays and resulting LOS values. Table O presents the results of the Cumulative Buildout Baseline intersection LOS analysis for the weekday a.m. and p.m., and Saturday midday peak hours. The LOS calculation sheets are provided in Appendix C.

**Table O – Cumulative Baseline Peak Hour Intersection Level of Service Summary**

| Intersection | Control | Target LOS | Weekday AM Peak Hour | | Weekday PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS |
| 1. Garces Highway/Albany Street | AWSC | C | 12.9 sec | B | **25.7 sec** | **D** | 17.4 sec | C |
| 2. Garces Highway/Dover Place | AWSC | C | 11.6 sec | B | **98.7 sec** | **F** | **63.7 sec** | **F** |
| 3. 1st Avenue/Albany Street | 1-way S | C | 10.8 sec | B | 14.0 sec | B | 14.5 sec | B |
| 4. 1st Avenue/Dover Place | 2-way S | C | 16.8 sec | C | **123.8 sec** | **F** | **199.2 sec** | **F** |
| 5. 1st Ave/Ellington St–SR 99 on-ramp | 1-way S | C | 11.2 sec | B | 16.7 sec | C | 16.7 sec | C |
| 6. 1st Ave/Fremont St-SR 99 off-ramp | AWSC | C | 6.9 sec | A | 7.1 sec | A | 6.9 sec | A |
| 7. Morse Boulevard/Belmont Street | 1-way S | C | 8.4 sec | A | 8.4 sec | A | 8.4 sec | A |
| 8. Morse Boulevard/Dover Parkway | 1-way S | C | 9.5 sec | B | 10.9 sec | B | 11.7 sec | B |
| 9. Woollomes Ave/Stradley-Albany | signal | D | 16.3 sec | B | 46.2 sec | D | **66.5 sec** | **E** |
| 10. Woollomes Ave/Belmont Street | signal | D | 8.0 sec | A | 9.7 sec | A | 9.3 sec | A |
| 11. Woollomes Ave/Grapevine Dwy | signal | D | 12.2 sec | B | 9.6 sec | A | 12.0 sec | B |
| 12. Woollomes Ave/Dover Parkway | signal | D | 12.3 sec | B | 17.8 sec | B | 25.0 sec | C |
| 13. Woollomes/Home Depot West | signal | D | 13.9 sec | B | 10.5 sec | B | 18.5 sec | B |
| 14. Woollomes/Home Depot East | 2-way S | D | 9.1 sec | A | 11.7 sec | B | 13.0 sec | B |
| 15. Woollomes Ave/SR 99 SB ramps | signal | D | 9.9 sec | A | 39.3 sec | D | 48.9 sec | D |
| 16. Woollomes Ave/SR 99 NB ramps | signal | D | 8.1 sec | A | 10.1 sec | B | 17.3 sec | B |
| 17. Woollomes Ave/Lexington St | signal | D | 13.3 sec | B | 19.8 sec | B | 15.0 sec | B |

Notes: LOS determined using HCM method in the *Synchro* LOS software.
**BOLD** value indicates unsatisfactory LOS.
***f****uture int* = future intersection
AWSC = all-way stop control
1-way S = 1-way stop control
2-way S = 2-way stop control

Based on the Cumulative Buildout Baseline weekday a.m. and p.m., and Saturday midday peak hour LOS analysis, the following study area intersections are forecast to operate with unsatisfactory LOS per the City's LOS standards:

- Garces Highway/Albany Street (LOS D in weekday p.m. peak hour)
- Garces Highway/Dover Place (LOS F in weekday p.m. peak hour and Saturday midday peak hour)
- 1st Avenue/Dover Place (LOS F in weekday p.m. peak hour and Saturday midday peak hour)
- Stradley Avenue – Albany Street/Woollomes Avenue (LOS E in Saturday midday peak hour)

**Roadway Segments**

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout Baseline weekday daily traffic volumes were compared with the roadway capacities in Table C – Daily Roadway Segment LOS Thresholds to determine the Cumulative Buildout Baseline roadway segment LOS values. Table P presents the results of the Cumulative Buildout Baseline weekday daily roadway LOS.

**Table P – Cumulative Buildout Baseline Daily Roadway Segment Levels of Service**

| Roadway Segment | Capacity Configuration | Target LOS | Cumulative Baseline ADT | Cumulative Baseline LOS |
|---|---|---|---|---|
| 1. Woollomes Ave, Stradley to Belmont | 4-lane Divided (>4.5 signals/mi) | D | 19,700 | D |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane Divided (>4.5 signals/mi)) | D | 19,900 | D |
| 3. Woollomes Ave, Grapevine Dwy to Dover | 4-lane Divided (>4.5 signals/mi) | D | **25,500** | **E** |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane Divided (>4.5 signals/mi) | D | 35,700 | D |
| 5. Woollomes Ave, Home Depot E to SR 99 | 6-lane Divided (>4.5 signals/mi) | D | **40,000** | **E** |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 6-lane Divided (>4.5 signals/mi) | D | 35,500 | D |
| 7. Woollomes Ave, SR 99 to Lexington | 6-lane Divided (>4.5 signals/mi) | D | 15,000 | A-C |
| 8. Albany St, north of Woollomes | 4-lane Undivided (<2 signals/mile) | C | 9,200 | A-B |
| 9. Stradley Ave, south of Woollomes | 4-lane Undivided (<2 signals/mile) | C | 3,700 | A-B |
| 10. Belmont St, north of Woollomes | 4-lane Undivided (<2 signals/mile) | C | -- | -- |
| 11. Belmont St, south of Woollomes | 4-lane Undivided (<2 signals/mile) | C | -- | -- |

Note: Thresholds based on 2009 FDOT Quality/Level of Service Handbook, Florida Department of Transportation. Adjustments made according to appropriate area conditions, following FDOT guidelines.

Based on the table, the following roadway segments in the study area are forecast to have daily traffic volumes beyond their acceptable daily capacities per the City's General Plan:

- Woollomes Avenue, Grapevine Driveway to Dover Parkway (LOS E)
- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS E)

**Freeway Mainline and Ramps**

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout Baseline weekday and Saturday midday peak hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into HCS to determine the Cumulative Buildout Baseline mainline segment and ramp LOS values. Table Q presents the results of the Cumulative Buildout Baseline weekday peak hours and Saturday midday peak hour freeway mainline LOS. The LOS calculation sheets are provided in Appendix D.

**Table Q – Cumulative Buildout Baseline Mainline Segment Peak Hour Levels of Service**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour Volume | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Volume | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Peak Hour Volume | Saturday Peak Hour Density pc/mi/ln | Saturday Peak Hour LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,294 | 6.8 | A | 2,778 | 14.6 | B | 3,370 | 17.7 | B |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,605 | 8.4 | A | 3,370 | 17.7 | B | 3,844 | 20.3 | C |
| SR 99 SB n/o Woollomes Ave | 3 | C | 2,349 | 12.3 | B | 3,202 | 16.8 | B | 3,387 | 17.7 | B |
| SR 99 SB s/o Woollomes Ave | 3 | C | 2,342 | 12.3 | B | 3,384 | 17.7 | B | 3,251 | 17.0 | B |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

Based on the table, all freeway mainline segments in the study area are forecast to continue to operate with satisfactory LOS, at LOS C or better, per Caltrans criteria.

Table R presents the results of the Cumulative Buildout Baseline weekday peak hours and Saturday midday peak hour freeway ramp LOS. The LOS calculation sheets are provided in Appendix E.

**Table R – Cumulative Buildout Baseline Freeway Ramps Peak Hour Levels of Service**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Midday Peak Density pc/mi/ln | Saturday Midday Peak LOS |
|---|---|---|---|---|---|---|---|---|
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 13.0 | B | 22.4 | B | 28.0 | C |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 13.6 | B | 24.8 | C | 27.4 | C |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 17.8 | B | **29.2** | **D** | **28.0** | **D** |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 17.7 | B | 23.8 | C | 25.7 | C |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

Based on the table, the SR 99 southbound off-ramp at Woollomes Avenue is forecast to operate with unsatisfactory LOS (LOS D) per Caltrans criteria during the weekday p.m. peak hour and Saturday midday peak hour.

## *Cumulative Buildout Baseline plus Project Conditions*

Traffic generated by the proposed project was added to the Cumulative Buildout Baseline scenario and the project impacts on the circulation system were analyzed. This scenario would also determine project-specific impacts and mitigation measures (if required).

### Intersection/Roadway Geometrics and Traffic Volumes

As previously discussed in the Project Description and the Existing plus Project section, the intersections and roadway segments surrounding the project site would be improved by the proposed project. Based on discussions with the City, it is anticipated that the proposed project would be conditioned to construct the following street improvements (from east side of project to west side of project):

- Construct the half-(street) section of Dover Parkway (west side of center line)), from Woollomes Avenue to its southern project boundary to have two lanes in the southbound

direction. The east side has already been constructed to its ultimate width. Dover Parkway has an ultimate right-of-way (ROW) of 90 feet.

- Construct the half-section of Woollomes Avenue (south side of center line), from the future Belmont Street to Dover Parkway to have two lanes in the eastbound direction. Woollomes Avenue has an ultimate ROW of 110 feet.
- Connect a primary access driveway on the West Pavilion site to the future Grapevine Shopping Center primary access driveway. This intersection will be signalized.
- Construct the half-section of Belmont Street (west side of center line), from the future Morse Boulevard to Woollomes Avenue to have two lanes in the southbound direction. Belmont Street has an ultimate ROW of 90 feet.
- Construct the full section of Belmont Street (both sides of center line), from Woollomes Avenue to its southern project boundary to have four total lanes (two lanes in each direction) plus a median. Belmont Street has an ultimate ROW of 90 feet.
- Install a traffic signal at the Belmont Street/Woollomes Avenue intersection.
- Construct the full section of Woollomes Avenue (both sides of center line), from Stradley Avenue – Albany Street to Belmont Street to have four total lanes (two lanes in each direction) plus a median. Woollomes Avenue has an ultimate ROW of 110 feet.
- Construct the half-section of Morse Boulevard (south side of center line), from Albany Street to the future Belmont Street to have two lanes in the eastbound direction. Morse Boulevard has an ultimate ROW of 90 feet.
- Construct the half-section of Stradley Avenue – Albany Street (east side of center line), from the northern project boundary to the southern project boundary to have two lanes in the northbound direction. Stradley Avenue – Albany Street has an ultimate ROW of 90 feet.

These improvements were assumed in the base roadway network for the Cumulative Buildout plus Project condition traffic analysis.

The proposed project trip assignments for the weekday peak hours, and Saturday midday peak hour, of the residential and retail/commercial land uses were added to the Cumulative Buildout Baseline weekday a.m. and p.m. peak hour, and Saturday midday peak hour, traffic volumes (Figures 15 and 16, respectively). This resulted in the Cumulative Buildout plus Project traffic volumes. Figure 17 illustrates the Cumulative Buildout plus Project weekday daily, a.m. and p.m. peak hour traffic volumes, and Figure 18 illustrates the Saturday midday peak hour traffic volumes at the study intersections and roadway segments.

## Levels of Service

### Intersections

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout plus Project weekday a.m. and p.m. peak hour, and Saturday midday peak hour traffic volumes were input into the *Synchro* LOS software to determine the Cumulative Buildout plus Project intersection delays and resulting LOS values. Table S presents the results of the Cumulative Buildout plus Project intersection LOS analysis for the weekday a.m. and p.m., and, and Table T for the Saturday midday peak hours. The LOS calculation sheets are provided in Appendix C.

Based on the Cumulative Buildout plus Project LOS analysis, and the significance criteria of the City, the proposed project would create significant impacts at the following study area intersections:

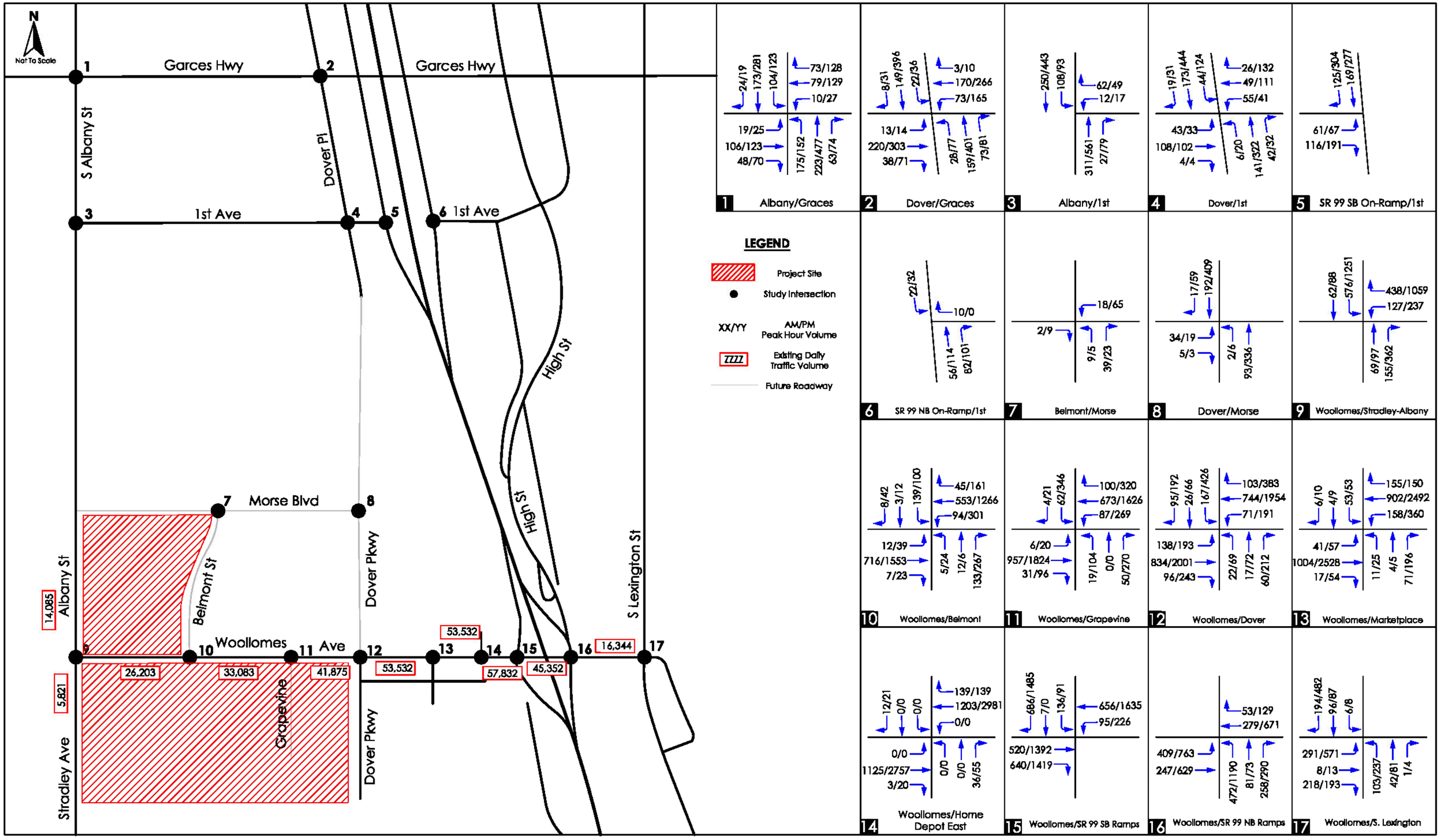


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Figure 17
Cumulative Buildout plus Project Weekday Daily and Peak Hour Traffic Volumes

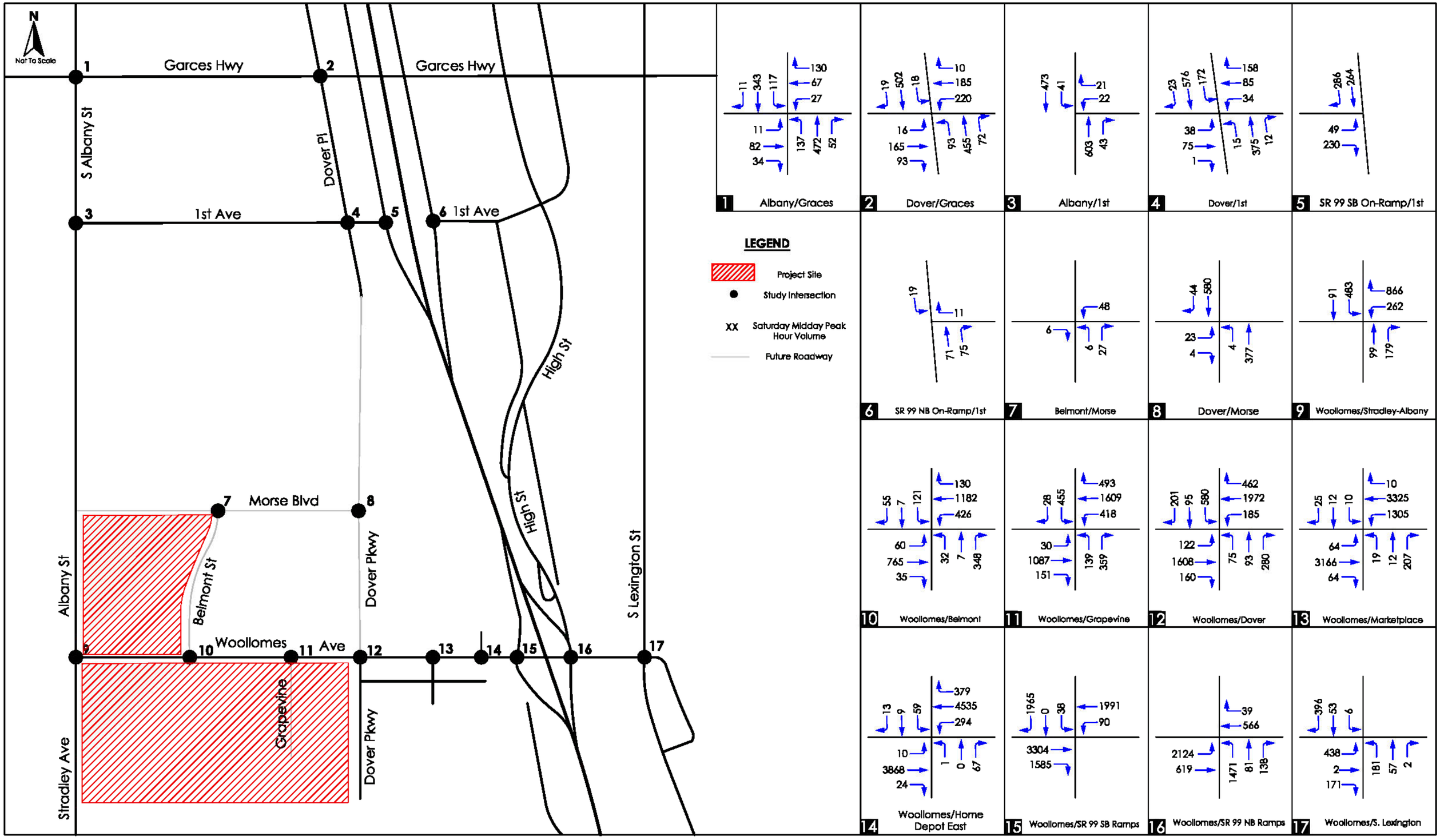


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Figure 18
Cumulative Buildout plus Project Saturday Midday Peak Hour Traffic Volumes

## Table S – Cumulative Buildout plus Project Weekday Intersection Level of Service Summary

| | | | | Cumulative Buildout Baseline | | | | Cumulative Buildout plus Project | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Target | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | | PM Peak Hour | | | |
| | Intersection | Control | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Difference | Delay | LOS | Difference |
| 1 . | Garces Highway/Albany Street | all-way stop | C | 12.9 sec | B | **25.7 sec** | **D** | 14.5 sec | B | 1.6 sec | **51.5 sec** | **F** | **25.8 sec** |
| 2 . | Garces Highway/Dover Place | all-way stop | C | 11.6 sec | B | **98.7 sec** | **F** | 13.8 sec | B | 2.2 sec | **208.0 sec** | **F** | **109.3 sec** |
| 3 . | 1st Avenue/Albany Street | one-way stop | C | 10.8 sec | B | 14.0 sec | B | 11.2 sec | B | 0.4 sec | 16.2 sec | C | 2.2 sec |
| 4 . | 1st Avenue/Dover Place | two-way stop | C | 16.8 sec | C | **123.8 sec** | **F** | 21.6 sec | C | 4.8 sec | **>X.X sec** | **F** | **-- sec** |
| 5 . | 1st Ave/Ellington St - SR 99 SB on-ramp | one-way stop | C | 11.2 sec | B | 16.7 sec | C | 11.2 sec | B | 0.0 sec | 16.7 sec | C | 0.0 sec |
| 6 . | 1 st Ave/Fremont St - SR 99 NB off-ramp | all-way stop | C | 6.9 sec | A | 7.1 sec | A | 6.9 sec | A | 0.0 sec | 7.1 sec | A | 0.0 sec |
| 7 . | Morse Avenue/Belmont Street | one-way stop | C | 8.4 sec | A | 8.4 sec | A | 8.5 sec | A | 0.1 sec | 8.6 sec | A | 0.2 sec |
| 8 . | Morse Avenue/Dover Parkway | one-way stop | C | 9.5 sec | B | 10.9 sec | B | 10.4 sec | B | 0.9 sec | 14.4 sec | C | 3.5 sec |
| 9 . | Woollomes Ave/Albany St - Stradley Ave | signal | D | 16.3 sec | B | 46.2 sec | D | 17.3 sec | B | 1.0 sec | **70.3 sec** | **E** | **24.1 sec** |
| 10 . | Woollomes Avenue/Belmont Street | signal | D | 8.0 sec | A | 9.7 sec | A | 15.2 sec | A | 7.2 sec | 31.5 sec | C | 21.8 sec |
| 11 . | Woollomes Avenue/Grapevine Driveway | signal | D | 12.2 sec | B | 9.6 sec | A | 11.0 sec | A | -1.2 sec | **81.0 sec** | **F** | **71.4 sec** |
| 12 . | Woollomes Avenue/Dover Parkway | signal | D | 12.3 sec | B | 17.8 sec | B | 25.5 sec | C | 13.2 sec | 22.0 sec | C | 4.2 sec |
| 13 . | Woollomes Ave/Home Depot Dwy West | signal | D | 13.9 sec | B | 10.5 sec | B | 13.6 sec | B | -0.3 sec | 11.4 sec | B | 0.9 sec |
| 14 . | Woollomes Ave/Home Depot Dwy East | two-way stop | D | 9.1 sec | A | 11.7 sec | B | 9.5 sec | A | 0.4 sec | 14.2 sec | B | 2.5 sec |
| 15 . | Woollomes Avenue/SR 99 SB ramps | signal | D | 9.9 sec | A | 39.3 sec | D | 11.9 sec | B | 2.0 sec | **81.5 sec** | **F** | **42.2 sec** |
| 16 . | Woollomes Avenue/SR 99 NB ramps | signal | D | 8.1 sec | A | 10.1 sec | B | 8.3 sec | A | 0.2 sec | 20.5 sec | C | 10.4 sec |
| 17 . | Woollomes Avenue/Lexington Street | signal | D | 13.3 sec | B | 19.8 sec | B | 13.4 sec | B | 0.1 sec | 30.5 sec | C | 10.7 sec |

Notes:

XX - Unsatisfactory LOS (LOS E or F) per the City's General Plan Circculation Element.

XX - Significant project impact. Proposed project either: 1) causes intersection to operate at LOS E or F from LOS D or better; or, 2) increases delay greater than 2.0 seconds at an intersection that would be operating at LOS E or F.

**Table T – Cumulative Buildout plus Project Saturday Intersection Level of Service Summary**

| | | | Cumulative Buildout | | | Cumulative Buildout + Project | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Saturday Midday Peak | | | Saturday Midday Peak Hour | | | | |
| | Intersection | Control | Delay | | LOS | Delay | | LOS | Difference | |
| 1 | Garces Highway/Albany Street | all-way stop | 17.4 | sec | C | **39.2** | **sec** | **E** | **21.8** | **sec** |
| 2 | Garces Highway/Dover Place | all-way stop | **63.7** | **sec** | **F** | **218.8** | **sec** | **F** | **155.1** | **sec** |
| 3 | 1st Avenue/Albany Street | one-way stop | 14.5 | sec | B | 18.0 | sec | C | 3.5 | sec |
| 4 | 1st Avenue/Dover Place | two-way stop | **199.2** | **sec** | **F** | **>X.X** | **sec** | **F** | **--** | **sec** |
| 5 | 1st Ave/Ellington St - SR 99 SB on-ramp | one-way stop | 16.7 | sec | C | 16.7 | sec | C | 0.0 | sec |
| 6 | 1 st Ave/Fremont St - SR 99 NB off-ramp | all-way stop | 6.9 | sec | A | 6.9 | sec | A | 0.0 | sec |
| 7 | Morse Avenue/Belmont Street | one-way stop | 8.4 | sec | A | 8.6 | sec | A | 0.2 | sec |
| 8 | Morse Avenue/Dover Parkway | one-way stop | 11.7 | sec | B | 17.9 | sec | C | 6.2 | sec |
| 9 | Woollomes Ave/Albany St - Stradley Ave | signal | **66.5** | **sec** | **E** | **78.7** | **sec** | **E** | **12.2** | **sec** |
| 10 | Woollomes Avenue/Belmont Street | signal | 9.3 | sec | A | **71.4** | **sec** | **E** | **62.1** | **sec** |
| 11 | Woollomes Avenue/Grapevine Driveway | signal | 12.0 | sec | B | **173.5** | **sec** | **F** | **161.5** | **sec** |
| 12 | Woollomes Avenue/Dover Parkway | signal | 25.0 | sec | C | **84.2** | **sec** | **F** | **59.2** | **sec** |
| 13 | Woollomes Ave/Home Depot Dwy West | signal | 18.5 | sec | B | 46.0 | sec | D | 27.5 | sec |
| 14 | Woollomes Ave/Home Depot Dwy East | two-way stop | 13.0 | sec | B | 16.2 | sec | C | 3.2 | sec |
| 15 | Woollomes Avenue/SR 99 SB ramps | signal | 48.9 | sec | D | **103.9** | **sec** | **F** | **55.0** | **sec** |
| 16 | Woollomes Avenue/SR 99 NB ramps | signal | 17.3 | sec | B | 50.4 | sec | D | 33.1 | sec |
| 17 | Woollomes Avenue/Lexington Street | signal | 15.0 | sec | B | 16.0 | sec | B | 1.0 | sec |

Notes:

**XX** - Unsatisfactory LOS (LOS E or F) per the City's General Plan Circculation Element.

**XX** - Significant project impact. Proposed project either: 1) causes intersection to operate at LOS E or F from LOS D or better; or, 2) increases delay greater than 2.0 seconds at an intersection that would be operating at LOS E or F.

- Garces Highway/Albany Street (LOS D to LOS F in weekday p.m. peak hour, and LOS C to LOS E in the Saturday midday peak hour)
- Garces Highway/Dover Place (LOS F to LOS F in the weekday p.m. peak hour and Saturday midday peak hour)
- 1st Avenue/Dover Place (LOS F to LOS F in the weekday p.m. peak hour and Saturday midday peak hour)
- Woollomes Avenue/Albany Street – Stradley Avenue (LOS D to LOS E in the weekday p.m. peak hour, and LOS E to LOS E in the Saturday midday peak hour)
- Woollomes Avenue/Belmont Street (LOS A to LOS E in the Saturday midday peak hour)
- Woollomes Avenue/Grapevine Driveway (LOS A to LOS F in the weekday p.m. peak hour, and LOS B to LOS F in the Saturday midday peak hour)
- Woollomes Avenue/Dover Parkway (LOS C to LOS F in the Saturday midday peak hour)
- Woollomes Avenue/SR 99 southbound ramps (LOS D to LOS F in the weekday p.m. peak hour, and LOS D to LOS F in Saturday midday peak hour)

Mitigation measures will be required of the project to mitigate these impacted intersections back to satisfactory levels of service.

### Roadway Segments

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout plus Project weekday daily traffic volumes (shown in Figure 17) were compared with the roadway capacities in Table C – Daily Roadway Segment LOS Thresholds to determine the Cumulative Buildout plus Project roadway segment LOS values. Table U presents the results of the Cumulative Buildout plus Project weekday daily roadway LOS.

**Table U – Cumulative Buildout plus Project Daily Roadway Segment Levels of Service**

| Roadway Segment | Capacity Configuration | Target | Cumulative plus Project | |
|---|---|---|---|---|
| | | LOS | ADT | LOS |
| 1. Woollomes Ave, Stradley to Belmont | 4-lane Divided (>4.5 signals/mi) | D | **26,003** | **E** |
| 2. Woollomes Ave, Belmont to Grapevine | 4-lane Divided (>4.5 signals/mi)) | D | **33,083** | **F** |
| 3. Woollomes Ave, Grapevine Dwy to Dover | 4-lane Divided (>4.5 signals/mi) | D | **41,875** | **F** |
| 4. Woollomes Ave, Dover to Home Depot E | 6-lane Divided (>4.5 signals/mi) | D | **53,532** | **F** |
| 5. Woollomes Ave, Home Depot E to SR 99 | 6-lane Divided (>4.5 signals/mi) | D | **57,832** | **F** |
| 6. Woollomes Ave, SR 99 SB to NB ramps | 6-lane Divided (>4.5 signals/mi) | D | **45,352** | **F** |
| 7. Woollomes Ave, SR 99 to Lexington | 6-lane Divided (>4.5 signals/mi) | D | 16,344 | A-C |
| 8. Albany St, north of Woollomes | 4-lane Undivided (<2 signals/mile) | C | 14,085 | A-B |
| 9. Stradley Ave, south of Woollomes | 4-lane Undivided (<2 signals/mile) | C | 5,821 | A-B |
| 10. Belmont St, north of Woollomes | 4-lane Undivided (<2 signals/mile) | C | -- | -- |
| 11. Belmont St, south of Woollomes | 4-lane Undivided (<2 signals/mile) | C | -- | -- |

Note: Thresholds based on 2009 FDOT Quality/Level of Service Handbook, Florida Department of Transportation. Adjustments made according to appropriate area conditions, following FDOT guidelines.

Based on the table, the proposed project would significantly impact the following roadway segments in the study area per the City's significance criteria:

- Woollomes Avenue, Stradley Avenue – Albany Street to Belmont Street (LOS D to LOS E)
- Woollomes Avenue, Belmont Street to Grapevine Driveway (LOS D to LOS F)
- Woollomes Avenue, Grapevine Driveway to Dover Parkway (LOS E to LOS F)
- Woollomes Avenue, Dover Parkway to Home Depot Driveway East (LOS D to LOS F)
- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS E to LOS F)
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (LOS D to LOS F)

Mitigation measures will be required of the project to mitigate these impacted roadway segments back to satisfactory levels of service.

### Freeway Mainline and Ramps

Based on the analysis methodology described in Section 1.0, the Cumulative Buildout plus Project weekday and Saturday midday peak hour traffic volumes at the study area mainline segments and ramps of SR 99 at Woollomes Avenue were input into HCS to determine the Cumulative Buildout plus Project mainline segment and ramp LOS values. Table V presents the results of the Cumulative Buildout plus Project weekday peak hours and Saturday midday peak hour freeway mainline LOS. The LOS calculation sheets are provided in Appendix D.

**Table V – Cumulative Buildout plus Project Mainline Segment Peak Hour Levels of Service**

| Mainline Segment | No. Lanes | Target LOS | Weekday AM Peak Hour Volume | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Volume | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Peak Hour Volume | Saturday Peak Hour Density pc/mi/ln | Saturday Peak Hour LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR 99 NB n/o Woollomes Ave | 3 | C | 1,436 | 7.5 | A | 2,836 | 14.9 | B | 3,785 | 19.9 | C |
| SR 99 NB s/o Woollomes Ave | 3 | C | 1,714 | 9.0 | A | 3,736 | 19.7 | C | 4,285 | 23.0 | C |
| SR 99 SB n/o Woollomes Ave | 3 | C | 2,438 | 12.8 | B | 3,496 | 18.3 | C | 3,762 | 19.8 | C |
| SR 99 SB s/o Woollomes Ave | 3 | C | 2,529 | 13.2 | B | 3,704 | 19.5 | C | 3,665 | 19.3 | C |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

Based on the table, all freeway mainline segments in the study area would continue to operate with satisfactory LOS with addition of project traffic volumes, at LOS C or better, per Caltrans criteria.

Table W presents the results of the Cumulative Buildout plus Project weekday peak hours and Saturday midday peak hour freeway ramp LOS. The LOS calculation sheets are provided in Appendix E.

**Table W – Cumulative Buildout plus Project Freeway Ramps Peak Hour Levels of Service**

| Ramp Location | Target LOS | Junction Type | Weekday AM Peak Hour Density pc/mi/ln | Weekday AM Peak Hour LOS | Weekday PM Peak Hour Density pc/mi/ln | Weekday PM Peak Hour LOS | Saturday Midday Peak Density pc/mi/ln | Saturday Midday Peak LOS |
|---|---|---|---|---|---|---|---|---|
| SR 99 NB on-ramp at Woollomes Ave | C | merge | 14.9 | B | 25.2 | C | **33.4** | **D** |
| SR 99 NB off-ramp at Woollomes Ave | C | diverge | 14.6 | B | 27.7 | C | **30.7** | **D** |
| SR 99 SB on-ramp at Woollomes Ave | C | merge | 20.2 | B | **33.4** | **D** | **33.4** | **D** |
| SR 99 SB off-ramp at Woollomes Ave | C | diverge | 18.4 | B | 26.1 | B | **28.8** | **F** |

Note: LOS determined using *Highway Capacity Software* (HCS) consistent with the *Highway Capacity Manual* (HCM).

Based on the table, the addition of project trips to the SR 99 ramps at Woollomes Avenue would create significant impacts to the following merge and diverge areas of the interchange:

- SR 99 northbound on-ramp at Woollomes Avenue (LOS C to LOS D in the Saturday midday peak hour)
- SR 99 northbound off-ramp at Woollomes Avenue (LOS C to LOS D in the Saturday midday peak hour)
- SR 99 southbound on-ramp at Woollomes Avenue (LOS D to LOS D in the weekday p.m. peak hour, and Saturday midday peak hour)
- SR 99 southbound off-ramp at Woollomes Avenue (LOS C to LOS F in the Saturday midday peak hour)

Mitigation measures will be required of the project to mitigate these impacted intersections back to satisfactory levels of service.

# 5.0 PROJECT ACCESS/CIRCULATION, PARKING, TRANSIT/BICYCLE/PEDESTRIAN FACILITIES

The following section discusses the proposed project's access, circulation, and parking characteristics. If required, mitigation measures will be proposed to mitigate impacts to less than significant levels.

## *Project Access and Circulation*

As shown on Figure 3 – Conceptual Project Site Plan, at this time, there is no specific development plan in terms of detailed layouts of structures and access driveway locations. The Vineyard at Delano project proposes 432 multi-family low-rise apartment (one- and two-story) units in 36 separate apartment buildings. Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center. All parking for the project would be accommodated on-site. The Delano West Pavilion proposes 440 apartment units and approximately 340,000 square feet of commercial and restaurant space. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

The project site would be served by Woollomes Avenue, Stradley Avenue – Albany Street, and Dover Parkway. New street segments of Belmont Street and Morse Boulevard would also be constructed as part of the project. The project proposes a new street, Belmont Street, which would bisect the project sites in a north–south direction, forming a new intersection at Woollomes Avenue and providing access between the Vineyard development and the West Pavilion development.

### Project Street Improvements

It is anticipated that the proposed project would be conditioned to construct the following street improvements (from east side of project to west side of project):

- Construct the half-(street) section of Dover Parkway (west side of center line)), from Woollomes Avenue to its southern project boundary to have two lanes in the southbound direction. The east side has already been constructed to its ultimate width. Dover Parkway has an ultimate right-of-way (ROW) of 90 feet.
- Construct the half-section of Woollomes Avenue (south side of center line), from the future Belmont Street to Dover Parkway to have two lanes in the eastbound direction. Woollomes Avenue has an ultimate ROW of 110 feet.
- Connect a primary access driveway on the West Pavilion site to the future Grapevine Shopping Center primary access driveway. This intersection will be signalized.
- Construct the half-section of Belmont Street (west side of center line), from the future Morse Boulevard to Woollomes Avenue to have two lanes in the southbound direction. Belmont Street has an ultimate ROW of 90 feet.
- Construct the full section of Belmont Street (both sides of center line), from Woollomes Avenue to its southern project boundary to have four total lanes (two lanes in each direction) plus a median. Belmont Street has an ultimate ROW of 90 feet.
- Install a traffic signal at the Belmont Street/Woollomes Avenue intersection.
- Construct the full section of Woollomes Avenue (both sides of center line), from Stradley Avenue – Albany Street to Belmont Street to have four total lanes (two lanes in each direction) plus a median. Woollomes Avenue has an ultimate ROW of 110 feet.
- Construct the half-section of Morse Boulevard (south side of center line), from Albany Street to the future Belmont Street to have two lanes in the eastbound direction. Morse Boulevard has an ultimate ROW of 90 feet.

- Construct the half-section of Stradley Avenue – Albany Street (east side of center line), from the northern project boundary to the southern project boundary to have two lanes in the northbound direction. Stradley Avenue – Albany Street has an ultimate ROW of 90 feet.

At the time specific and detailed development plans are developed for each phase of the either project, Vineyard at Delano and/or Delano West Pavilion, those plans will be subject to review and analysis for their primary, secondary, and emergency access points with the existing and future public streets of Woollomes Avenue, Stradley Avenue – Albany Street, Belmont Street, and Morse Boulevard. Those plans will be required to be prepared consistent with the City's Street Design Standards or other City-adopted design manual and/or guidelines.

## *Parking*

Per the City's Municipal Code, Chapter 20.13 – Parking Regulations, Table 13.A – Off-Street Automobile Parking Space Requirements, Table X shows the parking requirements for the proposed land uses of the project.

**Table X – Parking Requirements for Land Uses of the Proposed Project**

| Land Use | Minimum Off-Street Parking Requirements |
|---|---|
| **Multi-Family Dwelling** | |
| - Resident Parking | Studio: 1 space per unit<br>1 bedroom: 1.5 spaces per unit<br>2 or more bedrooms: 2 spaces per unit |
| - Guest Parking | 0.25 spaces per unit for 11 or more units; no guest parking for 10 or less units |
| **Commercial Uses** | |
| - Uses located in Regional Commercial Shopping Centers (more than 750,000 SF of GLA) | 1 space per 300 SF of GFA |
| - Uses located in Neighborhood, Community, and Convenience Shopping Centers (less than 750,000 SF of GLA) | 1 space per 250 SF of GFA |

At the time specific and detailed development plans are developed for each phase of the either project, Vineyard at Delano and/or Delano West Pavilion, those plans will be subject to review and analysis for their consistency with the Parking Requirements of the City's Zoning Code.

## *Transit, Bicycle and Pedestrian Facilities*

The proposed project could conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The project would create a demand for bicycle facilities, including bike lanes along the project frontages and on-site bicycle facilities (e.g., racks and lockers).

The Conceptual Project Site Plan does not indicate any apparent provisions of transit, bicycle, and/or pedestrian facilities. However, Bicycle Facilities Policy 3a in the Delano General Plan states that bike lanes shall be implemented on improved street segments. Policy 5 requires that secure

bicycle parking facilities be provided to all commercial development as a standard condition of project approval.

# 6.0 PROJECT IMPACTS AND MITIGATION MEASURES

The proposed project would be constructed within a 10 year timeframe with several phases of development within each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion were analyzed at full buildout (i.e., one single phase – buildout of project) to determine the total traffic mitigation measures required at full buildout of the project.

The applicant will be notified that separate *Focused Traffic Analyses* will be required, after certification of the EIR, for each phase of development (when specific numbers of DUs and retail square footages are determined) to determine the specific mitigation measures required for that level of development. Those mitigation measures will be consistent with the measures required for the buildout of the project.

## *City Fees*

### Development Impact Fees for Traffic and Circulation

The City adopted Resolution No. 2007-42 in June 2007 – *Development Impact Fees for Traffic and Circulation* (Ordinance No. 928 – *Development Impact Fees*) that levies fees on new development, on a one-time basis, as a Condition of Approval (COA) to cover the cost of infrastructure or facilities needed by that development as authorized by Section 66000(b) of the Government Code. A copy of the Development Impact Fee is located in Appendix H. Under the program, new local streets are constructed by developers as a COA for new developments. The program is one of several sources of funding used to maintain and develop streets. Ordinance No. 928 amended the City Municipal Code allowing impact fees to be established by resolution.

## *Existing plus Project*

Figure 19 illustrates the required mitigation measures (below) for the study area intersections and roadway segments for the Existing plus Project condition. Below are the required mitigation measures needed to offset significant project impacts.

### Intersections

The proposed project would create significant impacts at the following study area intersections:

- Garces Highway/Albany Street (LOS B to LOS D in weekday p.m. peak hour)
- Woollomes Avenue/Home Depot Driveway East (LOS B to LOS E in weekday p.m. peak hour, and LOS B to LOS F in Saturday midday peak hour)
- Woollomes Avenue/SR 99 northbound ramps (LOS A to LOS F in Saturday midday peak hour)

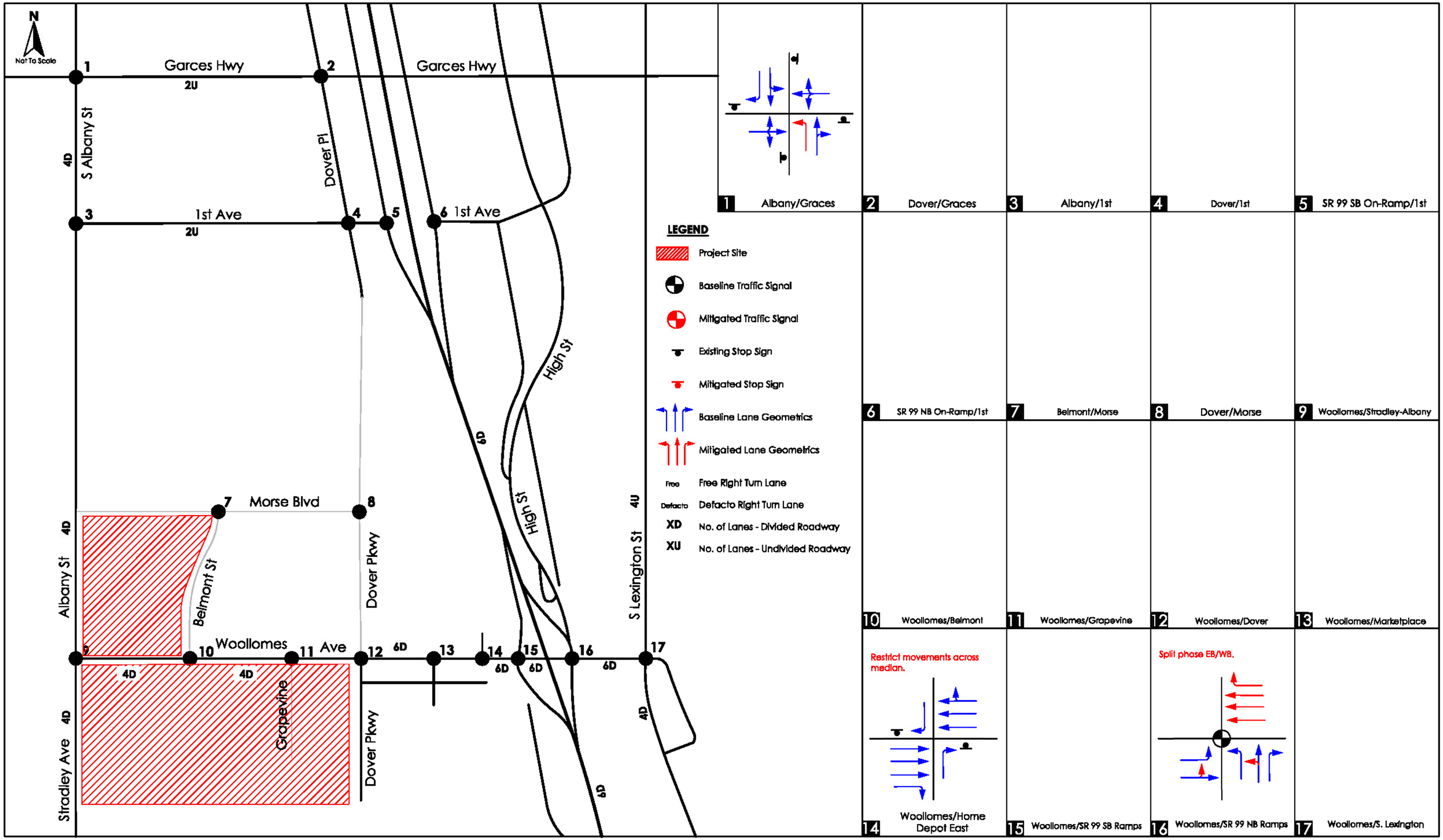


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Figure 19
Existing plus Project Traffic Mitigation Measures

**Mitigation Measure**

**TRAF-1** The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be reviewed and approved by the City's Public Works Department and/or Caltrans (where required).

a. Garces Highway/Albany Street

- Restripe the existing northbound approach to have a dedicated left turn lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

With implementation of this mitigation measure, the intersection would operate at LOS C in the weekday p.m. peak hour and the impact would become less than significant.

b. Woollomes Avenue/Home Depot Driveway East

- Restrict the southbound left and through movement through the intersection. These vehicles could use the existing signalized intersection at the Home Depot Driveway West.

With implementation of this mitigation measure, the intersection would operate at LOS C in the weekday p.m. peak hour and Saturday midday peak hour and the impact would become less than significant.

c. Woollomes Avenue/SR 99 northbound ramps

- Restripe the northbound through lane to a shared left plus through lane.
- Restripe the eastbound through lane to a shared left plus through lane.
- Widen the northbound on-ramp to accommodate two lanes at its split with High Street. Prior to the SR 99 mainline, the second on-ramp lane can merge to a single lane. This would accommodate two lanes of on-ramp traffic from the existing eastbound left turn lane and the new left turn plus shared lane.
- Modify the traffic signal to have a split phase for the eastbound and westbound approaches.

With implementation of this mitigation measure, the intersection would operate at LOS D in the Saturday midday peak hour. Due to the existing configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be done, unless a significant reconfiguration of the interchange is done. LOS D would still be a significant impact per Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99 to address impacts on the facilities addressed in **MM TRAF-1c**. Without jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM TRAF-1c**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant, for that reason, this impact remains **significant and unavoidable**.

## Roadway Segments

The proposed project would create significant impacts to the following roadway segments in the study area:

- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS A-C to LOS F)
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (LOS D to LOS F)

**Mitigation Measure**

**TRAF-2** The project applicant shall construct or fully fund the traffic improvements listed below. The design of these improvements to the street network shall be reviewed and approved by the City's Public Works Department and/or Caltrans (where required).

a. Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps
   - Restripe the existing 2-lane westbound segment, approximately 100 feet west of the southbound off-ramp, to a 3-lane segment. This segment would become a 6-lane, divided segment. There is adequate pavement width to accommodate this lane striping improvement.

   With implementation of this mitigation measure, the roadway segment would operate at LOS A-C and the impact would become less than significant.

b. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps
   - Convert the existing 2-lane, divided segment to a 4-lane, divided segment.

   With implementation of this mitigation measure, the roadway segment would operate at LOS D and the impact would become less than significant. However, due to the existing configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be done, unless a significant reconfiguration of the interchange is done. LOS F would still be a significant impact per City/Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99 to address impacts on the facilities addressed in **MM TRAF-2b**. Without jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM TRAF-2b**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant, for that reason, this impact remains **significant and unavoidable**.

### Freeway Mainline and Ramps

All freeway mainline segments in the study area would continue to operate with satisfactory LOS with addition of project traffic volumes, at LOS C or better, per Caltrans criteria in the Existing plus Project condition. No mitigation measures are required.

The addition of project trips to the SR 99 ramps at Woollomes Avenue would also not create any significant impacts to the merge and diverge areas of the interchange. No mitigation measures are required.

## *Cumulative Buildout (2040) plus Project*

Figure 20 illustrates the required mitigation measures (below) for the study area intersections and roadway segments for the Cumulative Buildout plus Project condition. Below are the required mitigation measures needed to offset significant project impacts.

### Intersections

The proposed project would create significant impacts at the following study area intersections:

- Garces Highway/Albany Street (LOS D to LOS F in weekday p.m. peak hour, and LOS C to LOS E in the Saturday midday peak hour)
- Garces Highway/Dover Place (LOS F to LOS F in the weekday p.m. peak hour and Saturday midday peak hour)

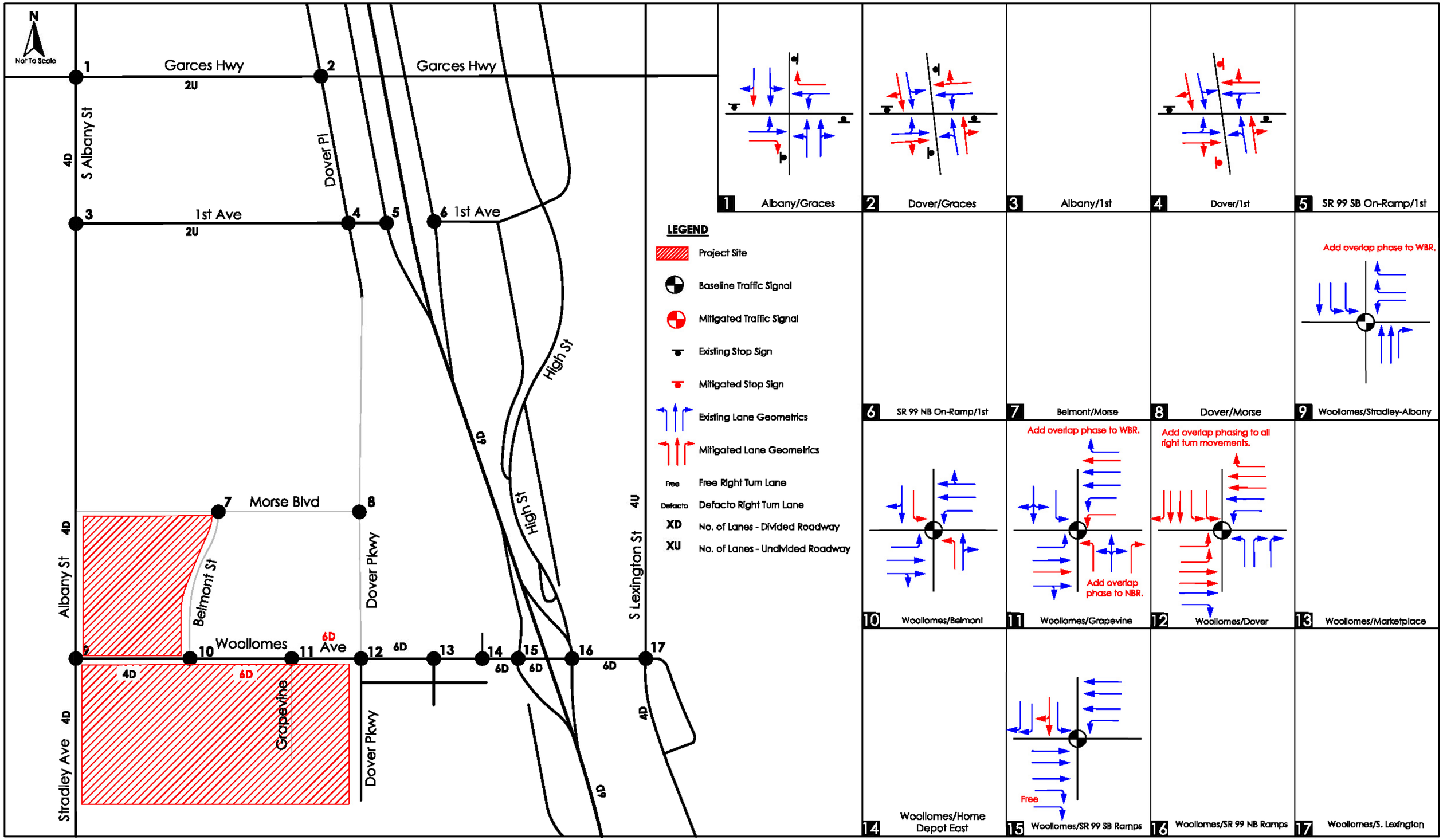


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Figure 20
Cumulative Buildout plus Project Traffic Mitigation Measures

- 1st Avenue/Dover Place (LOS F to LOS F in the weekday p.m. peak hour and Saturday midday peak hour)
- Woollomes Avenue/Albany Street – Stradley Avenue (LOS D to LOS E in the weekday p.m. peak hour, and LOS E to LOS E in the Saturday midday peak hour)
- Woollomes Avenue/Belmont Street (LOS A to LOS E in the Saturday midday peak hour)
- Woollomes Avenue/Grapevine Driveway (LOS A to LOS F in the weekday p.m. peak hour, and LOS B to LOS F in the Saturday midday peak hour)
- Woollomes Avenue/Dover Parkway (LOS C to LOS F in the Saturday midday peak hour)
- Woollomes Avenue/SR 99 southbound ramps (LOS D to LOS F in the weekday p.m. peak hour, and LOS D to LOS F in Saturday midday peak hour)

**Mitigation Measure**

**TRAF-3** The project applicant shall fully construct the improvements below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. Garces Highway/Albany Street
   - o Restripe the southbound right turn lane to a shared through plus right turn lane.
   - o Restripe the eastbound approach to have a shared left plus through lane and a dedicated right turn lane. Some minor widening of the approach may be required.
   - o Restripe the westbound approach to have a shared left plus through lane and a dedicated right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

   With the implementation of these improvements, the intersection would operate at LOS C in the weekday p.m. peak hour and Saturday midday peak hour.

b. Garces Highway/Dover Place
   - o Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.

   With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour and Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements can be done. Installation of a traffic signal would improve the LOS to LOS C or better, however, the forecast volumes at the intersection would not warrant the installation of a traffic signal.

c. 1st Avenue/Dover Place
   - o Restripe all four approaches (north, south, east, and west) to have a shared left plus through lane and a shared through plus right turn lane. There is adequate pavement width to accommodate this lane striping improvement.
   - o Convert the intersection to an all-way stop controlled intersection.

   With the implementation of these improvements, the intersection would operate at LOS C in the weekday p.m. peak hour, and LOS D in the Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements can be done. Installation of a traffic signal would improve the LOS to LOS C or better in the Saturday midday peak hour, however, the forecast volumes at the intersection would not warrant the installation of a traffic signal.

d. Woollomes Avenue/Albany Street

- Modify the signal to have a right turn overlap phase for the westbound approach.

With the implementation of this improvement, the intersection would operate at LOS B in the weekday p.m. peak hour, and LOS C in the Saturday midday peak hour.

e. Woollomes Avenue/Belmont Street

- Construct a separate northbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.
- Construct a separate southbound left turn lane with a protected phase. There is adequate right-of-way to implement this improvement.

With the implementation of these improvements, the intersection would operate at LOS D in the Saturday midday peak hour.

f. Woollomes Avenue/Grapevine Driveway

- Restripe the northbound approach to have a separate left turn lane, a shared left plus through plus right turn lane, and a dedicated right turn lane. There is adequate right-of-way to implement this improvement.
- Stripe third eastbound through lane.
- Construct a second (dual) westbound left turn lane.
- Stripe a third westbound through lane.

With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour and the Saturday midday peak hour.

g. Woollomes Avenue/Dover Parkway

- Modify the signal to have a right turn overlap phase for all approaches.

With the implementation of these improvements, the intersection would operate at LOS E in the Saturday midday peak hour. Due to the limited right-of-way at the intersection, no other operational or capacity improvements are feasible. LOS E would still be a significant impact per City's criteria. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable impact**.

h. Woollomes Avenue/SR 99 southbound ramps

- Restripe the southbound approach to have a single left turn lane, a shared left plus through plus right turn lane, and dual right turn lanes.
- Convert the eastbound dual right turn lanes to free (movement) dual right turn lanes.

With the implementation of these improvements, the intersection would operate at LOS D in the weekday p.m. peak hour, and LOS E in the Saturday midday peak hour. However, due to the configuration and limited right-of-way of the interchange, no other operational or capacity improvements can be done, unless a significant reconfiguration of the interchange is done. LOS E would still be a significant impact per City/Caltrans criteria.

Furthermore, the City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM TRAF-3a – 3h**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM TRAF-3a – 3h**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the

proportionate share of the proposed project's impact at the facilities identified in mitigation measure **TRAF-3a – 3h**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

## Roadway Segments

The proposed project would create significant impacts to the following roadway segments in the study area:

- Woollomes Avenue, Stradley Avenue – Albany Street to Belmont Street (LOS D to LOS E)
- Woollomes Avenue, Belmont Street to Grapevine Driveway (LOS D to LOS F)
- Woollomes Avenue, Grapevine Driveway to Dover Parkway (LOS E to LOS F)
- Woollomes Avenue, Dover Parkway to Home Depot Driveway East (LOS D to LOS F)
- Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps (LOS E to LOS F)
- Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps (LOS D to LOS F)

### Mitigation Measure

**TRAF-4** The project applicant shall fully construct the improvements listed below, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. Woollomes Avenue, Stradley Avenue – Albany Street to Belmont Street

   - Restripe the 4-lane, divided segment to a 6-lane, divided segment (three travel lanes in each direction, with median).

   With the implementation of these improvements, the roadway segment would operate at LOS D.

b. Woollomes Avenue, Belmont Street to Grapevine Driveway

   - Restripe the 4-lane, divided segment to a 6-lane, divided segment (three travel lanes in each direction, with median).

   With the implementation of these improvements, the roadway segment would operate at LOS D.

c. Woollomes Avenue, Grapevine Driveway to Dover Parkway

   - Restripe the 4-lane, divided segment to a 6-lane, divided segment (three travel lanes in each direction, with median).

   With the implementation of these improvements, the roadway segment would operate from LOS E to LOS F and the impact would remain significant. The 6-lane improvement would construct the ultimate configuration of this segment per the City's Circulation Element. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable impact**.

d. Woollomes Avenue, Dover Parkway to Home Depot Driveway East

   This segment would already be built to its ultimate configuration per the City's Circulation Element (6-lane, divided roadway with median). With the addition of project traffic, this segment would operate from LOS D to LOS F. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable impact**.

e. Woollomes Avenue, Home Depot Driveway East to SR 99 southbound ramps

This segment would already be built to its ultimate configuration per the City's Circulation Element (6-lane, divided roadway with median). With the addition of project traffic, this segment would operate from LOS E to LOS F. Therefore, the proposed project would have a **cumulatively considerable** and **significant and unavoidable impact**.

f. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps

This segment would already be built to its ultimate configuration per the City's Circulation Element (6-lane, divided roadway with median). With the addition of project traffic, this segment would operate from LOS D to LOS F.

Furthermore, the City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM TRAF-4a – 4f**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM TRAF-4a – 4f**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the proportionate share of the proposed project's impact at the facilities identified in mitigation measure **TRAF-4a – 4f**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

## Freeway Mainline and Ramps

All freeway mainline segments in the study area would continue to operate with satisfactory LOS with addition of project traffic volumes, at LOS C or better, per Caltrans criteria in the Cumulative Buildout plus Project condition. No mitigation measures are required.

The addition of project trips to the SR 99 ramps at Woollomes Avenue would create significant impacts to the following merge and diverge areas of the interchange:

- SR 99 northbound on-ramp at Woollomes Avenue (LOS C to LOS D in the Saturday midday peak hour)
- SR 99 northbound off-ramp at Woollomes Avenue (LOS C to LOS D in the Saturday midday peak hour)
- SR 99 southbound on-ramp at Woollomes Avenue (LOS D to LOS D in the Saturday midday peak hour)
- SR 99 southbound off-ramp at Woollomes Avenue (LOS C to LOS F in the Saturday midday peak hour)

### Mitigation Measure

**TRAF-5** The project applicant shall fully construct the following improvements, or pay their fair-share (through the City's Development Impact Fee) to mitigate the project's significant impacts through the needed traffic improvements listed below.

a. SR 99 northbound on-ramp at Woollomes Avenue

   - Construct a second on-ramp lane between Woollomes Avenue and SR 99.

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour.

b. SR 99 northbound off-ramp at Woollomes Avenue

- Construct a second off-ramp lane between Woollomes Avenue and SR 99.

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour and the impact would become less than significant.

c. SR 99 southbound on-ramp at Woollomes Avenue

- Construct a second on-ramp lane between Woollomes Avenue and SR 99.

With the implementation of these improvements, the on-ramp would operate at LOS C in the Saturday midday peak hour.

d. SR 99 southbound off-ramp at Woollomes Avenue

- Construct a second off-ramp lane between Woollomes Avenue and SR 99.

With the implementation of these improvements, the on-ramp would operate at LOS C in the weekday p.m. peak hour, and Saturday midday peak hour.

Furthermore, the City does not have the authority to build improvements on SR 99, and cannot be certain that the other development projects paying into the City's Development Impact Fee Program will be built and will pay to address their impacts on the facilities addressed in **MM TRAF-5a – 5d**. Without certain funding or jurisdiction, the City cannot guarantee that the proposed improvements will be constructed as proposed by mitigation measure **MM TRAF-5a – 5d**. Because the City cannot be certain that the improvements will occur, the EIR must assume that the improvements may not occur and that the project impacts at those significantly impacted roadway facilities would remain significant. While the City will collect fees representing the proportionate share of the proposed project's impact at the facilities identified in mitigation measure **TRAF-5a – 5d**, for the reasons explained in this section, this impact remains **cumulatively considerable** and **significant and unavoidable**.

# 7.0 REFERENCES


BSK Associates, *Draft Environmental Impact Report Grapevine Project*, Volume 1 (DEIR) and Volume 2 (Appendices), March 28, 2014.

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Transportation Research Board, *Highway Capacity Manual*, Special Report No. 209, Washington, D.C., 2000.

# TRAFFIC IMPACT STUDY

# APPENDIX

## VINEYARD AT DELANO AND DELANO WEST PAVILION PROJECTS

**City of Delano, CA**

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C O N S U L T I N G

**July 2015**

# APPENDIX A

# MOU Scoping Agreement for TIS

# MEMORANDUM OF UNDERSTANDING

# SCOPING AGREEMENT

**TO:** Jerome Keene, City of Delano
Roman Dowling, P.E., City of Delano

**FROM:** Dennis M. Pascua
Principal Transportation Planner

**DATE:** August 28, 2014

**SUBJECT:** **Scoping Agreement for Traffic Impact Study (TIS) for Vineyard at Delano (APNs 521-010-19 and 521-010-20) and Delano West Pavilion (APN 521-040-43) Project on Woollomes Avenue, west of Dover Parkway**

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The following Memorandum of Understanding (MOU) is a Scoping Agreement for the Traffic Impact Study (TIS) of the proposed Vineyard at Delano and Delano West Pavilion project on Woollomes Avenue, west of Dover Parkway, in the City of Delano (City) and Kern County (County).

**Project Name**: Vineyard at Delano and Delano West Pavilion (two project sites)

**Project Address**: The project sites total approximately 110 acres and include parcels both within the City of Delano (Vineyard APNs 521-010-19 and 521-010-20) and outside the southwest boundary of the City in an unincorporated area of Kern County (West Pavilion APN 521-040-43) that is intended for annexation into the City of Delano in the near future.

**Project Description**: The Vineyard at Delano project site is 33 acres in size and is currently vacant. The site was used for agricultural purposes in the past, however it is no longer used for that purpose and is in a fallow undeveloped state. The Vineyard at Delano project includes 432 multi-family low-rise apartment units (one- and two-story). Other amenities within the residential development would include a swimming pool, community athletic field, and community building and leasing center.

The Delano West Pavilion project site is approximately 77 acres in size. Similar to the Vineyard at Delano site, it was also used for agricultural purposes in the past, however it is no longer used for that purpose and is also in a fallow undeveloped state. The project proposes 440 apartment units and approximately 340,000

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square feet of retail, restaurant, and office space. Residential amenities are expected to be similar to those of the Vineyard at Delano project.

**Related Cases**: The Final EIR for the adjacent Grapevine Project was recently released by the City in June 2014 (SCH# 2013031078). This project is located immediately adjacent, and to the east of the Vineyard project site (and north of the West Pavilion project site), and would be a 328,500 square foot community shopping center.

| | **Consultant** | **Developer** |
|---|---|---|
| **Name**: | Dennis Pascua, Principal | Justin Huang |
| **Firm**: | Arch Beach Consulting | YK America |
| **Address**: | 1155 Camino Del Mar, #125<br>Del Mar, CA 92014 | 10508 Lower Azusa Road, #200<br>El Monte, CA 91731 |
| **Telephone**: | (858) 925-6190 | (626) 444-6668 ext. 105 |
| **E-Mail**: | dennis.pascua@archbeachconsulting.com | JustinH@YKAmerica.com |

## I. Background

Per the Project Kick-Off meeting on June 18, 2014, between the City, the Developer, and the EIR consultants, it was agreed that a Scoping Agreement would be prepared prior to the start of the TIS for the proposed project. The TIS would be prepared per the requirements and parameters of the City of Delano, Kern County, and Caltrans. The traffic study prepared for the Grapevine Project (by Omni-Means, Ltd. in March 2014) will serve as a reference for this TIS.

## II. Trip Geographic Distribution and Assignment

Preliminary project trip distribution and assignments for the weekday and Saturday peak hours for the residential components of the Vineyard and West Pavilion sites, and the retail/commercial components of the West Pavilion site, are provided in the tables below.

| ***RESIDENTAL TRIP DISTRIBUTION*** | |
|---|---|
| **Roadway** | **Percentage** |
| Albany Street, north of Woollomes Avenue | 10% |
| Stradley Avenue, south of Woollomes Avenue | 3% |
| Dover Parkway, north of Morse Boulevard | 13% |
| Dover parkway, south of Woollomes Avenue | 3% |
| SR 99, north of Woollomes Avenue | 26% |
| SR 99, south of Woollomes Avenue | 40% |
| High Street, north of Woollomes Avenue | 0% |
| Lexington Street, north of Woollomes Avenue | 3% |
| Lexington Street, south of Woollomes Avenue | 2% |
| **Total** | **100%** |

| ***RETAIL/COMMERCIAL TRIP DISTRIBUTION*** | |
|---|---|
| **Roadway** | **Percentage** |
| Albany Street, north of Woollomes Avenue | 10% |
| Stradley Avenue, south of Woollomes Avenue | 3% |
| Dover Parkway, north of Morse Boulevard | 15% |
| Dover parkway, south of Woollomes Avenue | 3% |
| SR 99, north of Woollomes Avenue | 27% |
| SR 99, south of Woollomes Avenue | 30% |
| High Street, north of Woollomes Avenue | 6% |
| Lexington Street, north of Woollomes Avenue | 3% |
| Lexington Street, south of Woollomes Avenue | 3% |
| **Total** | **100%** |

## III. Site Trip Generation Forecast

Trip generation rates for the proposed apartment and shopping center land uses were obtained from *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE) in 2012. Per the developer, the entire project (Vineyard and West Pavilion sites) would be constructed within a 10 year timeframe with several phases of development within each site. For purposes of the TIS, all phases of the Vineyard at Delano and Delano West Pavilion will be analyzed at full buildout (i.e., one single phase – buildout of project) to determine the total traffic mitigation measures required at full buildout of the project.

The applicant will be notified that separate Focused Traffic Analyses will be required, after certification of the EIR, for each phase of development (when specific numbers of DUs and retail square footages are determined) to determine the specific mitigation measures required for that level of development. Those mitigation measures will be consistent with the measures required for the buildout of the project.

Project site is currently vacant and no trips are being generated to/from the site.

The following table provides a preliminary trip generation analysis for daily, weekday a.m. and p.m. peak hours, and Saturday midday peak hour project-related trips.

## IV. Specific Project Issues to be Analyzed

a. The focus of this TIS will be on addressing the adequacy of site access and identifying specific near-term and future circulation improvements required in the study area to maintain acceptable peak hour and daily levels of service (LOS) for the study area intersections, roadway segments, freeway on/off ramps, and freeway mainline segments.

b. The traffic study shall address the project traffic impacts at all study intersections, roadway segments, freeway on/off ramps, and freeway mainline segments listed in Section VI and provide appropriate mitigation measures if applicable. Peak-hour traffic signal warrants shall be evaluated for all intersections that are not currently signalized.

c. Vehicular queuing analyses for the 95th (design) percentile will be analyzed for the major study area intersections and ramp intersections.

| Land Use | Size/Units | | Daily | Weekday AM Peak Hour OR Saturday Midday Peak Hour In | Out | Total | Weekday PM Peak Hour In | Out | Total |
|---|---|---|---|---|---|---|---|---|---|
| ***TRIP RATES*** | | | | | | | | | |
| Apartment (ITE 220) - WEEKDAY | per DU | | 6.65 | 0.10 | 0.41 | 0.51 | 0.40 | 0.22 | 0.62 |
| Apartment (ITE 220) - SATURDAY | per DU | | 6.39 | 0.26 | 0.26 | 0.52 | -- | -- | -- |
| Shopping Center (ITE 820) - WEEKDAY & SATURDAY | per TSF | | *ITE* [1] | *ITE equation* [1] | | | *ITE equation* [1] | | |
| ***WEEKDAY TRIP GENERATION*** | | | | | | | | | |
| Apartments at Vineyard at Delano (phases I - IV) | 432 | DUs | 2,873 | 44 | 176 | 220 | 174 | 94 | 268 |
| Apartments at Delano West Pavilion (phases I & II) | 440 | DUs | 2,926 | 45 | 180 | 224 | 177 | 95 | 273 |
| Shopping Center at Delano West Pavilion (phase III) | 170.000 | TSF | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| *pass-by trips (8%)* [2] | | | *-802* | *-11* | *-7* | *-18* | *-34* | *-37* | *-72* |
| | **Subtotal** | | **8,786** | **122** | **75** | **197** | **376** | **407** | **783** |
| Shopping Center at Delano West Pavilion (phase IV) | 170.000 | TSF | 9,588 | 134 | 82 | 215 | 410 | 445 | 855 |
| *pass-by trips (8%)* [2] | | | *-802* | *-11* | *-7* | *-18* | *-34* | *-37* | *-72* |
| | **Subtotal** | | **8,786** | **122** | **75** | **197** | **376** | **407** | **783** |
| **PROJECT NET EFFECTIVE TRIP GENERATION** | | | **23,370** | **334** | **506** | **840** | **1,103** | **1,004** | **2,107** |
| ***SATURDAY TRIP GENERATION*** | | | | | | | | | |
| Apartments at Vineyard at Delano | 432 | DUs | 2,760 | 112 | 112 | 225 | | | |
| Apartments at Delano West Pavilion | 440 | DUs | 2,812 | 114 | 114 | 229 | | | |
| Shopping Center at Delano West Pavilion (phase III) | 170.000 | TSF | 12,907 | 642 | 592 | 1,234 | | | |
| *pass-by trips (9%)* [2] | | | *-1,136* | *-56* | *-52* | *-109* | | | |
| | Subtotal | | 11,772 | 585 | 540 | 1,126 | | | |
| Shopping Center at Delano West Pavilion (phase IV) | 170.000 | TSF | 12,907 | 642 | 592 | 1,234 | | | |
| *pass-by trips (9%)* [2] | | | *-1,136* | *-56* | *-52* | *-109* | | | |
| | Subtotal | | 11,772 | 585 | 540 | 1,126 | | | |
| **PROJECT NET EFFECTIVE TRIP GENERATION** | | | **29,116** | **1,397** | **1,307** | **2,705** | | | |

Notes: Trip generation rates based on *Trip Generation, 9th Edition*, Institute of Transportation Engineers (ITE), 2012.

[1] Shopping Center trip generation estimates are based on the logrithmic equations contained in *Trip Generation, 9th Edition*.

[2] Per the ITE *Trip Generation Handbook, Second Edition* (ITE 2004), the calculated pass-by trip percentage for this size of Shopping Center Use is approximately 33% for the weekday and 35% for Saturday. A conservative estimate of one-quarter of that percentage (8% and 9%, respectively) was used in this analysis.

## V. Study of Horizon Years

a. Existing
b. Existing plus Project
c. Cumulative Baseline Conditions (existing + ambient growth + related projects)
d. Cumulative plus Project

Cumulative baseline daily and peak hour traffic volumes in the study area will be obtained from the Kern County Travel Demand Model and adjusted as necessary.

**VI. Facilities to be Studied**

a. Intersections

1. Albany Street/Garces Highway
2. Dover Place/Garces Highway
3. Albany Street/1st Avenue
4. Dover Place/1st Avenue
5. Belmont Street/Morse Boulevard *(future intersection)*
6. Dover Parkway/Morse Boulevard *(future intersection)*
7. Woollomes Avenue/Stradley Avenue – Albany Street
8. Woollomes Avenue/Vineyard – Pavilion Driveway *(future intersection)*
9. Woollomes Avenue/Belmont Street *(future intersection)*
10. Woollomes Avenue/Grapevine – Pavilion Driveway *(future intersection)*
11. Woollomes Avenue/Dover Parkway
12. Woollomes Avenue/Marketplace Drive
13. Woollomes Avenue/Home Depot East
14. Woollomes Avenue/SR 99 southbound ramps
15. Woollomes Avenue/SR 99 northbound ramps
16. Woollomes Avenue/S. Lexington Street

b. Roadway Segments

1. Woollomes Avenue, Stradley Avenue to Vineyard – Pavilion Driveway *(future street)*
2. Woollomes Avenue, Vineyard – Pavilion Driveway *(future street)* to Belmont Street *(future street)*
3. Woollomes Avenue, Belmont Street *(future street)* to Grapevine – Pavilion Driveway *(future street)*
4. Woollomes Avenue, Grapevine – Pavilion Driveway *(future street)* to Dover Parkway
5. Woollomes Avenue, Dover Parkway to Home Depot East
6. Woollomes Avenue, Home Depot East to SR 99 southbound ramps
7. Woollomes Avenue, SR 99 southbound ramps to SR 99 northbound ramps
8. Woollomes Avenue, SR 99 northbound ramps to S. Lexington Street
9. Stradley Avenue, north of Woollomes Avenue
10. Stradley Avenue, south of Woollomes Avenue
11. Belmont Street *(future street)*, north of Woollomes Avenue
12. Belmont Street *(future street)*, south of Woollomes Avenue
13. Lexington Street, north of Woollomes Avenue
14. Lexington Street, south of Woollomes Avenue

c. Freeway On/Off Ramps

1. SR 99 southbound on-ramp/1st Avenue
2. SR 99 northbound off-ramp – Fremont Street/1st Avenue
3. SR 99 southbound ramps/Woollomes Avenue
4. SR 99 northbound ramps/Woollomes Avenue

d. Freeway Mainline Segments

1. SR 99 northbound, north of Woollomes Avenue
2. SR 99 southbound, north of Woollomes Avenue
3. SR 99 northbound, south of Woollomes Avenue
4. SR 99 southbound, south of Woollomes Avenue

New traffic counts will be collected for the weekday daily, and weekday and Saturday peak hour traffic conditions for the study area intersections, roadways, and freeway on/off ramps. Traffic volumes for the SR 99 mainline segments will be obtained from Caltrans.

The Nueva Vista Language Academy, a 600 student elementary school, located well north of the project site on Garces Highway, between Albany Street and Dover Place (two proposed study area intersections) has been in session since the beginning of August 2014. Therefore, the new traffic counts will contain school-related traffic.

**VII. Deliverables**

a. Draft Traffic Impact Study (TIS) – 2 hard-copies and one electronic copy.
b. Final TIS – 2 hard-copies and one electronic copy.

All Draft and Final Traffic Impact Studies shall be delivered to:
Jerome Keene, Senior Associate Planner
City of Delano
1005 Eleventh Avenue
P.O. Box 3010
Delano, CA 93216-3010
(661) 720-2220
JeromeK@quadknopf.com

If you have any questions regarding this *Scoping Agreement*, please contact me at (858) 925-6190.

Recommended By:

Dennis Pascua, Principal
Arch Beach Consulting

Approved By:

Signature: _____

Print Name: _____
City of Delano

Date: _____

# APPENDIX B

## Raw Traffic Volume Count Sheets

Prepared by NDS/ATD

# VOLUME

## Woollomes Ave btwn Stradley Ave & Dover Pkwy

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_001

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 1,549 | 2,199 | 3,748 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 3 | | 5 | | 8 | | 12:00 | | | 22 | | 26 | | 48 | |
| 00:15 | | | 2 | | 5 | | 7 | | 12:15 | | | 17 | | 33 | | 50 | |
| 00:30 | | | 2 | | 4 | | 6 | | 12:30 | | | 28 | | 28 | | 56 | |
| 00:45 | | | 1 | 8 | 2 | 16 | 3 | 24 | 12:45 | | | 19 | 86 | 31 | 118 | 50 | 204 |
| 01:00 | | | 1 | | 1 | | 2 | | 13:00 | | | 19 | | 30 | | 49 | |
| 01:15 | | | 0 | | 1 | | 1 | | 13:15 | | | 20 | | 24 | | 44 | |
| 01:30 | | | 0 | | 3 | | 3 | | 13:30 | | | 17 | | 34 | | 51 | |
| 01:45 | | | 2 | 3 | 2 | 7 | 4 | 10 | 13:45 | | | 16 | 72 | 30 | 118 | 46 | 190 |
| 02:00 | | | 0 | | 2 | | 2 | | 14:00 | | | 21 | | 29 | | 50 | |
| 02:15 | | | 0 | | 2 | | 2 | | 14:15 | | | 23 | | 30 | | 53 | |
| 02:30 | | | 1 | | 6 | | 7 | | 14:30 | | | 26 | | 38 | | 64 | |
| 02:45 | | | 1 | 2 | 3 | 13 | 4 | 15 | 14:45 | | | 23 | 93 | 37 | 134 | 60 | 227 |
| 03:00 | | | 0 | | 1 | | 1 | | 15:00 | | | 52 | | 36 | | 88 | |
| 03:15 | | | 1 | | 0 | | 1 | | 15:15 | | | 45 | | 44 | | 89 | |
| 03:30 | | | 3 | | 4 | | 7 | | 15:30 | | | 30 | | 59 | | 89 | |
| 03:45 | | | 1 | 5 | 3 | 8 | 4 | 13 | 15:45 | | | 24 | 151 | 43 | 182 | 67 | 333 |
| 04:00 | | | 6 | | 3 | | 9 | | 16:00 | | | 26 | | 47 | | 73 | |
| 04:15 | | | 4 | | 1 | | 5 | | 16:15 | | | 23 | | 43 | | 66 | |
| 04:30 | | | 2 | | 2 | | 4 | | 16:30 | | | 26 | | 33 | | 59 | |
| 04:45 | | | 10 | 22 | 5 | 11 | 15 | 33 | 16:45 | | | 21 | 96 | 38 | 161 | 59 | 257 |
| 05:00 | | | 3 | | 2 | | 5 | | 17:00 | | | 24 | | 42 | | 66 | |
| 05:15 | | | 8 | | 7 | | 15 | | 17:15 | | | 36 | | 38 | | 74 | |
| 05:30 | | | 11 | | 15 | | 26 | | 17:30 | | | 29 | | 45 | | 74 | |
| 05:45 | | | 12 | 34 | 17 | 41 | 29 | 75 | 17:45 | | | 32 | 121 | 39 | 164 | 71 | 285 |
| 06:00 | | | 6 | | 27 | | 33 | | 18:00 | | | 33 | | 45 | | 78 | |
| 06:15 | | | 5 | | 14 | | 19 | | 18:15 | | | 31 | | 33 | | 64 | |
| 06:30 | | | 11 | | 12 | | 23 | | 18:30 | | | 26 | | 52 | | 78 | |
| 06:45 | | | 16 | 38 | 13 | 66 | 29 | 104 | 18:45 | | | 31 | 121 | 38 | 168 | 69 | 289 |
| 07:00 | | | 16 | | 14 | | 30 | | 19:00 | | | 35 | | 32 | | 67 | |
| 07:15 | | | 12 | | 12 | | 24 | | 19:15 | | | 29 | | 44 | | 73 | |
| 07:30 | | | 16 | | 33 | | 49 | | 19:30 | | | 29 | | 41 | | 70 | |
| 07:45 | | | 29 | 73 | 22 | 81 | 51 | 154 | 19:45 | | | 35 | 128 | 54 | 171 | 89 | 299 |
| 08:00 | | | 14 | | 12 | | 26 | | 20:00 | | | 38 | | 43 | | 81 | |
| 08:15 | | | 11 | | 27 | | 38 | | 20:15 | | | 30 | | 50 | | 80 | |
| 08:30 | | | 13 | | 16 | | 29 | | 20:30 | | | 22 | | 46 | | 68 | |
| 08:45 | | | 20 | 58 | 18 | 73 | 38 | 131 | 20:45 | | | 16 | 106 | 36 | 175 | 52 | 281 |
| 09:00 | | | 11 | | 12 | | 23 | | 21:00 | | | 11 | | 48 | | 59 | |
| 09:15 | | | 13 | | 22 | | 35 | | 21:15 | | | 17 | | 25 | | 42 | |
| 09:30 | | | 17 | | 21 | | 38 | | 21:30 | | | 9 | | 31 | | 40 | |
| 09:45 | | | 22 | 63 | 20 | 75 | 42 | 138 | 21:45 | | | 17 | 54 | 18 | 122 | 35 | 176 |
| 10:00 | | | 25 | | 21 | | 46 | | 22:00 | | | 10 | | 28 | | 38 | |
| 10:15 | | | 19 | | 19 | | 38 | | 22:15 | | | 4 | | 24 | | 28 | |
| 10:30 | | | 20 | | 24 | | 44 | | 22:30 | | | 9 | | 9 | | 18 | |
| 10:45 | | | 23 | 87 | 21 | 85 | 44 | 172 | 22:45 | | | 7 | 30 | 11 | 72 | 18 | 102 |
| 11:00 | | | 24 | | 31 | | 55 | | 23:00 | | | 2 | | 5 | | 7 | |
| 11:15 | | | 18 | | 25 | | 43 | | 23:15 | | | 3 | | 5 | | 8 | |
| 11:30 | | | 21 | | 27 | | 48 | | 23:30 | | | 1 | | 12 | | 13 | |
| 11:45 | | | 25 | 88 | 33 | 116 | 58 | 204 | 23:45 | | | 4 | 10 | 0 | 22 | 4 | 32 |
| TOTALS | | | | 481 | | 592 | | 1073 | TOTALS | | | | 1068 | | 1607 | | 2675 |
| SPLIT % | | | | 44.8% | | 55.2% | | 28.6% | SPLIT % | | | | 39.9% | | 60.1% | | 71.4% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 1,549 | 2,199 | 3,748 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | | | 11:45 | 11:45 | 11:45 | PM Peak Hour | | | 15:00 | 15:15 | 15:00 |
| AM Pk Volume | | | 92 | 120 | 212 | PM Pk Volume | | | 151 | 193 | 333 |
| Pk Hr Factor | | | 0.821 | 0.909 | 0.914 | Pk Hr Factor | | | 0.726 | 0.818 | 0.935 |
| 7 - 9 Volume | 0 | 0 | 131 | 154 | 285 | 4 - 6 Volume | 0 | 0 | 217 | 325 | 542 |
| 7 - 9 Peak Hour | | | 07:00 | 07:30 | 07:30 | 4 - 6 Peak Hour | | | 17:00 | 17:00 | 17:00 |
| 7 - 9 Pk Volume | 0 | 0 | 73 | 94 | 164 | 4 - 6 Pk Volume | 0 | 0 | 121 | 164 | 285 |
| Pk Hr Factor | 0.000 | 0.000 | 0.629 | 0.712 | 0.804 | Pk Hr Factor | 0.000 | 0.000 | 0.840 | 0.911 | 0.963 |

Prepared by NDS/ATD

# VOLUME

## Woollomes Ave btwn Dover Pkwy & Home Depot East

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_002

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 1,173 | 1,516 | 2,689 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 4 | | 5 | | 9 | | 12:00 | | | 19 | | 24 | | 43 | |
| 00:15 | | | 1 | | 1 | | 2 | | 12:15 | | | 18 | | 20 | | 38 | |
| 00:30 | | | 2 | | 5 | | 7 | | 12:30 | | | 22 | | 24 | | 46 | |
| 00:45 | | | 0 | 7 | 1 | 12 | 1 | 19 | 12:45 | | | 16 | 75 | 18 | 86 | 34 | 161 |
| 01:00 | | | 2 | | 1 | | 3 | | 13:00 | | | 19 | | 19 | | 38 | |
| 01:15 | | | 2 | | 0 | | 2 | | 13:15 | | | 18 | | 15 | | 33 | |
| 01:30 | | | 0 | | 1 | | 1 | | 13:30 | | | 13 | | 26 | | 39 | |
| 01:45 | | | 1 | 5 | 2 | 4 | 3 | 9 | 13:45 | | | 17 | 67 | 23 | 83 | 40 | 150 |
| 02:00 | | | 1 | | 1 | | 2 | | 14:00 | | | 11 | | 19 | | 30 | |
| 02:15 | | | 1 | | 3 | | 4 | | 14:15 | | | 21 | | 18 | | 39 | |
| 02:30 | | | 1 | | 5 | | 6 | | 14:30 | | | 25 | | 25 | | 50 | |
| 02:45 | | | 2 | 5 | 4 | 13 | 6 | 18 | 14:45 | | | 20 | 77 | 27 | 89 | 47 | 166 |
| 03:00 | | | 0 | | 1 | | 1 | | 15:00 | | | 50 | | 25 | | 75 | |
| 03:15 | | | 1 | | 1 | | 2 | | 15:15 | | | 36 | | 37 | | 73 | |
| 03:30 | | | 3 | | 4 | | 7 | | 15:30 | | | 23 | | 41 | | 64 | |
| 03:45 | | | 0 | 4 | 5 | 11 | 5 | 15 | 15:45 | | | 19 | 128 | 30 | 133 | 49 | 261 |
| 04:00 | | | 6 | | 2 | | 8 | | 16:00 | | | 23 | | 30 | | 53 | |
| 04:15 | | | 4 | | 2 | | 6 | | 16:15 | | | 22 | | 31 | | 53 | |
| 04:30 | | | 3 | | 2 | | 5 | | 16:30 | | | 22 | | 25 | | 47 | |
| 04:45 | | | 7 | 20 | 6 | 12 | 13 | 32 | 16:45 | | | 18 | 85 | 25 | 111 | 43 | 196 |
| 05:00 | | | 4 | | 4 | | 8 | | 17:00 | | | 14 | | 26 | | 40 | |
| 05:15 | | | 6 | | 7 | | 13 | | 17:15 | | | 24 | | 33 | | 57 | |
| 05:30 | | | 11 | | 15 | | 26 | | 17:30 | | | 14 | | 38 | | 52 | |
| 05:45 | | | 12 | 33 | 19 | 45 | 31 | 78 | 17:45 | | | 18 | 70 | 25 | 122 | 43 | 192 |
| 06:00 | | | 4 | | 28 | | 32 | | 18:00 | | | 19 | | 23 | | 42 | |
| 06:15 | | | 6 | | 14 | | 20 | | 18:15 | | | 18 | | 14 | | 32 | |
| 06:30 | | | 9 | | 13 | | 22 | | 18:30 | | | 16 | | 28 | | 44 | |
| 06:45 | | | 15 | 34 | 11 | 66 | 26 | 100 | 18:45 | | | 21 | 74 | 25 | 90 | 46 | 164 |
| 07:00 | | | 16 | | 11 | | 27 | | 19:00 | | | 17 | | 16 | | 33 | |
| 07:15 | | | 9 | | 11 | | 20 | | 19:15 | | | 17 | | 31 | | 48 | |
| 07:30 | | | 12 | | 27 | | 39 | | 19:30 | | | 22 | | 22 | | 44 | |
| 07:45 | | | 18 | 55 | 22 | 71 | 40 | 126 | 19:45 | | | 20 | 76 | 27 | 96 | 47 | 172 |
| 08:00 | | | 12 | | 10 | | 22 | | 20:00 | | | 20 | | 28 | | 48 | |
| 08:15 | | | 17 | | 24 | | 41 | | 20:15 | | | 15 | | 18 | | 33 | |
| 08:30 | | | 7 | | 14 | | 21 | | 20:30 | | | 13 | | 21 | | 34 | |
| 08:45 | | | 16 | 52 | 11 | 59 | 27 | 111 | 20:45 | | | 11 | 59 | 21 | 88 | 32 | 147 |
| 09:00 | | | 10 | | 11 | | 21 | | 21:00 | | | 13 | | 23 | | 36 | |
| 09:15 | | | 11 | | 17 | | 28 | | 21:15 | | | 12 | | 13 | | 25 | |
| 09:30 | | | 15 | | 13 | | 28 | | 21:30 | | | 4 | | 18 | | 22 | |
| 09:45 | | | 13 | 49 | 15 | 56 | 28 | 105 | 21:45 | | | 5 | 34 | 5 | 59 | 10 | 93 |
| 10:00 | | | 20 | | 14 | | 34 | | 22:00 | | | 9 | | 16 | | 25 | |
| 10:15 | | | 10 | | 17 | | 27 | | 22:15 | | | 4 | | 11 | | 15 | |
| 10:30 | | | 18 | | 20 | | 38 | | 22:30 | | | 5 | | 11 | | 16 | |
| 10:45 | | | 12 | 60 | 15 | 66 | 27 | 126 | 22:45 | | | 6 | 24 | 7 | 45 | 13 | 69 |
| 11:00 | | | 21 | | 24 | | 45 | | 23:00 | | | 0 | | 1 | | 1 | |
| 11:15 | | | 15 | | 19 | | 34 | | 23:15 | | | 2 | | 2 | | 4 | |
| 11:30 | | | 15 | | 20 | | 35 | | 23:30 | | | 2 | | 5 | | 7 | |
| 11:45 | | | 22 | 73 | 26 | 89 | 48 | 162 | 23:45 | | | 3 | 7 | 2 | 10 | 5 | 17 |
| TOTALS | | | | 397 | | 504 | | **901** | TOTALS | | | | 776 | | 1012 | | **1788** |
| SPLIT % | | | | 44.1% | | 55.9% | | **33.5%** | SPLIT % | | | | 43.4% | | 56.6% | | **66.5%** |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 1,173 | 1,516 | 2,689 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **AM Peak Hour** | | | 11:45 | 11:45 | **11:45** | **PM Peak Hour** | | | 14:30 | 15:15 | **15:00** |
| **AM Pk Volume** | | | 81 | 94 | **175** | **PM Pk Volume** | | | 131 | 138 | **261** |
| **Pk Hr Factor** | | | 0.920 | 0.904 | **0.911** | **Pk Hr Factor** | | | 0.655 | 0.841 | **0.870** |
| **7 - 9 Volume** | 0 | 0 | 107 | 130 | **237** | **4 - 6 Volume** | 0 | 0 | 155 | 233 | **388** |
| **7 - 9 Peak Hour** | | | 07:30 | 07:30 | **07:30** | **4 - 6 Peak Hour** | | | 16:00 | 16:45 | **16:00** |
| **7 - 9 Pk Volume** | 0 | 0 | 59 | 83 | **142** | **4 - 6 Pk Volume** | 0 | 0 | 85 | 122 | **196** |
| **Pk Hr Factor** | 0.000 | 0.000 | 0.819 | 0.769 | **0.866** | **Pk Hr Factor** | 0.000 | 0.000 | 0.924 | 0.803 | **0.925** |

Prepared by NDS/ATD

# VOLUME

## Woollomes Ave btwn Home Depot East & SR-99 SB Ramps

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_003

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 5,193 | 5,792 | 10,985 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **00:00** | | | 25 | | 14 | | 39 | | **12:00** | | | 100 | | 104 | | 204 | |
| **00:15** | | | 11 | | 5 | | 16 | | **12:15** | | | 104 | | 84 | | 188 | |
| **00:30** | | | 12 | | 6 | | 18 | | **12:30** | | | 72 | | 85 | | 157 | |
| **00:45** | | | 3 | 51 | 6 | 31 | 9 | 82 | **12:45** | | | 93 | 369 | 109 | 382 | 202 | 751 |
| **01:00** | | | 7 | | 11 | | 18 | | **13:00** | | | 81 | | 80 | | 161 | |
| **01:15** | | | 14 | | 3 | | 17 | | **13:15** | | | 95 | | 94 | | 189 | |
| **01:30** | | | 3 | | 4 | | 7 | | **13:30** | | | 78 | | 78 | | 156 | |
| **01:45** | | | 7 | 31 | 6 | 24 | 13 | 55 | **13:45** | | | 74 | 328 | 84 | 336 | 158 | 664 |
| **02:00** | | | 10 | | 3 | | 13 | | **14:00** | | | 68 | | 80 | | 148 | |
| **02:15** | | | 4 | | 8 | | 12 | | **14:15** | | | 89 | | 97 | | 186 | |
| **02:30** | | | 4 | | 7 | | 11 | | **14:30** | | | 83 | | 79 | | 162 | |
| **02:45** | | | 5 | 23 | 11 | 29 | 16 | 52 | **14:45** | | | 81 | 321 | 97 | 353 | 178 | 674 |
| **03:00** | | | 2 | | 3 | | 5 | | **15:00** | | | 107 | | 86 | | 193 | |
| **03:15** | | | 4 | | 9 | | 13 | | **15:15** | | | 109 | | 97 | | 206 | |
| **03:30** | | | 6 | | 5 | | 11 | | **15:30** | | | 84 | | 104 | | 188 | |
| **03:45** | | | 1 | 13 | 9 | 26 | 10 | 39 | **15:45** | | | 96 | 396 | 109 | 396 | 205 | 792 |
| **04:00** | | | 8 | | 10 | | 18 | | **16:00** | | | 90 | | 96 | | 186 | |
| **04:15** | | | 6 | | 9 | | 15 | | **16:15** | | | 81 | | 86 | | 167 | |
| **04:30** | | | 4 | | 7 | | 11 | | **16:30** | | | 72 | | 97 | | 169 | |
| **04:45** | | | 7 | 25 | 16 | 42 | 23 | 67 | **16:45** | | | 71 | 314 | 105 | 384 | 176 | 698 |
| **05:00** | | | 10 | | 17 | | 27 | | **17:00** | | | 89 | | 121 | | 210 | |
| **05:15** | | | 10 | | 12 | | 22 | | **17:15** | | | 87 | | 107 | | 194 | |
| **05:30** | | | 14 | | 27 | | 41 | | **17:30** | | | 83 | | 111 | | 194 | |
| **05:45** | | | 28 | 62 | 46 | 102 | 74 | 164 | **17:45** | | | 89 | 348 | 93 | 432 | 182 | 780 |
| **06:00** | | | 12 | | 56 | | 68 | | **18:00** | | | 75 | | 115 | | 190 | |
| **06:15** | | | 26 | | 42 | | 68 | | **18:15** | | | 85 | | 85 | | 170 | |
| **06:30** | | | 22 | | 36 | | 58 | | **18:30** | | | 93 | | 123 | | 216 | |
| **06:45** | | | 34 | 94 | 69 | 203 | 103 | 297 | **18:45** | | | 86 | 339 | 110 | 433 | 196 | 772 |
| **07:00** | | | 48 | | 44 | | 92 | | **19:00** | | | 93 | | 113 | | 206 | |
| **07:15** | | | 54 | | 51 | | 105 | | **19:15** | | | 94 | | 105 | | 199 | |
| **07:30** | | | 33 | | 59 | | 92 | | **19:30** | | | 94 | | 102 | | 196 | |
| **07:45** | | | 41 | 176 | 61 | 215 | 102 | 391 | **19:45** | | | 107 | 388 | 110 | 430 | 217 | 818 |
| **08:00** | | | 42 | | 64 | | 106 | | **20:00** | | | 106 | | 94 | | 200 | |
| **08:15** | | | 57 | | 71 | | 128 | | **20:15** | | | 99 | | 83 | | 182 | |
| **08:30** | | | 48 | | 53 | | 101 | | **20:30** | | | 80 | | 81 | | 161 | |
| **08:45** | | | 49 | 196 | 60 | 248 | 109 | 444 | **20:45** | | | 78 | 363 | 73 | 331 | 151 | 694 |
| **09:00** | | | 48 | | 68 | | 116 | | **21:00** | | | 84 | | 67 | | 151 | |
| **09:15** | | | 65 | | 76 | | 141 | | **21:15** | | | 63 | | 48 | | 111 | |
| **09:30** | | | 53 | | 61 | | 114 | | **21:30** | | | 69 | | 53 | | 122 | |
| **09:45** | | | 62 | 228 | 74 | 279 | 136 | 507 | **21:45** | | | 53 | 269 | 45 | 213 | 98 | 482 |
| **10:00** | | | 62 | | 89 | | 151 | | **22:00** | | | 63 | | 40 | | 103 | |
| **10:15** | | | 77 | | 82 | | 159 | | **22:15** | | | 31 | | 29 | | 60 | |
| **10:30** | | | 72 | | 87 | | 159 | | **22:30** | | | 34 | | 24 | | 58 | |
| **10:45** | | | 77 | 288 | 76 | 334 | 153 | 622 | **22:45** | | | 36 | 164 | 22 | 115 | 58 | 279 |
| **11:00** | | | 68 | | 87 | | 155 | | **23:00** | | | 24 | | 21 | | 45 | |
| **11:15** | | | 79 | | 99 | | 178 | | **23:15** | | | 17 | | 10 | | 27 | |
| **11:30** | | | 77 | | 104 | | 181 | | **23:30** | | | 24 | | 15 | | 39 | |
| **11:45** | | | 106 | 330 | 112 | 402 | 218 | 732 | **23:45** | | | 12 | 77 | 6 | 52 | 18 | 129 |
| **TOTALS** | | | | 1517 | | 1935 | | **3452** | **TOTALS** | | | | 3676 | | 3857 | | **7533** |
| **SPLIT %** | | | | 43.9% | | 56.1% | | **31.4%** | **SPLIT %** | | | | 48.8% | | 51.2% | | **68.6%** |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 5,193 | 5,792 | 10,985 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **AM Peak Hour** | | | 11:30 | 11:15 | **11:30** | **PM Peak Hour** | | | 19:30 | 18:30 | **19:00** |
| **AM Pk Volume** | | | 387 | 419 | **791** | **PM Pk Volume** | | | 406 | 451 | **818** |
| **Pk Hr Factor** | | | 0.913 | 0.935 | **0.907** | **Pk Hr Factor** | | | 0.949 | 0.917 | **0.942** |
| **7 - 9 Volume** | 0 | 0 | 372 | 463 | **835** | **4 - 6 Volume** | 0 | 0 | 662 | 816 | **1478** |
| **7 - 9 Peak Hour** | | | 08:00 | 07:30 | **08:00** | **4 - 6 Peak Hour** | | | 17:00 | 16:45 | **17:00** |
| **7 - 9 Pk Volume** | 0 | 0 | 196 | 255 | **444** | **4 - 6 Pk Volume** | 0 | 0 | 348 | 444 | **780** |
| **Pk Hr Factor** | 0.000 | 0.000 | 0.860 | 0.898 | **0.867** | **Pk Hr Factor** | 0.000 | 0.000 | 0.978 | 0.917 | **0.929** |

Prepared by NDS/ATD

# VOLUME

## Woollomes Ave btwn SR-99 SB Ramps & SR-99 NB Ramps

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_004

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 4,870 | 4,418 | 9,288 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 21 | | 8 | | 29 | | 12:00 | | | 88 | | 74 | | 162 | |
| 00:15 | | | 9 | | 5 | | 14 | | 12:15 | | | 94 | | 55 | | 149 | |
| 00:30 | | | 12 | | 6 | | 18 | | 12:30 | | | 65 | | 62 | | 127 | |
| 00:45 | | | 6 | 48 | 5 | 24 | 11 | 72 | 12:45 | | | 82 | 329 | 82 | 273 | 164 | 602 |
| 01:00 | | | 6 | | 11 | | 17 | | 13:00 | | | 70 | | 56 | | 126 | |
| 01:15 | | | 11 | | 2 | | 13 | | 13:15 | | | 80 | | 73 | | 153 | |
| 01:30 | | | 7 | | 2 | | 9 | | 13:30 | | | 77 | | 63 | | 140 | |
| 01:45 | | | 12 | 36 | 1 | 16 | 13 | 52 | 13:45 | | | 68 | 295 | 70 | 262 | 138 | 557 |
| 02:00 | | | 9 | | 4 | | 13 | | 14:00 | | | 66 | | 68 | | 134 | |
| 02:15 | | | 4 | | 5 | | 9 | | 14:15 | | | 71 | | 77 | | 148 | |
| 02:30 | | | 4 | | 6 | | 10 | | 14:30 | | | 63 | | 66 | | 129 | |
| 02:45 | | | 5 | 22 | 9 | 24 | 14 | 46 | 14:45 | | | 79 | 279 | 84 | 295 | 163 | 574 |
| 03:00 | | | 3 | | 5 | | 8 | | 15:00 | | | 86 | | 74 | | 160 | |
| 03:15 | | | 5 | | 9 | | 14 | | 15:15 | | | 91 | | 70 | | 161 | |
| 03:30 | | | 10 | | 6 | | 16 | | 15:30 | | | 83 | | 101 | | 184 | |
| 03:45 | | | 5 | 23 | 9 | 29 | 14 | 52 | 15:45 | | | 77 | 337 | 97 | 342 | 174 | 679 |
| 04:00 | | | 15 | | 9 | | 24 | | 16:00 | | | 82 | | 84 | | 166 | |
| 04:15 | | | 22 | | 12 | | 34 | | 16:15 | | | 64 | | 86 | | 150 | |
| 04:30 | | | 20 | | 13 | | 33 | | 16:30 | | | 62 | | 88 | | 150 | |
| 04:45 | | | 23 | 80 | 15 | 49 | 38 | 129 | 16:45 | | | 66 | 274 | 90 | 348 | 156 | 622 |
| 05:00 | | | 16 | | 14 | | 30 | | 17:00 | | | 82 | | 108 | | 190 | |
| 05:15 | | | 15 | | 22 | | 37 | | 17:15 | | | 73 | | 85 | | 158 | |
| 05:30 | | | 34 | | 41 | | 75 | | 17:30 | | | 65 | | 97 | | 162 | |
| 05:45 | | | 70 | 135 | 41 | 118 | 111 | 253 | 17:45 | | | 79 | 299 | 77 | 367 | 156 | 666 |
| 06:00 | | | 28 | | 45 | | 73 | | 18:00 | | | 65 | | 79 | | 144 | |
| 06:15 | | | 31 | | 33 | | 64 | | 18:15 | | | 75 | | 78 | | 153 | |
| 06:30 | | | 44 | | 30 | | 74 | | 18:30 | | | 82 | | 86 | | 168 | |
| 06:45 | | | 60 | 163 | 44 | 152 | 104 | 315 | 18:45 | | | 74 | 296 | 72 | 315 | 146 | 611 |
| 07:00 | | | 56 | | 36 | | 92 | | 19:00 | | | 93 | | 80 | | 173 | |
| 07:15 | | | 39 | | 37 | | 76 | | 19:15 | | | 78 | | 23 | | 101 | |
| 07:30 | | | 31 | | 51 | | 82 | | 19:30 | | | 82 | | 67 | | 149 | |
| 07:45 | | | 45 | 171 | 42 | 166 | 87 | 337 | 19:45 | | | 98 | 351 | 73 | 243 | 171 | 594 |
| 08:00 | | | 45 | | 52 | | 97 | | 20:00 | | | 92 | | 78 | | 170 | |
| 08:15 | | | 57 | | 52 | | 109 | | 20:15 | | | 84 | | 55 | | 139 | |
| 08:30 | | | 48 | | 39 | | 87 | | 20:30 | | | 69 | | 57 | | 126 | |
| 08:45 | | | 43 | 193 | 37 | 180 | 80 | 373 | 20:45 | | | 64 | 309 | 46 | 236 | 110 | 545 |
| 09:00 | | | 46 | | 55 | | 101 | | 21:00 | | | 69 | | 43 | | 112 | |
| 09:15 | | | 58 | | 68 | | 126 | | 21:15 | | | 49 | | 29 | | 78 | |
| 09:30 | | | 49 | | 52 | | 101 | | 21:30 | | | 63 | | 29 | | 92 | |
| 09:45 | | | 62 | 215 | 54 | 229 | 116 | 444 | 21:45 | | | 48 | 229 | 19 | 120 | 67 | 349 |
| 10:00 | | | 62 | | 60 | | 122 | | 22:00 | | | 56 | | 26 | | 82 | |
| 10:15 | | | 70 | | 57 | | 127 | | 22:15 | | | 24 | | 17 | | 41 | |
| 10:30 | | | 60 | | 62 | | 122 | | 22:30 | | | 28 | | 17 | | 45 | |
| 10:45 | | | 65 | 257 | 52 | 231 | 117 | 488 | 22:45 | | | 31 | 139 | 17 | 77 | 48 | 216 |
| 11:00 | | | 66 | | 60 | | 126 | | 23:00 | | | 17 | | 14 | | 31 | |
| 11:15 | | | 74 | | 65 | | 139 | | 23:15 | | | 15 | | 11 | | 26 | |
| 11:30 | | | 75 | | 83 | | 158 | | 23:30 | | | 23 | | 13 | | 36 | |
| 11:45 | | | 108 | 323 | 69 | 277 | 177 | 600 | 23:45 | | | 12 | 67 | 7 | 45 | 19 | 112 |
| TOTALS | | | | 1666 | | 1495 | | 3161 | TOTALS | | | | 3204 | | 2923 | | 6127 |
| SPLIT % | | | | 52.7% | | 47.3% | | 34.0% | SPLIT % | | | | 52.3% | | 47.7% | | 66.0% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 4,870 | 4,418 | 9,288 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | | | 11:30 | 11:15 | 11:30 | PM Peak Hour | | | 19:30 | 16:45 | 15:15 |
| AM Pk Volume | | | 365 | 291 | 646 | PM Pk Volume | | | 356 | 380 | 685 |
| Pk Hr Factor | | | 0.845 | 0.877 | 0.912 | Pk Hr Factor | | | 0.908 | 0.880 | 0.931 |
| 7 - 9 Volume | 0 | 0 | 364 | 346 | 710 | 4 - 6 Volume | 0 | 0 | 573 | 715 | 1288 |
| 7 - 9 Peak Hour | | | 07:45 | 07:30 | 07:45 | 4 - 6 Peak Hour | | | 17:00 | 16:45 | 16:45 |
| 7 - 9 Pk Volume | 0 | 0 | 195 | 197 | 380 | 4 - 6 Pk Volume | 0 | 0 | 299 | 380 | 666 |
| Pk Hr Factor | 0.000 | 0.000 | 0.855 | 0.947 | 0.872 | Pk Hr Factor | 0.000 | 0.000 | 0.912 | 0.880 | 0.876 |

Prepared by NDS/ATD

# VOLUME

## Woollomes Ave btwn SR-99 NB Ramps & S Lexington St

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_005

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 4,671 | 3,317 | 7,988 |

| AM Period | NB | SB | EB | | WB | | TOTAL | | PM Period | NB | SB | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | | | 11 | | 7 | | 18 | | 12:00 | | | 81 | | 63 | | 144 | |
| 00:15 | | | 6 | | 5 | | 11 | | 12:15 | | | 70 | | 38 | | 108 | |
| 00:30 | | | 9 | | 4 | | 13 | | 12:30 | | | 71 | | 41 | | 112 | |
| 00:45 | | | 10 | 36 | 1 | 17 | 11 | 53 | 12:45 | | | 71 | 293 | 68 | 210 | 139 | 503 |
| 01:00 | | | 7 | | 8 | | 15 | | 13:00 | | | 51 | | 43 | | 94 | |
| 01:15 | | | 4 | | 0 | | 4 | | 13:15 | | | 65 | | 56 | | 121 | |
| 01:30 | | | 8 | | 0 | | 8 | | 13:30 | | | 64 | | 51 | | 115 | |
| 01:45 | | | 13 | 32 | 0 | 8 | 13 | 40 | 13:45 | | | 67 | 247 | 56 | 206 | 123 | 453 |
| 02:00 | | | 5 | | 3 | | 8 | | 14:00 | | | 60 | | 50 | | 110 | |
| 02:15 | | | 3 | | 4 | | 7 | | 14:15 | | | 77 | | 69 | | 146 | |
| 02:30 | | | 5 | | 3 | | 8 | | 14:30 | | | 66 | | 59 | | 125 | |
| 02:45 | | | 2 | 15 | 7 | 17 | 9 | 32 | 14:45 | | | 74 | 277 | 64 | 242 | 138 | 519 |
| 03:00 | | | 2 | | 4 | | 6 | | 15:00 | | | 62 | | 57 | | 119 | |
| 03:15 | | | 4 | | 8 | | 12 | | 15:15 | | | 64 | | 45 | | 109 | |
| 03:30 | | | 14 | | 4 | | 18 | | 15:30 | | | 89 | | 83 | | 172 | |
| 03:45 | | | 8 | 28 | 6 | 22 | 14 | 50 | 15:45 | | | 87 | 302 | 74 | 259 | 161 | 561 |
| 04:00 | | | 17 | | 6 | | 23 | | 16:00 | | | 90 | | 58 | | 148 | |
| 04:15 | | | 31 | | 10 | | 41 | | 16:15 | | | 72 | | 66 | | 138 | |
| 04:30 | | | 20 | | 10 | | 30 | | 16:30 | | | 67 | | 68 | | 135 | |
| 04:45 | | | 29 | 97 | 14 | 40 | 43 | 137 | 16:45 | | | 81 | 310 | 61 | 253 | 142 | 563 |
| 05:00 | | | 25 | | 8 | | 33 | | 17:00 | | | 94 | | 90 | | 184 | |
| 05:15 | | | 22 | | 17 | | 39 | | 17:15 | | | 80 | | 62 | | 142 | |
| 05:30 | | | 54 | | 37 | | 91 | | 17:30 | | | 83 | | 72 | | 155 | |
| 05:45 | | | 89 | 190 | 33 | 95 | 122 | 285 | 17:45 | | | 95 | 352 | 63 | 287 | 158 | 639 |
| 06:00 | | | 50 | | 40 | | 90 | | 18:00 | | | 73 | | 49 | | 122 | |
| 06:15 | | | 63 | | 22 | | 85 | | 18:15 | | | 62 | | 68 | | 130 | |
| 06:30 | | | 68 | | 21 | | 89 | | 18:30 | | | 69 | | 60 | | 129 | |
| 06:45 | | | 106 | 287 | 30 | 113 | 136 | 400 | 18:45 | | | 68 | 272 | 55 | 232 | 123 | 504 |
| 07:00 | | | 76 | | 20 | | 96 | | 19:00 | | | 84 | | 61 | | 145 | |
| 07:15 | | | 54 | | 27 | | 81 | | 19:15 | | | 34 | | 18 | | 52 | |
| 07:30 | | | 69 | | 28 | | 97 | | 19:30 | | | 72 | | 56 | | 128 | |
| 07:45 | | | 81 | 280 | 28 | 103 | 109 | 383 | 19:45 | | | 54 | 244 | 45 | 180 | 99 | 424 |
| 08:00 | | | 59 | | 36 | | 95 | | 20:00 | | | 60 | | 67 | | 127 | |
| 08:15 | | | 55 | | 37 | | 92 | | 20:15 | | | 72 | | 35 | | 107 | |
| 08:30 | | | 57 | | 33 | | 90 | | 20:30 | | | 50 | | 36 | | 86 | |
| 08:45 | | | 49 | 220 | 27 | 133 | 76 | 353 | 20:45 | | | 56 | 238 | 24 | 162 | 80 | 400 |
| 09:00 | | | 45 | | 43 | | 88 | | 21:00 | | | 49 | | 28 | | 77 | |
| 09:15 | | | 57 | | 55 | | 112 | | 21:15 | | | 29 | | 20 | | 49 | |
| 09:30 | | | 43 | | 38 | | 81 | | 21:30 | | | 44 | | 22 | | 66 | |
| 09:45 | | | 56 | 201 | 41 | 177 | 97 | 378 | 21:45 | | | 31 | 153 | 14 | 84 | 45 | 237 |
| 10:00 | | | 56 | | 35 | | 91 | | 22:00 | | | 41 | | 16 | | 57 | |
| 10:15 | | | 49 | | 41 | | 90 | | 22:15 | | | 24 | | 11 | | 35 | |
| 10:30 | | | 57 | | 49 | | 106 | | 22:30 | | | 17 | | 12 | | 29 | |
| 10:45 | | | 45 | 207 | 41 | 166 | 86 | 373 | 22:45 | | | 14 | 96 | 10 | 49 | 24 | 145 |
| 11:00 | | | 52 | | 51 | | 103 | | 23:00 | | | 17 | | 10 | | 27 | |
| 11:15 | | | 55 | | 48 | | 103 | | 23:15 | | | 12 | | 9 | | 21 | |
| 11:30 | | | 51 | | 61 | | 112 | | 23:30 | | | 18 | | 6 | | 24 | |
| 11:45 | | | 79 | 237 | 70 | 230 | 149 | 467 | 23:45 | | | 10 | 57 | 7 | 32 | 17 | 89 |
| TOTALS | | | | 1830 | | 1121 | | 2951 | TOTALS | | | | 2841 | | 2196 | | 5037 |
| SPLIT % | | | | 62.0% | | 38.0% | | 36.9% | SPLIT % | | | | 56.4% | | 43.6% | | 63.1% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 0 | 0 | 4,671 | 3,317 | 7,988 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | | | 06:15 | 11:15 | 11:30 | PM Peak Hour | | | 17:00 | 17:00 | 17:00 |
| AM Pk Volume | | | 313 | 242 | 513 | PM Pk Volume | | | 352 | 287 | 639 |
| Pk Hr Factor | | | 0.738 | 0.864 | 0.861 | Pk Hr Factor | | | 0.926 | 0.797 | 0.868 |
| 7 - 9 Volume | 0 | 0 | 500 | 236 | 736 | 4 - 6 Volume | 0 | 0 | 662 | 540 | 1202 |
| 7 - 9 Peak Hour | | | 07:00 | 07:45 | 07:30 | 4 - 6 Peak Hour | | | 17:00 | 17:00 | 17:00 |
| 7 - 9 Pk Volume | 0 | 0 | 280 | 134 | 393 | 4 - 6 Pk Volume | 0 | 0 | 352 | 287 | 639 |
| Pk Hr Factor | 0.000 | 0.000 | 0.864 | 0.905 | 0.901 | Pk Hr Factor | 0.000 | 0.000 | 0.926 | 0.797 | 0.868 |

Prepared by NDS/ATD

# VOLUME

## Stradley Ave N/o Woollomes Ave

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_006

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 2,392 | 1,757 | 0 | 0 | 4,149 |

| AM Period | NB | | SB | | EB | | WB | | TOTAL | | PM Period | NB | | SB | | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 4 | | 4 | | | | | | 8 | | 12:00 | 28 | | 24 | | | | | | 52 | |
| 00:15 | 5 | | 1 | | | | | | 6 | | 12:15 | 29 | | 22 | | | | | | 51 | |
| 00:30 | 5 | | 2 | | | | | | 7 | | 12:30 | 26 | | 24 | | | | | | 50 | |
| 00:45 | 2 | 16 | 1 | 8 | | | | | 3 | 24 | 12:45 | 34 | 117 | 17 | 87 | | | | | 51 | 204 |
| 01:00 | 0 | | 2 | | | | | | 2 | | 13:00 | 31 | | 20 | | | | | | 51 | |
| 01:15 | 1 | | 0 | | | | | | 1 | | 13:15 | 28 | | 22 | | | | | | 50 | |
| 01:30 | 2 | | 0 | | | | | | 2 | | 13:30 | 32 | | 15 | | | | | | 47 | |
| 01:45 | 2 | 5 | 1 | 3 | | | | | 3 | 8 | 13:45 | 35 | 126 | 15 | 72 | | | | | 50 | 198 |
| 02:00 | 2 | | 0 | | | | | | 2 | | 14:00 | 33 | | 20 | | | | | | 53 | |
| 02:15 | 2 | | 1 | | | | | | 3 | | 14:15 | 32 | | 20 | | | | | | 52 | |
| 02:30 | 3 | | 1 | | | | | | 4 | | 14:30 | 37 | | 31 | | | | | | 68 | |
| 02:45 | 3 | 10 | 3 | 5 | | | | | 6 | 15 | 14:45 | 39 | 141 | 20 | 91 | | | | | 59 | 232 |
| 03:00 | 1 | | 0 | | | | | | 1 | | 15:00 | 72 | | 28 | | | | | | 100 | |
| 03:15 | 0 | | 1 | | | | | | 1 | | 15:15 | 70 | | 45 | | | | | | 115 | |
| 03:30 | 4 | | 3 | | | | | | 7 | | 15:30 | 60 | | 33 | | | | | | 93 | |
| 03:45 | 3 | 8 | 1 | 5 | | | | | 4 | 13 | 15:45 | 55 | 257 | 22 | 128 | | | | | 77 | 385 |
| 04:00 | 2 | | 7 | | | | | | 9 | | 16:00 | 75 | | 22 | | | | | | 97 | |
| 04:15 | 1 | | 4 | | | | | | 5 | | 16:15 | 50 | | 27 | | | | | | 77 | |
| 04:30 | 3 | | 4 | | | | | | 7 | | 16:30 | 44 | | 33 | | | | | | 77 | |
| 04:45 | 1 | 7 | 10 | 25 | | | | | 11 | 32 | 16:45 | 50 | 219 | 22 | 104 | | | | | 72 | 323 |
| 05:00 | 2 | | 8 | | | | | | 10 | | 17:00 | 44 | | 27 | | | | | | 71 | |
| 05:15 | 6 | | 21 | | | | | | 27 | | 17:15 | 56 | | 44 | | | | | | 100 | |
| 05:30 | 11 | | 33 | | | | | | 44 | | 17:30 | 47 | | 35 | | | | | | 82 | |
| 05:45 | 10 | 29 | 36 | 98 | | | | | 46 | 127 | 17:45 | 46 | 193 | 35 | 141 | | | | | 81 | 334 |
| 06:00 | 5 | | 39 | | | | | | 44 | | 18:00 | 46 | | 37 | | | | | | 83 | |
| 06:15 | 11 | | 17 | | | | | | 28 | | 18:15 | 46 | | 35 | | | | | | 81 | |
| 06:30 | 11 | | 14 | | | | | | 25 | | 18:30 | 51 | | 35 | | | | | | 86 | |
| 06:45 | 11 | 38 | 16 | 86 | | | | | 27 | 124 | 18:45 | 40 | 183 | 37 | 144 | | | | | 77 | 327 |
| 07:00 | 18 | | 15 | | | | | | 33 | | 19:00 | 36 | | 37 | | | | | | 73 | |
| 07:15 | 19 | | 15 | | | | | | 34 | | 19:15 | 48 | | 35 | | | | | | 83 | |
| 07:30 | 31 | | 19 | | | | | | 50 | | 19:30 | 49 | | 37 | | | | | | 86 | |
| 07:45 | 25 | 93 | 34 | 83 | | | | | 59 | 176 | 19:45 | 60 | 193 | 39 | 148 | | | | | 99 | 341 |
| 08:00 | 22 | | 19 | | | | | | 41 | | 20:00 | 36 | | 42 | | | | | | 78 | |
| 08:15 | 27 | | 14 | | | | | | 41 | | 20:15 | 52 | | 35 | | | | | | 87 | |
| 08:30 | 20 | | 16 | | | | | | 36 | | 20:30 | 50 | | 24 | | | | | | 74 | |
| 08:45 | 23 | 92 | 21 | 70 | | | | | 44 | 162 | 20:45 | 35 | 173 | 17 | 118 | | | | | 52 | 291 |
| 09:00 | 17 | | 13 | | | | | | 30 | | 21:00 | 47 | | 15 | | | | | | 62 | |
| 09:15 | 27 | | 18 | | | | | | 45 | | 21:15 | 25 | | 13 | | | | | | 38 | |
| 09:30 | 16 | | 16 | | | | | | 32 | | 21:30 | 24 | | 9 | | | | | | 33 | |
| 09:45 | 17 | 77 | 19 | 66 | | | | | 36 | 143 | 21:45 | 22 | 118 | 17 | 54 | | | | | 39 | 172 |
| 10:00 | 19 | | 19 | | | | | | 38 | | 22:00 | 32 | | 10 | | | | | | 42 | |
| 10:15 | 19 | | 23 | | | | | | 42 | | 22:15 | 22 | | 5 | | | | | | 27 | |
| 10:30 | 30 | | 19 | | | | | | 49 | | 22:30 | 9 | | 7 | | | | | | 16 | |
| 10:45 | 19 | 87 | 27 | 88 | | | | | 46 | 175 | 22:45 | 10 | 73 | 7 | 29 | | | | | 17 | 102 |
| 11:00 | 26 | | 29 | | | | | | 55 | | 23:00 | 5 | | 3 | | | | | | 8 | |
| 11:15 | 27 | | 20 | | | | | | 47 | | 23:15 | 4 | | 3 | | | | | | 7 | |
| 11:30 | 30 | | 21 | | | | | | 51 | | 23:30 | 13 | | 1 | | | | | | 14 | |
| 11:45 | 32 | 115 | 23 | 93 | | | | | 55 | 208 | 23:45 | 0 | 22 | 4 | 11 | | | | | 4 | 33 |
| TOTALS | | 577 | | 630 | | | | | | 1207 | TOTALS | | 1815 | | 1127 | | | | | | 2942 |
| SPLIT % | | 47.8% | | 52.2% | | | | | | 29.1% | SPLIT % | | 61.7% | | 38.3% | | | | | | 70.9% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 2,392 | 1,757 | 0 | 0 | 4,149 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 11:30 | 05:15 | | | 11:30 | PM Peak Hour | 15:15 | 19:15 | | | 15:00 |
| AM Pk Volume | 119 | 129 | | | 209 | PM Pk Volume | 260 | 153 | | | 385 |
| Pk Hr Factor | 0.930 | 0.827 | | | 0.950 | Pk Hr Factor | 0.867 | 0.911 | | | 0.837 |
| 7 - 9 Volume | 185 | 153 | 0 | 0 | 338 | 4 - 6 Volume | 412 | 245 | 0 | 0 | 657 |
| 7 - 9 Peak Hour | 07:30 | 07:15 | | | 07:30 | 4 - 6 Peak Hour | 16:00 | 17:00 | | | 17:00 |
| 7 - 9 Pk Volume | 105 | 87 | 0 | 0 | 191 | 4 - 6 Pk Volume | 219 | 141 | 0 | 0 | 334 |
| Pk Hr Factor | 0.847 | 0.640 | 0.000 | 0.000 | 0.809 | Pk Hr Factor | 0.730 | 0.801 | 0.000 | 0.000 | 0.835 |

Prepared by NDS/ATD

# VOLUME

## Stradley Ave S/o Woollomes Ave

**Day:** Thursday
**Date:** 8/28/2014

**City:** Delano
**Project #:** CA14_8104_007

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 860 | 842 | 0 | 0 | 1,702 |

| AM Period | NB | | SB | | EB | | WB | | TOTAL | | PM Period | NB | | SB | | EB | | WB | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00:00 | 0 | | 1 | | | | | | 1 | | 12:00 | 10 | | 13 | | | | | | 23 | |
| 00:15 | 1 | | 0 | | | | | | 1 | | 12:15 | 10 | | 17 | | | | | | 27 | |
| 00:30 | 1 | | 0 | | | | | | 1 | | 12:30 | 13 | | 10 | | | | | | 23 | |
| 00:45 | 0 | 2 | 0 | 1 | | | | | 0 | 3 | 12:45 | 14 | 47 | 10 | 50 | | | | | 24 | 97 |
| 01:00 | 0 | | 2 | | | | | | 2 | | 13:00 | 12 | | 9 | | | | | | 21 | |
| 01:15 | 0 | | 0 | | | | | | 0 | | 13:15 | 13 | | 12 | | | | | | 25 | |
| 01:30 | 0 | | 1 | | | | | | 1 | | 13:30 | 8 | | 11 | | | | | | 19 | |
| 01:45 | 0 | | 0 | 3 | | | | | 0 | 3 | 13:45 | 12 | 45 | 3 | 35 | | | | | 15 | 80 |
| 02:00 | 0 | | 0 | | | | | | 0 | | 14:00 | 13 | | 8 | | | | | | 21 | |
| 02:15 | 0 | | 1 | | | | | | 1 | | 14:15 | 13 | | 9 | | | | | | 22 | |
| 02:30 | 0 | | 1 | | | | | | 1 | | 14:30 | 18 | | 22 | | | | | | 40 | |
| 02:45 | 0 | | 2 | 4 | | | | | 2 | 4 | 14:45 | 14 | 58 | 10 | 49 | | | | | 24 | 107 |
| 03:00 | 0 | | 0 | | | | | | 0 | | 15:00 | 76 | | 12 | | | | | | 88 | |
| 03:15 | 0 | | 0 | | | | | | 0 | | 15:15 | 28 | | 13 | | | | | | 41 | |
| 03:30 | 0 | | 0 | | | | | | 0 | | 15:30 | 23 | | 18 | | | | | | 41 | |
| 03:45 | 0 | | 0 | | | | | | 0 | | 15:45 | 23 | 150 | 11 | 54 | | | | | 34 | 204 |
| 04:00 | 0 | | 2 | | | | | | 2 | | 16:00 | 40 | | 10 | | | | | | 50 | |
| 04:15 | 0 | | 0 | | | | | | 0 | | 16:15 | 17 | | 15 | | | | | | 32 | |
| 04:30 | 1 | | 2 | | | | | | 3 | | 16:30 | 21 | | 17 | | | | | | 38 | |
| 04:45 | 1 | 2 | 5 | 9 | | | | | 6 | 11 | 16:45 | 18 | 96 | 8 | 50 | | | | | 26 | 146 |
| 05:00 | 1 | | 6 | | | | | | 7 | | 17:00 | 23 | | 19 | | | | | | 42 | |
| 05:15 | 5 | | 19 | | | | | | 24 | | 17:15 | 20 | | 12 | | | | | | 32 | |
| 05:30 | 9 | | 36 | | | | | | 45 | | 17:30 | 7 | | 13 | | | | | | 20 | |
| 05:45 | 6 | 21 | 35 | 96 | | | | | 41 | 117 | 17:45 | 14 | 64 | 9 | 53 | | | | | 23 | 117 |
| 06:00 | 4 | | 52 | | | | | | 56 | | 18:00 | 9 | | 9 | | | | | | 18 | |
| 06:15 | 2 | | 16 | | | | | | 18 | | 18:15 | 18 | | 10 | | | | | | 28 | |
| 06:30 | 2 | | 6 | | | | | | 8 | | 18:30 | 12 | | 18 | | | | | | 30 | |
| 06:45 | 7 | 15 | 6 | 80 | | | | | 13 | 95 | 18:45 | 13 | 52 | 20 | 57 | | | | | 33 | 109 |
| 07:00 | 10 | | 6 | | | | | | 16 | | 19:00 | 11 | | 9 | | | | | | 20 | |
| 07:15 | 8 | | 5 | | | | | | 13 | | 19:15 | 13 | | 11 | | | | | | 24 | |
| 07:30 | 9 | | 10 | | | | | | 19 | | 19:30 | 12 | | 11 | | | | | | 23 | |
| 07:45 | 10 | 37 | 13 | 34 | | | | | 23 | 71 | 19:45 | 11 | 47 | 10 | 41 | | | | | 21 | 88 |
| 08:00 | 14 | | 8 | | | | | | 22 | | 20:00 | 12 | | 17 | | | | | | 29 | |
| 08:15 | 8 | | 12 | | | | | | 20 | | 20:15 | 6 | | 10 | | | | | | 16 | |
| 08:30 | 9 | | 7 | | | | | | 16 | | 20:30 | 8 | | 6 | | | | | | 14 | |
| 08:45 | 11 | 42 | 5 | 32 | | | | | 16 | 74 | 20:45 | 2 | 28 | 7 | 40 | | | | | 9 | 68 |
| 09:00 | 10 | | 9 | | | | | | 19 | | 21:00 | 3 | | 7 | | | | | | 10 | |
| 09:15 | 14 | | 10 | | | | | | 24 | | 21:15 | 6 | | 2 | | | | | | 8 | |
| 09:30 | 7 | | 11 | | | | | | 18 | | 21:30 | 0 | | 3 | | | | | | 3 | |
| 09:45 | 11 | 42 | 14 | 44 | | | | | 25 | 86 | 21:45 | 3 | 12 | 2 | 14 | | | | | 5 | 26 |
| 10:00 | 11 | | 6 | | | | | | 17 | | 22:00 | 3 | | 1 | | | | | | 4 | |
| 10:15 | 10 | | 10 | | | | | | 20 | | 22:15 | 1 | | 5 | | | | | | 6 | |
| 10:30 | 15 | | 9 | | | | | | 24 | | 22:30 | 3 | | 0 | | | | | | 3 | |
| 10:45 | 10 | 46 | 15 | 40 | | | | | 25 | 86 | 22:45 | 1 | 8 | 2 | 8 | | | | | 3 | 16 |
| 11:00 | 11 | | 19 | | | | | | 30 | | 23:00 | 3 | | 4 | | | | | | 7 | |
| 11:15 | 10 | | 9 | | | | | | 19 | | 23:15 | 0 | | 1 | | | | | | 1 | |
| 11:30 | 8 | | 4 | | | | | | 12 | | 23:30 | 1 | | 0 | | | | | | 1 | |
| 11:45 | 13 | 42 | 11 | 43 | | | | | 24 | 85 | 23:45 | 0 | 4 | 0 | 5 | | | | | 0 | 9 |
| TOTALS | | 249 | | 386 | | | | | | 635 | TOTALS | | 611 | | 456 | | | | | | 1067 |
| SPLIT % | | 39.2% | | 60.8% | | | | | | 37.3% | SPLIT % | | 57.3% | | 42.7% | | | | | | 62.7% |

| DAILY TOTALS | NB | SB | EB | WB | Total |
|---|---|---|---|---|---|
| | 860 | 842 | 0 | 0 | 1,702 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hour | 09:45 | 05:15 | | | 05:15 | PM Peak Hour | 15:00 | 16:15 | | | 15:00 |
| AM Pk Volume | 47 | 142 | | | 166 | PM Pk Volume | 150 | 59 | | | 204 |
| Pk Hr Factor | 0.783 | 0.683 | | | 0.741 | Pk Hr Factor | 0.493 | 0.776 | | | 0.580 |
| 7 - 9 Volume | 79 | 66 | 0 | 0 | 145 | 4 - 6 Volume | 160 | 103 | 0 | 0 | 263 |
| 7 - 9 Peak Hour | 08:00 | 07:30 | | | 07:30 | 4 - 6 Peak Hour | 16:00 | 16:15 | | | 16:00 |
| 7 - 9 Pk Volume | 42 | 43 | 0 | 0 | 84 | 4 - 6 Pk Volume | 96 | 59 | 0 | 0 | 146 |
| Pk Hr Factor | 0.750 | 0.827 | 0.000 | 0.000 | 0.913 | Pk Hr Factor | 0.600 | 0.776 | 0.000 | 0.000 | 0.730 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |
| Project #: | 14-8103-001 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 715 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Albany St

| Lanes | 1 | .5 | .5 | | |
|---|---|---|---|---|---|
| AM | 21 | 89 | 72 | 142 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 17 | 72 | 49 | 227 | PM |

### Eastbound Approach

Garces Hwy

| | AM | NOON | PM |
|---|---|---|---|
| | 191 | 0 | 234 |
| 0 | 22 | 0 | 29 |
| 1 | 123 | 0 | 143 |
| 0 | 56 | 0 | 81 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 60 | 0 | 68 | 0 |
| 91 | 0 | 148 | 1 |
| 7 | 0 | 17 | 0 |
| 209 | 0 | 216 | |
| AM | NOON | PM | |

**CONTROL**

4-Way Stop

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 152 | 79 | 60 | 14 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 170 | 69 | 130 | 24 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 182 | 142 | |
| NOON | 0 | 0 | |
| PM | 138 | 227 | |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 191 | 0 | 234 | 158 | 0 | 233 |
| 201 | 0 | 253 | 209 | 0 | 216 |
| | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 152 | 153 |
| NOON | 0 | 0 |
| PM | 170 | 223 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 324 |
| NOON | 0 |
| PM | 365 |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 392 | 0 | 487 | 367 | 0 | 449 |
| | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 305 |
| NOON | 0 |
| PM | 393 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pl and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |
| Project #: | 14-8103-002 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 400 PM |

### Peak Hour Summary

**Southbound Approach** (Dover Pl)

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 4 | 11 | 20 | 15 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 17 | 19 | 32 | 34 | PM |

**Eastbound Approach** (Garces Hwy)

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 173 | 0 | 281 |
| 0 | 2 | 0 | 8 |
| 1 | 218 | 0 | 318 |
| 0 | 16 | 0 | 3 |

**Westbound Approach**

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 3 | 0 | 10 | 0 |
| 165 | 0 | 259 | 1 |
| 33 | 0 | 48 | 0 |
| 267 | 0 | 389 | |

**CONTROL**: 4-Way Stop

**Northbound Approach**

| | | | | |
|---|---|---|---|---|
| AM | 60 | 4 | 10 | 29 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 70 | 5 | 16 | 39 |
| Lanes | | 0 | 1 | 0 |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 35 | 201 | 60 | 173 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 68 | 267 | 70 | 281 |
| | | 317 | 43 | 329 |
| | | 0 | 0 | 0 |
| | | 389 | 60 | 236 |

## Total Volume Per Leg

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 50 | 468 | 103 | 409 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 102 | 706 | 130 | 610 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and 1st Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-003 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 715 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Albany St

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 91 | 55 | 144 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 124 | 44 | 206 | PM |

### Eastbound Approach

1st Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 54 | 0 | 44 | 0 |
| 0 | 0 | 0 | 1 |
| 7 | 0 | 14 | 0 |
| 67 | 0 | 78 | |
| AM | NOON | PM | |

**CONTROL**

1-Way Stop (WB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 98 | 0 | 90 | 12 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 138 | 0 | 162 | 34 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 146 | 144 | AM |
| NOON | 0 | 0 | NOON |
| PM | 168 | 206 | PM |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 61 | 0 | 58 |
| 0 | 0 | 0 | 67 | 0 | 78 |
| | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 98 | 102 |
| NOON | 0 | 0 |
| PM | 138 | 196 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 290 |
| NOON | 0 |
| PM | 374 |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 128 | 0 | 136 |
| | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 200 |
| NOON | 0 |
| PM | 334 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pl and 1st Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-004 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 715 AM |
| NOON Peak Hour | |
| PM Peak Hour | 415 PM |

### Peak Hour Summary

**Southbound Approach** (Dover Pl)

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 16 | 18 | 3 | 24 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 20 | 14 | 6 | 28 | PM |

**Eastbound Approach** (1st Ave)

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 47 | 0 | 66 |
| 0 | 10 | 0 | 11 |
| 1 | 72 | 0 | 78 |
| 0 | 4 | 0 | 4 |

**Westbound Approach**

| Lanes | AM | NOON | PM |
|---|---|---|---|
| 0 | 0 | 0 | 4 |
| 1 | 30 | 0 | 44 |
| 0 | 48 | 0 | 17 |
| | 117 | 0 | 116 |

**CONTROL**

2-Way Stop (NB & SB)

**Northbound Approach**

| | | | | | Lanes |
|---|---|---|---|---|---|
| AM | 70 | 1 | 14 | 42 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 35 | 2 | 13 | 32 | PM |
| | | 0 | 1 | 0 | |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 37 | 78 | 70 | 47 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 40 | 65 | 57 | 66 |
| AM | 24 | 117 | 35 | 86 |
| NOON | 0 | 0 | 47 | 0 |
| PM | 28 | 116 | 93 | |

## Total Volume Per Leg

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 61 | 195 | 127 | 133 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 68 | 181 | 82 | 159 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and Woollomes Ave , Delano*

| | | | |
|---|---|---|---|
| Date: | 8/28/2014 | Project #: | 14-8103-005 |
| Day: | Thursday | City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Albany St

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 26 | 60 | 105 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 37 | 104 | 193 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 74 | 0 | 146 | 0 |
| | 0 | 0 | 0 | 1 |
| | 17 | 0 | 16 | 0 |
| | 70 | 0 | 121 | |
| | AM | NOON | PM | |

**CONTROL**

1-Way Stop (WB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 43 | 0 | 31 | 10 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 53 | 0 | 47 | 17 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 86 | 105 | |
| NOON | 0 | 0 | |
| PM | 141 | 193 | |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 91 | 0 | 162 |
| 0 | 0 | 0 | 70 | 0 | 121 |
| | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 43 | 41 |
| NOON | 0 | 0 |
| PM | 53 | 64 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 191 |
| NOON | 0 |
| PM | 334 |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 161 | 0 | 283 |
| | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 84 |
| NOON | 0 |
| PM | 117 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pkwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-006 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Dover Pkwy

| | Lanes | 0 | 0 | 0 | | |
|---|---|---|---|---|---|---|
| AM | | 0 | 0 | 0 | 0 | AM |
| NOON | | 0 | 0 | 0 | 0 | NOON |
| PM | | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 94 | 0 | 164 |
| 0 | 0 | 0 | 0 |
| 1 | 44 | 0 | 52 |
| 1 | 25 | 0 | 70 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 75 | 0 | 106 | 1 |
| | 8 | 0 | 16 | 1 |
| | 59 | 0 | 70 | |
| | AM | NOON | PM | |

### CONTROL

1-Way Stop (NB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 33 | 19 | 0 | 15 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 86 | 58 | 0 | 18 | PM |
| | | 1 | 0 | 2 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | |
|---|---|---|
| AM | 0 | 0 |
| NOON | 0 | 0 |
| PM | 0 | 0 |

| | West Leg | | |
|---|---|---|---|
| AM | 94 | 0 | 164 |
| NOON | 69 | 0 | 122 |

| | East Leg | | |
|---|---|---|---|
| AM | 83 | 0 | 122 |
| NOON | 59 | 0 | 70 |

| | South Leg | |
|---|---|---|
| AM | 33 | 34 |
| NOON | 0 | 0 |
| PM | 86 | 76 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 0 |
| NOON | 0 |
| PM | 0 |

| | West Leg | | |
|---|---|---|---|
| AM | 163 | 0 | 286 |

| | East Leg | | |
|---|---|---|---|
| AM | 142 | 0 | 192 |

| | South Leg |
|---|---|
| AM | 67 |
| NOON | 0 |
| PM | 162 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Marketplace Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-007 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Marketplace Dwy

| Lanes | .3 | .3 | .3 | | |
|---|---|---|---|---|---|
| AM | 6 | 4 | 5 | 14 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 10 | 9 | 9 | 18 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 82 | 0 | 120 |
| 1 | 9 | 0 | 11 |
| 3 | 47 | 0 | 44 |
| 1 | 5 | 0 | 16 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 3 | 0 | 2 | 1 |
| 65 | 0 | 88 | 2 |
| 100 | 0 | 252 | 1 |
| 123 | 0 | 249 | |
| AM | NOON | PM | |

### CONTROL

Signalized

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 109 | 11 | 2 | 71 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 277 | 22 | 5 | 196 | PM |
| | | 1 | .5 | 1.5 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| | 15 | 14 | AM |
| | 0 | 0 | NOON |
| | 28 | 18 | PM |

| AM | NOON | PM | East Leg | | |
|---|---|---|---|---|---|
| 82 | 0 | 120 | 168 | 0 | 342 |
| 61 | 0 | 71 | 123 | 0 | 249 |
| West Leg | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 109 | 84 |
| NOON | 0 | 0 |
| PM | 277 | 223 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| | 29 |
| | 0 |
| | 46 |

| AM | NOON | PM | East Leg | | |
|---|---|---|---|---|---|
| 143 | 0 | 191 | 291 | 0 | 591 |
| West Leg | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 193 |
| NOON | 0 |
| PM | 500 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Home Depot Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-008 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 800 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

### Southbound Approach

Home Depot Dwy

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 12 | 5 | 43 | 61 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 21 | 1 | 43 | 62 | PM |

### Eastbound Approach

Woollomes Ave

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 151 | 0 | 342 |
| 0 | 3 | 0 | 6 |
| 3 | 116 | 0 | 243 |
| 0 | 1 | 0 | 6 |

### Westbound Approach

| Lanes | AM | NOON | PM |
|---|---|---|---|
| 0 | 56 | 0 | 56 |
| 2 | 139 | 0 | 318 |
| 0 | 53 | 0 | 52 |
| | 195 | 0 | 341 |

### CONTROL

1-Way Stop (SB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 59 | 0 | 2 | 36 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 59 | 3 | 0 | 55 |
| Lanes | | 0 | 1 | 0 |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | East Leg | | West Leg | | South Leg | |
|---|---|---|---|---|---|---|---|---|
| AM | 60 | 61 | 248 | 426 | 151 | 342 | 59 | 38 |
| NOON | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM | 65 | 62 | 195 | 341 | 120 | 255 | 59 | 58 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 121 | 443 | 271 | 97 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 127 | 767 | 597 | 117 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 SB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-009 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 745 AM |
| NOON Peak Hour | |
| PM Peak Hour | 500 PM |

### Peak Hour Summary

**Southbound Approach** — SR-99 SB Ramps

| | Left | Thru | Right | U-turn |
|---|---|---|---|---|
| Lanes | 1 | .5 | .5 | |
| AM | 119 | 3 | 57 | 0 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 186 | 0 | 38 | 0 |

**Eastbound Approach** — Woollomes Ave

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 249 | 0 | 432 |
| 0 | 0 | 0 | 0 |
| 1 | 138 | 0 | 261 |
| 1 | 50 | 0 | 87 |

**Westbound Approach**

| Lanes | AM | NOON | PM |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 130 | 0 | 246 |
| 1 | 53 | 0 | 126 |
| | 195 | 0 | 299 |

**CONTROL**: Signalized

**Northbound Approach**

| | Left | Thru | Right | U-turn |
|---|---|---|---|---|
| AM | 106 | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 213 | 0 | 0 | 0 |
| Lanes | | 0 | 0 | 0 |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | South Leg | East Leg | West Leg |
|---|---|---|---|---|
| AM | 179 | 106 | 183 | 249 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 224 | 213 | 372 | 432 |
| | | | 195 | 188 |
| | | | 0 | 0 |
| | | | 299 | 348 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 179 | 378 | 437 | 106 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 224 | 671 | 780 | 213 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 NB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-010 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 445 PM |

### Peak Hour Summary

**Southbound Approach** (SR-99 NB Ramps)

| | Left | Thru | Right |
|---|---|---|---|
| Lanes | 0 | 0 | 0 |
| AM | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 |
| PM | 0 | 0 | 0 |

| | |
|---|---|
| AM | 86 |
| NOON | 0 |
| PM | 93 |

**Eastbound Approach** (Woollomes Ave)

| | AM | NOON | PM |
|---|---|---|---|
| | 197 | 0 | 380 |
| 1 | 29 | 0 | 34 |
| 1 | 98 | 0 | 151 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

**Westbound Approach**

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 6 | 0 | 12 | 0 |
| | 123 | 0 | 273 | 1 |
| | 0 | 0 | 0 | 0 |
| | 264 | 0 | 338 | |
| | AM | NOON | PM | |

**CONTROL**: Signalized

**Northbound Approach**

| | Left | Thru | Right |
|---|---|---|---|
| AM | 0 | 74 | 51 | 166 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 0 | 107 | 47 | 187 |
| Lanes | | 1 | 1 | 1 |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | South Leg | East Leg | West Leg |
|---|---|---|---|---|
| AM | 0 | 86 | 0 | 291 | 129 | 0 | 285 | 197 | 0 | 380 |
| NOON | 0 | 0 | 0 | 0 | 264 | 0 | 338 | 127 | 0 | 185 |
| PM | 0 | 93 | 0 | 341 | | | | | | |

## Total Volume Per Leg

| | North Leg | South Leg | East Leg | West Leg |
|---|---|---|---|---|
| AM | 86 | 291 | 393 | 324 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 93 | 341 | 623 | 565 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Lexington St and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-011 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 730 AM |
| NOON Peak Hour | |
| PM Peak Hour | 445 PM |

### Peak Hour Summary

### Southbound Approach

Lexington St

| Lanes | 0 | 2 | 0 | | |
|---|---|---|---|---|---|
| AM | 98 | 64 | 4 | 190 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 229 | 58 | 5 | 355 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 156 | 0 | 349 |
| 0 | 155 | 0 | 288 |
| 1 | 5 | 0 | 8 |
| 0 | 114 | 0 | 60 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 10 | 0 | 16 | |
| | AM | NOON | PM | |

### CONTROL

3-Way Stop(NB,SB & EB)

### Northbound Approach

| | | | | | |
|---|---|---|---|---|---|
| AM | 178 | 58 | 35 | 1 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 118 | 120 | 67 | 3 | PM |
| | | 1 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | | East Leg | | | West Leg | | | South Leg | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | AM | NOON | PM | | |
| AM | 166 | 190 | 0 | 0 | 0 | 156 | 0 | 349 | 178 | 94 |
| NOON | 0 | 0 | 10 | 0 | 16 | 274 | 0 | 356 | 0 | 0 |
| PM | 292 | 355 | AM | NOON | PM | | | | 118 | 190 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 356 | 10 | 430 | 272 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 647 | 16 | 705 | 308 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 NB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/28/2014 |
| Day: | Thursday |

| | |
|---|---|
| Project #: | 14-8103-110 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | 800 AM |
| NOON Peak Hour | |
| PM Peak Hour | 430 PM |

### Peak Hour Summary

**Southbound Approach** (SR-99 NB Ramps)

| | Left | Thru | Right |
|---|---|---|---|
| Lanes | 0 | 0 | 0 |
| AM | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 |
| PM | 0 | 0 | 0 |

| | |
|---|---|
| AM | 94 |
| NOON | 0 |
| PM | 161 |

**Eastbound Approach** (Woollomes Ave)

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 1 | 66 | 0 | 93 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

**Westbound Approach**

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 27 | 0 | 68 | 1 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | |
| | AM | NOON | PM | |

**CONTROL**: Signalized

**Northbound Approach**

| | Left | Thru | Right |
|---|---|---|---|
| AM | 0 | 1 | 0 |
| NOON | 0 | 0 | 0 |
| PM | 0 | 0 | 0 |
| Lanes | 0 | 1 | 0 |

| Count Periods | Start | End |
|---|---|---|
| AM | 7:00 AM | 9:00 AM |
| NOON | | |
| PM | 4:00 PM | 6:00 PM |

## Total Ins & Outs

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 0 | 27 | 0 | 0 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 0 | 68 | 1 | 93 |
| | 94 | 0 | 0 | 66 |
| | 0 | 0 | 0 | 0 |
| | 161 | 0 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 94 | 27 | 1 | 66 |
| NOON | 0 | 0 | 0 | 0 |
| PM | 161 | 68 | 0 | 93 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-001 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1115 AM |
| PM Peak Hour | |

### Peak Hour Summary

**Southbound Approach** (Albany St)

| Lanes | 1 | .5 | .5 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

**Eastbound Approach** (Garces Hwy)

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

**Westbound Approach**

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | |
| | AM | NOON | PM | |

**CONTROL**: 4-Way Stop

**Northbound Approach**

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 1 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | East Leg | | West Leg | | South Leg | |
|---|---|---|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 0 | 0 | 1 | 1 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-001 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Albany St

| Lanes | 1 | .5 | .5 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 10 | 85 | 23 | 175 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Garces Hwy

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 148 | 0 |
| 0 | 0 | 13 | 0 |
| 1 | 0 | 95 | 0 |
| 0 | 0 | 39 | 0 |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 52 | 0 | 0 |
| 0 | 77 | 0 | 1 |
| 0 | 20 | 0 | 0 |
| 0 | 130 | 0 | |

### CONTROL

4-Way Stop

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 144 | 61 | 110 | 12 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| Lanes | | 0 | 1 | 0 | Lanes |

## Total Ins & Outs

| | AM | NOON | PM |
|---|---|---|---|
| North Leg | 0 | 118 | 0 |
| | 0 | 175 | 0 |
| East Leg | 0 | 149 | 0 |
| | 0 | 130 | 0 |
| South Leg | 0 | 144 | 0 |
| | 0 | 183 | 0 |
| West Leg | 0 | 147 | 0 |
| | 0 | 148 | 0 |

## Total Volume Per Leg

| | AM | NOON | PM |
|---|---|---|---|
| North Leg | 0 | 293 | 0 |
| East Leg | 0 | 279 | 0 |
| South Leg | 0 | 327 | 0 |
| West Leg | 0 | 295 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pl and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-002 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1130 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Dover Pl

| Lanes | 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Garces Hwy

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 1 |
| | 0 | 1 | 0 | 0 |
| | 0 | 0 | 0 | |
| | AM | NOON | PM | |

### CONTROL

4-Way Stop

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 1 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| North Leg | | |
|---|---|---|
| 0 | 0 | AM |
| 0 | 0 | NOON |
| 0 | 0 | PM |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 |
| | | | AM | NOON | PM |

| South Leg | | |
|---|---|---|
| 0 | 0 | AM |
| 1 | 0 | NOON |
| 0 | 0 | PM |

## Total Volume Per Leg

| North Leg | | |
|---|---|---|
| 0 | | AM |
| 0 | | NOON |
| 0 | | PM |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 1 | 0 |
| | | | AM | NOON | PM |

| South Leg | |
|---|---|
| 0 | AM |
| 1 | NOON |
| 0 | PM |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pl and Garces Hwy , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-002 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Dover Pl

| Lanes | 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 8 | 13 | 16 | 21 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Garces Hwy

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 193 | 0 |
| 0 | 0 | 9 | 0 |
| 1 | 0 | 163 | 0 |
| 0 | 0 | 2 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 10 | 0 | 0 |
| 0 | 180 | 0 | 1 |
| 0 | 46 | 0 | 0 |
| 0 | 210 | 0 | |
| AM | NOON | PM | |

### CONTROL

4-Way Stop

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | | | |
| NOON | 61 | 5 | 2 | 31 |
| PM | 0 | 0 | 0 | 0 |
| Lanes | | 0 | 1 | 0 |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | East Leg | | West Leg | | South Leg | |
|---|---|---|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 236 | 0 | 0 | 0 | 0 |
| NOON | 37 | 21 | 0 | 210 | 0 | 174 | 61 | 38 |
| PM | 0 | 0 | 0 | 0 | 0 | 193 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 58 | 446 | 367 | 99 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and 1st Ave , Delano*

| | |
|---|---|
| Date: | 8/22/2014 |
| Day: | Friday |

| | |
|---|---|
| Project #: | 14-8103-003 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1215 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Albany St

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 1 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

1st Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 |
| | 0 | 1 | 0 | |
| | AM | NOON | PM | |

### CONTROL

1-Way Stop (WB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 1 | 0 | |
| PM | 0 | 0 | |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 1 | 0 |
| | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 0 | 0 |
| NOON | 0 | 0 |
| PM | 0 | 0 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 0 |
| NOON | 1 |
| PM | 0 |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 1 | 0 |
| | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 0 |
| NOON | 0 |
| PM | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and 1st Ave , Delano*

| | | | |
|---|---|---|---|
| Date: | 8/23/2014 | Project #: | 14-8103-003 |
| Day: | Saturday | City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Albany St

| Lanes | 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 115 | 18 | 178 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

1st Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 15 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 0 | 18 | 0 | 0 |
| 0 | 36 | 0 | |
| AM | NOON | PM | |

### CONTROL

1-Way Stop (WB)

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 133 | 0 | 163 | 18 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

## Total Ins & Outs

| | AM | NOON | PM |
|---|---|---|---|
| North Leg | 0 | 133 | 0 |
| | 0 | 178 | 0 |
| East Leg | 0 | 0 | 0 |
| | 33 | 36 | 0 |
| West Leg | 0 | 0 | 0 |
| | 0 | 0 | 0 |
| South Leg | 0 | 133 | 0 |
| | 0 | 181 | 0 |

## Total Volume Per Leg

| | AM | NOON | PM |
|---|---|---|---|
| North Leg | 0 | 311 | 0 |
| West Leg | 0 | 0 | 0 |
| East Leg | 0 | 69 | 0 |
| South Leg | 0 | 314 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pl and 1st Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-004 |
| City: | Delano |

| AM Peak Hour | |
|---|---|
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Dover Pl

| Lanes | 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 15 | 2 | 3 | 13 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

1st Ave

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 54 | 0 |
| 0 | 0 | 9 | 0 |
| 1 | 0 | 44 | 0 |
| 0 | 0 | 1 | 0 |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 2 | 0 | 0 |
| 0 | 37 | 0 | 1 |
| 0 | 15 | 0 | 0 |
| 0 | 59 | 0 | |

**CONTROL**

2-Way Stop (NB & SB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 18 | 2 | 2 | 12 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| North Leg | |
|---|---|
| 0 | 0 |
| 20 | 13 |
| 0 | 0 |

AM / NOON / PM

| West Leg (AM / NOON / PM) | East Leg (AM / NOON / PM) |
|---|---|
| 0 / 54 / 0 | 0 / 54 / 0 |
| 0 / 54 / 0 | 0 / 59 / 0 |

| South Leg | |
|---|---|
| 0 | 0 |
| 18 | 16 |
| 0 | 0 |

AM / NOON / PM

## Total Volume Per Leg

| North Leg |
|---|
| 0 |
| 33 |
| 0 |

AM / NOON / PM

| West Leg (AM / NOON / PM) | East Leg (AM / NOON / PM) |
|---|---|
| 0 / 108 / 0 | 0 / 113 / 0 |

| South Leg |
|---|
| 0 |
| 34 |
| 0 |

AM / NOON / PM

# ITM Peak Hour Summary

Prepared by:

NDS

## *Albany St and Woollomes Ave , Delano*

| | | | |
|---|---|---|---|
| Date: | 8/23/2014 | Project #: | 14-8103-005 |
| Day: | Saturday | City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Albany St

| Lanes | 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 42 | 90 | 178 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 128 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 0 | 22 | 0 | 0 |
| 0 | 111 | 0 | |
| AM | NOON | PM | |

**CONTROL**

1-Way Stop (WB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 64 | 0 | 50 | 21 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| North Leg | | |
|---|---|---|
| 0 | 0 | AM |
| 132 | 178 | NOON |
| 0 | 0 | PM |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 150 | 0 |
| 0 | 0 | 0 | 0 | 111 | 0 |
| | | | AM | NOON | PM |

| South Leg | | |
|---|---|---|
| 0 | 0 | AM |
| 64 | 71 | NOON |
| 0 | 0 | PM |

## Total Volume Per Leg

| North Leg | | |
|---|---|---|
| 0 | | AM |
| 310 | | NOON |
| 0 | | PM |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 261 | 0 |
| | | | AM | NOON | PM |

| South Leg | |
|---|---|
| 0 | AM |
| 135 | NOON |
| 0 | PM |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pkwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-006 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1115 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Dover Pkwy

| Lanes | 0 | 0 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

Woollomes Ave

### Eastbound Approach

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | |
| AM | NOON | PM | |

**CONTROL**

1-Way Stop (NB)

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 1 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | 0 | 2 | Lanes |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 0 | 0 | |
| PM | 0 | 0 | |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 |
| | | | AM | NOON | PM |

| | South Leg | |
|---|---|---|
| AM | 0 | 0 |
| NOON | 1 | 0 |
| PM | 0 | 0 |

## Total Volume Per Leg

| | North Leg |
|---|---|
| AM | 0 |
| NOON | 0 |
| PM | 0 |

| West Leg | | | East Leg | | |
|---|---|---|---|---|---|
| AM | NOON | PM | | | |
| 0 | 0 | 0 | 0 | 1 | 0 |
| | | | AM | NOON | PM |

| | South Leg |
|---|---|
| AM | 0 |
| NOON | 1 |
| PM | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Dover Pkwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-006 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1145 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Dover Pkwy

| | Lanes 0 | 0 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 158 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 64 | 0 |
| 1 | 0 | 45 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 90 | 0 | 1 |
| 0 | 5 | 0 | 1 |
| 0 | 83 | 0 | |
| AM | NOON | PM | |

### CONTROL

1-Way Stop (NB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 50 | 68 | 0 | 19 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | 0 | 2 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| North Leg | |
|---|---|
| 0 | 0 |
| 0 | 0 |
| 0 | 0 |

AM / NOON / PM

| West Leg | | |
|---|---|---|
| 0 | 158 | 0 |
| 0 | 109 | 0 |

| East Leg | | |
|---|---|---|
| 0 | 95 | 0 |
| 0 | 83 | 0 |

| South Leg | |
|---|---|
| 0 | 0 |
| 50 | 87 |
| 0 | 0 |

## Total Volume Per Leg

| North Leg |
|---|
| 0 |
| 0 |
| 0 |

AM / NOON / PM

| West Leg | | |
|---|---|---|
| 0 | 267 | 0 |

| East Leg | | |
|---|---|---|
| 0 | 178 | 0 |

| South Leg |
|---|
| 0 |
| 137 |
| 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Marketplace Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-007 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1145 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Marketplace Dwy

| Lanes | .3 | .3 | .3 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |

### Westbound Approach

| Lanes | AM | NOON | PM |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 |
| 1 | 0 | 2 | 0 |
| | 0 | 0 | 0 |

### CONTROL

Signalized

### Northbound Approach

| | | | | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 2 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | .5 | 1.5 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | East Leg | | | West Leg | | | South Leg | |
|---|---|---|---|---|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| NOON | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 0 | 2 | 0 | 2 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Marketplace Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-007 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1145 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Marketplace Dwy

| Lanes | .3 | .3 | .3 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 25 | 12 | 10 | 33 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 95 | 0 |
| 1 | 0 | 19 | 0 |
| 3 | 0 | 46 | 0 |
| 1 | 0 | 19 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 2 | 0 | 1 |
| 0 | 51 | 0 | 2 |
| 0 | 260 | 0 | 1 |
| 0 | 263 | 0 | |
| AM | NOON | PM | |

### CONTROL

Signalized

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 291 | 19 | 12 | 207 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | .5 | 1.5 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 47 | 33 | |
| PM | 0 | 0 | |

| | West Leg | | |
|---|---|---|---|
| AM | 0 | 95 | 0 |
| NOON | 0 | 84 | 0 |

| | East Leg | | |
|---|---|---|---|
| AM | 0 | 313 | 0 |
| NOON | 0 | 263 | 0 |

| | South Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 291 | 238 | |
| PM | 0 | 0 | |

## Total Volume Per Leg

| | North Leg | | |
|---|---|---|---|
| AM | 0 | | |
| NOON | 80 | | |
| PM | 0 | | |

| | West Leg | | |
|---|---|---|---|
| AM | 0 | 179 | 0 |

| | East Leg | | |
|---|---|---|---|
| AM | 0 | 576 | 0 |

| | South Leg | | |
|---|---|---|---|
| AM | 0 | | |
| NOON | 529 | | |
| PM | 0 | | |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Home Depot Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-008 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

**Southbound Approach** (Home Depot Dwy)

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

**Eastbound Approach** (Woollomes Ave)

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

**Westbound Approach**

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 2 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | |

**CONTROL**: 1-Way Stop (SB)

**Northbound Approach**

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 1 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | | East Leg | | | South Leg | | | West Leg | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | AM | NOON | PM |
| AM | 0 | 0 | | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 |
| NOON | 0 | 0 | | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 |
| PM | 0 | 0 | | AM NOON PM | | | 0 | 0 | | | | |

## Total Volume Per Leg

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 0 | 1 | 1 | 0 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Home Depot Dwy and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-008 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1145 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach (Home Depot Dwy)

| | Lanes 0 | 1 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 13 | 9 | 59 | 79 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach (Woollomes Ave)

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 308 | 0 |
| 0 | 0 | 3 | 0 |
| 3 | 0 | 253 | 0 |
| 0 | 0 | 7 | 0 |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 76 | 0 | 0 |
| 0 | 294 | 0 | 2 |
| 0 | 58 | 0 | 0 |
| 0 | 379 | 0 | |

### CONTROL

1-Way Stop (SB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 74 | 1 | 0 | 67 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 0 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| North Leg | |
|---|---|
| 0 | 0 |
| 81 | 79 |
| 0 | 0 |

| West Leg | | |
|---|---|---|
| 0 | 308 | 0 |
| 0 | 263 | 0 |

| East Leg | | |
|---|---|---|
| 0 | 428 | 0 |
| 0 | 379 | 0 |

| South Leg | |
|---|---|
| 0 | 0 |
| 74 | 68 |
| 0 | 0 |

## Total Volume Per Leg

| North Leg |
|---|
| 0 |
| 160 |
| 0 |

| West Leg | | |
|---|---|---|
| 0 | 571 | 0 |

| East Leg | | |
|---|---|---|
| 0 | 807 | 0 |

| South Leg |
|---|
| 0 |
| 142 |
| 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 SB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-009 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1130 AM |
| PM Peak Hour | |

### Peak Hour Summary

**Southbound Approach** — SR-99 SB Ramps

| Lanes | 1 | .5 | .5 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 222 | 0 | 16 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

**Eastbound Approach** — Woollomes Ave

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 414 | 0 |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 319 | 0 |
| 1 | 0 | 74 | 0 |

**Westbound Approach**

| Lanes | AM | NOON | PM |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 192 | 0 |
| 1 | 0 | 50 | 0 |
| | 0 | 335 | 0 |

**CONTROL**: Signalized

**Northbound Approach**

| | | | | | |
|---|---|---|---|---|---|
| AM | 0 | | 0 | 0 | 0 | AM |
| NOON | 124 | | 0 | 0 | 0 | NOON |
| PM | 0 | | 0 | 0 | 0 | PM |
| | | | 0 | 0 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | East Leg | | West Leg | | South Leg | |
|---|---|---|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 242 | 0 | 414 | 0 | 0 |
| NOON | 238 | 0 | 0 | 335 | 0 | 393 | 0 | 124 |
| PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | West Leg | South Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 238 | 577 | 807 | 124 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 NB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-0010 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1145 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

SR-99 NB Ramps

| Lanes | 0 | 0 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 121 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 244 | 0 |
| 1 | 0 | 68 | 0 |
| 1 | 0 | 132 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 2 | 0 | 0 |
| 0 | 154 | 0 | 1 |
| 0 | 0 | 0 | 0 |
| 0 | 221 | 0 | |
| AM | NOON | PM | |

### CONTROL

Signalized

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 90 | 51 | 89 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | 1 | 1 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 0 | 121 | |
| PM | 0 | 0 | |

| | West Leg | | |
|---|---|---|---|
| AM | 0 | 244 | 0 |
| NOON | 0 | 200 | 0 |
| PM | | | |

| | East Leg | | |
|---|---|---|---|
| AM | 0 | 156 | 0 |
| NOON | 0 | 221 | 0 |
| PM | | | |

| | South Leg | | |
|---|---|---|---|
| AM | 0 | 0 | |
| NOON | 0 | 230 | |
| PM | 0 | 0 | |

## Total Volume Per Leg

| | North Leg | | |
|---|---|---|---|
| AM | 0 | | |
| NOON | 121 | | |
| PM | 0 | | |

| | West Leg | | |
|---|---|---|---|
| AM | 0 | 444 | 0 |
| NOON | | | |
| PM | | | |

| | East Leg | | |
|---|---|---|---|
| AM | 0 | 377 | 0 |
| NOON | | | |
| PM | | | |

| | South Leg | | |
|---|---|---|---|
| AM | 0 | | |
| NOON | 230 | | |
| PM | 0 | | |

# ITM Peak Hour Summary

Prepared by:

NDS

## *Lexington St and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-0011 Uturns |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1215 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

Lexington St

| Lanes | 0 | 2 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 1 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | |
| AM | NOON | PM | |

**CONTROL**

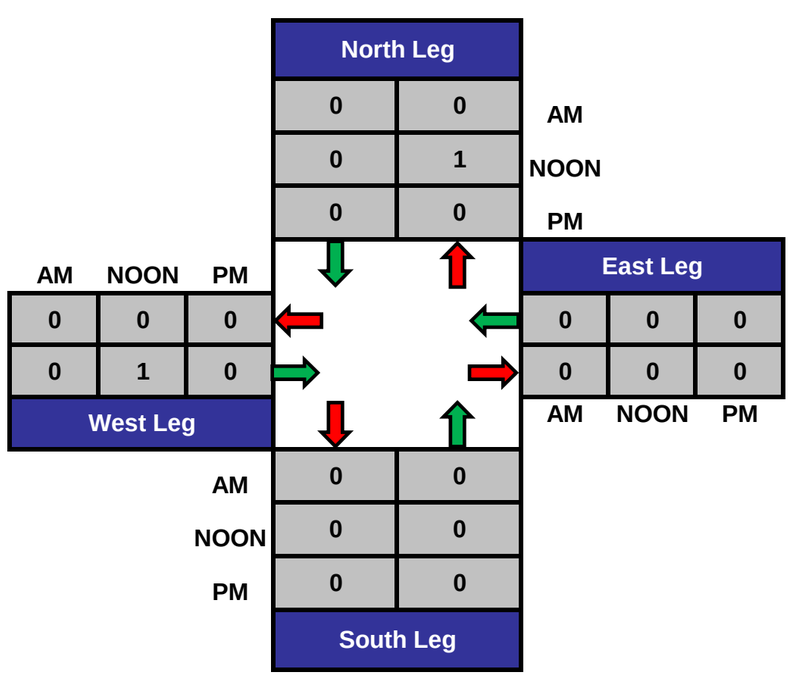
3-Way Stop(NB,SB & EB)

### Northbound Approach

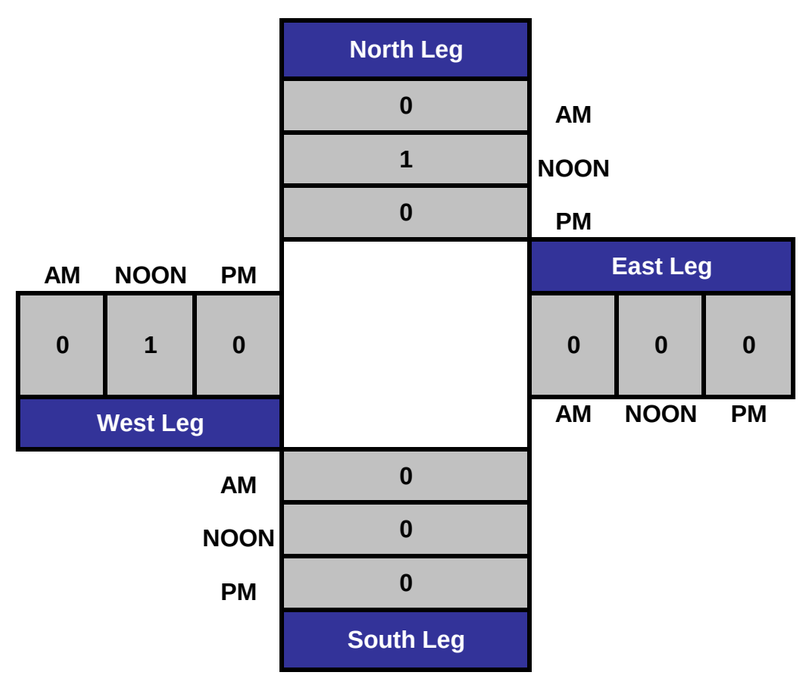
| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs




## Total Volume Per Leg



# ITM Peak Hour Summary

Prepared by:

NDS

## *Lexington St and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-0011 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1130 AM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach (Lexington St)

| Lanes | 0 | 2 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 137 | 35 | 4 | 239 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach (Woollomes Ave)

| Lanes | AM | NOON | PM |
|---|---|---|---|
| | 0 | 183 | 0 |
| 0 | 0 | 192 | 0 |
| 1 | 0 | 1 | 0 |
| 0 | 0 | 33 | 0 |

### Westbound Approach

| | AM | NOON | PM | Lanes |
|---|---|---|---|---|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 |
| | 0 | 7 | 0 | |

### CONTROL

3-Way Stop(NB,SB & EB)

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 68 | 46 | 47 | 2 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| Lanes | | 1 | 1 | 0 | Lanes |

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

## Total Ins & Outs

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 176 | 0 | 68 | 183 |
| PM | 0 | 0 | 95 | 0 |
| AM | 0 | 0 | 0 | 0 |
| NOON | 239 | 7 | 0 | 226 |
| PM | 0 | 0 | 0 | 0 |

## Total Volume Per Leg

| | North Leg | East Leg | South Leg | West Leg |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 |
| NOON | 415 | 7 | 163 | 409 |
| PM | 0 | 0 | 0 | 0 |

# ITM Peak Hour Summary

Prepared by:

NDS

## *SR-99 NB Ramps and Woollomes Ave , Delano*

| | |
|---|---|
| Date: | 8/23/2014 |
| Day: | Saturday |

| | |
|---|---|
| Project #: | 14-8103-0010 |
| City: | Delano |

| | |
|---|---|
| AM Peak Hour | |
| NOON Peak Hour | 1200 PM |
| PM Peak Hour | |

### Peak Hour Summary

### Southbound Approach

SR-99 NB Ramps

| Lanes | 0 | 0 | 0 | | |
|---|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 0 | 158 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |

### Eastbound Approach

Woollomes Ave

| | AM | NOON | PM |
|---|---|---|---|
| | 0 | 0 | 0 |
| 1 | 0 | 135 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |
| Lanes | AM | NOON | PM |

### Westbound Approach

| AM | NOON | PM | Lanes |
|---|---|---|---|
| 0 | 22 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | |
| AM | NOON | PM | |

### CONTROL

Signalized

| Count Periods | Start | End |
|---|---|---|
| AM | | |
| NOON | 11:00 AM | 1:00 PM |
| PM | | |

### Northbound Approach

| | | | | |
|---|---|---|---|---|
| AM | 0 | 0 | 0 | 0 | AM |
| NOON | 0 | 0 | 1 | 0 | NOON |
| PM | 0 | 0 | 0 | 0 | PM |
| | | 1 | 1 | 1 | Lanes |

## Total Ins & Outs

| North Leg | |
|---|---|
| 0 | 0 |
| 0 | 158 |
| 0 | 0 |

AM / NOON / PM

| West Leg | | |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 135 | 0 |

AM NOON PM

| East Leg | | |
|---|---|---|
| 0 | 22 | 0 |
| 0 | 0 | 0 |

AM NOON PM

| South Leg | |
|---|---|
| 0 | 0 |
| 0 | 1 |
| 0 | 0 |

AM / NOON / PM

## Total Volume Per Leg

| North Leg |
|---|
| 0 |
| 158 |
| 0 |

AM / NOON / PM

| West Leg | | |
|---|---|---|
| 0 | 135 | 0 |

AM NOON PM

| East Leg | | |
|---|---|---|
| 0 | 22 | 0 |

AM NOON PM

| South Leg |
|---|
| 0 |
| 1 |
| 0 |

AM / NOON / PM

# APPENDIX C

## Intersection Level of Service Worksheets

## *EXISTING CONDITION*

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 44 | 25 | 8 | 75 | 0 | 19 | 0 | 15 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | 1.00 | 0.82 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 1863 | 1583 | 1521 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 48 | 27 | 9 | 82 | 0 | 21 | 0 | 16 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 48 | 3 | 9 | 82 | 0 | 21 | 0 | 11 | 0 | 0 | 0 |
| Turn Type | | | Perm | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | 4 | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 4.9 | 4.9 | 4.9 | 4.9 | | 27.1 | | 27.1 | | | |
| Effective Green, g (s) | | 4.9 | 4.9 | 4.9 | 4.9 | | 27.1 | | 27.1 | | | |
| Actuated g/C Ratio | | 0.12 | 0.12 | 0.12 | 0.12 | | 0.68 | | 0.68 | | | |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 228 | 194 | 186 | 228 | | 1199 | | 1888 | | | |
| v/s Ratio Prot | | 0.03 | | | c0.04 | | | | | | | |
| v/s Ratio Perm | | | 0.00 | 0.01 | | | c0.01 | | 0.00 | | | |
| v/c Ratio | | 0.21 | 0.02 | 0.05 | 0.36 | | 0.02 | | 0.01 | | | |
| Uniform Delay, d1 | | 15.8 | 15.4 | 15.5 | 16.1 | | 2.1 | | 2.1 | | | |
| Progression Factor | | 1.00 | 1.00 | 0.69 | 0.80 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.5 | 0.0 | 0.1 | 1.0 | | 0.0 | | 0.0 | | | |
| Delay (s) | | 16.3 | 15.5 | 10.8 | 13.9 | | 2.1 | | 2.1 | | | |
| Level of Service | | B | B | B | B | | A | | A | | | |
| Approach Delay (s) | | 16.0 | | | 13.6 | | | 2.1 | | | 0.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.4 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.07 | | |
| Actuated Cycle Length (s) | 40.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 16.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 9 | 47 | 5 | 100 | 65 | 3 | 11 | 2 | 71 | 5 | 4 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1517 | 1504 | | 1726 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.75 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1392 | 1517 | 1504 | | 1696 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 10 | 51 | 5 | 109 | 71 | 3 | 12 | 2 | 77 | 5 | 4 | 7 |
| RTOR Reduction (vph) | 0 | 0 | 5 | 0 | 0 | 3 | 0 | 13 | 13 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 10 | 51 | 0 | 109 | 71 | 0 | 12 | 27 | 26 | 0 | 14 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 1.4 | 5.6 | 5.6 | 9.0 | 13.2 | 13.2 | 53.4 | 53.4 | 53.4 | | 53.4 | |
| Effective Green, g (s) | 1.4 | 5.6 | 5.6 | 9.0 | 13.2 | 13.2 | 53.4 | 53.4 | 53.4 | | 53.4 | |
| Actuated g/C Ratio | 0.02 | 0.07 | 0.07 | 0.11 | 0.16 | 0.16 | 0.67 | 0.67 | 0.67 | | 0.67 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 31 | 356 | 111 | 199 | 584 | 261 | 929 | 1013 | 1004 | | 1132 | |
| v/s Ratio Prot | 0.01 | 0.01 | | c0.06 | c0.02 | | | c0.02 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.01 | | 0.02 | | 0.01 | |
| v/c Ratio | 0.32 | 0.14 | 0.00 | 0.55 | 0.12 | 0.00 | 0.01 | 0.03 | 0.03 | | 0.01 | |
| Uniform Delay, d1 | 38.8 | 34.9 | 34.6 | 33.6 | 28.5 | 27.9 | 4.5 | 4.5 | 4.5 | | 4.5 | |
| Progression Factor | 0.80 | 1.10 | 1.26 | 0.85 | 0.88 | 0.90 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 6.0 | 0.2 | 0.0 | 3.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | |
| Delay (s) | 37.1 | 38.6 | 43.6 | 31.4 | 25.2 | 25.0 | 4.5 | 4.6 | 4.5 | | 4.5 | |
| Level of Service | D | D | D | C | C | C | A | A | A | | A | |
| Approach Delay (s) | | 38.8 | | | 28.9 | | | 4.5 | | | 4.5 | |
| Approach LOS | | D | | | C | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 23.4 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.10 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 24.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 138 | 50 | 53 | 130 | 0 | 0 | 0 | 0 | 57 | 3 | 119 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1778 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.66 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 1232 | 1863 | | | | | | 1778 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 150 | 54 | 58 | 141 | 0 | 0 | 0 | 0 | 62 | 3 | 129 |
| RTOR Reduction (vph) | 0 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| Lane Group Flow (vph) | 0 | 150 | 10 | 58 | 141 | 0 | 0 | 0 | 0 | 0 | 65 | 79 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 7.4 | 7.4 | 7.4 | 7.4 | | | | | | 24.6 | 24.6 |
| Effective Green, g (s) | | 7.4 | 7.4 | 7.4 | 7.4 | | | | | | 24.6 | 24.6 |
| Actuated g/C Ratio | | 0.19 | 0.19 | 0.19 | 0.19 | | | | | | 0.62 | 0.62 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 345 | 293 | 228 | 345 | | | | | | 1093 | 974 |
| v/s Ratio Prot | | c0.08 | | | 0.08 | | | | | | | |
| v/s Ratio Perm | | | 0.01 | 0.05 | | | | | | | 0.04 | c0.05 |
| v/c Ratio | | 0.43 | 0.03 | 0.25 | 0.41 | | | | | | 0.06 | 0.08 |
| Uniform Delay, d1 | | 14.4 | 13.4 | 13.9 | 14.4 | | | | | | 3.1 | 3.1 |
| Progression Factor | | 0.84 | 0.57 | 1.03 | 1.03 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.9 | 0.0 | 0.6 | 0.8 | | | | | | 0.1 | 0.2 |
| Delay (s) | | 13.0 | 7.6 | 14.9 | 15.6 | | | | | | 3.2 | 3.3 |
| Level of Service | | B | A | B | B | | | | | | A | A |
| Approach Delay (s) | | 11.6 | | | 15.4 | | | 0.0 | | | 3.2 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 10.1 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.16 | | |
| Actuated Cycle Length (s) | 40.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 27.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 95 | 98 | 0 | 0 | 123 | 33 | 74 | 52 | 166 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.97 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1809 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.65 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1210 | 1863 | | | 1809 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 103 | 107 | 0 | 0 | 134 | 36 | 80 | 57 | 180 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 0 | 71 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 103 | 107 | 0 | 0 | 141 | 0 | 80 | 57 | 109 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 7.7 | 7.7 | | | 7.7 | | 24.3 | 24.3 | 24.3 | | | |
| Effective Green, g (s) | 7.7 | 7.7 | | | 7.7 | | 24.3 | 24.3 | 24.3 | | | |
| Actuated g/C Ratio | 0.19 | 0.19 | | | 0.19 | | 0.61 | 0.61 | 0.61 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 233 | 359 | | | 348 | | 1075 | 1132 | 962 | | | |
| v/s Ratio Prot | | 0.06 | | | 0.08 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.09 | | | | | | 0.05 | | c0.07 | | | |
| v/c Ratio | 0.44 | 0.30 | | | 0.40 | | 0.07 | 0.05 | 0.11 | | | |
| Uniform Delay, d1 | 14.3 | 13.8 | | | 14.1 | | 3.2 | 3.2 | 3.3 | | | |
| Progression Factor | 0.54 | 0.52 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 1.3 | 0.5 | | | 0.8 | | 0.1 | 0.1 | 0.2 | | | |
| Delay (s) | 9.0 | 7.6 | | | 14.9 | | 3.4 | 3.3 | 3.5 | | | |
| Level of Service | A | A | | | B | | A | A | A | | | |
| Approach Delay (s) | | 8.3 | | | 14.9 | | | 3.5 | | | 0.0 | |
| Approach LOS | | A | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 7.7 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.19 | | |
| Actuated Cycle Length (s) | 40.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 27.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 22 | 123 | 56 | 7 | 91 | 60 | 79 | 60 | 14 | 72 | 89 | 21 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 134 | 61 | 8 | 99 | 65 | 86 | 65 | 15 | 78 | 97 | 23 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 218 | 172 | 166 | 175 | 23 |
| Volume Left (vph) | 24 | 8 | 86 | 78 | 0 |
| Volume Right (vph) | 61 | 65 | 15 | 0 | 23 |
| Hadj (s) | -0.11 | -0.18 | 0.08 | 0.26 | -0.67 |
| Departure Headway (s) | 5.1 | 5.1 | 5.5 | 6.0 | 5.1 |
| Degree Utilization, x | 0.31 | 0.24 | 0.25 | 0.29 | 0.03 |
| Capacity (veh/h) | 656 | 649 | 609 | 558 | 653 |
| Control Delay (s) | 10.3 | 9.7 | 10.3 | 10.3 | 7.1 |
| Approach Delay (s) | 10.3 | 9.7 | 10.3 | 9.9 | |
| Approach LOS | B | A | B | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 10.1 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 40.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 2 | 218 | 16 | 33 | 165 | 3 | 4 | 10 | 29 | 20 | 11 | 4 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 2 | 237 | 17 | 36 | 179 | 3 | 4 | 11 | 32 | 22 | 12 | 4 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 257 | 218 | 47 | 38 |
| Volume Left (vph) | 2 | 36 | 4 | 22 |
| Volume Right (vph) | 17 | 3 | 32 | 4 |
| Hadj (s) | 0.00 | 0.06 | -0.35 | 0.08 |
| Departure Headway (s) | 4.3 | 4.4 | 4.7 | 5.1 |
| Degree Utilization, x | 0.31 | 0.27 | 0.06 | 0.05 |
| Capacity (veh/h) | 805 | 779 | 692 | 632 |
| Control Delay (s) | 9.3 | 9.1 | 8.0 | 8.4 |
| Approach Delay (s) | 9.3 | 9.1 | 8.0 | 8.4 |
| Approach LOS | A | A | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 9.0 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 40.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 7 | 54 | 90 | 12 | 55 | 91 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 59 | 98 | 13 | 60 | 99 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 323 | 104 | | | 111 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 323 | 104 | | | 111 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 99 | 94 | | | 96 | |
| cM capacity (veh/h) | 644 | 950 | | | 1479 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 66 | 111 | 159 |
| Volume Left | 8 | 0 | 60 |
| Volume Right | 59 | 13 | 0 |
| cSH | 901 | 1700 | 1479 |
| Volume to Capacity | 0.07 | 0.07 | 0.04 |
| Queue Length 95th (ft) | 6 | 0 | 3 |
| Control Delay (s) | 9.3 | 0.0 | 3.0 |
| Lane LOS | A | | A |
| Approach Delay (s) | 9.3 | 0.0 | 3.0 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.3 | | |
| Intersection Capacity Utilization | 24.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 10 | 72 | 4 | 48 | 30 | 0 | 1 | 14 | 42 | 3 | 18 | 16 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 11 | 78 | 4 | 52 | 33 | 0 | 1 | 15 | 46 | 3 | 20 | 17 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 33 | | | 83 | | | 266 | 239 | 80 | 292 | 241 | 33 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 33 | | | 83 | | | 266 | 239 | 80 | 292 | 241 | 33 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 97 | | | 100 | 98 | 95 | 99 | 97 | 98 |
| cM capacity (veh/h) | 1579 | | | 1515 | | | 638 | 635 | 980 | 598 | 633 | 1041 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 93 | 85 | 62 | 40 |
| Volume Left | 11 | 52 | 1 | 3 |
| Volume Right | 4 | 0 | 46 | 17 |
| cSH | 1579 | 1515 | 857 | 758 |
| Volume to Capacity | 0.01 | 0.03 | 0.07 | 0.05 |
| Queue Length 95th (ft) | 1 | 3 | 6 | 4 |
| Control Delay (s) | 0.9 | 4.7 | 9.5 | 10.0 |
| Lane LOS | A | A | A | B |
| Approach Delay (s) | 0.9 | 4.7 | 9.5 | 10.0 |
| Approach LOS | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.3 | | |
| Intersection Capacity Utilization | 21.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 61 | 39 | 0 | 0 | 145 | 64 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 42 | 0 | 0 | 158 | 70 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 192 | 192 | 227 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 192 | 192 | 227 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 92 | 95 | 100 | | | |
| cM capacity (veh/h) | 797 | 849 | 1341 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 109 | 227 |
| Volume Left | 66 | 0 |
| Volume Right | 42 | 70 |
| cSH | 816 | 1700 |
| Volume to Capacity | 0.13 | 0.13 |
| Queue Length 95th (ft) | 11 | 0 |
| Control Delay (s) | 10.1 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 10.1 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.3 | | |
| Intersection Capacity Utilization | 24.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 10 | 35 | 76 | 16 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 38 | 83 | 17 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 11 | 38 | 83 | 17 |
| Volume Left (vph) | 0 | 0 | 0 | 17 |
| Volume Right (vph) | 11 | 0 | 83 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.04 | 0.07 | 0.02 |
| Capacity (veh/h) | 1019 | 890 | 1121 | 843 |
| Control Delay (s) | 6.5 | 7.1 | 6.5 | 7.3 |
| Approach Delay (s) | 6.5 | 6.7 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.7 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 17 | 74 | 31 | 10 | 60 | 26 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 80 | 34 | 11 | 65 | 28 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 198 | 39 | | | 45 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 198 | 39 | | | 45 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 98 | 92 | | | 96 | |
| cM capacity (veh/h) | 758 | 1032 | | | 1564 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 99 | 45 | 93 |
| Volume Left | 18 | 0 | 65 |
| Volume Right | 80 | 11 | 0 |
| cSH | 967 | 1700 | 1564 |
| Volume to Capacity | 0.10 | 0.03 | 0.04 |
| Queue Length 95th (ft) | 9 | 0 | 3 |
| Control Delay (s) | 9.1 | 0.0 | 5.3 |
| Lane LOS | A | | A |
| Approach Delay (s) | 9.1 | 0.0 | 5.3 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.9 | | |
| Intersection Capacity Utilization | 23.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 3 | 116 | 1 | 53 | 139 | 56 | 0 | 2 | 36 | 43 | 5 | 12 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 3 | 126 | 1 | 58 | 151 | 61 | 0 | 2 | 39 | 47 | 5 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 212 | | | 127 | | | 339 | 460 | 63 | 407 | 430 | 106 |
| vC1, stage 1 conf vol | | | | | | | 133 | 133 | | 297 | 297 | |
| vC2, stage 2 conf vol | | | | | | | 207 | 327 | | 110 | 134 | |
| vCu, unblocked vol | 212 | | | 127 | | | 339 | 460 | 63 | 407 | 430 | 106 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 96 | | | 100 | 100 | 96 | 92 | 99 | 99 |
| cM capacity (veh/h) | 1356 | | | 1457 | | | 681 | 585 | 988 | 616 | 597 | 928 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 3 | 63 | 63 | 1 | 58 | 101 | 111 | 41 | 65 |
| Volume Left | 3 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 47 |
| Volume Right | 0 | 0 | 0 | 1 | 0 | 0 | 61 | 39 | 13 |
| cSH | 1356 | 1700 | 1700 | 1700 | 1457 | 1700 | 1700 | 954 | 658 |
| Volume to Capacity | 0.00 | 0.04 | 0.04 | 0.00 | 0.04 | 0.06 | 0.07 | 0.04 | 0.10 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 8 |
| Control Delay (s) | 7.7 | 0.0 | 0.0 | 0.0 | 7.6 | 0.0 | 0.0 | 8.9 | 11.1 |
| Lane LOS | A | | | | A | | | A | B |
| Approach Delay (s) | 0.2 | | | | 1.6 | | | 8.9 | 11.1 |
| Approach LOS | | | | | | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.1 | | |
| Intersection Capacity Utilization | 26.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 155 | 5 | 114 | 0 | 0 | 0 | 58 | 35 | 1 | 4 | 64 | 98 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 168 | 5 | 124 | 0 | 0 | 0 | 63 | 38 | 1 | 4 | 70 | 107 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 168 | 129 | 63 | 39 | 39 | 141 |
| Volume Left (vph) | 168 | 0 | 63 | 0 | 4 | 0 |
| Volume Right (vph) | 0 | 124 | 0 | 1 | 0 | 107 |
| Hadj (s) | 0.53 | -0.64 | 0.53 | 0.01 | 0.09 | -0.49 |
| Departure Headway (s) | 5.7 | 4.6 | 6.0 | 5.5 | 5.5 | 4.9 |
| Degree Utilization, x | 0.27 | 0.16 | 0.11 | 0.06 | 0.06 | 0.19 |
| Capacity (veh/h) | 600 | 749 | 569 | 619 | 618 | 695 |
| Control Delay (s) | 9.6 | 7.3 | 8.5 | 7.6 | 7.7 | 7.9 |
| Approach Delay (s) | 8.6 | | 8.2 | | 7.8 | |
| Approach LOS | A | | A | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 8.3 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 27.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 52 | 70 | 16 | 106 | 0 | 58 | 0 | 18 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | 1.00 | 0.72 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 1863 | 1583 | 1341 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 57 | 76 | 17 | 115 | 0 | 63 | 0 | 20 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 57 | 11 | 17 | 115 | 0 | 63 | 0 | 14 | 0 | 0 | 0 |
| Turn Type | | | Perm | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | 4 | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 7.4 | 7.4 | 7.4 | 7.4 | | 34.6 | | 34.6 | | | |
| Effective Green, g (s) | | 7.4 | 7.4 | 7.4 | 7.4 | | 34.6 | | 34.6 | | | |
| Actuated g/C Ratio | | 0.15 | 0.15 | 0.15 | 0.15 | | 0.69 | | 0.69 | | | |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 276 | 234 | 198 | 276 | | 1225 | | 1929 | | | |
| v/s Ratio Prot | | 0.03 | | | c0.06 | | | | | | | |
| v/s Ratio Perm | | | 0.01 | 0.01 | | | c0.04 | | 0.00 | | | |
| v/c Ratio | | 0.21 | 0.05 | 0.09 | 0.42 | | 0.05 | | 0.01 | | | |
| Uniform Delay, d1 | | 18.7 | 18.3 | 18.4 | 19.3 | | 2.5 | | 2.4 | | | |
| Progression Factor | | 1.00 | 1.00 | 0.61 | 0.69 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.4 | 0.1 | 0.2 | 1.0 | | 0.1 | | 0.0 | | | |
| Delay (s) | | 19.1 | 18.4 | 11.5 | 14.3 | | 2.5 | | 2.4 | | | |
| Level of Service | | B | B | B | B | | A | | A | | | |
| Approach Delay (s) | | 18.7 | | | 13.9 | | | 2.5 | | | 0.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.0 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.12 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 17.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 11 | 44 | 16 | 252 | 88 | 2 | 22 | 5 | 196 | 9 | 9 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1516 | 1504 | | 1745 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.74 | 1.00 | 1.00 | | 0.93 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1373 | 1516 | 1504 | | 1647 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 12 | 48 | 17 | 274 | 96 | 2 | 24 | 5 | 213 | 10 | 10 | 11 |
| RTOR Reduction (vph) | 0 | 0 | 16 | 0 | 0 | 1 | 0 | 71 | 74 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 12 | 48 | 1 | 274 | 96 | 1 | 24 | 38 | 35 | 0 | 23 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 0.8 | 3.8 | 3.8 | 18.3 | 21.3 | 21.3 | 15.9 | 15.9 | 15.9 | | 15.9 | |
| Effective Green, g (s) | 0.8 | 3.8 | 3.8 | 18.3 | 21.3 | 21.3 | 15.9 | 15.9 | 15.9 | | 15.9 | |
| Actuated g/C Ratio | 0.02 | 0.08 | 0.08 | 0.37 | 0.43 | 0.43 | 0.32 | 0.32 | 0.32 | | 0.32 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 28 | 386 | 120 | 648 | 1508 | 674 | 437 | 482 | 478 | | 524 | |
| v/s Ratio Prot | c0.01 | 0.01 | | c0.15 | c0.03 | | | c0.03 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.02 | | 0.02 | | 0.01 | |
| v/c Ratio | 0.43 | 0.12 | 0.01 | 0.42 | 0.06 | 0.00 | 0.05 | 0.08 | 0.07 | | 0.04 | |
| Uniform Delay, d1 | 24.4 | 21.5 | 21.4 | 11.9 | 8.5 | 8.2 | 11.8 | 11.9 | 11.9 | | 11.8 | |
| Progression Factor | 0.48 | 0.45 | 0.31 | 0.59 | 0.66 | 0.54 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 10.2 | 0.1 | 0.0 | 0.4 | 0.0 | 0.0 | 0.2 | 0.3 | 0.3 | | 0.2 | |
| Delay (s) | 21.9 | 9.8 | 6.7 | 7.4 | 5.6 | 4.4 | 12.1 | 12.2 | 12.2 | | 12.0 | |
| Level of Service | C | A | A | A | A | A | B | B | B | | B | |
| Approach Delay (s) | | 11.0 | | | 6.9 | | | 12.2 | | | 12.0 | |
| Approach LOS | | B | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 9.3 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.28 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 35.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 261 | 87 | 126 | 246 | 0 | 0 | 0 | 0 | 38 | 0 | 186 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1770 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.46 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 852 | 1863 | | | | | | 1770 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 284 | 95 | 137 | 267 | 0 | 0 | 0 | 0 | 41 | 0 | 202 |
| RTOR Reduction (vph) | 0 | 0 | 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 |
| Lane Group Flow (vph) | 0 | 284 | 25 | 137 | 267 | 0 | 0 | 0 | 0 | 0 | 41 | 116 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 13.2 | 13.2 | 13.2 | 13.2 | | | | | | 28.8 | 28.8 |
| Effective Green, g (s) | | 13.2 | 13.2 | 13.2 | 13.2 | | | | | | 28.8 | 28.8 |
| Actuated g/C Ratio | | 0.26 | 0.26 | 0.26 | 0.26 | | | | | | 0.58 | 0.58 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 492 | 418 | 225 | 492 | | | | | | 1020 | 912 |
| v/s Ratio Prot | | 0.15 | | | 0.14 | | | | | | | |
| v/s Ratio Perm | | | 0.02 | c0.16 | | | | | | | 0.02 | c0.07 |
| v/c Ratio | | 0.58 | 0.06 | 0.61 | 0.54 | | | | | | 0.04 | 0.13 |
| Uniform Delay, d1 | | 16.0 | 13.8 | 16.1 | 15.8 | | | | | | 4.6 | 4.9 |
| Progression Factor | | 0.90 | 0.49 | 0.95 | 0.94 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 1.6 | 0.1 | 4.4 | 1.2 | | | | | | 0.1 | 0.3 |
| Delay (s) | | 16.1 | 6.8 | 19.7 | 16.0 | | | | | | 4.7 | 5.1 |
| Level of Service | | B | A | B | B | | | | | | A | A |
| Approach Delay (s) | | 13.7 | | | 17.2 | | | 0.0 | | | 5.1 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.1 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.28 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 42.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 127 | 151 | 0 | 0 | 273 | 80 | 107 | 47 | 187 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.97 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1806 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.34 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 631 | 1863 | | | 1806 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 138 | 164 | 0 | 0 | 297 | 87 | 116 | 51 | 203 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 93 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 138 | 164 | 0 | 0 | 357 | 0 | 116 | 51 | 110 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 15.0 | 15.0 | | | 15.0 | | 27.0 | 27.0 | 27.0 | | | |
| Effective Green, g (s) | 15.0 | 15.0 | | | 15.0 | | 27.0 | 27.0 | 27.0 | | | |
| Actuated g/C Ratio | 0.30 | 0.30 | | | 0.30 | | 0.54 | 0.54 | 0.54 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 189 | 559 | | | 542 | | 956 | 1006 | 855 | | | |
| v/s Ratio Prot | | 0.09 | | | 0.20 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.22 | | | | | | 0.07 | | c0.07 | | | |
| v/c Ratio | 0.73 | 0.29 | | | 0.66 | | 0.12 | 0.05 | 0.13 | | | |
| Uniform Delay, d1 | 15.7 | 13.4 | | | 15.3 | | 5.7 | 5.4 | 5.7 | | | |
| Progression Factor | 1.03 | 0.93 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 13.0 | 0.3 | | | 2.9 | | 0.3 | 0.1 | 0.3 | | | |
| Delay (s) | 29.3 | 12.8 | | | 18.2 | | 5.9 | 5.5 | 6.0 | | | |
| Level of Service | C | B | | | B | | A | A | A | | | |
| Approach Delay (s) | | 20.3 | | | 18.2 | | | 5.9 | | | 0.0 | |
| Approach LOS | | C | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 14.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 42.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 143 | 81 | 17 | 148 | 68 | 69 | 130 | 24 | 49 | 72 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 32 | 155 | 88 | 18 | 161 | 74 | 75 | 141 | 26 | 53 | 78 | 18 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 275 | 253 | 242 | 132 | 18 |
| Volume Left (vph) | 32 | 18 | 75 | 53 | 0 |
| Volume Right (vph) | 88 | 74 | 26 | 0 | 18 |
| Hadj (s) | -0.14 | -0.13 | 0.03 | 0.24 | -0.67 |
| Departure Headway (s) | 5.4 | 5.4 | 5.8 | 6.6 | 5.7 |
| Degree Utilization, x | 0.41 | 0.38 | 0.39 | 0.24 | 0.03 |
| Capacity (veh/h) | 619 | 612 | 566 | 489 | 559 |
| Control Delay (s) | 12.1 | 11.8 | 12.5 | 10.5 | 7.7 |
| Approach Delay (s) | 12.1 | 11.8 | 12.5 | 10.2 | |
| Approach LOS | B | B | B | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 11.8 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 46.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 8 | 318 | 3 | 48 | 259 | 10 | 5 | 16 | 39 | 32 | 19 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 9 | 346 | 3 | 52 | 282 | 11 | 5 | 17 | 42 | 35 | 21 | 18 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 358 | 345 | 65 | 74 |
| Volume Left (vph) | 9 | 52 | 5 | 35 |
| Volume Right (vph) | 3 | 11 | 42 | 18 |
| Hadj (s) | 0.03 | 0.05 | -0.34 | -0.02 |
| Departure Headway (s) | 4.8 | 4.8 | 5.4 | 5.7 |
| Degree Utilization, x | 0.47 | 0.46 | 0.10 | 0.12 |
| Capacity (veh/h) | 724 | 724 | 572 | 552 |
| Control Delay (s) | 11.9 | 11.7 | 8.9 | 9.4 |
| Approach Delay (s) | 11.9 | 11.7 | 8.9 | 9.4 |
| Approach LOS | B | B | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 11.4 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 54.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 14 | 44 | 162 | 34 | 44 | 124 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 48 | 176 | 37 | 48 | 135 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 425 | 195 | | | 213 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 425 | 195 | | | 213 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 97 | 94 | | | 96 | |
| cM capacity (veh/h) | 565 | 847 | | | 1357 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 63 | 213 | 183 |
| Volume Left | 15 | 0 | 48 |
| Volume Right | 48 | 37 | 0 |
| cSH | 756 | 1700 | 1357 |
| Volume to Capacity | 0.08 | 0.13 | 0.04 |
| Queue Length 95th (ft) | 7 | 0 | 3 |
| Control Delay (s) | 10.2 | 0.0 | 2.2 |
| Lane LOS | B | | A |
| Approach Delay (s) | 10.2 | 0.0 | 2.2 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 33.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 11 | 78 | 4 | 17 | 44 | 4 | 2 | 13 | 32 | 6 | 14 | 20 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 85 | 4 | 18 | 48 | 4 | 2 | 14 | 35 | 7 | 15 | 22 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 52 | | | 89 | | | 227 | 200 | 87 | 240 | 200 | 50 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 52 | | | 89 | | | 227 | 200 | 87 | 240 | 200 | 50 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 100 | 98 | 96 | 99 | 98 | 98 |
| cM capacity (veh/h) | 1554 | | | 1506 | | | 690 | 682 | 972 | 668 | 682 | 1018 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 101 | 71 | 51 | 43 |
| Volume Left | 12 | 18 | 2 | 7 |
| Volume Right | 4 | 4 | 35 | 22 |
| cSH | 1554 | 1506 | 856 | 814 |
| Volume to Capacity | 0.01 | 0.01 | 0.06 | 0.05 |
| Queue Length 95th (ft) | 1 | 1 | 5 | 4 |
| Control Delay (s) | 0.9 | 2.0 | 9.5 | 9.7 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 0.9 | 2.0 | 9.5 | 9.7 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.3 | | |
| Intersection Capacity Utilization | 17.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 50 | 0 | 0 | 246 | 76 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 54 | 0 | 0 | 267 | 83 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 309 | 309 | 350 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 309 | 309 | 350 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 89 | 93 | 100 | | | |
| cM capacity (veh/h) | 684 | 731 | 1209 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 127 | 350 |
| Volume Left | 73 | 0 |
| Volume Right | 54 | 83 |
| cSH | 703 | 1700 |
| Volume to Capacity | 0.18 | 0.21 |
| Queue Length 95th (ft) | 16 | 0 |
| Control Delay (s) | 11.2 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 11.2 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.0 | | |
| Intersection Capacity Utilization | 31.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 0 | 67 | 94 | 23 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 73 | 102 | 25 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 0 | 73 | 102 | 25 |
| Volume Left (vph) | 0 | 0 | 0 | 25 |
| Volume Right (vph) | 0 | 0 | 102 | 0 |
| Hadj (s) | 0.00 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 4.1 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.00 | 0.08 | 0.09 | 0.03 |
| Capacity (veh/h) | 867 | 896 | 1121 | 842 |
| Control Delay (s) | 7.1 | 7.3 | 6.5 | 7.3 |
| Approach Delay (s) | 0.0 | 6.8 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 15.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 16 | 146 | 47 | 17 | 104 | 37 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 159 | 51 | 18 | 113 | 40 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 327 | 60 | | | 70 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 327 | 60 | | | 70 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 97 | 84 | | | 93 | |
| cM capacity (veh/h) | 618 | 1005 | | | 1531 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 176 | 70 | 153 |
| Volume Left | 17 | 0 | 113 |
| Volume Right | 159 | 18 | 0 |
| cSH | 947 | 1700 | 1531 |
| Volume to Capacity | 0.19 | 0.04 | 0.07 |
| Queue Length 95th (ft) | 17 | 0 | 6 |
| Control Delay (s) | 9.7 | 0.0 | 5.7 |
| Lane LOS | A | | A |
| Approach Delay (s) | 9.7 | 0.0 | 5.7 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.5 | | |
| Intersection Capacity Utilization | 30.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 6 | 243 | 6 | 52 | 318 | 56 | 3 | 0 | 55 | 43 | 1 | 21 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 7 | 264 | 7 | 57 | 346 | 61 | 3 | 0 | 60 | 47 | 1 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 407 | | | 271 | | | 586 | 797 | 132 | 694 | 773 | 203 |
| vC1, stage 1 conf vol | | | | | | | 277 | 277 | | 489 | 489 | |
| vC2, stage 2 conf vol | | | | | | | 309 | 520 | | 205 | 284 | |
| vCu, unblocked vol | 407 | | | 271 | | | 586 | 797 | 132 | 694 | 773 | 203 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 96 | | | 99 | 100 | 93 | 90 | 100 | 97 |
| cM capacity (veh/h) | 1149 | | | 1290 | | | 545 | 459 | 893 | 459 | 465 | 804 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 7 | 132 | 132 | 7 | 57 | 230 | 176 | 63 | 71 |
| Volume Left | 7 | 0 | 0 | 0 | 57 | 0 | 0 | 3 | 47 |
| Volume Right | 0 | 0 | 0 | 7 | 0 | 0 | 61 | 60 | 23 |
| cSH | 1149 | 1700 | 1700 | 1700 | 1290 | 1700 | 1700 | 864 | 533 |
| Volume to Capacity | 0.01 | 0.08 | 0.08 | 0.00 | 0.04 | 0.14 | 0.10 | 0.07 | 0.13 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 6 | 11 |
| Control Delay (s) | 8.2 | 0.0 | 0.0 | 0.0 | 7.9 | 0.0 | 0.0 | 9.5 | 12.8 |
| Lane LOS | A | | | | A | | | A | B |
| Approach Delay (s) | 0.2 | | | | 1.0 | | | 9.5 | 12.8 |
| Approach LOS | | | | | | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 34.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 288 | 8 | 60 | 0 | 0 | 0 | 120 | 67 | 3 | 5 | 58 | 229 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 313 | 9 | 65 | 0 | 0 | 0 | 130 | 73 | 3 | 5 | 63 | 249 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 313 | 74 | 130 | 76 | 37 | 280 |
| Volume Left (vph) | 313 | 0 | 130 | 0 | 5 | 0 |
| Volume Right (vph) | 0 | 65 | 0 | 3 | 0 | 249 |
| Hadj (s) | 0.53 | -0.58 | 0.53 | 0.00 | 0.11 | -0.59 |
| Departure Headway (s) | 6.4 | 5.3 | 6.7 | 6.2 | 6.2 | 5.5 |
| Degree Utilization, x | 0.56 | 0.11 | 0.24 | 0.13 | 0.06 | 0.43 |
| Capacity (veh/h) | 540 | 640 | 510 | 549 | 550 | 631 |
| Control Delay (s) | 16.1 | 7.8 | 10.7 | 8.9 | 8.4 | 11.3 |
| Approach Delay (s) | 14.5 | | 10.0 | | 10.9 | |
| Approach LOS | B | | B | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 12.2 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 41.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 64 | 45 | 6 | 90 | 0 | 68 | 0 | 19 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | 1.00 | 0.71 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 1863 | 1583 | 1331 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 70 | 49 | 7 | 98 | 0 | 74 | 0 | 21 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 44 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 70 | 5 | 7 | 98 | 0 | 74 | 0 | 15 | 0 | 0 | 0 |
| Turn Type | | | Perm | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | 4 | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 5.6 | 5.6 | 5.6 | 5.6 | | 36.4 | | 36.4 | | | |
| Effective Green, g (s) | | 5.6 | 5.6 | 5.6 | 5.6 | | 36.4 | | 36.4 | | | |
| Actuated g/C Ratio | | 0.11 | 0.11 | 0.11 | 0.11 | | 0.73 | | 0.73 | | | |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 209 | 177 | 149 | 209 | | 1289 | | 2029 | | | |
| v/s Ratio Prot | | 0.04 | | | c0.05 | | | | | | | |
| v/s Ratio Perm | | | 0.00 | 0.01 | | | c0.04 | | 0.01 | | | |
| v/c Ratio | | 0.33 | 0.03 | 0.05 | 0.47 | | 0.06 | | 0.01 | | | |
| Uniform Delay, d1 | | 20.5 | 19.8 | 19.8 | 20.8 | | 1.9 | | 1.9 | | | |
| Progression Factor | | 1.00 | 1.00 | 0.66 | 0.71 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 1.0 | 0.1 | 0.1 | 1.7 | | 0.1 | | 0.0 | | | |
| Delay (s) | | 21.4 | 19.9 | 13.3 | 16.5 | | 2.0 | | 1.9 | | | |
| Level of Service | | C | B | B | B | | A | | A | | | |
| Approach Delay (s) | | 20.8 | | | 16.3 | | | 2.0 | | | 0.0 | |
| Approach LOS | | C | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.7 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.11 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 15.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 19 | 46 | 19 | 262 | 51 | 2 | 19 | 12 | 207 | 10 | 12 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.87 | 0.85 | | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.99 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1533 | 1504 | | 1711 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.72 | 1.00 | 1.00 | | 0.95 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1348 | 1533 | 1504 | | 1636 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 21 | 50 | 21 | 285 | 55 | 2 | 21 | 13 | 225 | 11 | 13 | 27 |
| RTOR Reduction (vph) | 0 | 0 | 19 | 0 | 0 | 1 | 0 | 75 | 81 | 0 | 19 | 0 |
| Lane Group Flow (vph) | 21 | 50 | 2 | 285 | 55 | 1 | 21 | 46 | 36 | 0 | 32 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 0.8 | 3.8 | 3.8 | 18.8 | 21.8 | 21.8 | 15.4 | 15.4 | 15.4 | | 15.4 | |
| Effective Green, g (s) | 0.8 | 3.8 | 3.8 | 18.8 | 21.8 | 21.8 | 15.4 | 15.4 | 15.4 | | 15.4 | |
| Actuated g/C Ratio | 0.02 | 0.08 | 0.08 | 0.38 | 0.44 | 0.44 | 0.31 | 0.31 | 0.31 | | 0.31 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 28 | 386 | 120 | 666 | 1543 | 690 | 415 | 472 | 463 | | 504 | |
| v/s Ratio Prot | c0.01 | 0.01 | | c0.16 | c0.02 | | | c0.03 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.02 | | 0.02 | | 0.02 | |
| v/c Ratio | 0.75 | 0.13 | 0.01 | 0.43 | 0.04 | 0.00 | 0.05 | 0.10 | 0.08 | | 0.06 | |
| Uniform Delay, d1 | 24.5 | 21.6 | 21.4 | 11.6 | 8.1 | 8.0 | 12.2 | 12.3 | 12.3 | | 12.2 | |
| Progression Factor | 0.44 | 0.40 | 0.26 | 0.79 | 0.87 | 0.86 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 71.8 | 0.2 | 0.0 | 0.4 | 0.0 | 0.0 | 0.2 | 0.4 | 0.3 | | 0.2 | |
| Delay (s) | 82.5 | 8.8 | 5.6 | 9.6 | 7.0 | 6.9 | 12.4 | 12.8 | 12.6 | | 12.5 | |
| Level of Service | F | A | A | A | A | A | B | B | B | | B | |
| Approach Delay (s) | | 24.9 | | | 9.2 | | | 12.7 | | | 12.5 | |
| Approach LOS | | C | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.6 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 37.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 319 | 74 | 50 | 192 | 0 | 0 | 0 | 0 | 16 | 0 | 222 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1770 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.39 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 727 | 1863 | | | | | | 1770 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 347 | 80 | 54 | 209 | 0 | 0 | 0 | 0 | 17 | 0 | 241 |
| RTOR Reduction (vph) | 0 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 110 |
| Lane Group Flow (vph) | 0 | 347 | 24 | 54 | 209 | 0 | 0 | 0 | 0 | 0 | 17 | 131 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 14.9 | 14.9 | 14.9 | 14.9 | | | | | | 27.1 | 27.1 |
| Effective Green, g (s) | | 14.9 | 14.9 | 14.9 | 14.9 | | | | | | 27.1 | 27.1 |
| Actuated g/C Ratio | | 0.30 | 0.30 | 0.30 | 0.30 | | | | | | 0.54 | 0.54 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 555 | 472 | 217 | 555 | | | | | | 959 | 858 |
| v/s Ratio Prot | | c0.19 | | | 0.11 | | | | | | | |
| v/s Ratio Perm | | | 0.02 | 0.07 | | | | | | | 0.01 | c0.08 |
| v/c Ratio | | 0.63 | 0.05 | 0.25 | 0.38 | | | | | | 0.02 | 0.15 |
| Uniform Delay, d1 | | 15.1 | 12.5 | 13.3 | 13.9 | | | | | | 5.3 | 5.7 |
| Progression Factor | | 0.88 | 0.64 | 1.39 | 1.42 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 2.2 | 0.0 | 0.6 | 0.4 | | | | | | 0.0 | 0.4 |
| Delay (s) | | 15.5 | 8.1 | 19.1 | 20.1 | | | | | | 5.3 | 6.1 |
| Level of Service | | B | A | B | C | | | | | | A | A |
| Approach Delay (s) | | 14.2 | | | 19.9 | | | 0.0 | | | 6.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.32 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 203 | 132 | 0 | 0 | 154 | 24 | 90 | 52 | 89 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.98 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1829 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.63 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1166 | 1863 | | | 1829 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 221 | 143 | 0 | 0 | 167 | 26 | 98 | 57 | 97 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 44 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 221 | 143 | 0 | 0 | 178 | 0 | 98 | 57 | 53 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 14.7 | 14.7 | | | 14.7 | | 27.3 | 27.3 | 27.3 | | | |
| Effective Green, g (s) | 14.7 | 14.7 | | | 14.7 | | 27.3 | 27.3 | 27.3 | | | |
| Actuated g/C Ratio | 0.29 | 0.29 | | | 0.29 | | 0.55 | 0.55 | 0.55 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 343 | 548 | | | 538 | | 966 | 1017 | 864 | | | |
| v/s Ratio Prot | | 0.08 | | | 0.10 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.19 | | | | | | c0.06 | | 0.03 | | | |
| v/c Ratio | 0.64 | 0.26 | | | 0.33 | | 0.10 | 0.06 | 0.06 | | | |
| Uniform Delay, d1 | 15.4 | 13.5 | | | 13.8 | | 5.5 | 5.3 | 5.3 | | | |
| Progression Factor | 0.10 | 0.10 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 3.8 | 0.2 | | | 0.4 | | 0.2 | 0.1 | 0.1 | | | |
| Delay (s) | 5.4 | 1.6 | | | 14.2 | | 5.7 | 5.4 | 5.5 | | | |
| Level of Service | A | A | | | B | | A | A | A | | | |
| Approach Delay (s) | | 3.9 | | | 14.2 | | | 5.5 | | | 0.0 | |
| Approach LOS | | A | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 6.9 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.29 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 95 | 39 | 20 | 77 | 52 | 62 | 110 | 12 | 23 | 85 | 10 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 14 | 103 | 42 | 22 | 84 | 57 | 67 | 120 | 13 | 25 | 92 | 11 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 160 | 162 | 200 | 117 | 11 |
| Volume Left (vph) | 14 | 22 | 67 | 25 | 0 |
| Volume Right (vph) | 42 | 57 | 13 | 0 | 11 |
| Hadj (s) | -0.11 | -0.15 | 0.06 | 0.14 | -0.67 |
| Departure Headway (s) | 4.9 | 4.8 | 5.1 | 5.7 | 4.9 |
| Degree Utilization, x | 0.22 | 0.22 | 0.28 | 0.19 | 0.01 |
| Capacity (veh/h) | 677 | 684 | 667 | 587 | 681 |
| Control Delay (s) | 9.2 | 9.2 | 10.1 | 8.8 | 6.7 |
| Approach Delay (s) | 9.2 | 9.2 | 10.1 | 8.6 | |
| Approach LOS | A | A | B | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 9.4 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 35.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 9 | 163 | 2 | 47 | 180 | 10 | 5 | 2 | 31 | 16 | 13 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 177 | 2 | 51 | 196 | 11 | 5 | 2 | 34 | 17 | 14 | 9 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 189 | 258 | 41 | 40 |
| Volume Left (vph) | 10 | 51 | 5 | 17 |
| Volume Right (vph) | 2 | 11 | 34 | 9 |
| Hadj (s) | 0.04 | 0.05 | -0.43 | -0.01 |
| Departure Headway (s) | 4.4 | 4.4 | 4.5 | 5.0 |
| Degree Utilization, x | 0.23 | 0.31 | 0.05 | 0.06 |
| Capacity (veh/h) | 791 | 799 | 715 | 655 |
| Control Delay (s) | 8.7 | 9.3 | 7.8 | 8.2 |
| Approach Delay (s) | 8.7 | 9.3 | 7.8 | 8.2 |
| Approach LOS | A | A | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 8.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 37.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 18 | 15 | 163 | 18 | 18 | 115 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 20 | 16 | 177 | 20 | 20 | 125 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 351 | 187 | | | 197 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 351 | 187 | | | 197 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 97 | 98 | | | 99 | |
| cM capacity (veh/h) | 637 | 855 | | | 1376 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 36 | 197 | 145 |
| Volume Left | 20 | 0 | 20 |
| Volume Right | 16 | 20 | 0 |
| cSH | 721 | 1700 | 1376 |
| Volume to Capacity | 0.05 | 0.12 | 0.01 |
| Queue Length 95th (ft) | 4 | 0 | 1 |
| Control Delay (s) | 10.3 | 0.0 | 1.1 |
| Lane LOS | B | | A |
| Approach Delay (s) | 10.3 | 0.0 | 1.1 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 30.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 9 | 44 | 1 | 15 | 37 | 2 | 2 | 2 | 12 | 3 | 2 | 15 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 48 | 1 | 16 | 40 | 2 | 2 | 2 | 13 | 3 | 2 | 16 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 42 | | | 49 | | | 159 | 143 | 48 | 156 | 142 | 41 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 42 | | | 49 | | | 159 | 143 | 48 | 156 | 142 | 41 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 100 | 100 | 99 | 100 | 100 | 98 |
| cM capacity (veh/h) | 1567 | | | 1558 | | | 782 | 736 | 1020 | 788 | 736 | 1030 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 59 | 59 | 17 | 22 |
| Volume Left | 10 | 16 | 2 | 3 |
| Volume Right | 1 | 2 | 13 | 16 |
| cSH | 1567 | 1558 | 939 | 948 |
| Volume to Capacity | 0.01 | 0.01 | 0.02 | 0.02 |
| Queue Length 95th (ft) | 0 | 1 | 1 | 2 |
| Control Delay (s) | 1.3 | 2.1 | 8.9 | 8.9 |
| Lane LOS | A | A | A | A |
| Approach Delay (s) | 1.3 | 2.1 | 8.9 | 8.9 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.5 | | |
| Intersection Capacity Utilization | 14.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 49 | 30 | 0 | 0 | 235 | 55 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 53 | 33 | 0 | 0 | 255 | 60 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 285 | 285 | 315 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 285 | 285 | 315 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 92 | 96 | 100 | | | |
| cM capacity (veh/h) | 705 | 754 | 1245 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 86 | 315 |
| Volume Left | 53 | 0 |
| Volume Right | 33 | 60 |
| cSH | 723 | 1700 |
| Volume to Capacity | 0.12 | 0.19 |
| Queue Length 95th (ft) | 10 | 0 |
| Control Delay (s) | 10.7 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 10.7 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 26.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 11 | 38 | 70 | 14 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 12 | 41 | 76 | 15 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 12 | 41 | 76 | 15 |
| Volume Left (vph) | 0 | 0 | 0 | 15 |
| Volume Right (vph) | 12 | 0 | 76 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.05 | 0.07 | 0.02 |
| Capacity (veh/h) | 1018 | 890 | 1121 | 842 |
| Control Delay (s) | 6.5 | 7.2 | 6.4 | 7.3 |
| Approach Delay (s) | 6.5 | 6.7 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.7 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 22 | 128 | 50 | 21 | 90 | 42 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 139 | 54 | 23 | 98 | 46 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 307 | 66 | | | 77 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 307 | 66 | | | 77 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 96 | 86 | | | 94 | |
| cM capacity (veh/h) | 641 | 998 | | | 1521 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 163 | 77 | 143 |
| Volume Left | 24 | 0 | 98 |
| Volume Right | 139 | 23 | 0 |
| cSH | 923 | 1700 | 1521 |
| Volume to Capacity | 0.18 | 0.05 | 0.06 |
| Queue Length 95th (ft) | 16 | 0 | 5 |
| Control Delay (s) | 9.7 | 0.0 | 5.3 |
| Lane LOS | A | | A |
| Approach Delay (s) | 9.7 | 0.0 | 5.3 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.1 | | |
| Intersection Capacity Utilization | 29.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 111 | 158 | 0 | 0 | 0 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 121 | 172 | 0 | 0 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | 1301 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 172 | | | | 292 | 172 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 172 | | | | 292 | 172 |
| tC, single (s) | 4.1 | | | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 100 | | | | 100 | 100 |
| cM capacity (veh/h) | 1405 | | | | 698 | 872 |

| Direction, Lane # | EB 1 | WB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 121 | 172 | 0 |
| Volume Left | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 |
| cSH | 1405 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.10 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 |
| Lane LOS | | | A |
| Approach Delay (s) | 0.0 | 0.0 | 0.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.0 | | |
| Intersection Capacity Utilization | 11.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 111 | 0 | 0 | 158 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 121 | 0 | 0 | 172 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | 693 | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 172 | | | 121 | | | 292 | 292 | 121 | 292 | 292 | 172 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 172 | | | 121 | | | 292 | 292 | 121 | 292 | 292 | 172 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1405 | | | 1467 | | | 660 | 618 | 931 | 660 | 618 | 872 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 121 | 172 | 0 | 0 |
| Volume Left | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 |
| cSH | 1405 | 1467 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.00 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | | | A | A |
| Approach Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 |
| Approach LOS | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.0 | | |
| Intersection Capacity Utilization | 11.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 3 | 253 | 7 | 59 | 294 | 76 | 1 | 0 | 67 | 59 | 9 | 13 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 3 | 275 | 8 | 64 | 320 | 83 | 1 | 0 | 73 | 64 | 10 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 402 | | | 283 | | | 589 | 812 | 138 | 706 | 778 | 201 |
| vC1, stage 1 conf vol | | | | | | | 282 | 282 | | 489 | 489 | |
| vC2, stage 2 conf vol | | | | | | | 307 | 530 | | 217 | 289 | |
| vCu, unblocked vol | 402 | | | 283 | | | 589 | 812 | 138 | 706 | 778 | 201 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 95 | | | 100 | 100 | 92 | 86 | 98 | 98 |
| cM capacity (veh/h) | 1153 | | | 1277 | | | 542 | 453 | 886 | 450 | 461 | 806 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 3 | 138 | 138 | 8 | 64 | 213 | 189 | 74 | 88 |
| Volume Left | 3 | 0 | 0 | 0 | 64 | 0 | 0 | 1 | 64 |
| Volume Right | 0 | 0 | 0 | 8 | 0 | 0 | 83 | 73 | 14 |
| cSH | 1153 | 1700 | 1700 | 1700 | 1277 | 1700 | 1700 | 878 | 485 |
| Volume to Capacity | 0.00 | 0.08 | 0.08 | 0.00 | 0.05 | 0.13 | 0.11 | 0.08 | 0.18 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 7 | 16 |
| Control Delay (s) | 8.1 | 0.0 | 0.0 | 0.0 | 8.0 | 0.0 | 0.0 | 9.5 | 14.1 |
| Lane LOS | A | | | | A | | | A | B |
| Approach Delay (s) | 0.1 | | | | 1.1 | | | 9.5 | 14.1 |
| Approach LOS | | | | | | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.7 | | |
| Intersection Capacity Utilization | 35.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 193 | 1 | 33 | 0 | 0 | 0 | 46 | 47 | 2 | 4 | 35 | 137 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 210 | 1 | 36 | 0 | 0 | 0 | 50 | 51 | 2 | 4 | 38 | 149 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 210 | 37 | 50 | 53 | 23 | 168 |
| Volume Left (vph) | 210 | 0 | 50 | 0 | 4 | 0 |
| Volume Right (vph) | 0 | 36 | 0 | 2 | 0 | 149 |
| Hadj (s) | 0.53 | -0.65 | 0.53 | 0.01 | 0.13 | -0.59 |
| Departure Headway (s) | 5.7 | 4.6 | 6.0 | 5.4 | 5.5 | 4.8 |
| Degree Utilization, x | 0.33 | 0.05 | 0.08 | 0.08 | 0.04 | 0.22 |
| Capacity (veh/h) | 599 | 745 | 575 | 628 | 623 | 721 |
| Control Delay (s) | 10.4 | 6.6 | 8.3 | 7.7 | 7.5 | 7.9 |
| Approach Delay (s) | 9.8 | | 8.0 | | 7.8 | |
| Approach LOS | A | | A | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 8.8 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 29.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

## *EXISTING PLUS PROJECT*

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 3 | 236 | 10 | 106 | 157 | 20 | 14 | 0 | 125 | 78 | 0 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3517 | | 1770 | 1831 | | 1770 | 3008 | | 1770 | 3008 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 3517 | | 1770 | 1831 | | 1770 | 3008 | | 1770 | 3008 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 3 | 257 | 11 | 115 | 171 | 22 | 15 | 0 | 136 | 85 | 0 | 12 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 6 | 0 | 0 | 110 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 3 | 263 | 0 | 115 | 187 | 0 | 15 | 26 | 0 | 85 | 4 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 0.7 | 11.1 | | 4.5 | 14.9 | | 0.7 | 9.1 | | 7.6 | 16.0 | |
| Effective Green, g (s) | 0.7 | 11.1 | | 4.5 | 14.9 | | 0.7 | 9.1 | | 7.6 | 16.0 | |
| Actuated g/C Ratio | 0.01 | 0.23 | | 0.09 | 0.31 | | 0.01 | 0.19 | | 0.16 | 0.33 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 26 | 808 | | 165 | 565 | | 26 | 567 | | 279 | 996 | |
| v/s Ratio Prot | 0.00 | 0.07 | | c0.06 | c0.10 | | 0.01 | c0.01 | | c0.05 | 0.00 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.12 | 0.33 | | 0.70 | 0.33 | | 0.58 | 0.05 | | 0.30 | 0.00 | |
| Uniform Delay, d1 | 23.5 | 15.5 | | 21.2 | 12.9 | | 23.7 | 16.0 | | 18.0 | 10.8 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 0.2 | | 12.1 | 0.3 | | 27.4 | 0.0 | | 0.6 | 0.0 | |
| Delay (s) | 25.5 | 15.7 | | 33.3 | 13.2 | | 51.1 | 16.1 | | 18.6 | 10.8 | |
| Level of Service | C | B | | C | B | | D | B | | B | B | |
| Approach Delay (s) | | 15.8 | | | 20.7 | | | 19.6 | | | 17.7 | |
| Approach LOS | | B | | | C | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 18.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.28 | | |
| Actuated Cycle Length (s) | 48.3 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 34.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 400 | 46 | 61 | 268 | 0 | 19 | 0 | 57 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | | |
| Frt | | 0.98 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3484 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Flt Permitted | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3484 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 435 | 50 | 66 | 291 | 0 | 21 | 0 | 62 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 471 | 0 | 66 | 291 | 0 | 21 | 0 | 19 | 0 | 0 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | Perm | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | |
| Actuated Green, G (s) | | 10.2 | | 1.8 | 16.0 | | 0.5 | | 10.6 | | | |
| Effective Green, g (s) | | 10.2 | | 1.8 | 16.0 | | 0.5 | | 10.6 | | | |
| Actuated g/C Ratio | | 0.29 | | 0.05 | 0.46 | | 0.01 | | 0.31 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 1027 | | 92 | 862 | | 26 | | 485 | | | |
| v/s Ratio Prot | | c0.14 | | c0.04 | 0.16 | | c0.01 | | | | | |
| v/s Ratio Perm | | | | | | | | | c0.01 | | | |
| v/c Ratio | | 0.46 | | 0.72 | 0.34 | | 0.81 | | 0.04 | | | |
| Uniform Delay, d1 | | 9.9 | | 16.1 | 5.9 | | 17.0 | | 8.4 | | | |
| Progression Factor | | 1.00 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.3 | | 23.3 | 0.2 | | 94.5 | | 0.0 | | | |
| Delay (s) | | 10.3 | | 39.4 | 6.2 | | 111.5 | | 8.5 | | | |
| Level of Service | | B | | D | A | | F | | A | | | |
| Approach Delay (s) | | 10.3 | | | 12.3 | | | 34.5 | | | 0.0 | |
| Approach LOS | | B | | | B | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.2 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 34.6 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 30.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 409 | 48 | 30 | 299 | 0 | 29 | 0 | 44 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 0.98 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3484 | | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | | 0.40 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3484 | | 747 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 445 | 52 | 33 | 325 | 0 | 32 | 0 | 48 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 473 | 0 | 33 | 325 | 0 | 32 | 0 | 27 | 0 | 0 | 0 |
| Turn Type | | | | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 14.2 | | 14.2 | 14.2 | | 27.8 | | 27.8 | | | |
| Effective Green, g (s) | | 14.2 | | 14.2 | 14.2 | | 27.8 | | 27.8 | | | |
| Actuated g/C Ratio | | 0.28 | | 0.28 | 0.28 | | 0.56 | | 0.56 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 989 | | 212 | 529 | | 984 | | 1550 | | | |
| v/s Ratio Prot | | 0.14 | | | c0.17 | | | | | | | |
| v/s Ratio Perm | | | | 0.04 | | | c0.02 | | 0.01 | | | |
| v/c Ratio | | 0.48 | | 0.16 | 0.61 | | 0.03 | | 0.02 | | | |
| Uniform Delay, d1 | | 14.8 | | 13.4 | 15.5 | | 5.0 | | 5.0 | | | |
| Progression Factor | | 1.00 | | 0.50 | 0.90 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.4 | | 0.3 | 2.1 | | 0.1 | | 0.0 | | | |
| Delay (s) | | 15.2 | | 7.0 | 16.0 | | 5.1 | | 5.0 | | | |
| Level of Service | | B | | A | B | | A | | A | | | |
| Approach Delay (s) | | 15.2 | | | 15.2 | | | 5.0 | | | 0.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 14.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.23 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 29.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 9 | 441 | 5 | 100 | 312 | 3 | 11 | 2 | 71 | 5 | 4 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1517 | 1504 | | 1726 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.75 | 1.00 | 1.00 | | 0.96 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1392 | 1517 | 1504 | | 1680 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 10 | 479 | 5 | 109 | 339 | 3 | 12 | 2 | 77 | 5 | 4 | 7 |
| RTOR Reduction (vph) | 0 | 0 | 4 | 0 | 0 | 2 | 0 | 23 | 23 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 10 | 479 | 1 | 109 | 339 | 1 | 12 | 17 | 16 | 0 | 12 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 0.8 | 12.9 | 12.9 | 4.8 | 16.9 | 16.9 | 20.3 | 20.3 | 20.3 | | 20.3 | |
| Effective Green, g (s) | 0.8 | 12.9 | 12.9 | 4.8 | 16.9 | 16.9 | 20.3 | 20.3 | 20.3 | | 20.3 | |
| Actuated g/C Ratio | 0.02 | 0.26 | 0.26 | 0.10 | 0.34 | 0.34 | 0.41 | 0.41 | 0.41 | | 0.41 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 28 | 1312 | 408 | 170 | 1196 | 535 | 565 | 616 | 611 | | 682 | |
| v/s Ratio Prot | 0.01 | c0.09 | | c0.06 | c0.10 | | | c0.01 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.01 | | 0.01 | | 0.01 | |
| v/c Ratio | 0.36 | 0.37 | 0.00 | 0.64 | 0.28 | 0.00 | 0.02 | 0.03 | 0.03 | | 0.02 | |
| Uniform Delay, d1 | 24.3 | 15.2 | 13.8 | 21.8 | 12.1 | 11.0 | 8.9 | 8.9 | 8.9 | | 8.9 | |
| Progression Factor | 1.30 | 0.66 | 0.51 | 0.79 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 7.5 | 0.2 | 0.0 | 7.8 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | | 0.0 | |
| Delay (s) | 39.2 | 10.2 | 7.0 | 24.9 | 11.8 | 11.0 | 9.0 | 9.0 | 9.0 | | 8.9 | |
| Level of Service | D | B | A | C | B | B | A | A | A | | A | |
| Approach Delay (s) | | 10.7 | | | 15.0 | | | 9.0 | | | 8.9 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.4 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.21 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 29.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 345 | 237 | 53 | 258 | 0 | 0 | 0 | 0 | 57 | 3 | 238 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1778 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.37 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 693 | 1863 | | | | | | 1778 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 375 | 258 | 58 | 280 | 0 | 0 | 0 | 0 | 62 | 3 | 259 |
| RTOR Reduction (vph) | 0 | 0 | 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 |
| Lane Group Flow (vph) | 0 | 375 | 83 | 58 | 280 | 0 | 0 | 0 | 0 | 0 | 65 | 135 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 16.0 | 16.0 | 16.0 | 16.0 | | | | | | 26.0 | 26.0 |
| Effective Green, g (s) | | 16.0 | 16.0 | 16.0 | 16.0 | | | | | | 26.0 | 26.0 |
| Actuated g/C Ratio | | 0.32 | 0.32 | 0.32 | 0.32 | | | | | | 0.52 | 0.52 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 596 | 507 | 222 | 596 | | | | | | 925 | 823 |
| v/s Ratio Prot | | c0.20 | | | 0.15 | | | | | | | |
| v/s Ratio Perm | | | 0.05 | 0.08 | | | | | | | 0.04 | c0.09 |
| v/c Ratio | | 0.63 | 0.16 | 0.26 | 0.47 | | | | | | 0.07 | 0.16 |
| Uniform Delay, d1 | | 14.5 | 12.2 | 12.6 | 13.6 | | | | | | 6.0 | 6.3 |
| Progression Factor | | 0.35 | 0.28 | 0.81 | 0.87 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 2.1 | 0.1 | 0.6 | 0.6 | | | | | | 0.1 | 0.4 |
| Delay (s) | | 7.1 | 3.5 | 10.8 | 12.5 | | | | | | 6.1 | 6.7 |
| Level of Service | | A | A | B | B | | | | | | A | A |
| Approach Delay (s) | | 5.6 | | | 12.2 | | | 0.0 | | | 6.6 | |
| Approach LOS | | A | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 7.6 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.34 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 44.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 275 | 125 | 0 | 0 | 142 | 33 | 183 | 52 | 166 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.97 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1815 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.64 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1188 | 1863 | | | 1815 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 299 | 136 | 0 | 0 | 154 | 36 | 199 | 57 | 180 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 93 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 299 | 136 | 0 | 0 | 169 | 0 | 199 | 57 | 87 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 17.7 | 17.7 | | | 17.7 | | 24.3 | 24.3 | 24.3 | | | |
| Effective Green, g (s) | 17.7 | 17.7 | | | 17.7 | | 24.3 | 24.3 | 24.3 | | | |
| Actuated g/C Ratio | 0.35 | 0.35 | | | 0.35 | | 0.49 | 0.49 | 0.49 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 421 | 660 | | | 643 | | 860 | 905 | 769 | | | |
| v/s Ratio Prot | | 0.07 | | | 0.09 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.25 | | | | | | c0.11 | | 0.06 | | | |
| v/c Ratio | 0.71 | 0.21 | | | 0.26 | | 0.23 | 0.06 | 0.11 | | | |
| Uniform Delay, d1 | 13.9 | 11.3 | | | 11.5 | | 7.4 | 6.8 | 7.0 | | | |
| Progression Factor | 0.25 | 0.29 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 5.2 | 0.1 | | | 0.2 | | 0.6 | 0.1 | 0.3 | | | |
| Delay (s) | 8.8 | 3.4 | | | 11.7 | | 8.1 | 6.9 | 7.3 | | | |
| Level of Service | A | A | | | B | | A | A | A | | | |
| Approach Delay (s) | | 7.1 | | | 11.7 | | | 7.6 | | | 0.0 | |
| Approach LOS | | A | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 8.1 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.43 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 44.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 22 | 123 | 56 | 40 | 91 | 60 | 79 | 111 | 45 | 72 | 122 | 21 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 134 | 61 | 43 | 99 | 65 | 86 | 121 | 49 | 78 | 133 | 23 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 218 | 208 | 255 | 211 | 23 |
| Volume Left (vph) | 24 | 43 | 86 | 78 | 0 |
| Volume Right (vph) | 61 | 65 | 49 | 0 | 23 |
| Hadj (s) | -0.11 | -0.11 | -0.01 | 0.22 | -0.67 |
| Departure Headway (s) | 5.6 | 5.6 | 5.7 | 6.3 | 5.5 |
| Degree Utilization, x | 0.34 | 0.32 | 0.40 | 0.37 | 0.03 |
| Capacity (veh/h) | 582 | 578 | 583 | 527 | 605 |
| Control Delay (s) | 11.5 | 11.3 | 12.4 | 11.9 | 7.4 |
| Approach Delay (s) | 11.5 | 11.3 | 12.4 | 11.4 | |
| Approach LOS | B | B | B | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 11.7 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 51.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 218 | 16 | 33 | 180 | 41 | 4 | 10 | 29 | 23 | 38 | 22 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 237 | 17 | 36 | 196 | 45 | 4 | 11 | 32 | 25 | 41 | 24 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 290 | 276 | 47 | 90 |
| Volume Left (vph) | 36 | 36 | 4 | 25 |
| Volume Right (vph) | 17 | 45 | 32 | 24 |
| Hadj (s) | 0.02 | -0.04 | -0.35 | -0.07 |
| Departure Headway (s) | 4.6 | 4.6 | 5.0 | 5.2 |
| Degree Utilization, x | 0.37 | 0.35 | 0.07 | 0.13 |
| Capacity (veh/h) | 744 | 754 | 620 | 615 |
| Control Delay (s) | 10.3 | 10.0 | 8.4 | 9.0 |
| Approach Delay (s) | 10.3 | 10.0 | 8.4 | 9.0 |
| Approach LOS | B | B | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 9.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 35.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 7 | 54 | 171 | 12 | 55 | 157 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 59 | 186 | 13 | 60 | 171 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 483 | 192 | | | 199 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 483 | 192 | | | 199 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 99 | 93 | | | 96 | |
| cM capacity (veh/h) | 519 | 849 | | | 1373 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 66 | 199 | 230 |
| Volume Left | 8 | 0 | 60 |
| Volume Right | 59 | 13 | 0 |
| cSH | 791 | 1700 | 1373 |
| Volume to Capacity | 0.08 | 0.12 | 0.04 |
| Queue Length 95th (ft) | 7 | 0 | 3 |
| Control Delay (s) | 10.0 | 0.0 | 2.3 |
| Lane LOS | A | | A |
| Approach Delay (s) | 10.0 | 0.0 | 2.3 |
| Approach LOS | A | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.4 | | |
| Intersection Capacity Utilization | 34.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 10 | 72 | 4 | 48 | 30 | 0 | 1 | 14 | 42 | 30 | 18 | 16 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 11 | 78 | 4 | 52 | 33 | 0 | 1 | 15 | 46 | 33 | 20 | 17 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 33 | | | 83 | | | 266 | 239 | 80 | 292 | 241 | 33 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 33 | | | 83 | | | 266 | 239 | 80 | 292 | 241 | 33 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 97 | | | 100 | 98 | 95 | 95 | 97 | 98 |
| cM capacity (veh/h) | 1579 | | | 1515 | | | 638 | 635 | 980 | 598 | 633 | 1041 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 93 | 85 | 62 | 70 |
| Volume Left | 11 | 52 | 1 | 33 |
| Volume Right | 4 | 0 | 46 | 17 |
| cSH | 1579 | 1515 | 857 | 681 |
| Volume to Capacity | 0.01 | 0.03 | 0.07 | 0.10 |
| Queue Length 95th (ft) | 1 | 3 | 6 | 8 |
| Control Delay (s) | 0.9 | 4.7 | 9.5 | 10.9 |
| Lane LOS | A | A | A | B |
| Approach Delay (s) | 0.9 | 4.7 | 9.5 | 10.9 |
| Approach LOS | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.9 | | |
| Intersection Capacity Utilization | 27.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 61 | 66 | 0 | 0 | 145 | 64 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 72 | 0 | 0 | 158 | 70 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 192 | 192 | 227 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 192 | 192 | 227 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 92 | 92 | 100 | | | |
| cM capacity (veh/h) | 797 | 849 | 1341 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 138 | 227 |
| Volume Left | 66 | 0 |
| Volume Right | 72 | 70 |
| cSH | 823 | 1700 |
| Volume to Capacity | 0.17 | 0.13 |
| Queue Length 95th (ft) | 15 | 0 |
| Control Delay (s) | 10.3 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 10.3 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.9 | | |
| Intersection Capacity Utilization | 25.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 10 | 35 | 76 | 16 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 38 | 83 | 17 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 11 | 38 | 83 | 17 |
| Volume Left (vph) | 0 | 0 | 0 | 17 |
| Volume Right (vph) | 11 | 0 | 83 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.04 | 0.07 | 0.02 |
| Capacity (veh/h) | 1019 | 890 | 1121 | 843 |
| Control Delay (s) | 6.5 | 7.1 | 6.5 | 7.3 |
| Approach Delay (s) | 6.5 | 6.7 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.7 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 48 | 130 | 52 | 67 | 179 | 34 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 52 | 141 | 57 | 73 | 195 | 37 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 519 | 65 | | | 129 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 519 | 65 | | | 129 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 88 | 86 | | | 87 | |
| cM capacity (veh/h) | 421 | 986 | | | 1454 | |

| Direction, Lane # | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 52 | 141 | 38 | 92 | 195 | 37 |
| Volume Left | 52 | 0 | 0 | 0 | 195 | 0 |
| Volume Right | 0 | 141 | 0 | 73 | 0 | 0 |
| cSH | 421 | 986 | 1700 | 1700 | 1454 | 1700 |
| Volume to Capacity | 0.12 | 0.14 | 0.02 | 0.05 | 0.13 | 0.02 |
| Queue Length 95th (ft) | 11 | 12 | 0 | 0 | 12 | 0 |
| Control Delay (s) | 14.7 | 9.3 | 0.0 | 0.0 | 7.9 | 0.0 |
| Lane LOS | B | A | | | A | |
| Approach Delay (s) | 10.7 | | 0.0 | | 6.6 | |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.5 | | |
| Intersection Capacity Utilization | 26.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 3 | 510 | 1 | 53 | 386 | 56 | 0 | 2 | 36 | 43 | 5 | 12 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 3 | 554 | 1 | 58 | 420 | 61 | 0 | 2 | 39 | 47 | 5 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | 0.91 | | | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | |
| vC, conflicting volume | 480 | | | 555 | | | 902 | 1157 | 277 | 889 | 1127 | 240 |
| vC1, stage 1 conf vol | | | | | | | 561 | 561 | | 565 | 565 | |
| vC2, stage 2 conf vol | | | | | | | 341 | 596 | | 324 | 562 | |
| vCu, unblocked vol | 480 | | | 306 | | | 687 | 968 | 0 | 673 | 936 | 240 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 95 | | | 100 | 99 | 96 | 89 | 99 | 98 |
| cM capacity (veh/h) | 1078 | | | 1136 | | | 483 | 402 | 984 | 428 | 402 | 761 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 3 | 277 | 277 | 1 | 58 | 280 | 201 | 41 | 65 |
| Volume Left | 3 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 47 |
| Volume Right | 0 | 0 | 0 | 1 | 0 | 0 | 61 | 39 | 13 |
| cSH | 1078 | 1700 | 1700 | 1700 | 1136 | 1700 | 1700 | 914 | 466 |
| Volume to Capacity | 0.00 | 0.16 | 0.16 | 0.00 | 0.05 | 0.16 | 0.12 | 0.05 | 0.14 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 12 |
| Control Delay (s) | 8.3 | 0.0 | 0.0 | 0.0 | 8.3 | 0.0 | 0.0 | 9.1 | 14.0 |
| Lane LOS | A | | | | A | | | A | B |
| Approach Delay (s) | 0.0 | | | | 0.9 | | | 9.1 | 14.0 |
| Approach LOS | | | | | | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 37.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 170 | 5 | 126 | 0 | 0 | 0 | 67 | 35 | 1 | 4 | 64 | 108 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 185 | 5 | 137 | 0 | 0 | 0 | 73 | 38 | 1 | 4 | 70 | 117 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 185 | 142 | 73 | 39 | 39 | 152 |
| Volume Left (vph) | 185 | 0 | 73 | 0 | 4 | 0 |
| Volume Right (vph) | 0 | 137 | 0 | 1 | 0 | 117 |
| Hadj (s) | 0.53 | -0.64 | 0.53 | 0.01 | 0.09 | -0.51 |
| Departure Headway (s) | 5.8 | 4.6 | 6.1 | 5.6 | 5.6 | 5.0 |
| Degree Utilization, x | 0.30 | 0.18 | 0.12 | 0.06 | 0.06 | 0.21 |
| Capacity (veh/h) | 593 | 740 | 558 | 606 | 606 | 682 |
| Control Delay (s) | 10.0 | 7.5 | 8.8 | 7.8 | 7.8 | 8.1 |
| Approach Delay (s) | 8.9 | | 8.4 | | 8.1 | |
| Approach LOS | A | | A | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 8.6 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 28.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 11 | 342 | 31 | 338 | 447 | 77 | 29 | 0 | 226 | 42 | 0 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3495 | | 1770 | 1822 | | 1770 | 3008 | | 1770 | 3008 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 3495 | | 1770 | 1822 | | 1770 | 3008 | | 1770 | 3008 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 12 | 372 | 34 | 367 | 486 | 84 | 32 | 0 | 246 | 46 | 0 | 7 |
| RTOR Reduction (vph) | 0 | 11 | 0 | 0 | 5 | 0 | 0 | 246 | 0 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 12 | 395 | 0 | 367 | 565 | 0 | 32 | 0 | 0 | 46 | 1 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 0.8 | 13.2 | | 31.1 | 43.5 | | 3.6 | 0.0 | | 9.8 | 6.1 | |
| Effective Green, g (s) | 0.8 | 13.2 | | 31.1 | 43.5 | | 3.6 | 0.0 | | 9.8 | 6.1 | |
| Actuated g/C Ratio | 0.01 | 0.19 | | 0.44 | 0.62 | | 0.05 | 0.00 | | 0.14 | 0.09 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 20 | 659 | | 786 | 1132 | | 91 | 0 | | 248 | 262 | |
| v/s Ratio Prot | 0.01 | c0.11 | | c0.21 | c0.31 | | c0.02 | | | c0.03 | c0.00 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.60 | 0.60 | | 0.47 | 0.50 | | 0.35 | 0.00 | | 0.19 | 0.00 | |
| Uniform Delay, d1 | 34.4 | 26.0 | | 13.6 | 7.3 | | 32.1 | 35.0 | | 26.6 | 29.2 | |
| Progression Factor | 1.00 | 1.00 | | 0.93 | 1.07 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 40.2 | 1.5 | | 0.3 | 0.2 | | 2.3 | 0.0 | | 0.4 | 0.0 | |
| Delay (s) | 74.6 | 27.5 | | 12.9 | 8.0 | | 34.4 | 35.0 | | 26.9 | 29.2 | |
| Level of Service | E | C | | B | A | | C | C | | C | C | |
| Approach Delay (s) | | 28.9 | | | 10.0 | | | 34.9 | | | 27.2 | |
| Approach LOS | | C | | | A | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 19.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 55.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 489 | 141 | 187 | 780 | 0 | 104 | 0 | 311 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | | |
| Frt | | 0.97 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3421 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Flt Permitted | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3421 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 532 | 153 | 203 | 848 | 0 | 113 | 0 | 338 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 250 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 646 | 0 | 203 | 848 | 0 | 113 | 0 | 88 | 0 | 0 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | Perm | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | |
| Actuated Green, G (s) | | 19.0 | | 20.8 | 43.8 | | 8.6 | | 18.2 | | | |
| Effective Green, g (s) | | 19.0 | | 20.8 | 43.8 | | 8.6 | | 18.2 | | | |
| Actuated g/C Ratio | | 0.27 | | 0.30 | 0.63 | | 0.12 | | 0.26 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 929 | | 526 | 1166 | | 217 | | 412 | | | |
| v/s Ratio Prot | | 0.19 | | 0.11 | c0.46 | | c0.06 | | | | | |
| v/s Ratio Perm | | | | | | | | | c0.06 | | | |
| v/c Ratio | | 0.70 | | 0.39 | 0.73 | | 0.52 | | 0.21 | | | |
| Uniform Delay, d1 | | 22.9 | | 19.5 | 9.0 | | 28.8 | | 20.3 | | | |
| Progression Factor | | 0.35 | | 0.88 | 0.88 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 2.2 | | 0.3 | 1.6 | | 2.2 | | 1.2 | | | |
| Delay (s) | | 10.2 | | 17.6 | 9.5 | | 31.0 | | 21.5 | | | |
| Level of Service | | B | | B | A | | C | | C | | | |
| Approach Delay (s) | | 10.2 | | | 11.1 | | | 23.9 | | | 0.0 | |
| Approach LOS | | B | | | B | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.4 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 60.1% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 683 | 113 | 85 | 857 | 0 | 109 | 0 | 176 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 0.98 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3464 | | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | | 0.29 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3464 | | 540 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 742 | 123 | 92 | 932 | 0 | 118 | 0 | 191 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 140 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 844 | 0 | 92 | 932 | 0 | 118 | 0 | 51 | 0 | 0 | 0 |
| Turn Type | | | | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 43.4 | | 43.4 | 43.4 | | 18.6 | | 18.6 | | | |
| Effective Green, g (s) | | 43.4 | | 43.4 | 43.4 | | 18.6 | | 18.6 | | | |
| Actuated g/C Ratio | | 0.62 | | 0.62 | 0.62 | | 0.27 | | 0.27 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 2148 | | 335 | 1155 | | 470 | | 741 | | | |
| v/s Ratio Prot | | 0.24 | | | c0.50 | | | | | | | |
| v/s Ratio Perm | | | | 0.17 | | | c0.07 | | 0.02 | | | |
| v/c Ratio | | 0.39 | | 0.27 | 0.81 | | 0.25 | | 0.07 | | | |
| Uniform Delay, d1 | | 6.7 | | 6.1 | 10.1 | | 20.2 | | 19.2 | | | |
| Progression Factor | | 0.35 | | 0.07 | 0.54 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.1 | | 0.4 | 3.8 | | 1.3 | | 0.2 | | | |
| Delay (s) | | 2.4 | | 0.8 | 9.3 | | 21.5 | | 19.4 | | | |
| Level of Service | | A | | A | A | | C | | B | | | |
| Approach Delay (s) | | 2.4 | | | 8.5 | | | 20.2 | | | 0.0 | |
| Approach LOS | | A | | | A | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 7.8 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 57.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 11 | 833 | 16 | 252 | 908 | 2 | 22 | 5 | 196 | 9 | 9 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1516 | 1504 | | 1745 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.74 | 1.00 | 1.00 | | 0.93 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1373 | 1516 | 1504 | | 1649 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 12 | 905 | 17 | 274 | 987 | 2 | 24 | 5 | 213 | 10 | 10 | 11 |
| RTOR Reduction (vph) | 0 | 0 | 12 | 0 | 0 | 1 | 0 | 74 | 78 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 12 | 905 | 5 | 274 | 987 | 1 | 24 | 35 | 31 | 0 | 23 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 0.8 | 22.0 | 22.0 | 15.8 | 37.0 | 37.0 | 20.2 | 20.2 | 20.2 | | 20.2 | |
| Effective Green, g (s) | 0.8 | 22.0 | 22.0 | 15.8 | 37.0 | 37.0 | 20.2 | 20.2 | 20.2 | | 20.2 | |
| Actuated g/C Ratio | 0.01 | 0.31 | 0.31 | 0.23 | 0.53 | 0.53 | 0.29 | 0.29 | 0.29 | | 0.29 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 20 | 1598 | 498 | 400 | 1871 | 837 | 396 | 437 | 434 | | 476 | |
| v/s Ratio Prot | 0.01 | 0.18 | | c0.15 | c0.28 | | | c0.02 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.02 | | 0.02 | | 0.01 | |
| v/c Ratio | 0.60 | 0.57 | 0.01 | 0.69 | 0.53 | 0.00 | 0.06 | 0.08 | 0.07 | | 0.05 | |
| Uniform Delay, d1 | 34.4 | 20.0 | 16.5 | 24.8 | 10.8 | 7.8 | 18.0 | 18.1 | 18.1 | | 18.0 | |
| Progression Factor | 1.04 | 0.70 | 0.35 | 1.04 | 1.04 | 1.06 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 38.7 | 0.4 | 0.0 | 2.8 | 0.2 | 0.0 | 0.3 | 0.4 | 0.3 | | 0.2 | |
| Delay (s) | 74.7 | 14.5 | 5.8 | 28.6 | 11.3 | 8.2 | 18.3 | 18.5 | 18.4 | | 18.2 | |
| Level of Service | E | B | A | C | B | A | B | B | B | | B | |
| Approach Delay (s) | | 15.1 | | | 15.1 | | | 18.4 | | | 18.2 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 15.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.41 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 48.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 730 | 407 | 126 | 675 | 0 | 0 | 0 | 0 | 38 | 0 | 578 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1770 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.13 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 245 | 1863 | | | | | | 1770 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 793 | 442 | 137 | 734 | 0 | 0 | 0 | 0 | 41 | 0 | 628 |
| RTOR Reduction (vph) | 0 | 0 | 216 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 |
| Lane Group Flow (vph) | 0 | 793 | 226 | 137 | 734 | 0 | 0 | 0 | 0 | 0 | 41 | 517 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 35.8 | 35.8 | 35.8 | 35.8 | | | | | | 26.2 | 26.2 |
| Effective Green, g (s) | | 35.8 | 35.8 | 35.8 | 35.8 | | | | | | 26.2 | 26.2 |
| Actuated g/C Ratio | | 0.51 | 0.51 | 0.51 | 0.51 | | | | | | 0.37 | 0.37 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 953 | 810 | 125 | 953 | | | | | | 662 | 592 |
| v/s Ratio Prot | | 0.43 | | | 0.39 | | | | | | | |
| v/s Ratio Perm | | | 0.14 | c0.56 | | | | | | | 0.02 | c0.33 |
| v/c Ratio | | 0.83 | 0.28 | 1.10 | 0.77 | | | | | | 0.06 | 0.87 |
| Uniform Delay, d1 | | 14.5 | 9.7 | 17.1 | 13.8 | | | | | | 14.0 | 20.4 |
| Progression Factor | | 0.61 | 1.16 | 0.55 | 0.49 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 5.7 | 0.2 | 89.5 | 2.3 | | | | | | 0.2 | 16.3 |
| Delay (s) | | 14.6 | 11.5 | 98.9 | 9.1 | | | | | | 14.2 | 36.7 |
| Level of Service | | B | B | F | A | | | | | | B | D |
| Approach Delay (s) | | 13.5 | | | 23.2 | | | 0.0 | | | 35.3 | |
| Approach LOS | | B | | | C | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 21.8 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 1.00 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 121.8% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 538 | 209 | 0 | 0 | 336 | 80 | 473 | 47 | 187 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.97 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1814 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.44 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 825 | 1863 | | | 1814 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 585 | 227 | 0 | 0 | 365 | 87 | 514 | 51 | 203 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 148 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 585 | 227 | 0 | 0 | 440 | 0 | 514 | 51 | 55 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 43.0 | 43.0 | | | 43.0 | | 19.0 | 19.0 | 19.0 | | | |
| Effective Green, g (s) | 43.0 | 43.0 | | | 43.0 | | 19.0 | 19.0 | 19.0 | | | |
| Actuated g/C Ratio | 0.61 | 0.61 | | | 0.61 | | 0.27 | 0.27 | 0.27 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 507 | 1144 | | | 1114 | | 480 | 506 | 430 | | | |
| v/s Ratio Prot | | 0.12 | | | 0.24 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.71 | | | | | | c0.29 | | 0.03 | | | |
| v/c Ratio | 1.15 | 0.20 | | | 0.39 | | 1.07 | 0.10 | 0.13 | | | |
| Uniform Delay, d1 | 13.5 | 5.9 | | | 6.9 | | 25.5 | 19.1 | 19.2 | | | |
| Progression Factor | 0.80 | 0.14 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 82.9 | 0.1 | | | 0.2 | | 61.3 | 0.4 | 0.6 | | | |
| Delay (s) | 93.8 | 0.9 | | | 7.1 | | 86.8 | 19.5 | 19.9 | | | |
| Level of Service | F | A | | | A | | F | B | B | | | |
| Approach Delay (s) | | 67.8 | | | 7.1 | | | 64.7 | | | 0.0 | |
| Approach LOS | | E | | | A | | | E | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 53.1 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.13 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 121.8% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 143 | 81 | 123 | 148 | 68 | 69 | 230 | 78 | 49 | 182 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 32 | 155 | 88 | 134 | 161 | 74 | 75 | 250 | 85 | 53 | 198 | 18 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 275 | 368 | 410 | 251 | 18 |
| Volume Left (vph) | 32 | 134 | 75 | 53 | 0 |
| Volume Right (vph) | 88 | 74 | 85 | 0 | 18 |
| Hadj (s) | -0.14 | -0.01 | -0.05 | 0.14 | -0.67 |
| Departure Headway (s) | 7.6 | 7.4 | 7.3 | 8.2 | 7.4 |
| Degree Utilization, x | 0.58 | 0.75 | 0.83 | 0.57 | 0.04 |
| Capacity (veh/h) | 422 | 458 | 472 | 390 | 436 |
| Control Delay (s) | 20.4 | 29.5 | 36.9 | 20.6 | 9.5 |
| Approach Delay (s) | 20.4 | 29.5 | 36.9 | 19.8 | |
| Approach LOS | C | D | E | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 27.9 | | |
| HCM Level of Service | D | | |
| Intersection Capacity Utilization | 79.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 62 | 318 | 3 | 48 | 304 | 103 | 5 | 16 | 39 | 43 | 105 | 78 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 67 | 346 | 3 | 52 | 330 | 112 | 5 | 17 | 42 | 47 | 114 | 85 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 416 | 495 | 65 | 246 |
| Volume Left (vph) | 67 | 52 | 5 | 47 |
| Volume Right (vph) | 3 | 112 | 42 | 85 |
| Hadj (s) | 0.06 | -0.08 | -0.34 | -0.14 |
| Departure Headway (s) | 5.9 | 5.6 | 6.9 | 6.5 |
| Degree Utilization, x | 0.68 | 0.77 | 0.12 | 0.44 |
| Capacity (veh/h) | 586 | 614 | 430 | 498 |
| Control Delay (s) | 20.5 | 25.3 | 10.9 | 14.5 |
| Approach Delay (s) | 20.5 | 25.3 | 10.9 | 14.5 |
| Approach LOS | C | D | B | B |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 20.7 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 57.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 14 | 44 | 316 | 34 | 44 | 341 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 48 | 343 | 37 | 48 | 371 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 828 | 362 | | | 380 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 828 | 362 | | | 380 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 95 | 93 | | | 96 | |
| cM capacity (veh/h) | 327 | 683 | | | 1178 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 63 | 380 | 418 |
| Volume Left | 15 | 0 | 48 |
| Volume Right | 48 | 37 | 0 |
| cSH | 541 | 1700 | 1178 |
| Volume to Capacity | 0.12 | 0.22 | 0.04 |
| Queue Length 95th (ft) | 10 | 0 | 3 |
| Control Delay (s) | 12.5 | 0.0 | 1.3 |
| Lane LOS | B | | A |
| Approach Delay (s) | 12.5 | 0.0 | 1.3 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.6 | | |
| Intersection Capacity Utilization | 52.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 11 | 78 | 4 | 17 | 44 | 4 | 2 | 13 | 32 | 92 | 14 | 20 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 85 | 4 | 18 | 48 | 4 | 2 | 14 | 35 | 100 | 15 | 22 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 52 | | | 89 | | | 227 | 200 | 87 | 240 | 200 | 50 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 52 | | | 89 | | | 227 | 200 | 87 | 240 | 200 | 50 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 100 | 98 | 96 | 85 | 98 | 98 |
| cM capacity (veh/h) | 1554 | | | 1506 | | | 690 | 682 | 972 | 668 | 682 | 1018 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 101 | 71 | 51 | 137 |
| Volume Left | 12 | 18 | 2 | 100 |
| Volume Right | 4 | 4 | 35 | 22 |
| cSH | 1554 | 1506 | 856 | 708 |
| Volume to Capacity | 0.01 | 0.01 | 0.06 | 0.19 |
| Queue Length 95th (ft) | 1 | 1 | 5 | 18 |
| Control Delay (s) | 0.9 | 2.0 | 9.5 | 11.3 |
| Lane LOS | A | A | A | B |
| Approach Delay (s) | 0.9 | 2.0 | 9.5 | 11.3 |
| Approach LOS | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.3 | | |
| Intersection Capacity Utilization | 26.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 136 | 0 | 0 | 246 | 76 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 148 | 0 | 0 | 267 | 83 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 309 | 309 | 350 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 309 | 309 | 350 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 89 | 80 | 100 | | | |
| cM capacity (veh/h) | 684 | 731 | 1209 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 221 | 350 |
| Volume Left | 73 | 0 |
| Volume Right | 148 | 83 |
| cSH | 715 | 1700 |
| Volume to Capacity | 0.31 | 0.21 |
| Queue Length 95th (ft) | 33 | 0 |
| Control Delay (s) | 12.3 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 12.3 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.7 | | |
| Intersection Capacity Utilization | 36.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 0 | 67 | 94 | 23 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 73 | 102 | 25 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 0 | 73 | 102 | 25 |
| Volume Left (vph) | 0 | 0 | 0 | 25 |
| Volume Right (vph) | 0 | 0 | 102 | 0 |
| Hadj (s) | 0.00 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 4.1 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.00 | 0.08 | 0.09 | 0.03 |
| Capacity (veh/h) | 867 | 896 | 1121 | 842 |
| Control Delay (s) | 7.1 | 7.3 | 6.5 | 7.3 |
| Approach Delay (s) | 0.0 | 6.8 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 15.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 136 | 341 | 61 | 68 | 314 | 59 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 148 | 371 | 66 | 74 | 341 | 64 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 850 | 70 | | | 140 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 850 | 70 | | | 140 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 35 | 62 | | | 76 | |
| cM capacity (veh/h) | 229 | 978 | | | 1441 | |

| Direction, Lane # | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 148 | 371 | 44 | 96 | 341 | 64 |
| Volume Left | 148 | 0 | 0 | 0 | 341 | 0 |
| Volume Right | 0 | 371 | 0 | 74 | 0 | 0 |
| cSH | 229 | 978 | 1700 | 1700 | 1441 | 1700 |
| Volume to Capacity | 0.65 | 0.38 | 0.03 | 0.06 | 0.24 | 0.04 |
| Queue Length 95th (ft) | 99 | 45 | 0 | 0 | 23 | 0 |
| Control Delay (s) | 45.7 | 10.9 | 0.0 | 0.0 | 8.3 | 0.0 |
| Lane LOS | E | B | | | A | |
| Approach Delay (s) | 20.8 | | 0.0 | | 7.0 | |
| Approach LOS | C | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 12.8 | | |
| Intersection Capacity Utilization | 38.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 6 | 1032 | 6 | 52 | 1138 | 56 | 3 | 0 | 55 | 43 | 1 | 21 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 7 | 1122 | 7 | 57 | 1237 | 61 | 3 | 0 | 60 | 47 | 1 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | 0.82 | | | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | |
| vC, conflicting volume | 1298 | | | 1128 | | | 1890 | 2546 | 561 | 2014 | 2522 | 649 |
| vC1, stage 1 conf vol | | | | | | | 1135 | 1135 | | 1380 | 1380 | |
| vC2, stage 2 conf vol | | | | | | | 755 | 1411 | | 634 | 1141 | |
| vCu, unblocked vol | 1298 | | | 725 | | | 1651 | 2448 | 36 | 1802 | 2419 | 649 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 92 | | | 98 | 100 | 93 | 65 | 99 | 94 |
| cM capacity (veh/h) | 530 | | | 719 | | | 216 | 155 | 846 | 134 | 155 | 412 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 7 | 561 | 561 | 7 | 57 | 825 | 473 | 63 | 71 |
| Volume Left | 7 | 0 | 0 | 0 | 57 | 0 | 0 | 3 | 47 |
| Volume Right | 0 | 0 | 0 | 7 | 0 | 0 | 61 | 60 | 23 |
| cSH | 530 | 1700 | 1700 | 1700 | 719 | 1700 | 1700 | 736 | 171 |
| Volume to Capacity | 0.01 | 0.33 | 0.33 | 0.00 | 0.08 | 0.49 | 0.28 | 0.09 | 0.41 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 7 | 46 |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 0.0 | 10.4 | 0.0 | 0.0 | 10.4 | 40.0 |
| Lane LOS | B | | | | B | | | B | E |
| Approach Delay (s) | 0.1 | | | | 0.4 | | | 10.4 | 40.0 |
| Approach LOS | | | | | | | | B | E |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.6 | | |
| Intersection Capacity Utilization | 57.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 318 | 8 | 88 | 0 | 0 | 0 | 150 | 67 | 3 | 5 | 58 | 262 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 346 | 9 | 96 | 0 | 0 | 0 | 163 | 73 | 3 | 5 | 63 | 285 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 346 | 104 | 163 | 76 | 37 | 316 |
| Volume Left (vph) | 346 | 0 | 163 | 0 | 5 | 0 |
| Volume Right (vph) | 0 | 96 | 0 | 3 | 0 | 285 |
| Hadj (s) | 0.53 | -0.61 | 0.53 | 0.00 | 0.11 | -0.60 |
| Departure Headway (s) | 6.7 | 5.5 | 7.0 | 6.5 | 6.5 | 5.7 |
| Degree Utilization, x | 0.64 | 0.16 | 0.32 | 0.14 | 0.07 | 0.50 |
| Capacity (veh/h) | 524 | 619 | 488 | 522 | 525 | 601 |
| Control Delay (s) | 19.5 | 8.4 | 12.0 | 9.3 | 8.7 | 13.3 |
| Approach Delay (s) | 17.0 | | 11.2 | | 12.8 | |
| Approach LOS | C | | B | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 14.2 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 46.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 7 | 431 | 41 | 484 | 424 | 50 | 38 | 0 | 294 | 50 | 0 | 7 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3493 | | 1770 | 1833 | | 1770 | 3008 | | 1770 | 3008 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 3493 | | 1770 | 1833 | | 1770 | 3008 | | 1770 | 3008 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 8 | 468 | 45 | 526 | 461 | 54 | 41 | 0 | 320 | 54 | 0 | 8 |
| RTOR Reduction (vph) | 0 | 9 | 0 | 0 | 3 | 0 | 0 | 316 | 0 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 8 | 504 | 0 | 526 | 512 | 0 | 41 | 4 | 0 | 54 | 0 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 1.4 | 16.8 | | 36.8 | 52.2 | | 5.7 | 0.9 | | 9.5 | 4.7 | |
| Effective Green, g (s) | 1.4 | 16.8 | | 36.8 | 52.2 | | 5.7 | 0.9 | | 9.5 | 4.7 | |
| Actuated g/C Ratio | 0.02 | 0.21 | | 0.46 | 0.65 | | 0.07 | 0.01 | | 0.12 | 0.06 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 31 | 734 | | 814 | 1196 | | 126 | 34 | | 210 | 177 | |
| v/s Ratio Prot | 0.00 | c0.14 | | c0.30 | 0.28 | | 0.02 | c0.00 | | c0.03 | 0.00 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.26 | 0.69 | | 0.65 | 0.43 | | 0.33 | 0.11 | | 0.26 | 0.00 | |
| Uniform Delay, d1 | 38.8 | 29.2 | | 16.6 | 6.7 | | 35.3 | 39.2 | | 32.0 | 35.4 | |
| Progression Factor | 1.00 | 1.00 | | 0.87 | 0.91 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 4.4 | 2.7 | | 1.2 | 0.2 | | 1.5 | 6.2 | | 0.7 | 0.0 | |
| Delay (s) | 43.2 | 31.9 | | 15.5 | 6.3 | | 36.8 | 45.3 | | 32.7 | 35.4 | |
| Level of Service | D | C | | B | A | | D | D | | C | D | |
| Approach Delay (s) | | 32.0 | | | 11.0 | | | 44.4 | | | 33.0 | |
| Approach LOS | | C | | | B | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 23.3 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.59 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 66.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 587 | 222 | 290 | 849 | 0 | 140 | 0 | 412 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 1.00 | | | |
| Frt | | 0.96 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3394 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Flt Permitted | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3394 | | 1770 | 1863 | | 1770 | | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 638 | 241 | 315 | 923 | 0 | 152 | 0 | 448 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 341 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 832 | 0 | 315 | 923 | 0 | 152 | 0 | 107 | 0 | 0 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | Perm | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | 2 | | | |
| Actuated Green, G (s) | | 26.0 | | 22.9 | 52.9 | | 9.6 | | 19.1 | | | |
| Effective Green, g (s) | | 26.0 | | 22.9 | 52.9 | | 9.6 | | 19.1 | | | |
| Actuated g/C Ratio | | 0.32 | | 0.29 | 0.66 | | 0.12 | | 0.24 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 1103 | | 507 | 1232 | | 212 | | 378 | | | |
| v/s Ratio Prot | | 0.25 | | 0.18 | c0.50 | | c0.09 | | | | | |
| v/s Ratio Perm | | | | | | | | | c0.07 | | | |
| v/c Ratio | | 0.75 | | 0.62 | 0.75 | | 0.72 | | 0.28 | | | |
| Uniform Delay, d1 | | 24.1 | | 24.8 | 9.1 | | 33.9 | | 24.9 | | | |
| Progression Factor | | 0.35 | | 0.80 | 0.69 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 2.7 | | 1.5 | 1.6 | | 11.0 | | 1.9 | | | |
| Delay (s) | | 11.2 | | 21.3 | 7.9 | | 44.9 | | 26.7 | | | |
| Level of Service | | B | | C | A | | D | | C | | | |
| Approach Delay (s) | | 11.2 | | | 11.3 | | | 31.3 | | | 0.0 | |
| Approach LOS | | B | | | B | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 15.7 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 65.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 882 | 110 | 113 | 1011 | 0 | 129 | 0 | 228 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Lane Util. Factor | | 0.95 | | 1.00 | 1.00 | | 1.00 | | 0.88 | | | |
| Frt | | 0.98 | | 1.00 | 1.00 | | 1.00 | | 0.85 | | | |
| Flt Protected | | 1.00 | | 0.95 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (prot) | | 3480 | | 1770 | 1863 | | 1770 | | 2787 | | | |
| Flt Permitted | | 1.00 | | 0.23 | 1.00 | | 0.95 | | 1.00 | | | |
| Satd. Flow (perm) | | 3480 | | 432 | 1863 | | 1770 | | 2787 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 959 | 120 | 123 | 1099 | 0 | 140 | 0 | 248 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 199 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1067 | 0 | 123 | 1099 | 0 | 140 | 0 | 49 | 0 | 0 | 0 |
| Turn Type | | | | Perm | | | custom | | custom | | | |
| Protected Phases | | 4 | | | 8 | | | | | | | |
| Permitted Phases | | | | 8 | | | 2 | | 2 | | | |
| Actuated Green, G (s) | | 56.1 | | 56.1 | 56.1 | | 15.9 | | 15.9 | | | |
| Effective Green, g (s) | | 56.1 | | 56.1 | 56.1 | | 15.9 | | 15.9 | | | |
| Actuated g/C Ratio | | 0.70 | | 0.70 | 0.70 | | 0.20 | | 0.20 | | | |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | 4.0 | | 4.0 | | | |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | 3.0 | | 3.0 | | | |
| Lane Grp Cap (vph) | | 2440 | | 303 | 1306 | | 352 | | 554 | | | |
| v/s Ratio Prot | | 0.31 | | | c0.59 | | | | | | | |
| v/s Ratio Perm | | | | 0.28 | | | c0.08 | | 0.02 | | | |
| v/c Ratio | | 0.44 | | 0.41 | 0.84 | | 0.40 | | 0.09 | | | |
| Uniform Delay, d1 | | 5.1 | | 5.0 | 8.7 | | 27.9 | | 26.1 | | | |
| Progression Factor | | 0.35 | | 0.25 | 0.97 | | 1.00 | | 1.00 | | | |
| Incremental Delay, d2 | | 0.1 | | 0.8 | 4.3 | | 3.3 | | 0.3 | | | |
| Delay (s) | | 1.9 | | 2.0 | 12.8 | | 31.2 | | 26.5 | | | |
| Level of Service | | A | | A | B | | C | | C | | | |
| Approach Delay (s) | | 1.9 | | | 11.7 | | | 28.2 | | | 0.0 | |
| Approach LOS | | A | | | B | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 10.1 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 67.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 19 | 1073 | 19 | 262 | 1079 | 2 | 19 | 12 | 207 | 10 | 12 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.87 | 0.85 | | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.99 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 1533 | 1504 | | 1711 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.72 | 1.00 | 1.00 | | 0.95 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 1770 | 3539 | 1583 | 1348 | 1533 | 1504 | | 1638 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 21 | 1166 | 21 | 285 | 1173 | 2 | 21 | 13 | 225 | 11 | 13 | 27 |
| RTOR Reduction (vph) | 0 | 0 | 14 | 0 | 0 | 1 | 0 | 78 | 85 | 0 | 20 | 0 |
| Lane Group Flow (vph) | 21 | 1166 | 7 | 285 | 1173 | 1 | 21 | 43 | 32 | 0 | 31 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 1.6 | 28.1 | 28.1 | 17.7 | 44.2 | 44.2 | 22.2 | 22.2 | 22.2 | | 22.2 | |
| Effective Green, g (s) | 1.6 | 28.1 | 28.1 | 17.7 | 44.2 | 44.2 | 22.2 | 22.2 | 22.2 | | 22.2 | |
| Actuated g/C Ratio | 0.02 | 0.35 | 0.35 | 0.22 | 0.55 | 0.55 | 0.28 | 0.28 | 0.28 | | 0.28 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 35 | 1786 | 556 | 392 | 1955 | 875 | 374 | 425 | 417 | | 455 | |
| v/s Ratio Prot | 0.01 | 0.23 | | c0.16 | c0.33 | | | c0.03 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.00 | 0.02 | | 0.02 | | 0.02 | |
| v/c Ratio | 0.60 | 0.65 | 0.01 | 0.73 | 0.60 | 0.00 | 0.06 | 0.10 | 0.08 | | 0.07 | |
| Uniform Delay, d1 | 38.9 | 21.8 | 16.9 | 28.9 | 12.0 | 8.0 | 21.2 | 21.5 | 21.3 | | 21.3 | |
| Progression Factor | 1.03 | 0.66 | 0.39 | 1.06 | 1.12 | 1.10 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 23.2 | 0.8 | 0.0 | 2.3 | 0.2 | 0.0 | 0.3 | 0.5 | 0.4 | | 0.3 | |
| Delay (s) | 63.3 | 15.3 | 6.6 | 33.0 | 13.5 | 8.9 | 21.5 | 22.0 | 21.7 | | 21.6 | |
| Level of Service | E | B | A | C | B | A | C | C | C | | C | |
| Approach Delay (s) | | 16.0 | | | 17.3 | | | 21.8 | | | 21.6 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 17.2 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.47 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 54.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 932 | 488 | 50 | 715 | 0 | 0 | 0 | 0 | 16 | 0 | 727 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Lane Util. Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | 1.00 | 1.00 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | | 1.00 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (prot) | | 1863 | 1583 | 1770 | 1863 | | | | | | 1770 | 1583 |
| Flt Permitted | | 1.00 | 1.00 | 0.10 | 1.00 | | | | | | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1863 | 1583 | 186 | 1863 | | | | | | 1770 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 1013 | 530 | 54 | 777 | 0 | 0 | 0 | 0 | 17 | 0 | 790 |
| RTOR Reduction (vph) | 0 | 0 | 259 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
| Lane Group Flow (vph) | 0 | 1013 | 271 | 54 | 777 | 0 | 0 | 0 | 0 | 0 | 17 | 705 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 40.0 | 40.0 | 40.0 | 40.0 | | | | | | 32.0 | 32.0 |
| Effective Green, g (s) | | 40.0 | 40.0 | 40.0 | 40.0 | | | | | | 32.0 | 32.0 |
| Actuated g/C Ratio | | 0.50 | 0.50 | 0.50 | 0.50 | | | | | | 0.40 | 0.40 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 932 | 792 | 93 | 932 | | | | | | 708 | 633 |
| v/s Ratio Prot | | c0.54 | | | 0.42 | | | | | | | |
| v/s Ratio Perm | | | 0.17 | 0.29 | | | | | | | 0.01 | c0.45 |
| v/c Ratio | | 1.09 | 0.34 | 0.58 | 0.83 | | | | | | 0.02 | 1.11 |
| Uniform Delay, d1 | | 20.0 | 12.1 | 14.1 | 17.1 | | | | | | 14.5 | 24.0 |
| Progression Factor | | 0.50 | 0.81 | 0.37 | 0.38 | | | | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | 54.1 | 0.2 | 4.8 | 3.6 | | | | | | 0.1 | 71.4 |
| Delay (s) | | 64.1 | 10.0 | 10.1 | 10.1 | | | | | | 14.6 | 95.4 |
| Level of Service | | E | B | B | B | | | | | | B | F |
| Approach Delay (s) | | 45.5 | | | 10.1 | | | 0.0 | | | 93.7 | |
| Approach LOS | | D | | | B | | | A | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 48.5 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.10 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 136.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 740 | 208 | 0 | 0 | 236 | 24 | 531 | 52 | 89 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.99 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 1770 | 1863 | | | 1840 | | 1770 | 1863 | 1583 | | | |
| Flt Permitted | 0.56 | 1.00 | | | 1.00 | | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1047 | 1863 | | | 1840 | | 1770 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 804 | 226 | 0 | 0 | 257 | 26 | 577 | 57 | 97 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 68 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 804 | 226 | 0 | 0 | 279 | 0 | 577 | 57 | 29 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 48.0 | 48.0 | | | 48.0 | | 24.0 | 24.0 | 24.0 | | | |
| Effective Green, g (s) | 48.0 | 48.0 | | | 48.0 | | 24.0 | 24.0 | 24.0 | | | |
| Actuated g/C Ratio | 0.60 | 0.60 | | | 0.60 | | 0.30 | 0.30 | 0.30 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 628 | 1118 | | | 1104 | | 531 | 559 | 475 | | | |
| v/s Ratio Prot | | 0.12 | | | 0.15 | | | 0.03 | | | | |
| v/s Ratio Perm | c0.77 | | | | | | c0.33 | | 0.02 | | | |
| v/c Ratio | 1.28 | 0.20 | | | 0.25 | | 1.09 | 0.10 | 0.06 | | | |
| Uniform Delay, d1 | 16.0 | 7.3 | | | 7.5 | | 28.0 | 20.2 | 20.0 | | | |
| Progression Factor | 1.00 | 0.32 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 127.3 | 0.0 | | | 0.1 | | 64.6 | 0.4 | 0.2 | | | |
| Delay (s) | 143.2 | 2.3 | | | 7.7 | | 92.6 | 20.6 | 20.2 | | | |
| Level of Service | F | A | | | A | | F | C | C | | | |
| Approach Delay (s) | | 112.3 | | | 7.7 | | | 77.4 | | | 0.0 | |
| Approach LOS | | F | | | A | | | E | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 85.3 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.22 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 136.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 95 | 39 | 165 | 77 | 52 | 62 | 241 | 82 | 23 | 225 | 10 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 14 | 103 | 42 | 179 | 84 | 57 | 67 | 262 | 89 | 25 | 245 | 11 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total (vph) | 160 | 320 | 418 | 270 | 11 |
| Volume Left (vph) | 14 | 179 | 67 | 25 | 0 |
| Volume Right (vph) | 42 | 57 | 89 | 0 | 11 |
| Hadj (s) | -0.11 | 0.04 | -0.06 | 0.08 | -0.67 |
| Departure Headway (s) | 7.0 | 6.6 | 6.3 | 7.1 | 6.3 |
| Degree Utilization, x | 0.31 | 0.59 | 0.73 | 0.53 | 0.02 |
| Capacity (veh/h) | 432 | 492 | 547 | 466 | 518 |
| Control Delay (s) | 13.1 | 18.7 | 24.6 | 16.6 | 8.2 |
| Approach Delay (s) | 13.1 | 18.7 | 24.6 | 16.3 | |
| Approach LOS | B | C | C | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 19.4 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 72.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 79 | 163 | 2 | 47 | 250 | 132 | 5 | 2 | 31 | 23 | 136 | 82 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 86 | 177 | 2 | 51 | 272 | 143 | 5 | 2 | 34 | 25 | 148 | 89 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 265 | 466 | 41 | 262 |
| Volume Left (vph) | 86 | 51 | 5 | 25 |
| Volume Right (vph) | 2 | 143 | 34 | 89 |
| Hadj (s) | 0.09 | -0.13 | -0.43 | -0.15 |
| Departure Headway (s) | 5.6 | 5.1 | 6.0 | 5.7 |
| Degree Utilization, x | 0.41 | 0.66 | 0.07 | 0.42 |
| Capacity (veh/h) | 599 | 677 | 472 | 571 |
| Control Delay (s) | 12.5 | 17.6 | 9.4 | 12.8 |
| Approach Delay (s) | 12.5 | 17.6 | 9.4 | 12.8 |
| Approach LOS | B | C | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 14.8 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 52.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 18 | 15 | 363 | 18 | 18 | 399 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 20 | 16 | 395 | 20 | 20 | 434 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 877 | 404 | | | 414 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 877 | 404 | | | 414 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 94 | 97 | | | 98 | |
| cM capacity (veh/h) | 313 | 646 | | | 1145 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 36 | 414 | 453 |
| Volume Left | 20 | 0 | 20 |
| Volume Right | 16 | 20 | 0 |
| cSH | 409 | 1700 | 1145 |
| Volume to Capacity | 0.09 | 0.24 | 0.02 |
| Queue Length 95th (ft) | 7 | 0 | 1 |
| Control Delay (s) | 14.6 | 0.0 | 0.5 |
| Lane LOS | B | | A |
| Approach Delay (s) | 14.6 | 0.0 | 0.5 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.8 | | |
| Intersection Capacity Utilization | 45.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 9 | 44 | 1 | 15 | 37 | 2 | 2 | 2 | 12 | 126 | 2 | 15 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 10 | 48 | 1 | 16 | 40 | 2 | 2 | 2 | 13 | 137 | 2 | 16 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 42 | | | 49 | | | 159 | 143 | 48 | 156 | 142 | 41 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 42 | | | 49 | | | 159 | 143 | 48 | 156 | 142 | 41 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 99 | | | 100 | 100 | 99 | 83 | 100 | 98 |
| cM capacity (veh/h) | 1567 | | | 1558 | | | 782 | 736 | 1020 | 788 | 736 | 1030 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 59 | 59 | 17 | 155 |
| Volume Left | 10 | 16 | 2 | 137 |
| Volume Right | 1 | 2 | 13 | 16 |
| cSH | 1567 | 1558 | 939 | 807 |
| Volume to Capacity | 0.01 | 0.01 | 0.02 | 0.19 |
| Queue Length 95th (ft) | 0 | 1 | 1 | 18 |
| Control Delay (s) | 1.3 | 2.1 | 8.9 | 10.5 |
| Lane LOS | A | A | A | B |
| Approach Delay (s) | 1.3 | 2.1 | 8.9 | 10.5 |
| Approach LOS | | | A | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.8 | | |
| Intersection Capacity Utilization | 26.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 49 | 153 | 0 | 0 | 235 | 55 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 53 | 166 | 0 | 0 | 255 | 60 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 285 | 285 | 315 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 285 | 285 | 315 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 92 | 78 | 100 | | | |
| cM capacity (veh/h) | 705 | 754 | 1245 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 220 | 315 |
| Volume Left | 53 | 0 |
| Volume Right | 166 | 60 |
| cSH | 741 | 1700 |
| Volume to Capacity | 0.30 | 0.19 |
| Queue Length 95th (ft) | 31 | 0 |
| Control Delay (s) | 11.9 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 11.9 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.9 | | |
| Intersection Capacity Utilization | 34.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 11 | 38 | 70 | 14 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 12 | 41 | 76 | 15 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 12 | 41 | 76 | 15 |
| Volume Left (vph) | 0 | 0 | 0 | 15 |
| Volume Right (vph) | 12 | 0 | 76 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.05 | 0.07 | 0.02 |
| Capacity (veh/h) | 1018 | 890 | 1121 | 842 |
| Control Delay (s) | 6.5 | 7.2 | 6.4 | 7.3 |
| Approach Delay (s) | 6.5 | 6.7 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.7 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 117 | 343 | 65 | 89 | 388 | 57 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 127 | 373 | 71 | 97 | 422 | 62 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1024 | 84 | | | 167 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1024 | 84 | | | 167 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 21 | 61 | | | 70 | |
| cM capacity (veh/h) | 162 | 959 | | | 1408 | |

| Direction, Lane # | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 127 | 373 | 47 | 120 | 422 | 62 |
| Volume Left | 127 | 0 | 0 | 0 | 422 | 0 |
| Volume Right | 0 | 373 | 0 | 97 | 0 | 0 |
| cSH | 162 | 959 | 1700 | 1700 | 1408 | 1700 |
| Volume to Capacity | 0.79 | 0.39 | 0.03 | 0.07 | 0.30 | 0.04 |
| Queue Length 95th (ft) | 127 | 47 | 0 | 0 | 32 | 0 |
| Control Delay (s) | 79.9 | 11.1 | 0.0 | 0.0 | 8.6 | 0.0 |
| Lane LOS | F | B | | | A | |
| Approach Delay (s) | 28.6 | | 0.0 | | 7.5 | |
| Approach LOS | D | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 15.6 | | |
| Intersection Capacity Utilization | 42.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 3 | 1280 | 7 | 59 | 1322 | 76 | 1 | 0 | 67 | 59 | 9 | 13 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 3 | 1391 | 8 | 64 | 1437 | 83 | 1 | 0 | 73 | 64 | 10 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | 0.77 | | | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | |
| vC, conflicting volume | 1520 | | | 1399 | | | 2264 | 3046 | 696 | 2382 | 3012 | 760 |
| vC1, stage 1 conf vol | | | | | | | 1398 | 1398 | | 1607 | 1607 | |
| vC2, stage 2 conf vol | | | | | | | 866 | 1648 | | 775 | 1405 | |
| vCu, unblocked vol | 1520 | | | 933 | | | 2049 | 3059 | 25 | 2202 | 3015 | 760 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 89 | | | 99 | 100 | 91 | 31 | 91 | 96 |
| cM capacity (veh/h) | 435 | | | 565 | | | 158 | 114 | 810 | 93 | 110 | 349 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 3 | 696 | 696 | 8 | 64 | 958 | 562 | 74 | 88 |
| Volume Left | 3 | 0 | 0 | 0 | 64 | 0 | 0 | 1 | 64 |
| Volume Right | 0 | 0 | 0 | 8 | 0 | 0 | 83 | 73 | 14 |
| cSH | 435 | 1700 | 1700 | 1700 | 565 | 1700 | 1700 | 763 | 108 |
| Volume to Capacity | 0.01 | 0.41 | 0.41 | 0.00 | 0.11 | 0.56 | 0.33 | 0.10 | 0.82 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 10 | 0 | 0 | 8 | 116 |
| Control Delay (s) | 13.3 | 0.0 | 0.0 | 0.0 | 12.2 | 0.0 | 0.0 | 10.2 | 115.6 |
| Lane LOS | B | | | | B | | | B | F |
| Approach Delay (s) | 0.0 | | | | 0.5 | | | 10.2 | 115.6 |
| Approach LOS | | | | | | | | B | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.7 | | |
| Intersection Capacity Utilization | 63.5% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 232 | 1 | 70 | 0 | 0 | 0 | 86 | 47 | 2 | 4 | 35 | 179 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 252 | 1 | 76 | 0 | 0 | 0 | 93 | 51 | 2 | 4 | 38 | 195 |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 252 | 77 | 93 | 53 | 23 | 214 |
| Volume Left (vph) | 252 | 0 | 93 | 0 | 4 | 0 |
| Volume Right (vph) | 0 | 76 | 0 | 2 | 0 | 195 |
| Hadj (s) | 0.53 | -0.66 | 0.53 | 0.01 | 0.13 | -0.60 |
| Departure Headway (s) | 6.0 | 4.8 | 6.3 | 5.7 | 5.8 | 5.1 |
| Degree Utilization, x | 0.42 | 0.10 | 0.16 | 0.08 | 0.04 | 0.30 |
| Capacity (veh/h) | 574 | 704 | 544 | 589 | 585 | 676 |
| Control Delay (s) | 12.1 | 7.2 | 9.3 | 8.1 | 7.8 | 9.0 |
| Approach Delay (s) | 10.9 | | 8.8 | | 8.9 | |
| Approach LOS | B | | A | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 9.8 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 34.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

## *EXISTING PLUS PROJECT WITH MITIGATION*

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 29 | 143 | 81 | 123 | 148 | 68 | 69 | 230 | 78 | 49 | 182 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 32 | 155 | 88 | 134 | 161 | 74 | 75 | 250 | 85 | 53 | 198 | 18 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 275 | 368 | 75 | 335 | 251 | 18 |
| Volume Left (vph) | 32 | 134 | 75 | 0 | 53 | 0 |
| Volume Right (vph) | 88 | 74 | 0 | 85 | 0 | 18 |
| Hadj (s) | -0.14 | -0.01 | 0.53 | -0.14 | 0.14 | -0.67 |
| Departure Headway (s) | 7.2 | 7.0 | 8.2 | 7.5 | 8.0 | 7.2 |
| Degree Utilization, x | 0.55 | 0.72 | 0.17 | 0.69 | 0.56 | 0.04 |
| Capacity (veh/h) | 450 | 482 | 417 | 458 | 409 | 450 |
| Control Delay (s) | 18.7 | 26.0 | 11.6 | 24.5 | 19.6 | 9.3 |
| Approach Delay (s) | 18.7 | 26.0 | 22.1 | | 18.9 | |
| Approach LOS | C | D | C | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 21.8 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 75.3% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 6 | 1032 | 6 | 52 | 1138 | 56 | 3 | 0 | 55 | 0 | 0 | 65 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 7 | 1122 | 7 | 57 | 1237 | 61 | 3 | 0 | 60 | 0 | 0 | 71 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | 0.82 | | | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | |
| vC, conflicting volume | 1298 | | | 1128 | | | 1937 | 2546 | 561 | 2014 | 2522 | 649 |
| vC1, stage 1 conf vol | | | | | | | 1135 | 1135 | | 1380 | 1380 | |
| vC2, stage 2 conf vol | | | | | | | 802 | 1411 | | 634 | 1141 | |
| vCu, unblocked vol | 1298 | | | 725 | | | 1708 | 2448 | 36 | 1802 | 2419 | 649 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 92 | | | 98 | 100 | 93 | 100 | 100 | 83 |
| cM capacity (veh/h) | 530 | | | 719 | | | 193 | 155 | 846 | 134 | 155 | 412 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 7 | 561 | 561 | 7 | 57 | 825 | 473 | 63 | 71 |
| Volume Left | 7 | 0 | 0 | 0 | 57 | 0 | 0 | 3 | 0 |
| Volume Right | 0 | 0 | 0 | 7 | 0 | 0 | 61 | 60 | 71 |
| cSH | 530 | 1700 | 1700 | 1700 | 719 | 1700 | 1700 | 720 | 412 |
| Volume to Capacity | 0.01 | 0.33 | 0.33 | 0.00 | 0.08 | 0.49 | 0.28 | 0.09 | 0.17 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 7 | 15 |
| Control Delay (s) | 11.9 | 0.0 | 0.0 | 0.0 | 10.4 | 0.0 | 0.0 | 10.5 | 15.5 |
| Lane LOS | B | | | | B | | | B | C |
| Approach Delay (s) | 0.1 | | | | 0.4 | | | 10.5 | 15.5 |
| Approach LOS | | | | | | | | B | C |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 50.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 3 | 1280 | 7 | 59 | 1322 | 76 | 1 | 0 | 67 | 0 | 0 | 81 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 3 | 1391 | 8 | 64 | 1437 | 83 | 1 | 0 | 73 | 0 | 0 | 88 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | TWLTL | | | TWLTL | | | | | | | |
| Median storage veh) | | 2 | | | 2 | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | | | | 0.77 | | | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | |
| vC, conflicting volume | 1520 | | | 1399 | | | 2333 | 3046 | 696 | 2382 | 3012 | 760 |
| vC1, stage 1 conf vol | | | | | | | 1398 | 1398 | | 1607 | 1607 | |
| vC2, stage 2 conf vol | | | | | | | 935 | 1648 | | 775 | 1405 | |
| vCu, unblocked vol | 1520 | | | 933 | | | 2138 | 3059 | 25 | 2202 | 3015 | 760 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | 6.5 | 5.5 | | 6.5 | 5.5 | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 99 | | | 89 | | | 99 | 100 | 91 | 100 | 100 | 75 |
| cM capacity (veh/h) | 435 | | | 565 | | | 136 | 114 | 810 | 93 | 110 | 349 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | EB 4 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|---|
| Volume Total | 3 | 696 | 696 | 8 | 64 | 958 | 562 | 74 | 88 |
| Volume Left | 3 | 0 | 0 | 0 | 64 | 0 | 0 | 1 | 0 |
| Volume Right | 0 | 0 | 0 | 8 | 0 | 0 | 83 | 73 | 88 |
| cSH | 435 | 1700 | 1700 | 1700 | 565 | 1700 | 1700 | 755 | 349 |
| Volume to Capacity | 0.01 | 0.41 | 0.41 | 0.00 | 0.11 | 0.56 | 0.33 | 0.10 | 0.25 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 10 | 0 | 0 | 8 | 25 |
| Control Delay (s) | 13.3 | 0.0 | 0.0 | 0.0 | 12.2 | 0.0 | 0.0 | 10.3 | 18.8 |
| Lane LOS | B | | | | B | | | B | C |
| Approach Delay (s) | 0.0 | | | | 0.5 | | | 10.3 | 18.8 |
| Approach LOS | | | | | | | | B | C |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 58.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 740 | 208 | 0 | 0 | 236 | 24 | 531 | 52 | 89 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.95 | 0.95 | | | 1.00 | | 0.95 | 0.95 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 0.99 | | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 0.97 | | | 1.00 | | 0.95 | 0.96 | 1.00 | | | |
| Satd. Flow (prot) | 1681 | 1721 | | | 1840 | | 1681 | 1700 | 1583 | | | |
| Flt Permitted | 0.95 | 0.97 | | | 1.00 | | 0.95 | 0.96 | 1.00 | | | |
| Satd. Flow (perm) | 1681 | 1721 | | | 1840 | | 1681 | 1700 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 804 | 226 | 0 | 0 | 257 | 26 | 577 | 57 | 97 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 48 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 507 | 523 | 0 | 0 | 277 | 0 | 317 | 317 | 49 | 0 | 0 | 0 |
| Turn Type | Split | | | | | | Perm | | Perm | | | |
| Protected Phases | 4 | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | | | | | | | 2 | | 2 | | | |
| Actuated Green, G (s) | 21.0 | 21.0 | | | 13.8 | | 18.2 | 18.2 | 18.2 | | | |
| Effective Green, g (s) | 21.0 | 21.0 | | | 13.8 | | 18.2 | 18.2 | 18.2 | | | |
| Actuated g/C Ratio | 0.32 | 0.32 | | | 0.21 | | 0.28 | 0.28 | 0.28 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 543 | 556 | | | 391 | | 471 | 476 | 443 | | | |
| v/s Ratio Prot | 0.30 | c0.30 | | | c0.15 | | | | | | | |
| v/s Ratio Perm | | | | | | | c0.19 | 0.19 | 0.03 | | | |
| v/c Ratio | 0.93 | 0.94 | | | 0.71 | | 0.67 | 0.67 | 0.11 | | | |
| Uniform Delay, d1 | 21.3 | 21.4 | | | 23.7 | | 20.8 | 20.7 | 17.4 | | | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 23.3 | 24.3 | | | 5.8 | | 7.5 | 7.2 | 0.5 | | | |
| Delay (s) | 44.6 | 45.7 | | | 29.6 | | 28.2 | 27.9 | 17.9 | | | |
| Level of Service | D | D | | | C | | C | C | B | | | |
| Approach Delay (s) | | 45.2 | | | 29.6 | | | 26.7 | | | 0.0 | |
| Approach LOS | | D | | | C | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 36.4 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.79 | | |
| Actuated Cycle Length (s) | 65.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 122.9% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

## *CUMULATIVE BUILDOUT BASELINE*

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 99 | 407 | 50 | 99 | 489 | 53 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 108 | 442 | 54 | 108 | 532 | 58 |
| RTOR Reduction (vph) | 0 | 375 | 0 | 64 | 0 | 0 |
| Lane Group Flow (vph) | 108 | 67 | 54 | 44 | 532 | 58 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 9.1 | 9.1 | 24.5 | 24.5 | 14.4 | 42.9 |
| Effective Green, g (s) | 9.1 | 9.1 | 24.5 | 24.5 | 14.4 | 42.9 |
| Actuated g/C Ratio | 0.15 | 0.15 | 0.41 | 0.41 | 0.24 | 0.71 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 268 | 423 | 1445 | 646 | 824 | 1332 |
| v/s Ratio Prot | c0.06 | | 0.02 | | c0.15 | 0.03 |
| v/s Ratio Perm | | 0.02 | | c0.03 | | |
| v/c Ratio | 0.40 | 0.16 | 0.04 | 0.07 | 0.65 | 0.04 |
| Uniform Delay, d1 | 23.0 | 22.1 | 10.7 | 10.8 | 20.5 | 2.5 |
| Progression Factor | 0.05 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.9 | 0.2 | 0.0 | 0.2 | 1.7 | 0.1 |
| Delay (s) | 2.1 | 16.5 | 10.7 | 11.0 | 22.3 | 2.6 |
| Level of Service | A | B | B | B | C | A |
| Approach Delay (s) | 13.7 | | 10.9 | | | 20.3 |
| Approach LOS | B | | B | | | C |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 16.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 32.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 12 | 576 | 0 | 0 | 498 | 25 | 0 | 0 | 0 | 60 | 0 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | | | | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.99 | | | | | | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | | 0.96 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3514 | | | | | | 1755 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | | | | | | 0.82 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3514 | | | | | | 1501 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 13 | 626 | 0 | 0 | 541 | 27 | 0 | 0 | 0 | 65 | 0 | 9 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 13 | 626 | 0 | 0 | 561 | 0 | 0 | 0 | 0 | 0 | 70 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.4 | 21.8 | | | 16.4 | | | | | | 30.2 | |
| Effective Green, g (s) | 1.4 | 21.8 | | | 16.4 | | | | | | 30.2 | |
| Actuated g/C Ratio | 0.02 | 0.36 | | | 0.27 | | | | | | 0.50 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | 41 | 1286 | | | 960 | | | | | | 756 | |
| v/s Ratio Prot | 0.01 | c0.18 | | | c0.16 | | | | | | | |
| v/s Ratio Perm | | | | | | | | | | | c0.05 | |
| v/c Ratio | 0.32 | 0.49 | | | 0.58 | | | | | | 0.09 | |
| Uniform Delay, d1 | 28.8 | 14.8 | | | 18.9 | | | | | | 7.8 | |
| Progression Factor | 0.59 | 0.18 | | | 0.66 | | | | | | 0.98 | |
| Incremental Delay, d2 | 3.9 | 0.3 | | | 0.8 | | | | | | 0.1 | |
| Delay (s) | 20.8 | 2.9 | | | 13.3 | | | | | | 7.7 | |
| Level of Service | C | A | | | B | | | | | | A | |
| Approach Delay (s) | | 3.2 | | | 13.3 | | | 0.0 | | | 7.7 | |
| Approach LOS | | A | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 8.0 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.27 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 26.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 6 | 630 | 0 | 0 | 519 | 100 | 0 | 0 | 0 | 62 | 0 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3539 | 1583 | | | | 1681 | 1666 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.76 | 0.86 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3539 | 1583 | | | | 1340 | 1491 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 7 | 685 | 0 | 0 | 564 | 109 | 0 | 0 | 0 | 67 | 0 | 4 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 77 | 0 | 0 | 0 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 7 | 685 | 0 | 0 | 564 | 32 | 0 | 0 | 0 | 36 | 33 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.3 | 22.8 | | | 17.5 | 17.5 | | | | 29.2 | 29.2 | |
| Effective Green, g (s) | 1.3 | 22.8 | | | 17.5 | 17.5 | | | | 29.2 | 29.2 | |
| Actuated g/C Ratio | 0.02 | 0.38 | | | 0.29 | 0.29 | | | | 0.49 | 0.49 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 38 | 1345 | | | 1032 | 462 | | | | 652 | 726 | |
| v/s Ratio Prot | 0.00 | c0.19 | | | 0.16 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.02 | | | | c0.03 | 0.02 | |
| v/c Ratio | 0.18 | 0.51 | | | 0.55 | 0.07 | | | | 0.06 | 0.05 | |
| Uniform Delay, d1 | 28.8 | 14.3 | | | 17.9 | 15.4 | | | | 8.1 | 8.1 | |
| Progression Factor | 0.55 | 1.06 | | | 0.58 | 0.03 | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 0.3 | | | 0.6 | 0.1 | | | | 0.2 | 0.1 | |
| Delay (s) | 18.2 | 15.4 | | | 10.9 | 0.5 | | | | 8.3 | 8.2 | |
| Level of Service | B | B | | | B | A | | | | A | A | |
| Approach Delay (s) | | 15.5 | | | 9.2 | | | 0.0 | | | 8.2 | |
| Approach LOS | | B | | | A | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.2 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.25 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 27.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 100 | 507 | 85 | 49 | 550 | 103 | 19 | 9 | 31 | 167 | 14 | 50 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 109 | 551 | 92 | 53 | 598 | 112 | 21 | 10 | 34 | 182 | 15 | 54 |
| RTOR Reduction (vph) | 0 | 0 | 68 | 0 | 0 | 88 | 0 | 0 | 26 | 0 | 0 | 32 |
| Lane Group Flow (vph) | 109 | 551 | 24 | 53 | 598 | 24 | 21 | 10 | 8 | 182 | 15 | 22 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 6.2 | 15.9 | 15.9 | 3.4 | 13.1 | 13.1 | 0.8 | 13.6 | 13.6 | 11.1 | 23.9 | 23.9 |
| Effective Green, g (s) | 6.2 | 15.9 | 15.9 | 3.4 | 13.1 | 13.1 | 0.8 | 13.6 | 13.6 | 11.1 | 23.9 | 23.9 |
| Actuated g/C Ratio | 0.10 | 0.27 | 0.27 | 0.06 | 0.22 | 0.22 | 0.01 | 0.23 | 0.23 | 0.18 | 0.40 | 0.40 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 355 | 1348 | 419 | 195 | 1110 | 346 | 46 | 802 | 359 | 635 | 1410 | 631 |
| v/s Ratio Prot | 0.03 | c0.11 | | 0.02 | c0.12 | | 0.01 | 0.00 | | c0.05 | 0.00 | |
| v/s Ratio Perm | | | 0.02 | | | 0.02 | | | 0.00 | | | c0.01 |
| v/c Ratio | 0.31 | 0.41 | 0.06 | 0.27 | 0.54 | 0.07 | 0.46 | 0.01 | 0.02 | 0.29 | 0.01 | 0.03 |
| Uniform Delay, d1 | 24.9 | 18.2 | 16.5 | 27.1 | 20.8 | 18.6 | 29.4 | 18.0 | 18.0 | 21.0 | 10.9 | 11.0 |
| Progression Factor | 0.30 | 0.43 | 0.03 | 0.51 | 0.55 | 1.40 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.5 | 0.2 | 0.1 | 0.7 | 0.5 | 0.1 | 7.0 | 0.0 | 0.1 | 0.3 | 0.0 | 0.1 |
| Delay (s) | 8.0 | 8.1 | 0.5 | 14.6 | 12.0 | 26.2 | 36.4 | 18.0 | 18.1 | 21.3 | 10.9 | 11.1 |
| Level of Service | A | A | A | B | B | C | D | B | B | C | B | B |
| Approach Delay (s) | | 7.1 | | | 14.2 | | | 24.0 | | | 18.5 | |
| Approach LOS | | A | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 35.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 41 | 647 | 17 | 158 | 685 | 155 | 11 | 4 | 71 | 53 | 4 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.96 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1530 | 1504 | | 1763 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.71 | 1.00 | 1.00 | | 0.80 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1326 | 1530 | 1504 | | 1474 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 45 | 703 | 18 | 172 | 745 | 168 | 12 | 4 | 77 | 58 | 4 | 7 |
| RTOR Reduction (vph) | 0 | 0 | 14 | 0 | 0 | 109 | 0 | 22 | 24 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 45 | 703 | 5 | 172 | 745 | 59 | 12 | 19 | 16 | 0 | 65 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 2.4 | 15.0 | 15.0 | 8.5 | 21.1 | 21.1 | 24.5 | 24.5 | 24.5 | | 24.5 | |
| Effective Green, g (s) | 2.4 | 15.0 | 15.0 | 8.5 | 21.1 | 21.1 | 24.5 | 24.5 | 24.5 | | 24.5 | |
| Actuated g/C Ratio | 0.04 | 0.25 | 0.25 | 0.14 | 0.35 | 0.35 | 0.41 | 0.41 | 0.41 | | 0.41 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 137 | 1271 | 396 | 486 | 1788 | 557 | 541 | 625 | 614 | | 602 | |
| v/s Ratio Prot | 0.01 | c0.14 | | 0.05 | c0.15 | | | 0.01 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.04 | 0.01 | | 0.01 | | c0.04 | |
| v/c Ratio | 0.33 | 0.55 | 0.01 | 0.35 | 0.42 | 0.11 | 0.02 | 0.03 | 0.03 | | 0.11 | |
| Uniform Delay, d1 | 28.0 | 19.6 | 16.9 | 23.3 | 14.8 | 13.1 | 10.6 | 10.6 | 10.6 | | 11.0 | |
| Progression Factor | 0.65 | 0.69 | 0.54 | 0.82 | 0.92 | 0.73 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.3 | 0.5 | 0.0 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | | 0.4 | |
| Delay (s) | 19.5 | 14.1 | 9.1 | 19.5 | 13.8 | 9.7 | 10.7 | 10.7 | 10.7 | | 11.3 | |
| Level of Service | B | B | A | B | B | A | B | B | B | | B | |
| Approach Delay (s) | | 14.3 | | | 14.1 | | | 10.7 | | | 11.3 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.9 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.30 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 37.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 351 | 453 | 95 | 528 | 0 | 0 | 0 | 0 | 136 | 7 | 597 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.97 | 0.95 | 0.95 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 3433 | 1511 | 1504 |
| Flt Permitted | | 1.00 | 1.00 | 0.52 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 963 | 5085 | | | | | 3433 | 1511 | 1504 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 382 | 492 | 103 | 574 | 0 | 0 | 0 | 0 | 148 | 8 | 649 |
| RTOR Reduction (vph) | 0 | 0 | 377 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 51 |
| Lane Group Flow (vph) | 0 | 382 | 115 | 103 | 574 | 0 | 0 | 0 | 0 | 148 | 275 | 280 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 14.0 | 14.0 | 14.0 | 14.0 | | | | | 38.0 | 38.0 | 38.0 |
| Effective Green, g (s) | | 14.0 | 14.0 | 14.0 | 14.0 | | | | | 38.0 | 38.0 | 38.0 |
| Actuated g/C Ratio | | 0.23 | 0.23 | 0.23 | 0.23 | | | | | 0.63 | 0.63 | 0.63 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1187 | 650 | 225 | 1187 | | | | | 2174 | 957 | 953 |
| v/s Ratio Prot | | 0.08 | | | c0.11 | | | | | | 0.18 | |
| v/s Ratio Perm | | | 0.04 | 0.11 | | | | | | 0.04 | | c0.19 |
| v/c Ratio | | 0.32 | 0.18 | 0.46 | 0.48 | | | | | 0.07 | 0.29 | 0.29 |
| Uniform Delay, d1 | | 19.1 | 18.4 | 19.7 | 19.9 | | | | | 4.2 | 4.9 | 5.0 |
| Progression Factor | | 0.21 | 0.18 | 1.14 | 1.13 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.2 | 0.1 | 1.5 | 0.3 | | | | | 0.1 | 0.8 | 0.8 |
| Delay (s) | | 4.2 | 3.5 | 24.0 | 22.8 | | | | | 4.3 | 5.7 | 5.7 |
| Level of Service | | A | A | C | C | | | | | A | A | A |
| Approach Delay (s) | | 3.8 | | | 23.0 | | | 0.0 | | | 5.4 | |
| Approach LOS | | A | | | C | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 9.9 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.35 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 43.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 267 | 220 | 0 | 0 | 260 | 53 | 363 | 81 | 258 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.94 | 0.91 | | | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Flt Permitted | 0.57 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 3001 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 290 | 239 | 0 | 0 | 283 | 58 | 395 | 88 | 280 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 92 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 290 | 239 | 0 | 0 | 283 | 11 | 395 | 88 | 188 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | Perm | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | | | |
| Actuated Green, G (s) | 11.8 | 11.8 | | | 11.8 | 11.8 | 40.2 | 40.2 | 40.2 | | | |
| Effective Green, g (s) | 11.8 | 11.8 | | | 11.8 | 11.8 | 40.2 | 40.2 | 40.2 | | | |
| Actuated g/C Ratio | 0.20 | 0.20 | | | 0.20 | 0.20 | 0.67 | 0.67 | 0.67 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 590 | 1000 | | | 1000 | 311 | 2300 | 1248 | 1061 | | | |
| v/s Ratio Prot | | 0.05 | | | 0.06 | | | 0.05 | | | | |
| v/s Ratio Perm | c0.10 | | | | | 0.01 | 0.12 | | c0.12 | | | |
| v/c Ratio | 0.49 | 0.24 | | | 0.28 | 0.04 | 0.17 | 0.07 | 0.18 | | | |
| Uniform Delay, d1 | 21.4 | 20.3 | | | 20.5 | 19.5 | 3.7 | 3.4 | 3.7 | | | |
| Progression Factor | 0.49 | 0.46 | | | 0.72 | 0.45 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 0.6 | 0.1 | | | 0.2 | 0.0 | 0.2 | 0.1 | 0.4 | | | |
| Delay (s) | 11.2 | 9.5 | | | 14.9 | 8.7 | 3.9 | 3.5 | 4.1 | | | |
| Level of Service | B | A | | | B | A | A | A | A | | | |
| Approach Delay (s) | | 10.4 | | | 13.8 | | | 3.9 | | | 0.0 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 8.1 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.25 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 43.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 276 | 8 | 206 | 0 | 0 | 0 | 94 | 42 | 1 | 6 | 96 | 184 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 1.00 | | 1.00 | 0.90 | |
| Flt Protected | 0.95 | 0.96 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1690 | 1583 | | | | 1770 | 3528 | | 1770 | 3190 | |
| Flt Permitted | 0.95 | 0.96 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1690 | 1583 | | | | 1770 | 3528 | | 1770 | 3190 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 300 | 9 | 224 | 0 | 0 | 0 | 102 | 46 | 1 | 7 | 104 | 200 |
| RTOR Reduction (vph) | 0 | 0 | 181 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 0 |
| Lane Group Flow (vph) | 153 | 156 | 43 | 0 | 0 | 0 | 102 | 47 | 0 | 7 | 192 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 11.6 | 11.6 | 11.6 | | | | 10.0 | 35.1 | | 1.3 | 26.4 | |
| Effective Green, g (s) | 11.6 | 11.6 | 11.6 | | | | 10.0 | 35.1 | | 1.3 | 26.4 | |
| Actuated g/C Ratio | 0.19 | 0.19 | 0.19 | | | | 0.17 | 0.59 | | 0.02 | 0.44 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 325 | 327 | 306 | | | | 295 | 2064 | | 38 | 1404 | |
| v/s Ratio Prot | | | | | | | c0.06 | 0.01 | | 0.00 | c0.06 | |
| v/s Ratio Perm | 0.09 | 0.09 | 0.03 | | | | | | | | | |
| v/c Ratio | 0.47 | 0.48 | 0.14 | | | | 0.35 | 0.02 | | 0.18 | 0.14 | |
| Uniform Delay, d1 | 21.5 | 21.5 | 20.1 | | | | 22.1 | 5.2 | | 28.8 | 10.0 | |
| Progression Factor | 0.72 | 0.72 | 0.48 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 1.1 | 0.2 | | | | 0.7 | 0.0 | | 2.3 | 0.2 | |
| Delay (s) | 16.4 | 16.5 | 9.8 | | | | 22.8 | 5.3 | | 31.2 | 10.2 | |
| Level of Service | B | B | A | | | | C | A | | C | B | |
| Approach Delay (s) | | 13.7 | | | 0.0 | | | 17.3 | | | 10.7 | |
| Approach LOS | | B | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.26 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 31.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 19 | 106 | 48 | 10 | 79 | 73 | 175 | 173 | 63 | 104 | 140 | 24 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 115 | 52 | 11 | 86 | 79 | 190 | 188 | 68 | 113 | 152 | 26 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 188 | 176 | 284 | 163 | 265 | 26 |
| Volume Left (vph) | 21 | 11 | 190 | 0 | 113 | 0 |
| Volume Right (vph) | 52 | 79 | 0 | 68 | 0 | 26 |
| Hadj (s) | -0.11 | -0.22 | 0.37 | -0.26 | 0.25 | -0.67 |
| Departure Headway (s) | 6.2 | 6.1 | 6.5 | 5.9 | 6.6 | 5.7 |
| Degree Utilization, x | 0.32 | 0.30 | 0.52 | 0.27 | 0.49 | 0.04 |
| Capacity (veh/h) | 526 | 528 | 523 | 581 | 516 | 588 |
| Control Delay (s) | 12.1 | 11.6 | 15.1 | 9.8 | 14.5 | 7.7 |
| Approach Delay (s) | 12.1 | 11.6 | 13.1 | | 13.9 | |
| Approach LOS | B | B | B | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 12.9 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 49.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 220 | 38 | 59 | 170 | 3 | 28 | 91 | 73 | 22 | 101 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 14 | 239 | 41 | 64 | 185 | 3 | 30 | 99 | 79 | 24 | 110 | 9 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 295 | 252 | 209 | 142 |
| Volume Left (vph) | 14 | 64 | 30 | 24 |
| Volume Right (vph) | 41 | 3 | 79 | 9 |
| Hadj (s) | -0.04 | 0.08 | -0.16 | 0.03 |
| Departure Headway (s) | 5.3 | 5.5 | 5.5 | 5.8 |
| Degree Utilization, x | 0.43 | 0.38 | 0.32 | 0.23 |
| Capacity (veh/h) | 634 | 611 | 588 | 546 |
| Control Delay (s) | 12.3 | 11.8 | 11.1 | 10.6 |
| Approach Delay (s) | 12.3 | 11.8 | 11.1 | 10.6 |
| Approach LOS | B | B | B | B |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 11.6 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 50.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 12 | 62 | 261 | 27 | 108 | 217 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 13 | 67 | 284 | 29 | 117 | 236 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 651 | 157 | | | 313 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 651 | 157 | | | 313 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 96 | 92 | | | 91 | |
| cM capacity (veh/h) | 363 | 861 | | | 1244 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 80 | 189 | 124 | 196 | 157 |
| Volume Left | 13 | 0 | 0 | 117 | 0 |
| Volume Right | 67 | 0 | 29 | 0 | 0 |
| cSH | 705 | 1700 | 1700 | 1244 | 1700 |
| Volume to Capacity | 0.11 | 0.11 | 0.07 | 0.09 | 0.09 |
| Queue Length 95th (ft) | 10 | 0 | 0 | 8 | 0 |
| Control Delay (s) | 10.8 | 0.0 | 0.0 | 5.2 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s) | 10.8 | 0.0 | | 2.9 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.5 | | |
| Intersection Capacity Utilization | 31.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 43 | 108 | 4 | 55 | 49 | 26 | 6 | 72 | 42 | 44 | 110 | 19 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 47 | 117 | 4 | 60 | 53 | 28 | 7 | 78 | 46 | 48 | 120 | 21 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 82 | | | 122 | | | 480 | 414 | 120 | 485 | 402 | 67 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 82 | | | 122 | | | 480 | 414 | 120 | 485 | 402 | 67 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 96 | | | 98 | 84 | 95 | 88 | 76 | 98 |
| cM capacity (veh/h) | 1516 | | | 1466 | | | 375 | 491 | 932 | 390 | 499 | 996 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 168 | 141 | 130 | 188 |
| Volume Left | 47 | 60 | 7 | 48 |
| Volume Right | 4 | 28 | 46 | 21 |
| cSH | 1516 | 1466 | 578 | 491 |
| Volume to Capacity | 0.03 | 0.04 | 0.23 | 0.38 |
| Queue Length 95th (ft) | 2 | 3 | 22 | 44 |
| Control Delay (s) | 2.2 | 3.4 | 13.0 | 16.8 |
| Lane LOS | A | A | B | C |
| Approach Delay (s) | 2.2 | 3.4 | 13.0 | 16.8 |
| Approach LOS | | | B | C |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 9.1 | | |
| Intersection Capacity Utilization | 34.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 61 | 116 | 0 | 0 | 169 | 125 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 126 | 0 | 0 | 184 | 136 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 252 | 252 | 320 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 252 | 252 | 320 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 91 | 84 | 100 | | | |
| cM capacity (veh/h) | 737 | 787 | 1240 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 192 | 320 |
| Volume Left | 66 | 0 |
| Volume Right | 126 | 136 |
| cSH | 769 | 1700 |
| Volume to Capacity | 0.25 | 0.19 |
| Queue Length 95th (ft) | 25 | 0 |
| Control Delay (s) | 11.2 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 11.2 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.2 | | |
| Intersection Capacity Utilization | 33.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 10 | 56 | 82 | 22 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 61 | 89 | 24 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 11 | 61 | 89 | 24 |
| Volume Left (vph) | 0 | 0 | 0 | 24 |
| Volume Right (vph) | 11 | 0 | 89 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.07 | 0.08 | 0.03 |
| Capacity (veh/h) | 994 | 889 | 1121 | 838 |
| Control Delay (s) | 6.6 | 7.3 | 6.5 | 7.3 |
| Approach Delay (s) | 6.6 | 6.8 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 15.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 0 | 13 | 0 | 0 | 16 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 14 | 0 | 0 | 17 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 0 | | 28 | 0 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 0 | | 28 | 0 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 99 | | 100 | 98 |
| cM capacity (veh/h) | | | 1623 | | 978 | 1085 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 0 | 14 | 0 | 17 |
| Volume Left | 0 | 14 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 17 |
| cSH | 1700 | 1623 | 1700 | 1085 |
| Volume to Capacity | 0.00 | 0.01 | 0.00 | 0.02 |
| Queue Length 95th (ft) | 0 | 1 | 0 | 1 |
| Control Delay (s) | 0.0 | 7.2 | 0.0 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.2 | 8.4 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.9 | | |
| Intersection Capacity Utilization | 6.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 11 | 5 | 2 | 47 | 135 | 11 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 5 | 2 | 51 | 147 | 12 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 183 | 153 | 159 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 183 | 153 | 159 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 99 | 100 | | | |
| cM capacity (veh/h) | 788 | 866 | 1418 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 12 | 5 | 2 | 26 | 26 | 159 |
| Volume Left | 12 | 0 | 2 | 0 | 0 | 0 |
| Volume Right | 0 | 5 | 0 | 0 | 0 | 12 |
| cSH | 788 | 866 | 1418 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.02 | 0.01 | 0.00 | 0.02 | 0.02 | 0.09 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 9.6 | 9.2 | 7.5 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | A | A | | | |
| Approach Delay (s) | 9.5 | | 0.3 | | | 0.0 |
| Approach LOS | A | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.8 | | |
| Intersection Capacity Utilization | 17.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 768 | 3 | 0 | 986 | 139 | 0 | 0 | 36 | 0 | 0 | 12 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 835 | 3 | 0 | 1072 | 151 | 0 | 0 | 39 | 0 | 0 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.92 | | | 0.85 | | | 0.90 | 0.90 | 0.85 | 0.90 | 0.90 | 0.92 |
| vC, conflicting volume | 1223 | | | 838 | | | 1205 | 2058 | 417 | 1604 | 1985 | 433 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 919 | | | 469 | | | 430 | 1380 | 0 | 874 | 1300 | 55 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 96 | 100 | 100 | 99 |
| cM capacity (veh/h) | 676 | | | 930 | | | 450 | 128 | 926 | 209 | 144 | 915 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 417 | 417 | 3 | 429 | 429 | 365 | 39 | 13 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 3 | 0 | 0 | 151 | 39 | 13 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 926 | 915 |
| Volume to Capacity | 0.25 | 0.25 | 0.00 | 0.25 | 0.25 | 0.21 | 0.04 | 0.01 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.1 | 9.0 |
| Lane LOS | | | | | | | A | A |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 9.1 | 9.0 |
| Approach LOS | | | | | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 32.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 118 | 915 | 83 | 313 | 1142 | 67 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 128 | 995 | 90 | 340 | 1241 | 73 |
| RTOR Reduction (vph) | 0 | 829 | 0 | 260 | 0 | 0 |
| Lane Group Flow (vph) | 128 | 166 | 90 | 80 | 1241 | 73 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 11.7 | 11.7 | 16.4 | 16.4 | 29.9 | 50.3 |
| Effective Green, g (s) | 11.7 | 11.7 | 16.4 | 16.4 | 29.9 | 50.3 |
| Actuated g/C Ratio | 0.17 | 0.17 | 0.23 | 0.23 | 0.43 | 0.72 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 296 | 466 | 829 | 371 | 1466 | 1339 |
| v/s Ratio Prot | c0.07 | | 0.03 | | c0.36 | 0.04 |
| v/s Ratio Perm | | 0.06 | | c0.05 | | |
| v/c Ratio | 0.43 | 0.36 | 0.11 | 0.21 | 0.85 | 0.05 |
| Uniform Delay, d1 | 26.2 | 25.8 | 21.1 | 21.6 | 18.0 | 2.9 |
| Progression Factor | 0.80 | 3.55 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.8 | 0.4 | 0.3 | 1.3 | 4.7 | 0.1 |
| Delay (s) | 21.8 | 92.1 | 21.3 | 22.9 | 22.7 | 3.0 |
| Level of Service | C | F | C | C | C | A |
| Approach Delay (s) | 84.1 | | 22.6 | | | 21.6 |
| Approach LOS | F | | C | | | C |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 46.2 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.58 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 58.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 39 | 1416 | 0 | 0 | 1025 | 84 | 0 | 0 | 0 | 58 | 0 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | | | | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.99 | | | | | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3499 | | | | | | 1707 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | | | | | | 0.85 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3499 | | | | | | 1492 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 42 | 1539 | 0 | 0 | 1114 | 91 | 0 | 0 | 0 | 63 | 0 | 46 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 34 | 0 |
| Lane Group Flow (vph) | 42 | 1539 | 0 | 0 | 1196 | 0 | 0 | 0 | 0 | 0 | 75 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 4.2 | 43.7 | | | 35.5 | | | | | | 18.3 | |
| Effective Green, g (s) | 4.2 | 43.7 | | | 35.5 | | | | | | 18.3 | |
| Actuated g/C Ratio | 0.06 | 0.62 | | | 0.51 | | | | | | 0.26 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | 106 | 2209 | | | 1774 | | | | | | 390 | |
| v/s Ratio Prot | 0.02 | c0.43 | | | 0.34 | | | | | | | |
| v/s Ratio Perm | | | | | | | | | | | c0.05 | |
| v/c Ratio | 0.40 | 0.70 | | | 0.67 | | | | | | 0.19 | |
| Uniform Delay, d1 | 31.7 | 8.7 | | | 12.9 | | | | | | 20.1 | |
| Progression Factor | 0.76 | 0.32 | | | 1.20 | | | | | | 1.02 | |
| Incremental Delay, d2 | 1.5 | 0.6 | | | 0.8 | | | | | | 0.2 | |
| Delay (s) | 25.5 | 3.4 | | | 16.3 | | | | | | 20.7 | |
| Level of Service | C | A | | | B | | | | | | C | |
| Approach Delay (s) | | 4.0 | | | 16.3 | | | 0.0 | | | 20.7 | |
| Approach LOS | | A | | | B | | | A | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 9.7 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.55 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 51.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 20 | 1454 | 0 | 0 | 1088 | 320 | 0 | 0 | 0 | 346 | 0 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3539 | 1583 | | | | 1681 | 1665 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.76 | 0.75 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3539 | 1583 | | | | 1340 | 1304 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 22 | 1580 | 0 | 0 | 1183 | 348 | 0 | 0 | 0 | 376 | 0 | 23 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 144 | 0 | 0 | 0 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 22 | 1580 | 0 | 0 | 1183 | 204 | 0 | 0 | 0 | 199 | 194 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.6 | 42.5 | | | 36.9 | 36.9 | | | | 19.5 | 19.5 | |
| Effective Green, g (s) | 1.6 | 42.5 | | | 36.9 | 36.9 | | | | 19.5 | 19.5 | |
| Actuated g/C Ratio | 0.02 | 0.61 | | | 0.53 | 0.53 | | | | 0.28 | 0.28 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 40 | 2149 | | | 1866 | 834 | | | | 373 | 363 | |
| v/s Ratio Prot | 0.01 | c0.45 | | | 0.33 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.13 | | | | c0.15 | 0.15 | |
| v/c Ratio | 0.55 | 0.74 | | | 0.63 | 0.24 | | | | 0.53 | 0.53 | |
| Uniform Delay, d1 | 33.8 | 9.8 | | | 11.8 | 9.0 | | | | 21.4 | 21.4 | |
| Progression Factor | 1.31 | 0.11 | | | 1.08 | 1.05 | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 11.3 | 1.0 | | | 0.5 | 0.1 | | | | 5.4 | 5.5 | |
| Delay (s) | 55.7 | 2.0 | | | 13.1 | 9.5 | | | | 26.8 | 26.9 | |
| Level of Service | E | A | | | B | A | | | | C | C | |
| Approach Delay (s) | | 2.8 | | | 12.3 | | | 0.0 | | | 26.8 | |
| Approach LOS | | A | | | B | | | A | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 9.6 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.67 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 57.1% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 100 | 1463 | 237 | 121 | 1300 | 383 | 58 | 31 | 54 | 426 | 27 | 50 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 109 | 1590 | 258 | 132 | 1413 | 416 | 63 | 34 | 59 | 463 | 29 | 54 |
| RTOR Reduction (vph) | 0 | 0 | 152 | 0 | 0 | 266 | 0 | 0 | 54 | 0 | 0 | 36 |
| Lane Group Flow (vph) | 109 | 1590 | 106 | 132 | 1413 | 150 | 63 | 34 | 5 | 463 | 29 | 18 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 3.2 | 25.2 | 25.2 | 3.2 | 25.2 | 25.2 | 2.4 | 6.4 | 6.4 | 19.2 | 23.2 | 23.2 |
| Effective Green, g (s) | 3.2 | 25.2 | 25.2 | 3.2 | 25.2 | 25.2 | 2.4 | 6.4 | 6.4 | 19.2 | 23.2 | 23.2 |
| Actuated g/C Ratio | 0.05 | 0.36 | 0.36 | 0.05 | 0.36 | 0.36 | 0.03 | 0.09 | 0.09 | 0.27 | 0.33 | 0.33 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 157 | 1831 | 570 | 157 | 1831 | 570 | 118 | 324 | 145 | 942 | 1173 | 525 |
| v/s Ratio Prot | 0.03 | c0.31 | | c0.04 | 0.28 | | 0.02 | c0.01 | | c0.13 | 0.01 | |
| v/s Ratio Perm | | | 0.07 | | | 0.09 | | | 0.00 | | | 0.01 |
| v/c Ratio | 0.69 | 0.87 | 0.19 | 0.84 | 0.77 | 0.26 | 0.53 | 0.10 | 0.04 | 0.49 | 0.02 | 0.03 |
| Uniform Delay, d1 | 32.9 | 20.9 | 15.4 | 33.1 | 19.9 | 15.8 | 33.2 | 29.2 | 29.0 | 21.3 | 15.8 | 15.8 |
| Progression Factor | 0.84 | 0.68 | 0.95 | 0.73 | 0.63 | 0.54 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 8.8 | 3.3 | 0.1 | 25.3 | 1.6 | 0.2 | 4.6 | 0.7 | 0.5 | 0.4 | 0.0 | 0.1 |
| Delay (s) | 36.6 | 17.6 | 14.7 | 49.4 | 14.0 | 8.7 | 37.8 | 29.8 | 29.5 | 21.7 | 15.8 | 15.9 |
| Level of Service | D | B | B | D | B | A | D | C | C | C | B | B |
| Approach Delay (s) | | 18.3 | | | 15.3 | | | 32.9 | | | 20.8 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 17.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 60.5% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 57 | 1832 | 54 | 360 | 1769 | 150 | 25 | 5 | 196 | 53 | 9 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.96 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1516 | 1504 | | 1763 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.75 | 1.00 | 1.00 | | 0.75 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1404 | 1516 | 1504 | | 1371 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 62 | 1991 | 59 | 391 | 1923 | 163 | 27 | 5 | 213 | 58 | 10 | 11 |
| RTOR Reduction (vph) | 0 | 0 | 20 | 0 | 0 | 54 | 0 | 81 | 85 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 62 | 1991 | 39 | 391 | 1923 | 109 | 27 | 28 | 24 | 0 | 70 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 2.4 | 32.6 | 32.6 | 10.0 | 40.2 | 40.2 | 15.4 | 15.4 | 15.4 | | 15.4 | |
| Effective Green, g (s) | 2.4 | 32.6 | 32.6 | 10.0 | 40.2 | 40.2 | 15.4 | 15.4 | 15.4 | | 15.4 | |
| Actuated g/C Ratio | 0.03 | 0.47 | 0.47 | 0.14 | 0.57 | 0.57 | 0.22 | 0.22 | 0.22 | | 0.22 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 118 | 2368 | 737 | 490 | 2920 | 909 | 309 | 334 | 331 | | 302 | |
| v/s Ratio Prot | 0.02 | c0.39 | | c0.11 | 0.38 | | | 0.02 | | | | |
| v/s Ratio Perm | | | 0.02 | | | 0.07 | 0.02 | | 0.02 | | c0.05 | |
| v/c Ratio | 0.53 | 0.84 | 0.05 | 0.80 | 0.66 | 0.12 | 0.09 | 0.08 | 0.07 | | 0.23 | |
| Uniform Delay, d1 | 33.2 | 16.4 | 10.2 | 29.0 | 10.2 | 6.8 | 21.7 | 21.7 | 21.6 | | 22.4 | |
| Progression Factor | 0.54 | 0.27 | 0.22 | 1.09 | 0.74 | 0.84 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 2.6 | 1.8 | 0.0 | 5.1 | 0.3 | 0.0 | 0.6 | 0.5 | 0.4 | | 1.8 | |
| Delay (s) | 20.4 | 6.2 | 2.3 | 36.8 | 7.9 | 5.8 | 22.3 | 22.2 | 22.1 | | 24.2 | |
| Level of Service | C | A | A | D | A | A | C | C | C | | C | |
| Approach Delay (s) | | 6.5 | | | 12.3 | | | 22.1 | | | 24.2 | |
| Approach LOS | | A | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 10.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.67 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 66.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1016 | 1100 | 226 | 1207 | 0 | 0 | 0 | 0 | 91 | 0 | 1190 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.97 | 0.95 | 0.95 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 3433 | 1504 | 1504 |
| Flt Permitted | | 1.00 | 1.00 | 0.21 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 390 | 5085 | | | | | 3433 | 1504 | 1504 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 1104 | 1196 | 246 | 1312 | 0 | 0 | 0 | 0 | 99 | 0 | 1293 |
| RTOR Reduction (vph) | 0 | 0 | 564 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 25 |
| Lane Group Flow (vph) | 0 | 1104 | 632 | 246 | 1312 | 0 | 0 | 0 | 0 | 99 | 622 | 621 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 37.0 | 37.0 | 37.0 | 37.0 | | | | | 25.0 | 25.0 | 25.0 |
| Effective Green, g (s) | | 37.0 | 37.0 | 37.0 | 37.0 | | | | | 25.0 | 25.0 | 25.0 |
| Actuated g/C Ratio | | 0.53 | 0.53 | 0.53 | 0.53 | | | | | 0.36 | 0.36 | 0.36 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2688 | 1473 | 206 | 2688 | | | | | 1226 | 537 | 537 |
| v/s Ratio Prot | | 0.22 | | | 0.26 | | | | | | c0.41 | |
| v/s Ratio Perm | | | 0.23 | c0.63 | | | | | | 0.03 | | 0.41 |
| v/c Ratio | | 0.41 | 0.43 | 1.19 | 0.49 | | | | | 0.08 | 1.16 | 1.16 |
| Uniform Delay, d1 | | 9.9 | 10.1 | 16.5 | 10.5 | | | | | 14.9 | 22.5 | 22.5 |
| Progression Factor | | 0.32 | 0.96 | 1.05 | 0.67 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.1 | 0.1 | 122.9 | 0.1 | | | | | 0.1 | 90.5 | 89.8 |
| Delay (s) | | 3.2 | 9.7 | 140.2 | 7.1 | | | | | 15.0 | 113.0 | 112.3 |
| Level of Service | | A | A | F | A | | | | | B | F | F |
| Approach Delay (s) | | 6.6 | | | 28.1 | | | 0.0 | | | 105.7 | |
| Approach LOS | | A | | | C | | | A | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 39.3 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.18 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 85.6% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 446 | 570 | 0 | 0 | 609 | 129 | 824 | 73 | 290 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.94 | 0.91 | | | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Flt Permitted | 0.34 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1804 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 485 | 620 | 0 | 0 | 662 | 140 | 896 | 79 | 315 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 89 | 0 | 0 | 83 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 485 | 620 | 0 | 0 | 662 | 51 | 896 | 79 | 232 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | Perm | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | | | |
| Actuated Green, G (s) | 25.3 | 25.3 | | | 25.3 | 25.3 | 36.7 | 36.7 | 36.7 | | | |
| Effective Green, g (s) | 25.3 | 25.3 | | | 25.3 | 25.3 | 36.7 | 36.7 | 36.7 | | | |
| Actuated g/C Ratio | 0.36 | 0.36 | | | 0.36 | 0.36 | 0.52 | 0.52 | 0.52 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 652 | 1838 | | | 1838 | 572 | 1800 | 977 | 830 | | | |
| v/s Ratio Prot | | 0.12 | | | 0.13 | | | 0.04 | | | | |
| v/s Ratio Perm | c0.27 | | | | | 0.03 | c0.26 | | 0.15 | | | |
| v/c Ratio | 0.74 | 0.34 | | | 0.36 | 0.09 | 0.50 | 0.08 | 0.28 | | | |
| Uniform Delay, d1 | 19.5 | 16.3 | | | 16.4 | 14.7 | 10.7 | 8.3 | 9.3 | | | |
| Progression Factor | 0.36 | 0.31 | | | 0.74 | 0.51 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 4.3 | 0.1 | | | 0.1 | 0.1 | 1.0 | 0.2 | 0.8 | | | |
| Delay (s) | 11.3 | 5.1 | | | 12.2 | 7.6 | 11.7 | 8.4 | 10.1 | | | |
| Level of Service | B | A | | | B | A | B | A | B | | | |
| Approach Delay (s) | | 7.8 | | | 11.4 | | | 11.1 | | | 0.0 | |
| Approach LOS | | A | | | B | | | B | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 10.1 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.60 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 85.6% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 541 | 13 | 165 | 0 | 0 | 0 | 208 | 81 | 4 | 8 | 87 | 449 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 0.99 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1689 | 1583 | | | | 1770 | 3516 | | 1770 | 3095 | |
| Flt Permitted | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1689 | 1583 | | | | 1770 | 3516 | | 1770 | 3095 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 588 | 14 | 179 | 0 | 0 | 0 | 226 | 88 | 4 | 9 | 95 | 488 |
| RTOR Reduction (vph) | 0 | 0 | 132 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 333 | 0 |
| Lane Group Flow (vph) | 300 | 302 | 47 | 0 | 0 | 0 | 226 | 90 | 0 | 9 | 250 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 18.5 | 18.5 | 18.5 | | | | 17.2 | 38.7 | | 0.8 | 22.3 | |
| Effective Green, g (s) | 18.5 | 18.5 | 18.5 | | | | 17.2 | 38.7 | | 0.8 | 22.3 | |
| Actuated g/C Ratio | 0.26 | 0.26 | 0.26 | | | | 0.25 | 0.55 | | 0.01 | 0.32 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 444 | 446 | 418 | | | | 435 | 1944 | | 20 | 986 | |
| v/s Ratio Prot | | | | | | | c0.13 | 0.03 | | 0.01 | c0.08 | |
| v/s Ratio Perm | 0.18 | 0.18 | 0.03 | | | | | | | | | |
| v/c Ratio | 0.68 | 0.68 | 0.11 | | | | 0.52 | 0.05 | | 0.45 | 0.25 | |
| Uniform Delay, d1 | 23.1 | 23.1 | 19.5 | | | | 22.8 | 7.2 | | 34.4 | 17.7 | |
| Progression Factor | 0.87 | 0.87 | 0.50 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.9 | 3.9 | 0.1 | | | | 1.1 | 0.0 | | 15.3 | 0.6 | |
| Delay (s) | 24.1 | 24.1 | 9.9 | | | | 23.9 | 7.2 | | 49.6 | 18.3 | |
| Level of Service | C | C | A | | | | C | A | | D | B | |
| Approach Delay (s) | | 20.8 | | | 0.0 | | | 19.1 | | | 18.8 | |
| Approach LOS | | C | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 19.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.47 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 53.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 25 | 123 | 70 | 27 | 129 | 128 | 152 | 377 | 74 | 123 | 170 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 27 | 134 | 76 | 29 | 140 | 139 | 165 | 410 | 80 | 134 | 185 | 21 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 237 | 309 | 370 | 285 | 318 | 21 |
| Volume Left (vph) | 27 | 29 | 165 | 0 | 134 | 0 |
| Volume Right (vph) | 76 | 139 | 0 | 80 | 0 | 21 |
| Hadj (s) | -0.14 | -0.22 | 0.26 | -0.16 | 0.24 | -0.67 |
| Departure Headway (s) | 7.8 | 7.4 | 7.9 | 7.4 | 8.3 | 7.3 |
| Degree Utilization, x | 0.51 | 0.64 | 0.81 | 0.59 | 0.73 | 0.04 |
| Capacity (veh/h) | 418 | 449 | 448 | 466 | 418 | 465 |
| Control Delay (s) | 18.7 | 22.6 | 35.3 | 19.3 | 29.4 | 9.4 |
| Approach Delay (s) | 18.7 | 22.6 | 28.4 | | 28.1 | |
| Approach LOS | C | C | D | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 25.7 | | |
| HCM Level of Service | D | | |
| Intersection Capacity Utilization | 63.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 14 | 303 | 71 | 120 | 266 | 10 | 77 | 254 | 81 | 36 | 237 | 31 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 329 | 77 | 130 | 289 | 11 | 84 | 276 | 88 | 39 | 258 | 34 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 422 | 430 | 448 | 330 |
| Volume Left (vph) | 15 | 130 | 84 | 39 |
| Volume Right (vph) | 77 | 11 | 88 | 34 |
| Hadj (s) | -0.07 | 0.08 | -0.05 | 0.00 |
| Departure Headway (s) | 9.2 | 9.3 | 9.2 | 9.6 |
| Degree Utilization, x | 1.08 | 1.12 | 1.14 | 0.88 |
| Capacity (veh/h) | 392 | 397 | 395 | 365 |
| Control Delay (s) | 98.0 | 111.5 | 121.0 | 52.4 |
| Approach Delay (s) | 98.0 | 111.5 | 121.0 | 52.4 |
| Approach LOS | F | F | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 98.7 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 87.7% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 17 | 49 | 461 | 79 | 93 | 333 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 53 | 501 | 86 | 101 | 362 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 927 | 293 | | | 587 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 927 | 293 | | | 587 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 92 | 92 | | | 90 | |
| cM capacity (veh/h) | 240 | 703 | | | 984 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 72 | 334 | 253 | 222 | 241 |
| Volume Left | 18 | 0 | 0 | 101 | 0 |
| Volume Right | 53 | 0 | 86 | 0 | 0 |
| cSH | 469 | 1700 | 1700 | 984 | 1700 |
| Volume to Capacity | 0.15 | 0.20 | 0.15 | 0.10 | 0.14 |
| Queue Length 95th (ft) | 13 | 0 | 0 | 9 | 0 |
| Control Delay (s) | 14.0 | 0.0 | 0.0 | 4.7 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s) | 14.0 | 0.0 | | 2.2 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.8 | | |
| Intersection Capacity Utilization | 41.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 33 | 102 | 4 | 41 | 111 | 132 | 20 | 175 | 32 | 124 | 240 | 31 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 111 | 4 | 45 | 121 | 143 | 22 | 190 | 35 | 135 | 261 | 34 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 264 | | | 115 | | | 630 | 538 | 113 | 596 | 468 | 192 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 264 | | | 115 | | | 630 | 538 | 113 | 596 | 468 | 192 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 97 | | | 89 | 55 | 96 | 46 | 44 | 96 |
| cM capacity (veh/h) | 1300 | | | 1474 | | | 202 | 424 | 940 | 249 | 464 | 849 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 151 | 309 | 247 | 429 |
| Volume Left | 36 | 45 | 22 | 135 |
| Volume Right | 4 | 143 | 35 | 34 |
| cSH | 1300 | 1474 | 416 | 376 |
| Volume to Capacity | 0.03 | 0.03 | 0.59 | 1.14 |
| Queue Length 95th (ft) | 2 | 2 | 93 | 412 |
| Control Delay (s) | 2.0 | 1.3 | 25.5 | 123.8 |
| Lane LOS | A | A | D | F |
| Approach Delay (s) | 2.0 | 1.3 | 25.5 | 123.8 |
| Approach LOS | | | D | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 53.0 | | |
| Intersection Capacity Utilization | 62.6% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 191 | 0 | 0 | 277 | 304 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 208 | 0 | 0 | 301 | 330 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 466 | 466 | 632 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 466 | 466 | 632 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 87 | 65 | 100 | | | |
| cM capacity (veh/h) | 555 | 596 | 951 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 280 | 632 |
| Volume Left | 73 | 0 |
| Volume Right | 208 | 330 |
| cSH | 585 | 1700 |
| Volume to Capacity | 0.48 | 0.37 |
| Queue Length 95th (ft) | 65 | 0 |
| Control Delay (s) | 16.7 | 0.0 |
| Lane LOS | C | |
| Approach Delay (s) | 16.7 | 0.0 |
| Approach LOS | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.1 | | |
| Intersection Capacity Utilization | 55.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 0 | 114 | 101 | 32 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 124 | 110 | 35 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 0 | 124 | 110 | 35 |
| Volume Left (vph) | 0 | 0 | 0 | 35 |
| Volume Right (vph) | 0 | 0 | 110 | 0 |
| Hadj (s) | 0.00 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 4.2 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.00 | 0.14 | 0.10 | 0.04 |
| Capacity (veh/h) | 823 | 894 | 1121 | 831 |
| Control Delay (s) | 7.2 | 7.6 | 6.5 | 7.4 |
| Approach Delay (s) | 0.0 | 7.1 | | 7.4 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 7.1 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 16.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 0 | 42 | 0 | 0 | 10 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 46 | 0 | 0 | 11 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 0 | | 91 | 0 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 0 | | 91 | 0 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 100 | 99 |
| cM capacity (veh/h) | | | 1623 | | 883 | 1085 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 0 | 46 | 0 | 11 |
| Volume Left | 0 | 46 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 11 |
| cSH | 1700 | 1623 | 1700 | 1085 |
| Volume to Capacity | 0.00 | 0.03 | 0.00 | 0.01 |
| Queue Length 95th (ft) | 0 | 2 | 0 | 1 |
| Control Delay (s) | 0.0 | 7.3 | 0.0 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.3 | 8.4 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.5 | | |
| Intersection Capacity Utilization | 6.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 7 | 3 | 6 | 202 | 228 | 36 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 8 | 3 | 7 | 220 | 248 | 39 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 390 | 267 | 287 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 390 | 267 | 287 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 99 | 100 | 99 | | | |
| cM capacity (veh/h) | 583 | 731 | 1272 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 8 | 3 | 7 | 110 | 110 | 287 |
| Volume Left | 8 | 0 | 7 | 0 | 0 | 0 |
| Volume Right | 0 | 3 | 0 | 0 | 0 | 39 |
| cSH | 583 | 731 | 1272 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.01 | 0.00 | 0.01 | 0.06 | 0.06 | 0.17 |
| Queue Length 95th (ft) | 1 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 11.3 | 9.9 | 7.8 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | A | | | |
| Approach Delay (s) | 10.9 | | 0.2 | | | 0.0 |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 24.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 2061 | 20 | 0 | 2258 | 139 | 0 | 0 | 55 | 0 | 0 | 21 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 2240 | 22 | 0 | 2454 | 151 | 0 | 0 | 60 | 0 | 0 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.84 | | | 0.55 | | | 0.63 | 0.63 | 0.55 | 0.63 | 0.63 | 0.84 |
| vC, conflicting volume | 2605 | | | 2262 | | | 3081 | 4846 | 1120 | 3710 | 4792 | 894 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 2242 | | | 1666 | | | 1604 | 4388 | 0 | 2596 | 4303 | 202 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 90 | 100 | 100 | 97 |
| cM capacity (veh/h) | 191 | | | 211 | | | 43 | 1 | 600 | 7 | 1 | 676 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 1120 | 1120 | 22 | 982 | 982 | 642 | 60 | 23 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 22 | 0 | 0 | 151 | 60 | 23 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 600 | 676 |
| Volume to Capacity | 0.66 | 0.66 | 0.01 | 0.58 | 0.58 | 0.38 | 0.10 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 3 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.7 | 10.5 |
| Lane LOS | | | | | | | B | B |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 11.7 | 10.5 |
| Approach LOS | | | | | | | B | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 67.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 266 | 1130 | 84 | 369 | 1061 | 77 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 289 | 1228 | 91 | 401 | 1153 | 84 |
| RTOR Reduction (vph) | 0 | 938 | 0 | 291 | 0 | 0 |
| Lane Group Flow (vph) | 289 | 290 | 91 | 110 | 1153 | 84 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 26.0 | 26.0 | 30.2 | 30.2 | 41.8 | 76.0 |
| Effective Green, g (s) | 26.0 | 26.0 | 30.2 | 30.2 | 41.8 | 76.0 |
| Actuated g/C Ratio | 0.24 | 0.24 | 0.27 | 0.27 | 0.38 | 0.69 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 418 | 659 | 972 | 435 | 1305 | 1287 |
| v/s Ratio Prot | c0.16 | | 0.03 | | c0.34 | 0.05 |
| v/s Ratio Perm | | 0.10 | | c0.07 | | |
| v/c Ratio | 0.69 | 0.44 | 0.09 | 0.25 | 0.88 | 0.07 |
| Uniform Delay, d1 | 38.3 | 35.8 | 29.7 | 31.1 | 31.8 | 5.5 |
| Progression Factor | 0.59 | 3.33 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 3.0 | 0.3 | 0.2 | 1.4 | 7.4 | 0.1 |
| Delay (s) | 25.5 | 119.6 | 29.9 | 32.5 | 39.2 | 5.6 |
| Level of Service | C | F | C | C | D | A |
| Approach Delay (s) | 101.7 | | 32.0 | | | 37.0 |
| Approach LOS | F | | C | | | D |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 66.5 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 0.64 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 59.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 60 | 1370 | 0 | 0 | 1341 | 250 | 0 | 0 | 0 | 72 | 0 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | | | | | | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.98 | | | | | | 0.94 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3456 | | | | | | 1705 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | | | | | | 0.83 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3456 | | | | | | 1464 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 65 | 1489 | 0 | 0 | 1458 | 272 | 0 | 0 | 0 | 78 | 0 | 60 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 24 | 0 |
| Lane Group Flow (vph) | 65 | 1489 | 0 | 0 | 1715 | 0 | 0 | 0 | 0 | 0 | 114 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 7.4 | 78.2 | | | 66.8 | | | | | | 23.8 | |
| Effective Green, g (s) | 7.4 | 78.2 | | | 66.8 | | | | | | 23.8 | |
| Actuated g/C Ratio | 0.07 | 0.71 | | | 0.61 | | | | | | 0.22 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | | | | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | | 3.0 | |
| Lane Grp Cap (vph) | 119 | 2516 | | | 2099 | | | | | | 317 | |
| v/s Ratio Prot | 0.04 | c0.42 | | | c0.50 | | | | | | | |
| v/s Ratio Perm | | | | | | | | | | | c0.08 | |
| v/c Ratio | 0.55 | 0.59 | | | 0.82 | | | | | | 0.36 | |
| Uniform Delay, d1 | 49.7 | 7.9 | | | 16.8 | | | | | | 36.6 | |
| Progression Factor | 0.96 | 0.38 | | | 0.56 | | | | | | 0.99 | |
| Incremental Delay, d2 | 3.2 | 0.2 | | | 1.4 | | | | | | 0.7 | |
| Delay (s) | 50.9 | 3.3 | | | 10.7 | | | | | | 37.0 | |
| Level of Service | D | A | | | B | | | | | | D | |
| Approach Delay (s) | | 5.2 | | | 10.7 | | | 0.0 | | | 37.0 | |
| Approach LOS | | A | | | B | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 9.3 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.68 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 63.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 30 | 1412 | 0 | 0 | 1563 | 493 | 0 | 0 | 0 | 455 | 0 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3539 | | | 3539 | 1583 | | | | 1681 | 1666 | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | 1.00 | | | | 0.76 | 0.75 | |
| Satd. Flow (perm) | 1770 | 3539 | | | 3539 | 1583 | | | | 1340 | 1304 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 1535 | 0 | 0 | 1699 | 536 | 0 | 0 | 0 | 495 | 0 | 30 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 0 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 33 | 1535 | 0 | 0 | 1699 | 440 | 0 | 0 | 0 | 262 | 259 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 2.4 | 68.4 | | | 62.0 | 62.0 | | | | 33.6 | 33.6 | |
| Effective Green, g (s) | 2.4 | 68.4 | | | 62.0 | 62.0 | | | | 33.6 | 33.6 | |
| Actuated g/C Ratio | 0.02 | 0.62 | | | 0.56 | 0.56 | | | | 0.31 | 0.31 | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 39 | 2201 | | | 1995 | 892 | | | | 409 | 398 | |
| v/s Ratio Prot | 0.02 | c0.43 | | | c0.48 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.28 | | | | 0.20 | c0.20 | |
| v/c Ratio | 0.85 | 0.70 | | | 0.85 | 0.49 | | | | 0.64 | 0.65 | |
| Uniform Delay, d1 | 53.6 | 13.9 | | | 20.1 | 14.5 | | | | 33.0 | 33.1 | |
| Progression Factor | 0.78 | 0.18 | | | 0.50 | 0.13 | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 75.1 | 0.8 | | | 1.9 | 0.2 | | | | 7.5 | 8.0 | |
| Delay (s) | 116.8 | 3.3 | | | 11.9 | 2.2 | | | | 40.5 | 41.1 | |
| Level of Service | F | A | | | B | A | | | | D | D | |
| Approach Delay (s) | | 5.7 | | | 9.6 | | | 0.0 | | | 40.8 | |
| Approach LOS | | A | | | A | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.0 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.77 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 63.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 100 | 1614 | 153 | 250 | 1938 | 462 | 68 | 38 | 150 | 580 | 36 | 50 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 109 | 1754 | 166 | 272 | 2107 | 502 | 74 | 41 | 163 | 630 | 39 | 54 |
| RTOR Reduction (vph) | 0 | 0 | 60 | 0 | 0 | 145 | 0 | 0 | 106 | 0 | 0 | 38 |
| Lane Group Flow (vph) | 109 | 1754 | 106 | 272 | 2107 | 357 | 74 | 41 | 57 | 630 | 39 | 16 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 5.3 | 43.7 | 43.7 | 13.0 | 51.4 | 51.4 | 4.0 | 8.4 | 8.4 | 28.9 | 33.3 | 33.3 |
| Effective Green, g (s) | 5.3 | 43.7 | 43.7 | 13.0 | 51.4 | 51.4 | 4.0 | 8.4 | 8.4 | 28.9 | 33.3 | 33.3 |
| Actuated g/C Ratio | 0.05 | 0.40 | 0.40 | 0.12 | 0.47 | 0.47 | 0.04 | 0.08 | 0.08 | 0.26 | 0.30 | 0.30 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 165 | 2020 | 629 | 406 | 2376 | 740 | 125 | 270 | 121 | 902 | 1071 | 479 |
| v/s Ratio Prot | 0.03 | 0.34 | | c0.08 | c0.41 | | 0.02 | 0.01 | | c0.18 | 0.01 | |
| v/s Ratio Perm | | | 0.07 | | | 0.23 | | | c0.04 | | | 0.01 |
| v/c Ratio | 0.66 | 0.87 | 0.17 | 0.67 | 0.89 | 0.48 | 0.59 | 0.15 | 0.47 | 0.70 | 0.04 | 0.03 |
| Uniform Delay, d1 | 51.5 | 30.5 | 21.4 | 46.4 | 26.7 | 20.1 | 52.2 | 47.5 | 48.7 | 36.6 | 27.0 | 27.0 |
| Progression Factor | 0.84 | 0.73 | 0.88 | 0.71 | 0.58 | 0.34 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 7.0 | 3.1 | 0.1 | 2.5 | 2.7 | 0.3 | 7.3 | 1.2 | 12.5 | 2.4 | 0.1 | 0.1 |
| Delay (s) | 50.2 | 25.4 | 19.0 | 35.6 | 18.1 | 7.2 | 59.5 | 48.7 | 61.2 | 39.0 | 27.1 | 27.2 |
| Level of Service | D | C | B | D | B | A | E | D | E | D | C | C |
| Approach Delay (s) | | 26.2 | | | 17.9 | | | 58.9 | | | 37.5 | |
| Approach LOS | | C | | | B | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 25.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 74.0% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 74 | 2206 | 64 | 693 | 2605 | 200 | 20 | 12 | 207 | 78 | 12 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.87 | 0.85 | | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1533 | 1504 | | 1749 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.68 | 1.00 | 1.00 | | 0.59 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1271 | 1533 | 1504 | | 1069 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 80 | 2398 | 70 | 753 | 2832 | 217 | 22 | 13 | 225 | 85 | 13 | 27 |
| RTOR Reduction (vph) | 0 | 0 | 13 | 0 | 0 | 33 | 0 | 91 | 99 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 80 | 2398 | 57 | 753 | 2832 | 184 | 22 | 30 | 18 | 0 | 116 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 4.0 | 55.1 | 55.1 | 25.7 | 76.8 | 76.8 | 17.2 | 17.2 | 17.2 | | 17.2 | |
| Effective Green, g (s) | 4.0 | 55.1 | 55.1 | 25.7 | 76.8 | 76.8 | 17.2 | 17.2 | 17.2 | | 17.2 | |
| Actuated g/C Ratio | 0.04 | 0.50 | 0.50 | 0.23 | 0.70 | 0.70 | 0.16 | 0.16 | 0.16 | | 0.16 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 125 | 2547 | 793 | 802 | 3550 | 1105 | 199 | 240 | 235 | | 167 | |
| v/s Ratio Prot | 0.02 | c0.47 | | c0.22 | 0.56 | | | 0.02 | | | | |
| v/s Ratio Perm | | | 0.04 | | | 0.12 | 0.02 | | 0.01 | | c0.11 | |
| v/c Ratio | 0.64 | 0.94 | 0.07 | 0.94 | 0.80 | 0.17 | 0.11 | 0.12 | 0.08 | | 0.69 | |
| Uniform Delay, d1 | 52.3 | 25.9 | 14.2 | 41.4 | 11.3 | 5.7 | 39.8 | 39.9 | 39.6 | | 43.9 | |
| Progression Factor | 1.07 | 0.39 | 0.29 | 1.04 | 0.62 | 0.48 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 6.2 | 4.9 | 0.0 | 12.7 | 0.8 | 0.0 | 1.1 | 1.1 | 0.6 | | 21.1 | |
| Delay (s) | 62.1 | 15.1 | 4.1 | 55.8 | 7.8 | 2.8 | 41.0 | 41.0 | 40.3 | | 65.0 | |
| Level of Service | E | B | A | E | A | A | D | D | D | | E | |
| Approach Delay (s) | | 16.2 | | | 17.0 | | | 40.7 | | | 65.0 | |
| Approach LOS | | B | | | B | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 18.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.90 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 85.5% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1364 | 1170 | 90 | 1424 | 0 | 0 | 0 | 0 | 38 | 0 | 1590 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.97 | 0.95 | 0.95 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 3433 | 1504 | 1504 |
| Flt Permitted | | 1.00 | 1.00 | 0.09 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 173 | 5085 | | | | | 3433 | 1504 | 1504 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 1483 | 1272 | 98 | 1548 | 0 | 0 | 0 | 0 | 41 | 0 | 1728 |
| RTOR Reduction (vph) | 0 | 0 | 383 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Lane Group Flow (vph) | 0 | 1483 | 889 | 98 | 1548 | 0 | 0 | 0 | 0 | 41 | 859 | 859 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 50.0 | 50.0 | 50.0 | 50.0 | | | | | 52.0 | 52.0 | 52.0 |
| Effective Green, g (s) | | 50.0 | 50.0 | 50.0 | 50.0 | | | | | 52.0 | 52.0 | 52.0 |
| Actuated g/C Ratio | | 0.45 | 0.45 | 0.45 | 0.45 | | | | | 0.47 | 0.47 | 0.47 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2311 | 1267 | 79 | 2311 | | | | | 1623 | 711 | 711 |
| v/s Ratio Prot | | 0.29 | | | 0.30 | | | | | | c0.57 | |
| v/s Ratio Perm | | | 0.32 | c0.57 | | | | | | 0.01 | | 0.57 |
| v/c Ratio | | 0.64 | 0.70 | 1.24 | 0.67 | | | | | 0.03 | 1.21 | 1.21 |
| Uniform Delay, d1 | | 23.1 | 24.0 | 30.0 | 23.5 | | | | | 15.5 | 29.0 | 29.0 |
| Progression Factor | | 0.27 | 0.07 | 0.92 | 0.95 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.3 | 0.8 | 167.0 | 0.6 | | | | | 0.0 | 106.4 | 106.4 |
| Delay (s) | | 6.4 | 2.5 | 194.7 | 22.9 | | | | | 15.5 | 135.4 | 135.4 |
| Level of Service | | A | A | F | C | | | | | B | F | F |
| Approach Delay (s) | | 4.6 | | | 33.1 | | | 0.0 | | | 132.6 | |
| Approach LOS | | A | | | C | | | A | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 48.9 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.23 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 99.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 859 | 543 | 0 | 0 | 484 | 39 | 1030 | 81 | 138 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.94 | 0.91 | | | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Flt Permitted | 0.45 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 2347 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 934 | 590 | 0 | 0 | 526 | 42 | 1120 | 88 | 150 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 91 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 934 | 590 | 0 | 0 | 526 | 19 | 1120 | 88 | 59 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | Perm | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | | | |
| Actuated Green, G (s) | 25.3 | 25.3 | | | 25.3 | 25.3 | 21.7 | 21.7 | 21.7 | | | |
| Effective Green, g (s) | 25.3 | 25.3 | | | 25.3 | 25.3 | 21.7 | 21.7 | 21.7 | | | |
| Actuated g/C Ratio | 0.46 | 0.46 | | | 0.46 | 0.46 | 0.39 | 0.39 | 0.39 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 1080 | 2339 | | | 2339 | 728 | 1354 | 735 | 625 | | | |
| v/s Ratio Prot | | 0.12 | | | 0.10 | | | 0.05 | | | | |
| v/s Ratio Perm | c0.40 | | | | | 0.01 | c0.33 | | 0.04 | | | |
| v/c Ratio | 0.86 | 0.25 | | | 0.22 | 0.03 | 0.83 | 0.12 | 0.09 | | | |
| Uniform Delay, d1 | 13.3 | 9.1 | | | 8.9 | 8.1 | 15.0 | 10.6 | 10.5 | | | |
| Progression Factor | 1.55 | 1.08 | | | 0.64 | 0.25 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 5.9 | 0.0 | | | 0.0 | 0.0 | 5.9 | 0.3 | 0.3 | | | |
| Delay (s) | 26.6 | 9.8 | | | 5.7 | 2.1 | 20.9 | 10.9 | 10.8 | | | |
| Level of Service | C | A | | | A | A | C | B | B | | | |
| Approach Delay (s) | | 20.1 | | | 5.5 | | | 19.1 | | | 0.0 | |
| Approach LOS | | C | | | A | | | B | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 17.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 99.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 399 | 2 | 134 | 0 | 0 | 0 | 142 | 57 | 2 | 6 | 53 | 355 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 1.00 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1686 | 1583 | | | | 1770 | 3523 | | 1770 | 3078 | |
| Flt Permitted | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1686 | 1583 | | | | 1770 | 3523 | | 1770 | 3078 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 434 | 2 | 146 | 0 | 0 | 0 | 154 | 62 | 2 | 7 | 58 | 386 |
| RTOR Reduction (vph) | 0 | 0 | 112 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 253 | 0 |
| Lane Group Flow (vph) | 217 | 219 | 34 | 0 | 0 | 0 | 154 | 63 | 0 | 7 | 191 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 12.9 | 12.9 | 12.9 | | | | 11.1 | 29.3 | | 0.8 | 19.0 | |
| Effective Green, g (s) | 12.9 | 12.9 | 12.9 | | | | 11.1 | 29.3 | | 0.8 | 19.0 | |
| Actuated g/C Ratio | 0.23 | 0.23 | 0.23 | | | | 0.20 | 0.53 | | 0.01 | 0.35 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 394 | 395 | 371 | | | | 357 | 1877 | | 26 | 1063 | |
| v/s Ratio Prot | | | | | | | c0.09 | 0.02 | | 0.00 | c0.06 | |
| v/s Ratio Perm | 0.13 | 0.13 | 0.02 | | | | | | | | | |
| v/c Ratio | 0.55 | 0.55 | 0.09 | | | | 0.43 | 0.03 | | 0.27 | 0.18 | |
| Uniform Delay, d1 | 18.5 | 18.5 | 16.5 | | | | 19.2 | 6.1 | | 26.8 | 12.6 | |
| Progression Factor | 0.71 | 0.71 | 1.22 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.6 | 1.7 | 0.1 | | | | 0.8 | 0.0 | | 5.5 | 0.4 | |
| Delay (s) | 14.7 | 14.8 | 20.1 | | | | 20.0 | 6.1 | | 32.3 | 12.9 | |
| Level of Service | B | B | C | | | | C | A | | C | B | |
| Approach Delay (s) | | 16.1 | | | 0.0 | | | 16.0 | | | 13.2 | |
| Approach LOS | | B | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 15.0 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.36 | | |
| Actuated Cycle Length (s) | 55.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 41.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 11 | 82 | 34 | 27 | 67 | 130 | 137 | 341 | 52 | 117 | 204 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 89 | 37 | 29 | 73 | 141 | 149 | 371 | 57 | 127 | 222 | 12 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 138 | 243 | 334 | 242 | 349 | 12 |
| Volume Left (vph) | 12 | 29 | 149 | 0 | 127 | 0 |
| Volume Right (vph) | 37 | 141 | 0 | 57 | 0 | 12 |
| Hadj (s) | -0.11 | -0.29 | 0.26 | -0.13 | 0.22 | -0.67 |
| Departure Headway (s) | 7.0 | 6.5 | 6.8 | 6.4 | 7.0 | 6.1 |
| Degree Utilization, x | 0.27 | 0.44 | 0.63 | 0.43 | 0.68 | 0.02 |
| Capacity (veh/h) | 442 | 505 | 509 | 542 | 488 | 555 |
| Control Delay (s) | 12.6 | 14.5 | 19.6 | 13.0 | 22.5 | 8.1 |
| Approach Delay (s) | 12.6 | 14.5 | 16.8 | | 22.0 | |
| Approach LOS | B | B | C | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 17.4 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 61.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 16 | 165 | 93 | 150 | 185 | 10 | 93 | 264 | 72 | 18 | 297 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 179 | 101 | 163 | 201 | 11 | 101 | 287 | 78 | 20 | 323 | 21 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 298 | 375 | 466 | 363 |
| Volume Left (vph) | 17 | 163 | 101 | 20 |
| Volume Right (vph) | 101 | 11 | 78 | 21 |
| Hadj (s) | -0.16 | 0.10 | -0.02 | 0.01 |
| Departure Headway (s) | 8.9 | 8.7 | 8.5 | 8.7 |
| Degree Utilization, x | 0.73 | 0.91 | 1.10 | 0.87 |
| Capacity (veh/h) | 385 | 375 | 423 | 400 |
| Control Delay (s) | 32.5 | 53.6 | 103.7 | 48.2 |
| Approach Delay (s) | 32.5 | 53.6 | 103.7 | 48.2 |
| Approach LOS | D | F | F | E |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 63.7 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 88.4% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 22 | 21 | 473 | 43 | 41 | 333 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 23 | 514 | 47 | 45 | 362 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 808 | 280 | | | 561 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 808 | 280 | | | 561 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 92 | 97 | | | 96 | |
| cM capacity (veh/h) | 305 | 717 | | | 1006 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 47 | 343 | 218 | 165 | 241 |
| Volume Left | 24 | 0 | 0 | 45 | 0 |
| Volume Right | 23 | 0 | 47 | 0 | 0 |
| cSH | 424 | 1700 | 1700 | 1006 | 1700 |
| Volume to Capacity | 0.11 | 0.20 | 0.13 | 0.04 | 0.14 |
| Queue Length 95th (ft) | 9 | 0 | 0 | 3 | 0 |
| Control Delay (s) | 14.5 | 0.0 | 0.0 | 2.7 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s) | 14.5 | 0.0 | | 1.1 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 38.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 38 | 75 | 1 | 34 | 85 | 158 | 15 | 183 | 12 | 172 | 301 | 23 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 41 | 82 | 1 | 37 | 92 | 172 | 16 | 199 | 13 | 187 | 327 | 25 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 264 | | | 83 | | | 605 | 503 | 82 | 529 | 417 | 178 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 264 | | | 83 | | | 605 | 503 | 82 | 529 | 417 | 178 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 98 | | | 91 | 55 | 99 | 34 | 34 | 97 |
| cM capacity (veh/h) | 1300 | | | 1515 | | | 180 | 445 | 978 | 284 | 497 | 865 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 124 | 301 | 228 | 539 |
| Volume Left | 41 | 37 | 16 | 187 |
| Volume Right | 1 | 172 | 13 | 25 |
| cSH | 1300 | 1515 | 414 | 400 |
| Volume to Capacity | 0.03 | 0.02 | 0.55 | 1.35 |
| Queue Length 95th (ft) | 2 | 2 | 81 | 633 |
| Control Delay (s) | 2.8 | 1.1 | 23.8 | 199.2 |
| Lane LOS | A | A | C | F |
| Approach Delay (s) | 2.8 | 1.1 | 23.8 | 199.2 |
| Approach LOS | | | C | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 95.2 | | |
| Intersection Capacity Utilization | 65.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 49 | 230 | 0 | 0 | 264 | 286 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 53 | 250 | 0 | 0 | 287 | 311 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 442 | 442 | 598 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 442 | 442 | 598 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 91 | 59 | 100 | | | |
| cM capacity (veh/h) | 573 | 615 | 979 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 303 | 598 |
| Volume Left | 53 | 0 |
| Volume Right | 250 | 311 |
| cSH | 607 | 1700 |
| Volume to Capacity | 0.50 | 0.35 |
| Queue Length 95th (ft) | 70 | 0 |
| Control Delay (s) | 16.7 | 0.0 |
| Lane LOS | C | |
| Approach Delay (s) | 16.7 | 0.0 |
| Approach LOS | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.6 | | |
| Intersection Capacity Utilization | 55.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 11 | 71 | 75 | 19 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 12 | 77 | 82 | 21 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 12 | 77 | 82 | 21 |
| Volume Left (vph) | 0 | 0 | 0 | 21 |
| Volume Right (vph) | 12 | 0 | 82 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.09 | 0.07 | 0.02 |
| Capacity (veh/h) | 983 | 889 | 1121 | 834 |
| Control Delay (s) | 6.6 | 7.3 | 6.4 | 7.3 |
| Approach Delay (s) | 6.6 | 6.9 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 0 | 34 | 0 | 0 | 12 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 37 | 0 | 0 | 13 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 0 | | 74 | 0 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 0 | | 74 | 0 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 98 | | 100 | 99 |
| cM capacity (veh/h) | | | 1623 | | 909 | 1085 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 0 | 37 | 0 | 13 |
| Volume Left | 0 | 37 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 13 |
| cSH | 1700 | 1623 | 1700 | 1085 |
| Volume to Capacity | 0.00 | 0.02 | 0.01 | 0.01 |
| Queue Length 95th (ft) | 0 | 2 | 0 | 1 |
| Control Delay (s) | 0.0 | 7.3 | 0.0 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.3 | 8.4 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.6 | | |
| Intersection Capacity Utilization | 6.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 8 | 4 | 4 | 200 | 319 | 29 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 9 | 4 | 4 | 217 | 347 | 32 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 480 | 362 | 378 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 480 | 362 | 378 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 99 | 100 | | | |
| cM capacity (veh/h) | 513 | 634 | 1177 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 9 | 4 | 4 | 109 | 109 | 378 |
| Volume Left | 9 | 0 | 4 | 0 | 0 | 0 |
| Volume Right | 0 | 4 | 0 | 0 | 0 | 32 |
| cSH | 513 | 634 | 1177 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.02 | 0.01 | 0.00 | 0.06 | 0.06 | 0.22 |
| Queue Length 95th (ft) | 1 | 1 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 12.1 | 10.7 | 8.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | B | A | | | |
| Approach Delay (s) | 11.7 | | 0.2 | | | 0.0 |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 28.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 2467 | 24 | 0 | 3498 | 189 | 0 | 0 | 67 | 0 | 0 | 13 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 2682 | 26 | 0 | 3802 | 205 | 0 | 0 | 73 | 0 | 0 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.76 | | | 0.50 | | | 0.62 | 0.62 | 0.50 | 0.62 | 0.62 | 0.76 |
| vC, conflicting volume | 4008 | | | 2708 | | | 3963 | 6689 | 1341 | 5318 | 6612 | 1370 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 3853 | | | 2420 | | | 2248 | 6618 | 0 | 4421 | 6496 | 389 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 87 | 100 | 100 | 97 |
| cM capacity (veh/h) | 38 | | | 97 | | | 14 | 0 | 547 | 0 | 0 | 464 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 1341 | 1341 | 26 | 1521 | 1521 | 966 | 73 | 14 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 26 | 0 | 0 | 205 | 73 | 14 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 547 | 464 |
| Volume to Capacity | 0.79 | 0.79 | 0.02 | 0.89 | 0.89 | 0.57 | 0.13 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.6 | 13.0 |
| Lane LOS | | | | | | | B | B |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 12.6 | 13.0 |
| Approach LOS | | | | | | | B | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 81.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

## *CUMULATIVE BUILDOUT PLUS PROJECT*

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 127 | 438 | 69 | 155 | 576 | 62 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 138 | 476 | 75 | 168 | 626 | 67 |
| RTOR Reduction (vph) | 0 | 396 | 0 | 106 | 0 | 0 |
| Lane Group Flow (vph) | 138 | 80 | 75 | 62 | 626 | 67 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 10.1 | 10.1 | 22.0 | 22.0 | 15.9 | 41.9 |
| Effective Green, g (s) | 10.1 | 10.1 | 22.0 | 22.0 | 15.9 | 41.9 |
| Actuated g/C Ratio | 0.17 | 0.17 | 0.37 | 0.37 | 0.27 | 0.70 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 298 | 469 | 1298 | 580 | 910 | 1301 |
| v/s Ratio Prot | c0.08 | | 0.02 | | c0.18 | 0.04 |
| v/s Ratio Perm | | 0.03 | | c0.04 | | |
| v/c Ratio | 0.46 | 0.17 | 0.06 | 0.11 | 0.69 | 0.05 |
| Uniform Delay, d1 | 22.5 | 21.4 | 12.3 | 12.5 | 19.8 | 2.8 |
| Progression Factor | 0.18 | 0.89 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.1 | 0.2 | 0.1 | 0.4 | 2.2 | 0.1 |
| Delay (s) | 5.0 | 19.1 | 12.4 | 12.9 | 22.0 | 2.9 |
| Level of Service | A | B | B | B | C | A |
| Approach Delay (s) | 16.0 | | 12.7 | | | 20.2 |
| Approach LOS | B | | B | | | C |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 17.3 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.37 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 36.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 12 | 716 | 7 | 94 | 553 | 45 | 5 | 12 | 133 | 139 | 3 | 8 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.99 | | | 0.88 | | | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 1.00 | | | 0.96 | |
| Satd. Flow (prot) | 1770 | 3534 | | 1770 | 3499 | | | 1637 | | | 1767 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | | | 0.63 | |
| Satd. Flow (perm) | 1770 | 3534 | | 1770 | 3499 | | | 1627 | | | 1160 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 13 | 778 | 8 | 102 | 601 | 49 | 5 | 13 | 145 | 151 | 3 | 9 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 103 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 13 | 785 | 0 | 102 | 642 | 0 | 0 | 60 | 0 | 0 | 159 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.3 | 22.7 | | 8.0 | 29.4 | | | 17.3 | | | 17.3 | |
| Effective Green, g (s) | 1.3 | 22.7 | | 8.0 | 29.4 | | | 17.3 | | | 17.3 | |
| Actuated g/C Ratio | 0.02 | 0.38 | | 0.13 | 0.49 | | | 0.29 | | | 0.29 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 38 | 1337 | | 236 | 1715 | | | 469 | | | 334 | |
| v/s Ratio Prot | 0.01 | c0.22 | | 0.06 | c0.18 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.04 | | | c0.14 | |
| v/c Ratio | 0.34 | 0.59 | | 0.43 | 0.37 | | | 0.13 | | | 0.48 | |
| Uniform Delay, d1 | 28.9 | 14.9 | | 23.9 | 9.6 | | | 15.8 | | | 17.6 | |
| Progression Factor | 0.76 | 0.88 | | 0.70 | 1.58 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 4.4 | 0.6 | | 1.2 | 0.1 | | | 0.6 | | | 1.1 | |
| Delay (s) | 26.4 | 13.6 | | 17.9 | 15.2 | | | 16.3 | | | 18.7 | |
| Level of Service | C | B | | B | B | | | B | | | B | |
| Approach Delay (s) | | 13.8 | | | 15.6 | | | 16.3 | | | 18.7 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 15.2 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.52 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 56.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 6 | 957 | 31 | 87 | 673 | 100 | 19 | 0 | 50 | 62 | 0 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | | 1.00 | | 0.95 | 0.95 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | 0.85 | | 0.90 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.99 | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3522 | | 1770 | 3539 | 1583 | | 1658 | | 1681 | 1666 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.93 | | 0.82 | 0.78 | |
| Satd. Flow (perm) | 1770 | 3522 | | 1770 | 3539 | 1583 | | 1563 | | 1442 | 1354 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 7 | 1040 | 34 | 95 | 732 | 109 | 21 | 0 | 54 | 67 | 0 | 4 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 49 | 0 | 42 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 7 | 1070 | 0 | 95 | 732 | 60 | 0 | 33 | 0 | 36 | 32 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.3 | 26.6 | | 8.0 | 33.3 | 33.3 | | 13.4 | | 13.4 | 13.4 | |
| Effective Green, g (s) | 1.3 | 26.6 | | 8.0 | 33.3 | 33.3 | | 13.4 | | 13.4 | 13.4 | |
| Actuated g/C Ratio | 0.02 | 0.44 | | 0.13 | 0.55 | 0.55 | | 0.22 | | 0.22 | 0.22 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 38 | 1561 | | 236 | 1964 | 879 | | 349 | | 322 | 302 | |
| v/s Ratio Prot | 0.00 | c0.30 | | c0.05 | 0.21 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.04 | | 0.02 | | c0.02 | 0.02 | |
| v/c Ratio | 0.18 | 0.69 | | 0.40 | 0.37 | 0.07 | | 0.09 | | 0.11 | 0.11 | |
| Uniform Delay, d1 | 28.8 | 13.4 | | 23.8 | 7.5 | 6.2 | | 18.5 | | 18.6 | 18.5 | |
| Progression Factor | 1.05 | 0.94 | | 1.54 | 0.41 | 0.03 | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.1 | 1.1 | | 1.1 | 0.1 | 0.0 | | 0.5 | | 0.7 | 0.7 | |
| Delay (s) | 32.4 | 13.7 | | 37.8 | 3.2 | 0.2 | | 19.0 | | 19.3 | 19.2 | |
| Level of Service | C | B | | D | A | A | | B | | B | B | |
| Approach Delay (s) | | 13.8 | | | 6.4 | | | 19.0 | | | 19.2 | |
| Approach LOS | | B | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 11.0 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 53.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 138 | 834 | 96 | 71 | 744 | 103 | 22 | 17 | 60 | 167 | 26 | 95 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 150 | 907 | 104 | 77 | 809 | 112 | 24 | 18 | 65 | 182 | 28 | 103 |
| RTOR Reduction (vph) | 0 | 0 | 71 | 0 | 0 | 82 | 0 | 0 | 54 | 0 | 0 | 68 |
| Lane Group Flow (vph) | 150 | 907 | 33 | 77 | 809 | 30 | 24 | 18 | 11 | 182 | 28 | 35 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 6.6 | 19.0 | 19.0 | 3.6 | 16.0 | 16.0 | 0.8 | 10.4 | 10.4 | 11.0 | 20.6 | 20.6 |
| Effective Green, g (s) | 6.6 | 19.0 | 19.0 | 3.6 | 16.0 | 16.0 | 0.8 | 10.4 | 10.4 | 11.0 | 20.6 | 20.6 |
| Actuated g/C Ratio | 0.11 | 0.32 | 0.32 | 0.06 | 0.27 | 0.27 | 0.01 | 0.17 | 0.17 | 0.18 | 0.34 | 0.34 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 378 | 1610 | 501 | 206 | 1356 | 422 | 46 | 613 | 274 | 629 | 1215 | 543 |
| v/s Ratio Prot | 0.04 | c0.18 | | 0.02 | c0.16 | | 0.01 | 0.01 | | c0.05 | 0.01 | |
| v/s Ratio Perm | | | 0.02 | | | 0.02 | | | 0.01 | | | c0.02 |
| v/c Ratio | 0.40 | 0.56 | 0.07 | 0.37 | 0.60 | 0.07 | 0.52 | 0.03 | 0.04 | 0.29 | 0.02 | 0.07 |
| Uniform Delay, d1 | 24.8 | 17.0 | 14.3 | 27.1 | 19.2 | 16.4 | 29.4 | 20.6 | 20.6 | 21.1 | 13.0 | 13.2 |
| Progression Factor | 1.59 | 1.91 | 4.06 | 0.60 | 0.74 | 1.12 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 0.5 | 0.3 | 0.0 | 1.1 | 0.7 | 0.1 | 10.3 | 0.1 | 0.3 | 0.3 | 0.0 | 0.2 |
| Delay (s) | 40.0 | 32.9 | 58.1 | 17.4 | 14.9 | 18.5 | 39.7 | 20.7 | 20.9 | 21.4 | 13.1 | 13.5 |
| Level of Service | D | C | E | B | B | B | D | C | C | C | B | B |
| Approach Delay (s) | | 36.1 | | | 15.5 | | | 25.1 | | | 18.0 | |
| Approach LOS | | D | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 25.5 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 40.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 41 | 1004 | 17 | 158 | 902 | 155 | 11 | 4 | 71 | 53 | 4 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.99 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.96 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1530 | 1504 | | 1763 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.71 | 1.00 | 1.00 | | 0.79 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1326 | 1530 | 1504 | | 1459 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 45 | 1091 | 18 | 172 | 980 | 168 | 12 | 4 | 77 | 58 | 4 | 7 |
| RTOR Reduction (vph) | 0 | 0 | 12 | 0 | 0 | 99 | 0 | 24 | 26 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 45 | 1091 | 6 | 172 | 980 | 69 | 12 | 17 | 14 | 0 | 64 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 2.4 | 18.9 | 18.9 | 8.3 | 24.8 | 24.8 | 20.8 | 20.8 | 20.8 | | 20.8 | |
| Effective Green, g (s) | 2.4 | 18.9 | 18.9 | 8.3 | 24.8 | 24.8 | 20.8 | 20.8 | 20.8 | | 20.8 | |
| Actuated g/C Ratio | 0.04 | 0.31 | 0.31 | 0.14 | 0.41 | 0.41 | 0.35 | 0.35 | 0.35 | | 0.35 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 137 | 1602 | 499 | 475 | 2102 | 654 | 460 | 530 | 521 | | 506 | |
| v/s Ratio Prot | 0.01 | c0.21 | | 0.05 | c0.19 | | | 0.01 | | | | |
| v/s Ratio Perm | | | 0.00 | | | 0.04 | 0.01 | | 0.01 | | c0.04 | |
| v/c Ratio | 0.33 | 0.68 | 0.01 | 0.36 | 0.47 | 0.11 | 0.03 | 0.03 | 0.03 | | 0.13 | |
| Uniform Delay, d1 | 28.0 | 17.9 | 14.1 | 23.4 | 12.8 | 10.8 | 12.9 | 12.9 | 12.9 | | 13.4 | |
| Progression Factor | 0.66 | 0.83 | 0.34 | 0.75 | 0.87 | 0.65 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.3 | 1.1 | 0.0 | 0.5 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | | 0.5 | |
| Delay (s) | 19.8 | 15.9 | 4.9 | 18.1 | 11.3 | 7.1 | 13.0 | 13.1 | 13.0 | | 13.9 | |
| Level of Service | B | B | A | B | B | A | B | B | B | | B | |
| Approach Delay (s) | | 15.9 | | | 11.6 | | | 13.0 | | | 13.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.6 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 44.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 291 | 8 | 218 | 0 | 0 | 0 | 103 | 42 | 1 | 6 | 96 | 194 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 1.00 | | 1.00 | 0.90 | |
| Flt Protected | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1690 | 1583 | | | | 1770 | 3528 | | 1770 | 3184 | |
| Flt Permitted | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1690 | 1583 | | | | 1770 | 3528 | | 1770 | 3184 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 316 | 9 | 237 | 0 | 0 | 0 | 112 | 46 | 1 | 7 | 104 | 211 |
| RTOR Reduction (vph) | 0 | 0 | 189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 0 |
| Lane Group Flow (vph) | 161 | 164 | 48 | 0 | 0 | 0 | 112 | 47 | 0 | 7 | 194 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 12.1 | 12.1 | 12.1 | | | | 10.3 | 34.6 | | 1.3 | 25.6 | |
| Effective Green, g (s) | 12.1 | 12.1 | 12.1 | | | | 10.3 | 34.6 | | 1.3 | 25.6 | |
| Actuated g/C Ratio | 0.20 | 0.20 | 0.20 | | | | 0.17 | 0.58 | | 0.02 | 0.43 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 339 | 341 | 319 | | | | 304 | 2034 | | 38 | 1359 | |
| v/s Ratio Prot | | | | | | | c0.06 | 0.01 | | 0.00 | c0.06 | |
| v/s Ratio Perm | 0.10 | 0.10 | 0.03 | | | | | | | | | |
| v/c Ratio | 0.47 | 0.48 | 0.15 | | | | 0.37 | 0.02 | | 0.18 | 0.14 | |
| Uniform Delay, d1 | 21.1 | 21.2 | 19.7 | | | | 22.0 | 5.4 | | 28.8 | 10.5 | |
| Progression Factor | 0.73 | 0.73 | 0.46 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.0 | 1.1 | 0.2 | | | | 0.8 | 0.0 | | 2.3 | 0.2 | |
| Delay (s) | 16.5 | 16.6 | 9.2 | | | | 22.7 | 5.5 | | 31.2 | 10.7 | |
| Level of Service | B | B | A | | | | C | A | | C | B | |
| Approach Delay (s) | | 13.4 | | | 0.0 | | | 17.6 | | | 11.2 | |
| Approach LOS | | B | | | A | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 13.4 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.28 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 32.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 19 | 106 | 48 | 10 | 79 | 73 | 175 | 223 | 63 | 104 | 173 | 24 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 115 | 52 | 11 | 86 | 79 | 190 | 242 | 68 | 113 | 188 | 26 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 188 | 176 | 311 | 190 | 301 | 26 |
| Volume Left (vph) | 21 | 11 | 190 | 0 | 113 | 0 |
| Volume Right (vph) | 52 | 79 | 0 | 68 | 0 | 26 |
| Hadj (s) | -0.11 | -0.22 | 0.34 | -0.22 | 0.22 | -0.67 |
| Departure Headway (s) | 6.5 | 6.4 | 6.7 | 6.1 | 6.8 | 5.9 |
| Degree Utilization, x | 0.34 | 0.31 | 0.58 | 0.32 | 0.57 | 0.04 |
| Capacity (veh/h) | 502 | 503 | 518 | 567 | 509 | 576 |
| Control Delay (s) | 12.7 | 12.3 | 17.1 | 10.7 | 17.0 | 7.9 |
| Approach Delay (s) | 12.7 | 12.3 | 14.7 | | 16.3 | |
| Approach LOS | B | B | B | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 14.5 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 52.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 13 | 220 | 38 | 73 | 170 | 3 | 28 | 159 | 73 | 22 | 149 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 14 | 239 | 41 | 79 | 185 | 3 | 30 | 173 | 79 | 24 | 162 | 9 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 295 | 267 | 283 | 195 |
| Volume Left (vph) | 14 | 79 | 30 | 24 |
| Volume Right (vph) | 41 | 3 | 79 | 9 |
| Hadj (s) | -0.04 | 0.09 | -0.11 | 0.03 |
| Departure Headway (s) | 5.9 | 6.1 | 5.9 | 6.3 |
| Degree Utilization, x | 0.48 | 0.45 | 0.47 | 0.34 |
| Capacity (veh/h) | 562 | 535 | 553 | 501 |
| Control Delay (s) | 14.3 | 14.0 | 14.0 | 12.4 |
| Approach Delay (s) | 14.3 | 14.0 | 14.0 | 12.4 |
| Approach LOS | B | B | B | B |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 13.8 | | |
| HCM Level of Service | B | | |
| Intersection Capacity Utilization | 56.2% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 12 | 62 | 311 | 27 | 108 | 250 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 13 | 67 | 338 | 29 | 117 | 272 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 723 | 184 | | | 367 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 723 | 184 | | | 367 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 96 | 92 | | | 90 | |
| cM capacity (veh/h) | 325 | 827 | | | 1188 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 80 | 225 | 142 | 208 | 181 |
| Volume Left | 13 | 0 | 0 | 117 | 0 |
| Volume Right | 67 | 0 | 29 | 0 | 0 |
| cSH | 662 | 1700 | 1700 | 1188 | 1700 |
| Volume to Capacity | 0.12 | 0.13 | 0.08 | 0.10 | 0.11 |
| Queue Length 95th (ft) | 10 | 0 | 0 | 8 | 0 |
| Control Delay (s) | 11.2 | 0.0 | 0.0 | 5.1 | 0.0 |
| Lane LOS | B | | | A | |
| Approach Delay (s) | 11.2 | 0.0 | | 2.7 | |
| Approach LOS | B | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 34.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 43 | 108 | 4 | 55 | 49 | 26 | 6 | 141 | 42 | 44 | 173 | 19 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 47 | 117 | 4 | 60 | 53 | 28 | 7 | 153 | 46 | 48 | 188 | 21 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 82 | | | 122 | | | 515 | 414 | 120 | 522 | 402 | 67 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 82 | | | 122 | | | 515 | 414 | 120 | 522 | 402 | 67 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 96 | | | 98 | 69 | 95 | 85 | 62 | 98 |
| cM capacity (veh/h) | 1516 | | | 1466 | | | 309 | 491 | 932 | 318 | 499 | 996 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 168 | 141 | 205 | 257 |
| Volume Left | 47 | 60 | 7 | 48 |
| Volume Right | 4 | 28 | 46 | 21 |
| cSH | 1516 | 1466 | 538 | 468 |
| Volume to Capacity | 0.03 | 0.04 | 0.38 | 0.55 |
| Queue Length 95th (ft) | 2 | 3 | 44 | 81 |
| Control Delay (s) | 2.2 | 3.4 | 15.8 | 21.6 |
| Lane LOS | A | A | C | C |
| Approach Delay (s) | 2.2 | 3.4 | 15.8 | 21.6 |
| Approach LOS | | | C | C |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 12.5 | | |
| Intersection Capacity Utilization | 44.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 61 | 116 | 0 | 0 | 169 | 125 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 66 | 126 | 0 | 0 | 184 | 136 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 252 | 252 | 320 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 252 | 252 | 320 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 91 | 84 | 100 | | | |
| cM capacity (veh/h) | 737 | 787 | 1240 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 192 | 320 |
| Volume Left | 66 | 0 |
| Volume Right | 126 | 136 |
| cSH | 769 | 1700 |
| Volume to Capacity | 0.25 | 0.19 |
| Queue Length 95th (ft) | 25 | 0 |
| Control Delay (s) | 11.2 | 0.0 |
| Lane LOS | B | |
| Approach Delay (s) | 11.2 | 0.0 |
| Approach LOS | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.2 | | |
| Intersection Capacity Utilization | 33.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 10 | 56 | 82 | 22 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 61 | 89 | 24 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 11 | 61 | 89 | 24 |
| Volume Left (vph) | 0 | 0 | 0 | 24 |
| Volume Right (vph) | 11 | 0 | 89 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.07 | 0.08 | 0.03 |
| Capacity (veh/h) | 994 | 889 | 1121 | 838 |
| Control Delay (s) | 6.6 | 7.3 | 6.5 | 7.3 |
| Approach Delay (s) | 6.6 | 6.8 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 15.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 2 | 18 | 0 | 9 | 39 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 2 | 20 | 0 | 10 | 42 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 2 | | 40 | 1 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 2 | | 40 | 1 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 99 | | 99 | 96 |
| cM capacity (veh/h) | | | 1620 | | 960 | 1083 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 2 | 20 | 10 | 42 |
| Volume Left | 0 | 20 | 10 | 0 |
| Volume Right | 2 | 0 | 0 | 42 |
| cSH | 1700 | 1620 | 960 | 1083 |
| Volume to Capacity | 0.00 | 0.01 | 0.01 | 0.04 |
| Queue Length 95th (ft) | 0 | 1 | 1 | 3 |
| Control Delay (s) | 0.0 | 7.2 | 8.8 | 8.5 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.2 | 8.5 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.9 | | |
| Intersection Capacity Utilization | 17.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 34 | 5 | 2 | 93 | 192 | 17 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 37 | 5 | 2 | 101 | 209 | 18 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 273 | 218 | 227 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 273 | 218 | 227 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 95 | 99 | 100 | | | |
| cM capacity (veh/h) | 693 | 786 | 1338 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 37 | 5 | 2 | 51 | 51 | 227 |
| Volume Left | 37 | 0 | 2 | 0 | 0 | 0 |
| Volume Right | 0 | 5 | 0 | 0 | 0 | 18 |
| cSH | 693 | 786 | 1338 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.05 | 0.01 | 0.00 | 0.03 | 0.03 | 0.13 |
| Queue Length 95th (ft) | 4 | 1 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 10.5 | 9.6 | 7.7 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | A | A | | | |
| Approach Delay (s) | 10.4 | | 0.2 | | | 0.0 |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.2 | | |
| Intersection Capacity Utilization | 21.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 1125 | 3 | 0 | 1203 | 139 | 0 | 0 | 36 | 0 | 0 | 12 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 1223 | 3 | 0 | 1308 | 151 | 0 | 0 | 39 | 0 | 0 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.89 | | | 0.78 | | | 0.83 | 0.83 | 0.78 | 0.83 | 0.83 | 0.89 |
| vC, conflicting volume | 1459 | | | 1226 | | | 1672 | 2682 | 611 | 2034 | 2609 | 511 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1098 | | | 715 | | | 630 | 1848 | 0 | 1067 | 1761 | 38 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 95 | 100 | 100 | 99 |
| cM capacity (veh/h) | 565 | | | 684 | | | 299 | 61 | 842 | 139 | 69 | 917 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 611 | 611 | 3 | 523 | 523 | 413 | 39 | 13 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 3 | 0 | 0 | 151 | 39 | 13 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 842 | 917 |
| Volume to Capacity | 0.36 | 0.36 | 0.00 | 0.31 | 0.31 | 0.24 | 0.05 | 0.01 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.5 | 9.0 |
| Lane LOS | | | | | | | A | A |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 9.5 | 9.0 |
| Approach LOS | | | | | | | A | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 41.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 237 | 1059 | 97 | 362 | 1251 | 88 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 258 | 1151 | 105 | 393 | 1360 | 96 |
| RTOR Reduction (vph) | 0 | 913 | 0 | 291 | 0 | 0 |
| Lane Group Flow (vph) | 258 | 238 | 105 | 102 | 1360 | 96 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 20.7 | 20.7 | 22.8 | 22.8 | 44.5 | 71.3 |
| Effective Green, g (s) | 20.7 | 20.7 | 22.8 | 22.8 | 44.5 | 71.3 |
| Actuated g/C Ratio | 0.21 | 0.21 | 0.23 | 0.23 | 0.44 | 0.71 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 366 | 577 | 807 | 361 | 1528 | 1328 |
| v/s Ratio Prot | c0.15 | | 0.03 | | c0.40 | 0.05 |
| v/s Ratio Perm | | 0.09 | | c0.06 | | |
| v/c Ratio | 0.70 | 0.41 | 0.13 | 0.28 | 0.89 | 0.07 |
| Uniform Delay, d1 | 36.8 | 34.4 | 30.7 | 31.9 | 25.5 | 4.3 |
| Progression Factor | 1.10 | 4.13 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 4.2 | 0.3 | 0.3 | 2.0 | 6.9 | 0.1 |
| Delay (s) | 44.7 | 142.2 | 31.0 | 33.8 | 32.4 | 4.4 |
| Level of Service | D | F | C | C | C | A |
| Approach Delay (s) | 124.4 | | 33.2 | | | 30.6 |
| Approach LOS | F | | C | | | C |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 70.3 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 0.69 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 64.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 39 | 1553 | 23 | 301 | 1266 | 161 | 24 | 6 | 267 | 100 | 12 | 42 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | | 0.88 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 1.00 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 3531 | | 1770 | 3479 | | | 1630 | | | 1738 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.97 | | | 0.32 | |
| Satd. Flow (perm) | 1770 | 3531 | | 1770 | 3479 | | | 1589 | | | 578 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 42 | 1688 | 25 | 327 | 1376 | 175 | 26 | 7 | 290 | 109 | 13 | 46 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 228 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 42 | 1712 | 0 | 327 | 1542 | 0 | 0 | 95 | 0 | 0 | 154 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 3.6 | 47.0 | | 19.6 | 63.0 | | | 21.4 | | | 21.4 | |
| Effective Green, g (s) | 3.6 | 47.0 | | 19.6 | 63.0 | | | 21.4 | | | 21.4 | |
| Actuated g/C Ratio | 0.04 | 0.47 | | 0.20 | 0.63 | | | 0.21 | | | 0.21 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 64 | 1660 | | 347 | 2192 | | | 340 | | | 124 | |
| v/s Ratio Prot | 0.02 | c0.48 | | c0.18 | 0.44 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.06 | | | c0.27 | |
| v/c Ratio | 0.66 | 1.03 | | 0.94 | 0.70 | | | 0.28 | | | 1.24 | |
| Uniform Delay, d1 | 47.6 | 26.5 | | 39.6 | 12.3 | | | 32.9 | | | 39.3 | |
| Progression Factor | 1.32 | 0.45 | | 0.55 | 0.13 | | | 1.00 | | | 1.01 | |
| Incremental Delay, d2 | 13.2 | 25.5 | | 22.1 | 0.6 | | | 2.0 | | | 159.2 | |
| Delay (s) | 76.0 | 37.5 | | 43.8 | 2.2 | | | 34.9 | | | 199.0 | |
| Level of Service | E | D | | D | A | | | C | | | F | |
| Approach Delay (s) | | 38.4 | | | 9.5 | | | 34.9 | | | 199.0 | |
| Approach LOS | | D | | | A | | | C | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 31.5 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 1.06 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 100.5% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 20 | 1824 | 96 | 269 | 1626 | 320 | 104 | 0 | 270 | 346 | 0 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | | 1.00 | | 0.95 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 0.90 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.99 | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3513 | | 1770 | 3539 | 1583 | | 1658 | | 1681 | 1665 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.64 | | 0.34 | 0.36 | |
| Satd. Flow (perm) | 1770 | 3513 | | 1770 | 3539 | 1583 | | 1075 | | 605 | 624 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 22 | 1983 | 104 | 292 | 1767 | 348 | 113 | 0 | 293 | 376 | 0 | 23 |
| RTOR Reduction (vph) | 0 | 4 | 0 | 0 | 0 | 60 | 0 | 97 | 0 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 22 | 2083 | 0 | 292 | 1767 | 288 | 0 | 309 | 0 | 199 | 195 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 1.6 | 48.0 | | 15.4 | 61.8 | 61.8 | | 24.6 | | 24.6 | 24.6 | |
| Effective Green, g (s) | 1.6 | 48.0 | | 15.4 | 61.8 | 61.8 | | 24.6 | | 24.6 | 24.6 | |
| Actuated g/C Ratio | 0.02 | 0.48 | | 0.15 | 0.62 | 0.62 | | 0.25 | | 0.25 | 0.25 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 28 | 1686 | | 273 | 2187 | 978 | | 264 | | 149 | 154 | |
| v/s Ratio Prot | 0.01 | c0.59 | | c0.17 | 0.50 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.18 | | 0.29 | | c0.33 | 0.31 | |
| v/c Ratio | 0.79 | 1.24 | | 1.07 | 0.81 | 0.29 | | 1.17 | | 1.34 | 1.27 | |
| Uniform Delay, d1 | 49.0 | 26.0 | | 42.3 | 14.6 | 8.9 | | 37.7 | | 37.7 | 37.7 | |
| Progression Factor | 0.75 | 0.42 | | 0.64 | 0.34 | 0.04 | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 35.0 | 107.8 | | 59.4 | 1.2 | 0.1 | | 110.2 | | 189.4 | 162.3 | |
| Delay (s) | 71.5 | 118.7 | | 86.6 | 6.2 | 0.4 | | 147.9 | | 227.1 | 200.0 | |
| Level of Service | E | F | | F | A | A | | F | | F | F | |
| Approach Delay (s) | | 118.2 | | | 15.1 | | | 147.9 | | | 213.5 | |
| Approach LOS | | F | | | B | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 81.0 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.24 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 107.4% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 193 | 2001 | 243 | 191 | 1954 | 383 | 69 | 72 | 212 | 426 | 66 | 192 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 210 | 2175 | 264 | 208 | 2124 | 416 | 75 | 78 | 230 | 463 | 72 | 209 |
| RTOR Reduction (vph) | 0 | 0 | 82 | 0 | 0 | 133 | 0 | 0 | 110 | 0 | 0 | 109 |
| Lane Group Flow (vph) | 210 | 2175 | 182 | 208 | 2124 | 284 | 75 | 78 | 120 | 463 | 72 | 100 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 7.5 | 46.9 | 46.9 | 7.6 | 47.0 | 47.0 | 4.0 | 10.9 | 10.9 | 18.6 | 25.5 | 25.5 |
| Effective Green, g (s) | 7.5 | 46.9 | 46.9 | 7.6 | 47.0 | 47.0 | 4.0 | 10.9 | 10.9 | 18.6 | 25.5 | 25.5 |
| Actuated g/C Ratio | 0.08 | 0.47 | 0.47 | 0.08 | 0.47 | 0.47 | 0.04 | 0.11 | 0.11 | 0.19 | 0.26 | 0.26 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 257 | 2385 | 742 | 261 | 2390 | 744 | 137 | 386 | 173 | 639 | 902 | 404 |
| v/s Ratio Prot | c0.06 | c0.43 | | 0.06 | 0.42 | | 0.02 | 0.02 | | c0.13 | 0.02 | |
| v/s Ratio Perm | | | 0.11 | | | 0.18 | | | c0.08 | | | 0.06 |
| v/c Ratio | 0.82 | 0.91 | 0.24 | 0.80 | 0.89 | 0.38 | 0.55 | 0.20 | 0.70 | 0.72 | 0.08 | 0.25 |
| Uniform Delay, d1 | 45.6 | 24.6 | 15.9 | 45.4 | 24.1 | 17.1 | 47.1 | 40.6 | 43.0 | 38.3 | 28.3 | 29.6 |
| Progression Factor | 0.66 | 0.68 | 0.52 | 0.73 | 0.58 | 0.25 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 1.9 | 0.6 | 0.0 | 10.1 | 2.9 | 0.2 | 4.4 | 1.2 | 20.7 | 4.1 | 0.2 | 1.5 |
| Delay (s) | 32.2 | 17.4 | 8.3 | 43.4 | 16.8 | 4.4 | 51.5 | 41.8 | 63.6 | 42.4 | 28.5 | 31.1 |
| Level of Service | C | B | A | D | B | A | D | D | E | D | C | C |
| Approach Delay (s) | | 17.7 | | | 17.0 | | | 56.8 | | | 37.9 | |
| Approach LOS | | B | | | B | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 22.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.83 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 73.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 57 | 2528 | 54 | 360 | 2492 | 150 | 25 | 5 | 196 | 53 | 9 | 10 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.96 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1516 | 1504 | | 1763 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.73 | 1.00 | 1.00 | | 0.68 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1360 | 1516 | 1504 | | 1239 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 62 | 2748 | 59 | 391 | 2709 | 163 | 27 | 5 | 213 | 58 | 10 | 11 |
| RTOR Reduction (vph) | 0 | 0 | 10 | 0 | 0 | 28 | 0 | 88 | 92 | 0 | 6 | 0 |
| Lane Group Flow (vph) | 62 | 2748 | 49 | 391 | 2709 | 135 | 27 | 21 | 17 | 0 | 73 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 4.0 | 59.1 | 59.1 | 13.7 | 68.8 | 68.8 | 15.2 | 15.2 | 15.2 | | 15.2 | |
| Effective Green, g (s) | 4.0 | 59.1 | 59.1 | 13.7 | 68.8 | 68.8 | 15.2 | 15.2 | 15.2 | | 15.2 | |
| Actuated g/C Ratio | 0.04 | 0.59 | 0.59 | 0.14 | 0.69 | 0.69 | 0.15 | 0.15 | 0.15 | | 0.15 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 137 | 3005 | 936 | 470 | 3498 | 1089 | 207 | 230 | 229 | | 188 | |
| v/s Ratio Prot | 0.02 | c0.54 | | 0.11 | c0.53 | | | 0.01 | | | | |
| v/s Ratio Perm | | | 0.03 | | | 0.09 | 0.02 | | 0.01 | | c0.06 | |
| v/c Ratio | 0.45 | 0.91 | 0.05 | 0.83 | 0.77 | 0.12 | 0.13 | 0.09 | 0.07 | | 0.39 | |
| Uniform Delay, d1 | 46.9 | 18.2 | 8.6 | 42.0 | 10.4 | 5.3 | 36.7 | 36.5 | 36.4 | | 38.2 | |
| Progression Factor | 0.63 | 0.19 | 0.09 | 0.99 | 0.89 | 0.84 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.1 | 2.4 | 0.0 | 1.2 | 0.1 | 0.0 | 1.3 | 0.8 | 0.6 | | 6.0 | |
| Delay (s) | 30.6 | 5.9 | 0.8 | 42.9 | 9.4 | 4.5 | 38.0 | 37.2 | 37.0 | | 44.2 | |
| Level of Service | C | A | A | D | A | A | D | D | D | | D | |
| Approach Delay (s) | | 6.4 | | | 13.1 | | | 37.2 | | | 44.2 | |
| Approach LOS | | A | | | B | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 11.4 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.81 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 79.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1392 | 1419 | 226 | 1635 | 0 | 0 | 0 | 0 | 91 | 0 | 1485 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.97 | 0.95 | 0.95 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 3433 | 1504 | 1504 |
| Flt Permitted | | 1.00 | 1.00 | 0.18 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 339 | 5085 | | | | | 3433 | 1504 | 1504 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 1513 | 1542 | 246 | 1777 | 0 | 0 | 0 | 0 | 99 | 0 | 1614 |
| RTOR Reduction (vph) | 0 | 0 | 864 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Lane Group Flow (vph) | 0 | 1513 | 678 | 246 | 1777 | 0 | 0 | 0 | 0 | 99 | 805 | 805 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 22.0 | 22.0 | 22.0 | 22.0 | | | | | 20.0 | 20.0 | 20.0 |
| Effective Green, g (s) | | 22.0 | 22.0 | 22.0 | 22.0 | | | | | 20.0 | 20.0 | 20.0 |
| Actuated g/C Ratio | | 0.44 | 0.44 | 0.44 | 0.44 | | | | | 0.40 | 0.40 | 0.40 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2237 | 1226 | 149 | 2237 | | | | | 1373 | 602 | 602 |
| v/s Ratio Prot | | 0.30 | | | 0.35 | | | | | | c0.53 | |
| v/s Ratio Perm | | | 0.24 | c0.73 | | | | | | 0.03 | | 0.53 |
| v/c Ratio | | 0.68 | 0.55 | 1.65 | 0.79 | | | | | 0.07 | 1.34 | 1.34 |
| Uniform Delay, d1 | | 11.2 | 10.4 | 14.0 | 12.1 | | | | | 9.3 | 15.0 | 15.0 |
| Progression Factor | | 0.98 | 9.72 | 0.67 | 0.57 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.4 | 0.3 | 311.6 | 1.3 | | | | | 0.1 | 162.5 | 162.5 |
| Delay (s) | | 11.3 | 101.0 | 320.9 | 8.2 | | | | | 9.4 | 177.5 | 177.5 |
| Level of Service | | B | F | F | A | | | | | A | F | F |
| Approach Delay (s) | | 56.6 | | | 46.2 | | | 0.0 | | | 167.8 | |
| Approach LOS | | E | | | D | | | A | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 81.5 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.50 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 102.8% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 763 | 629 | 0 | 0 | 671 | 129 | 1190 | 73 | 290 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.94 | 0.91 | | | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Flt Permitted | 0.35 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 1849 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 829 | 684 | 0 | 0 | 729 | 140 | 1293 | 79 | 315 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 76 | 0 | 0 | 95 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 829 | 684 | 0 | 0 | 729 | 64 | 1293 | 79 | 220 | 0 | 0 | 0 |
| Turn Type | Perm | | | | | Perm | Perm | | Perm | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | | | |
| Actuated Green, G (s) | 23.0 | 23.0 | | | 23.0 | 23.0 | 19.0 | 19.0 | 19.0 | | | |
| Effective Green, g (s) | 23.0 | 23.0 | | | 23.0 | 23.0 | 19.0 | 19.0 | 19.0 | | | |
| Actuated g/C Ratio | 0.46 | 0.46 | | | 0.46 | 0.46 | 0.38 | 0.38 | 0.38 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 851 | 2339 | | | 2339 | 728 | 1305 | 708 | 602 | | | |
| v/s Ratio Prot | | 0.13 | | | 0.14 | | | 0.04 | | | | |
| v/s Ratio Perm | c0.45 | | | | | 0.04 | c0.38 | | 0.14 | | | |
| v/c Ratio | 0.97 | 0.29 | | | 0.31 | 0.09 | 0.99 | 0.11 | 0.36 | | | |
| Uniform Delay, d1 | 13.2 | 8.4 | | | 8.5 | 7.6 | 15.4 | 10.0 | 11.2 | | | |
| Progression Factor | 0.37 | 0.17 | | | 0.90 | 1.02 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 20.8 | 0.1 | | | 0.1 | 0.0 | 22.8 | 0.3 | 1.7 | | | |
| Delay (s) | 25.8 | 1.5 | | | 7.8 | 7.8 | 38.2 | 10.4 | 12.9 | | | |
| Level of Service | C | A | | | A | A | D | B | B | | | |
| Approach Delay (s) | | 14.8 | | | 7.8 | | | 32.2 | | | 0.0 | |
| Approach LOS | | B | | | A | | | C | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 20.5 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 50.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 102.8% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 571 | 13 | 193 | 0 | 0 | 0 | 237 | 81 | 4 | 8 | 87 | 482 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 0.99 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1689 | 1583 | | | | 1770 | 3516 | | 1770 | 3090 | |
| Flt Permitted | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1689 | 1583 | | | | 1770 | 3516 | | 1770 | 3090 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 621 | 14 | 210 | 0 | 0 | 0 | 258 | 88 | 4 | 9 | 95 | 524 |
| RTOR Reduction (vph) | 0 | 0 | 156 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 318 | 0 |
| Lane Group Flow (vph) | 317 | 318 | 54 | 0 | 0 | 0 | 258 | 90 | 0 | 9 | 301 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 25.8 | 25.8 | 25.8 | | | | 22.9 | 60.8 | | 1.4 | 39.3 | |
| Effective Green, g (s) | 25.8 | 25.8 | 25.8 | | | | 22.9 | 60.8 | | 1.4 | 39.3 | |
| Actuated g/C Ratio | 0.26 | 0.26 | 0.26 | | | | 0.23 | 0.61 | | 0.01 | 0.39 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 434 | 436 | 408 | | | | 405 | 2138 | | 25 | 1214 | |
| v/s Ratio Prot | | | | | | | c0.15 | 0.03 | | 0.01 | c0.10 | |
| v/s Ratio Perm | c0.19 | 0.19 | 0.03 | | | | | | | | | |
| v/c Ratio | 0.73 | 0.73 | 0.13 | | | | 0.64 | 0.04 | | 0.36 | 0.25 | |
| Uniform Delay, d1 | 33.9 | 33.9 | 28.5 | | | | 34.8 | 7.9 | | 48.9 | 20.4 | |
| Progression Factor | 0.91 | 0.91 | 1.36 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.0 | 5.8 | 0.1 | | | | 3.3 | 0.0 | | 8.7 | 0.5 | |
| Delay (s) | 36.9 | 36.7 | 38.9 | | | | 38.1 | 7.9 | | 57.5 | 20.9 | |
| Level of Service | D | D | D | | | | D | A | | E | C | |
| Approach Delay (s) | | 37.3 | | | 0.0 | | | 30.1 | | | 21.4 | |
| Approach LOS | | D | | | A | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 30.5 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.49 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 57.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 25 | 123 | 70 | 27 | 129 | 128 | 152 | 477 | 74 | 123 | 281 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 27 | 134 | 76 | 29 | 140 | 139 | 165 | 518 | 80 | 134 | 305 | 21 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 237 | 309 | 424 | 340 | 439 | 21 |
| Volume Left (vph) | 27 | 29 | 165 | 0 | 134 | 0 |
| Volume Right (vph) | 76 | 139 | 0 | 80 | 0 | 21 |
| Hadj (s) | -0.14 | -0.22 | 0.23 | -0.13 | 0.19 | -0.67 |
| Departure Headway (s) | 8.5 | 8.1 | 8.3 | 8.0 | 8.6 | 7.7 |
| Degree Utilization, x | 0.56 | 0.70 | 0.98 | 0.75 | 1.05 | 0.04 |
| Capacity (veh/h) | 402 | 433 | 424 | 445 | 421 | 463 |
| Control Delay (s) | 21.9 | 27.6 | 67.0 | 30.2 | 87.5 | 9.9 |
| Approach Delay (s) | 21.9 | 27.6 | 50.7 | | 84.0 | |
| Approach LOS | C | D | F | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 51.5 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 71.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 14 | 303 | 71 | 165 | 266 | 10 | 77 | 401 | 81 | 36 | 396 | 31 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 329 | 77 | 179 | 289 | 11 | 84 | 436 | 88 | 39 | 430 | 34 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 422 | 479 | 608 | 503 |
| Volume Left (vph) | 15 | 179 | 84 | 39 |
| Volume Right (vph) | 77 | 11 | 88 | 34 |
| Hadj (s) | -0.07 | 0.10 | -0.03 | 0.01 |
| Departure Headway (s) | 9.5 | 9.7 | 9.5 | 9.6 |
| Degree Utilization, x | 1.11 | 1.29 | 1.61 | 1.34 |
| Capacity (veh/h) | 390 | 379 | 381 | 384 |
| Control Delay (s) | 111.2 | 175.7 | 310.3 | 196.2 |
| Approach Delay (s) | 111.2 | 175.7 | 310.3 | 196.2 |
| Approach LOS | F | F | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 208.0 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 102.7% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 17 | 49 | 561 | 79 | 93 | 443 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 53 | 610 | 86 | 101 | 482 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1096 | 348 | | | 696 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1096 | 348 | | | 696 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 90 | 92 | | | 89 | |
| cM capacity (veh/h) | 184 | 648 | | | 896 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 72 | 407 | 289 | 262 | 321 |
| Volume Left | 18 | 0 | 0 | 101 | 0 |
| Volume Right | 53 | 0 | 86 | 0 | 0 |
| cSH | 393 | 1700 | 1700 | 896 | 1700 |
| Volume to Capacity | 0.18 | 0.24 | 0.17 | 0.11 | 0.19 |
| Queue Length 95th (ft) | 16 | 0 | 0 | 10 | 0 |
| Control Delay (s) | 16.2 | 0.0 | 0.0 | 4.4 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s) | 16.2 | 0.0 | | 2.0 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.7 | | |
| Intersection Capacity Utilization | 46.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 33 | 102 | 4 | 41 | 111 | 132 | 20 | 322 | 32 | 124 | 444 | 31 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 111 | 4 | 45 | 121 | 143 | 22 | 350 | 35 | 135 | 483 | 34 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 264 | | | 115 | | | 741 | 538 | 113 | 676 | 468 | 192 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 264 | | | 115 | | | 741 | 538 | 113 | 676 | 468 | 192 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 97 | | | 0 | 17 | 96 | 0 | 0 | 96 |
| cM capacity (veh/h) | 1300 | | | 1474 | | | 0 | 424 | 940 | 106 | 464 | 849 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 151 | 309 | 407 | 651 |
| Volume Left | 36 | 45 | 22 | 135 |
| Volume Right | 4 | 143 | 35 | 34 |
| cSH | 1300 | 1474 | 0 | 276 |
| Volume to Capacity | 0.03 | 0.03 | Err | 2.36 |
| Queue Length 95th (ft) | 2 | 2 | Err | 1289 |
| Control Delay (s) | 2.0 | 1.3 | Err | 649.7 |
| Lane LOS | A | A | F | F |
| Approach Delay (s) | 2.0 | 1.3 | Err | 649.7 |
| Approach LOS | | | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 81.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 191 | 0 | 0 | 277 | 304 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 208 | 0 | 0 | 301 | 330 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 466 | 466 | 632 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 466 | 466 | 632 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 87 | 65 | 100 | | | |
| cM capacity (veh/h) | 555 | 596 | 951 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 280 | 632 |
| Volume Left | 73 | 0 |
| Volume Right | 208 | 330 |
| cSH | 585 | 1700 |
| Volume to Capacity | 0.48 | 0.37 |
| Queue Length 95th (ft) | 65 | 0 |
| Control Delay (s) | 16.7 | 0.0 |
| Lane LOS | C | |
| Approach Delay (s) | 16.7 | 0.0 |
| Approach LOS | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.1 | | |
| Intersection Capacity Utilization | 55.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 0 | 114 | 101 | 32 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 124 | 110 | 35 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 0 | 124 | 110 | 35 |
| Volume Left (vph) | 0 | 0 | 0 | 35 |
| Volume Right (vph) | 0 | 0 | 110 | 0 |
| Hadj (s) | 0.00 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 4.2 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.00 | 0.14 | 0.10 | 0.04 |
| Capacity (veh/h) | 823 | 894 | 1121 | 831 |
| Control Delay (s) | 7.2 | 7.6 | 6.5 | 7.4 |
| Approach Delay (s) | 0.0 | 7.1 | | 7.4 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 7.1 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 16.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 9 | 65 | 0 | 5 | 23 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 10 | 71 | 0 | 5 | 25 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 10 | | 146 | 5 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 10 | | 146 | 5 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 96 | | 99 | 98 |
| cM capacity (veh/h) | | | 1610 | | 809 | 1078 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 10 | 71 | 5 | 25 |
| Volume Left | 0 | 71 | 5 | 0 |
| Volume Right | 10 | 0 | 0 | 25 |
| cSH | 1700 | 1610 | 809 | 1078 |
| Volume to Capacity | 0.01 | 0.04 | 0.01 | 0.02 |
| Queue Length 95th (ft) | 0 | 3 | 1 | 2 |
| Control Delay (s) | 0.0 | 7.3 | 9.5 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.3 | 8.6 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.0 | | |
| Intersection Capacity Utilization | 20.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 19 | 3 | 6 | 336 | 409 | 59 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 3 | 7 | 365 | 445 | 64 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 672 | 477 | 509 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 672 | 477 | 509 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 95 | 99 | 99 | | | |
| cM capacity (veh/h) | 387 | 535 | 1053 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 21 | 3 | 7 | 183 | 183 | 509 |
| Volume Left | 21 | 0 | 7 | 0 | 0 | 0 |
| Volume Right | 0 | 3 | 0 | 0 | 0 | 64 |
| cSH | 387 | 535 | 1053 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.05 | 0.01 | 0.01 | 0.11 | 0.11 | 0.30 |
| Queue Length 95th (ft) | 4 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 14.8 | 11.8 | 8.4 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | B | A | | | |
| Approach Delay (s) | 14.4 | | 0.1 | | | 0.0 |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.4 | | |
| Intersection Capacity Utilization | 35.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 2757 | 20 | 0 | 2981 | 139 | 0 | 0 | 55 | 0 | 0 | 21 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 2997 | 22 | 0 | 3240 | 151 | 0 | 0 | 60 | 0 | 0 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.69 | | | 0.41 | | | 0.57 | 0.57 | 0.41 | 0.57 | 0.57 | 0.69 |
| vC, conflicting volume | 3391 | | | 3018 | | | 4100 | 6388 | 1498 | 4874 | 6334 | 1156 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 2904 | | | 3045 | | | 1709 | 5746 | 0 | 3075 | 5651 | 0 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 87 | 100 | 100 | 97 |
| cM capacity (veh/h) | 86 | | | 45 | | | 32 | 0 | 449 | 3 | 0 | 753 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 1498 | 1498 | 22 | 1296 | 1296 | 799 | 60 | 23 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 22 | 0 | 0 | 151 | 60 | 23 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 449 | 753 |
| Volume to Capacity | 0.88 | 0.88 | 0.01 | 0.76 | 0.76 | 0.47 | 0.13 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.2 | 9.9 |
| Lane LOS | | | | | | | B | A |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 14.2 | 9.9 |
| Approach LOS | | | | | | | B | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 86.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 359 | 1278 | 99 | 435 | 1219 | 91 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 390 | 1389 | 108 | 473 | 1325 | 99 |
| RTOR Reduction (vph) | 0 | 1014 | 0 | 343 | 0 | 0 |
| Lane Group Flow (vph) | 390 | 375 | 108 | 130 | 1325 | 99 |
| Turn Type | | Perm | | Perm | Prot | |
| Protected Phases | 8 | | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 35.1 | 35.1 | 28.0 | 28.0 | 54.9 | 86.9 |
| Effective Green, g (s) | 35.1 | 35.1 | 28.0 | 28.0 | 54.9 | 86.9 |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.22 | 0.22 | 0.42 | 0.67 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 478 | 752 | 762 | 341 | 1450 | 1245 |
| v/s Ratio Prot | c0.22 | | 0.03 | | c0.39 | 0.05 |
| v/s Ratio Perm | | 0.13 | | c0.08 | | |
| v/c Ratio | 0.82 | 0.50 | 0.14 | 0.38 | 0.91 | 0.08 |
| Uniform Delay, d1 | 44.4 | 40.0 | 41.3 | 43.6 | 35.3 | 7.5 |
| Progression Factor | 0.94 | 3.49 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.8 | 0.1 | 0.4 | 3.2 | 9.1 | 0.1 |
| Delay (s) | 44.7 | 139.7 | 41.7 | 46.8 | 44.4 | 7.7 |
| Level of Service | D | F | D | D | D | A |
| Approach Delay (s) | 118.9 | | 45.9 | | | 41.9 |
| Approach LOS | F | | D | | | D |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 78.7 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 0.76 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 68.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 60 | 1560 | 35 | 426 | 1552 | 299 | 32 | 7 | 348 | 121 | 7 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | | 0.88 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 1.00 | | | 0.97 | |
| Satd. Flow (prot) | 1770 | 3528 | | 1770 | 3453 | | | 1630 | | | 1730 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.96 | | | 0.33 | |
| Satd. Flow (perm) | 1770 | 3528 | | 1770 | 3453 | | | 1575 | | | 582 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 65 | 1696 | 38 | 463 | 1687 | 325 | 35 | 8 | 378 | 132 | 8 | 60 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 243 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 65 | 1733 | 0 | 463 | 2000 | 0 | 0 | 178 | 0 | 0 | 188 | 0 |
| Turn Type | Prot | | | Prot | | | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 5.0 | 52.0 | | 29.0 | 76.0 | | | 37.0 | | | 37.0 | |
| Effective Green, g (s) | 5.0 | 52.0 | | 29.0 | 76.0 | | | 37.0 | | | 37.0 | |
| Actuated g/C Ratio | 0.04 | 0.40 | | 0.22 | 0.58 | | | 0.28 | | | 0.28 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | 68 | 1411 | | 395 | 2019 | | | 448 | | | 166 | |
| v/s Ratio Prot | 0.04 | c0.49 | | c0.26 | 0.58 | | | | | | | |
| v/s Ratio Perm | | | | | | | | 0.11 | | | c0.32 | |
| v/c Ratio | 0.96 | 1.23 | | 1.17 | 0.99 | | | 0.40 | | | 1.13 | |
| Uniform Delay, d1 | 62.4 | 39.0 | | 50.5 | 26.6 | | | 37.5 | | | 46.5 | |
| Progression Factor | 1.32 | 0.49 | | 0.60 | 0.28 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 65.2 | 106.1 | | 80.2 | 4.1 | | | 2.6 | | | 109.6 | |
| Delay (s) | 147.3 | 125.2 | | 110.7 | 11.7 | | | 40.1 | | | 156.0 | |
| Level of Service | F | F | | F | B | | | D | | | F | |
| Approach Delay (s) | | 126.0 | | | 30.2 | | | 40.1 | | | 156.0 | |
| Approach LOS | | F | | | C | | | D | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 71.4 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 1.18 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 115.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 30 | 1883 | 151 | 418 | 2143 | 493 | 139 | 0 | 359 | 455 | 0 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | | 1.00 | | 0.95 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 0.90 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.99 | | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3500 | | 1770 | 3539 | 1583 | | 1658 | | 1681 | 1666 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.58 | | 0.35 | 0.36 | |
| Satd. Flow (perm) | 1770 | 3500 | | 1770 | 3539 | 1583 | | 977 | | 611 | 620 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 2047 | 164 | 454 | 2329 | 536 | 151 | 0 | 390 | 495 | 0 | 30 |
| RTOR Reduction (vph) | 0 | 5 | 0 | 0 | 0 | 59 | 0 | 72 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 33 | 2206 | 0 | 454 | 2329 | 477 | 0 | 469 | 0 | 262 | 260 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | | 6 | | |
| Actuated Green, G (s) | 3.2 | 54.0 | | 21.8 | 72.6 | 72.6 | | 42.2 | | 42.2 | 42.2 | |
| Effective Green, g (s) | 3.2 | 54.0 | | 21.8 | 72.6 | 72.6 | | 42.2 | | 42.2 | 42.2 | |
| Actuated g/C Ratio | 0.02 | 0.42 | | 0.17 | 0.56 | 0.56 | | 0.32 | | 0.32 | 0.32 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 44 | 1454 | | 297 | 1976 | 884 | | 317 | | 198 | 201 | |
| v/s Ratio Prot | 0.02 | c0.63 | | c0.26 | 0.66 | | | | | | | |
| v/s Ratio Perm | | | | | | 0.30 | | c0.48 | | 0.43 | 0.42 | |
| v/c Ratio | 0.75 | 1.52 | | 1.53 | 1.18 | 0.54 | | 1.48 | | 1.32 | 1.29 | |
| Uniform Delay, d1 | 63.0 | 38.0 | | 54.1 | 28.7 | 18.1 | | 43.9 | | 43.9 | 43.9 | |
| Progression Factor | 0.91 | 0.29 | | 0.59 | 0.45 | 0.53 | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 6.4 | 233.2 | | 239.4 | 80.9 | 0.1 | | 231.7 | | 176.2 | 163.1 | |
| Delay (s) | 63.9 | 244.1 | | 271.1 | 93.8 | 9.7 | | 275.6 | | 220.1 | 207.0 | |
| Level of Service | E | F | | F | F | A | | F | | F | F | |
| Approach Delay (s) | | 241.4 | | | 104.5 | | | 275.6 | | | 213.6 | |
| Approach LOS | | F | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 173.5 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.51 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 127.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 222 | 2311 | 160 | 358 | 2728 | 462 | 75 | 93 | 360 | 580 | 95 | 251 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 241 | 2512 | 174 | 389 | 2965 | 502 | 82 | 101 | 391 | 630 | 103 | 273 |
| RTOR Reduction (vph) | 0 | 0 | 37 | 0 | 0 | 90 | 0 | 0 | 104 | 0 | 0 | 81 |
| Lane Group Flow (vph) | 241 | 2512 | 137 | 389 | 2965 | 413 | 82 | 101 | 287 | 630 | 103 | 192 |
| Turn Type | Prot | | Perm | Prot | | Perm | Prot | | Perm | Prot | | Perm |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 7.0 | 58.0 | 58.0 | 14.0 | 65.0 | 65.0 | 6.0 | 22.0 | 22.0 | 20.0 | 36.0 | 36.0 |
| Effective Green, g (s) | 7.0 | 58.0 | 58.0 | 14.0 | 65.0 | 65.0 | 6.0 | 22.0 | 22.0 | 20.0 | 36.0 | 36.0 |
| Actuated g/C Ratio | 0.05 | 0.45 | 0.45 | 0.11 | 0.50 | 0.50 | 0.05 | 0.17 | 0.17 | 0.15 | 0.28 | 0.28 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 185 | 2269 | 706 | 370 | 2543 | 792 | 158 | 599 | 268 | 528 | 980 | 438 |
| v/s Ratio Prot | 0.07 | 0.49 | | c0.11 | c0.58 | | 0.02 | 0.03 | | c0.18 | 0.03 | |
| v/s Ratio Perm | | | 0.09 | | | 0.26 | | | c0.18 | | | 0.12 |
| v/c Ratio | 1.30 | 1.11 | 0.19 | 1.05 | 1.17 | 0.52 | 0.52 | 0.17 | 1.07 | 1.19 | 0.11 | 0.44 |
| Uniform Delay, d1 | 61.5 | 36.0 | 21.8 | 58.0 | 32.5 | 22.0 | 60.6 | 46.2 | 54.0 | 55.0 | 35.0 | 38.7 |
| Progression Factor | 0.90 | 0.39 | 0.26 | 0.75 | 0.63 | 0.38 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 139.9 | 48.9 | 0.0 | 38.7 | 76.0 | 0.2 | 2.9 | 0.6 | 75.2 | 104.5 | 0.2 | 3.2 |
| Delay (s) | 195.4 | 62.9 | 5.6 | 82.4 | 96.3 | 8.6 | 63.5 | 46.8 | 129.2 | 159.5 | 35.2 | 41.8 |
| Level of Service | F | E | A | F | F | A | E | D | F | F | D | D |
| Approach Delay (s) | | 70.4 | | | 83.5 | | | 105.3 | | | 114.8 | |
| Approach LOS | | E | | | F | | | F | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 84.2 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.13 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 93.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 74 | 3112 | 64 | 693 | 3502 | 200 | 20 | 12 | 207 | 78 | 12 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 1.00 | 0.95 | 0.95 | | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.87 | 0.85 | | 0.97 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | 0.97 | |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1770 | 1533 | 1504 | | 1749 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.68 | 1.00 | 1.00 | | 0.51 | |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 1268 | 1533 | 1504 | | 920 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 80 | 3383 | 70 | 753 | 3807 | 217 | 22 | 13 | 225 | 85 | 13 | 27 |
| RTOR Reduction (vph) | 0 | 0 | 8 | 0 | 0 | 22 | 0 | 95 | 103 | 0 | 8 | 0 |
| Lane Group Flow (vph) | 80 | 3383 | 62 | 753 | 3807 | 195 | 22 | 26 | 14 | 0 | 117 | 0 |
| Turn Type | Prot | | Perm | Prot | | Perm | Perm | | Perm | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | | | 6 | |
| Permitted Phases | | | 4 | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 4.0 | 77.0 | 77.0 | 25.0 | 98.0 | 98.0 | 16.0 | 16.0 | 16.0 | | 16.0 | |
| Effective Green, g (s) | 4.0 | 77.0 | 77.0 | 25.0 | 98.0 | 98.0 | 16.0 | 16.0 | 16.0 | | 16.0 | |
| Actuated g/C Ratio | 0.03 | 0.59 | 0.59 | 0.19 | 0.75 | 0.75 | 0.12 | 0.12 | 0.12 | | 0.12 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | 3.0 | |
| Lane Grp Cap (vph) | 106 | 3012 | 938 | 660 | 3833 | 1193 | 156 | 189 | 185 | | 113 | |
| v/s Ratio Prot | 0.02 | c0.67 | | c0.22 | 0.75 | | | 0.02 | | | | |
| v/s Ratio Perm | | | 0.04 | | | 0.12 | 0.02 | | 0.01 | | c0.13 | |
| v/c Ratio | 0.75 | 1.12 | 0.07 | 1.14 | 0.99 | 0.16 | 0.14 | 0.14 | 0.08 | | 1.04 | |
| Uniform Delay, d1 | 62.5 | 26.5 | 11.2 | 52.5 | 15.7 | 4.5 | 50.9 | 50.9 | 50.5 | | 57.0 | |
| Progression Factor | 1.03 | 0.20 | 0.10 | 1.01 | 0.91 | 0.62 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 2.8 | 55.9 | 0.0 | 65.3 | 3.0 | 0.0 | 1.9 | 1.5 | 0.8 | | 94.8 | |
| Delay (s) | 67.0 | 61.1 | 1.2 | 118.2 | 17.3 | 2.8 | 52.8 | 52.4 | 51.3 | | 151.8 | |
| Level of Service | E | E | A | F | B | A | D | D | D | | F | |
| Approach Delay (s) | | 60.1 | | | 32.5 | | | 51.9 | | | 151.8 | |
| Approach LOS | | E | | | C | | | D | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 46.0 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.11 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 103.0% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1855 | 1585 | 90 | 1947 | 0 | 0 | 0 | 0 | 38 | 0 | 1965 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.97 | 0.95 | 0.95 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 3433 | 1504 | 1504 |
| Flt Permitted | | 1.00 | 1.00 | 0.06 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 113 | 5085 | | | | | 3433 | 1504 | 1504 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 2016 | 1723 | 98 | 2116 | 0 | 0 | 0 | 0 | 41 | 0 | 2136 |
| RTOR Reduction (vph) | 0 | 0 | 323 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Lane Group Flow (vph) | 0 | 2016 | 1400 | 98 | 2116 | 0 | 0 | 0 | 0 | 41 | 1066 | 1066 |
| Turn Type | | | Perm | Perm | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | 8 | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 66.0 | 66.0 | 66.0 | 66.0 | | | | | 56.0 | 56.0 | 56.0 |
| Effective Green, g (s) | | 66.0 | 66.0 | 66.0 | 66.0 | | | | | 56.0 | 56.0 | 56.0 |
| Actuated g/C Ratio | | 0.51 | 0.51 | 0.51 | 0.51 | | | | | 0.43 | 0.43 | 0.43 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 2582 | 1415 | 57 | 2582 | | | | | 1479 | 648 | 648 |
| v/s Ratio Prot | | 0.40 | | | 0.42 | | | | | | c0.71 | |
| v/s Ratio Perm | | | 0.50 | c0.87 | | | | | | 0.01 | | 0.71 |
| v/c Ratio | | 0.78 | 0.99 | 1.72 | 0.82 | | | | | 0.03 | 1.65 | 1.65 |
| Uniform Delay, d1 | | 26.1 | 31.6 | 32.0 | 27.0 | | | | | 21.3 | 37.0 | 37.0 |
| Progression Factor | | 0.62 | 0.40 | 0.53 | 0.51 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.1 | 5.0 | 348.3 | 0.8 | | | | | 0.0 | 297.4 | 297.4 |
| Delay (s) | | 16.3 | 17.8 | 365.3 | 14.4 | | | | | 21.4 | 334.4 | 334.4 |
| Level of Service | | B | B | F | B | | | | | C | F | F |
| Approach Delay (s) | | 17.0 | | | 30.0 | | | 0.0 | | | 328.5 | |
| Approach LOS | | B | | | C | | | A | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 103.9 | HCM Level of Service | F |
| HCM Volume to Capacity ratio | 1.68 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 188.3% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 1274 | 619 | 0 | 0 | 566 | 39 | 1471 | 81 | 138 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Lane Util. Factor | 0.94 | 0.91 | | | 0.91 | 1.00 | 0.97 | 1.00 | 1.00 | | | |
| Frt | 1.00 | 1.00 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | | | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (prot) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Flt Permitted | 0.95 | 1.00 | | | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | | | |
| Satd. Flow (perm) | 4990 | 5085 | | | 5085 | 1583 | 3433 | 1863 | 1583 | | | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 1385 | 673 | 0 | 0 | 615 | 42 | 1599 | 88 | 150 | 0 | 0 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 82 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 1385 | 673 | 0 | 0 | 615 | 8 | 1599 | 88 | 68 | 0 | 0 | 0 |
| Turn Type | Prot | | | | | Perm | Perm | | Perm | | | |
| Protected Phases | 7 | 4 | | | 8 | | | 2 | | | | |
| Permitted Phases | | | | | | 8 | 2 | | 2 | | | |
| Actuated Green, G (s) | 27.0 | 46.5 | | | 15.5 | 15.5 | 45.5 | 45.5 | 45.5 | | | |
| Effective Green, g (s) | 27.0 | 46.5 | | | 15.5 | 15.5 | 45.5 | 45.5 | 45.5 | | | |
| Actuated g/C Ratio | 0.27 | 0.46 | | | 0.16 | 0.16 | 0.46 | 0.46 | 0.46 | | | |
| Clearance Time (s) | 4.0 | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | 1347 | 2365 | | | 788 | 245 | 1562 | 848 | 720 | | | |
| v/s Ratio Prot | c0.28 | 0.13 | | | c0.12 | | | 0.05 | | | | |
| v/s Ratio Perm | | | | | | 0.01 | c0.47 | | 0.04 | | | |
| v/c Ratio | 1.03 | 0.28 | | | 0.78 | 0.03 | 1.02 | 0.10 | 0.09 | | | |
| Uniform Delay, d1 | 36.5 | 16.5 | | | 40.6 | 35.9 | 27.2 | 15.6 | 15.5 | | | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Incremental Delay, d2 | 32.0 | 0.1 | | | 5.0 | 0.1 | 29.0 | 0.2 | 0.3 | | | |
| Delay (s) | 68.5 | 16.6 | | | 45.7 | 35.9 | 56.2 | 15.8 | 15.8 | | | |
| Level of Service | E | B | | | D | D | E | B | B | | | |
| Approach Delay (s) | | 51.5 | | | 45.0 | | | 51.0 | | | 0.0 | |
| Approach LOS | | D | | | D | | | D | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 50.4 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 188.3% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 438 | 2 | 171 | 0 | 0 | 0 | 181 | 57 | 2 | 6 | 53 | 396 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | | | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | | | | 1.00 | 1.00 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1681 | 1686 | 1583 | | | | 1770 | 3523 | | 1770 | 3071 | |
| Flt Permitted | 0.95 | 0.95 | 1.00 | | | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1681 | 1686 | 1583 | | | | 1770 | 3523 | | 1770 | 3071 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 476 | 2 | 186 | 0 | 0 | 0 | 197 | 62 | 2 | 7 | 58 | 430 |
| RTOR Reduction (vph) | 0 | 0 | 142 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 263 | 0 |
| Lane Group Flow (vph) | 238 | 240 | 44 | 0 | 0 | 0 | 197 | 63 | 0 | 7 | 225 | 0 |
| Turn Type | Perm | | Perm | | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | 4 | | | | | | | | | |
| Actuated Green, G (s) | 15.4 | 15.4 | 15.4 | | | | 12.4 | 36.4 | | 1.2 | 25.2 | |
| Effective Green, g (s) | 15.4 | 15.4 | 15.4 | | | | 12.4 | 36.4 | | 1.2 | 25.2 | |
| Actuated g/C Ratio | 0.24 | 0.24 | 0.24 | | | | 0.19 | 0.56 | | 0.02 | 0.39 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | | | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | | | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 398 | 399 | 375 | | | | 338 | 1973 | | 33 | 1191 | |
| v/s Ratio Prot | | | | | | | c0.11 | 0.02 | | 0.00 | c0.07 | |
| v/s Ratio Perm | 0.14 | 0.14 | 0.03 | | | | | | | | | |
| v/c Ratio | 0.60 | 0.60 | 0.12 | | | | 0.58 | 0.03 | | 0.21 | 0.19 | |
| Uniform Delay, d1 | 22.0 | 22.1 | 19.5 | | | | 23.9 | 6.4 | | 31.4 | 13.1 | |
| Progression Factor | 0.56 | 0.57 | 0.88 | | | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.4 | 2.5 | 0.1 | | | | 2.6 | 0.0 | | 3.2 | 0.4 | |
| Delay (s) | 14.7 | 15.0 | 17.2 | | | | 26.5 | 6.4 | | 34.6 | 13.5 | |
| Level of Service | B | B | B | | | | C | A | | C | B | |
| Approach Delay (s) | | 15.5 | | | 0.0 | | | 21.6 | | | 13.8 | |
| Approach LOS | | B | | | A | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 16.0 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 65.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 46.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 11 | 82 | 34 | 27 | 67 | 130 | 137 | 472 | 52 | 117 | 343 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 89 | 37 | 29 | 73 | 141 | 149 | 513 | 57 | 127 | 373 | 12 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total (vph) | 138 | 243 | 405 | 313 | 500 | 12 |
| Volume Left (vph) | 12 | 29 | 149 | 0 | 127 | 0 |
| Volume Right (vph) | 37 | 141 | 0 | 57 | 0 | 12 |
| Hadj (s) | -0.11 | -0.29 | 0.22 | -0.09 | 0.16 | -0.67 |
| Departure Headway (s) | 7.9 | 7.3 | 7.2 | 6.9 | 7.4 | 6.6 |
| Degree Utilization, x | 0.30 | 0.49 | 0.81 | 0.60 | 1.03 | 0.02 |
| Capacity (veh/h) | 420 | 475 | 492 | 506 | 475 | 532 |
| Control Delay (s) | 14.3 | 17.0 | 33.2 | 18.5 | 75.5 | 8.5 |
| Approach Delay (s) | 14.3 | 17.0 | 26.8 | | 73.9 | |
| Approach LOS | B | C | D | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 39.2 | | |
| HCM Level of Service | E | | |
| Intersection Capacity Utilization | 72.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 16 | 165 | 93 | 220 | 185 | 10 | 93 | 455 | 72 | 18 | 502 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 179 | 101 | 239 | 201 | 11 | 101 | 495 | 78 | 20 | 546 | 21 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 298 | 451 | 674 | 586 |
| Volume Left (vph) | 17 | 239 | 101 | 20 |
| Volume Right (vph) | 101 | 11 | 78 | 21 |
| Hadj (s) | -0.16 | 0.13 | -0.01 | 0.02 |
| Departure Headway (s) | 9.4 | 9.1 | 9.0 | 9.0 |
| Degree Utilization, x | 0.78 | 1.14 | 1.68 | 1.47 |
| Capacity (veh/h) | 377 | 392 | 405 | 411 |
| Control Delay (s) | 38.6 | 119.9 | 339.9 | 247.4 |
| Approach Delay (s) | 38.6 | 119.9 | 339.9 | 247.4 |
| Approach LOS | E | F | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 218.8 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 113.1% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 22 | 21 | 603 | 43 | 41 | 473 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 24 | 23 | 655 | 47 | 45 | 514 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1025 | 351 | | | 702 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1025 | 351 | | | 702 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 89 | 96 | | | 95 | |
| cM capacity (veh/h) | 219 | 645 | | | 891 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 47 | 437 | 265 | 216 | 343 |
| Volume Left | 24 | 0 | 0 | 45 | 0 |
| Volume Right | 23 | 0 | 47 | 0 | 0 |
| cSH | 324 | 1700 | 1700 | 891 | 1700 |
| Volume to Capacity | 0.14 | 0.26 | 0.16 | 0.05 | 0.20 |
| Queue Length 95th (ft) | 12 | 0 | 0 | 4 | 0 |
| Control Delay (s) | 18.0 | 0.0 | 0.0 | 2.3 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s) | 18.0 | 0.0 | | 0.9 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 45.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 38 | 75 | 1 | 34 | 85 | 158 | 15 | 375 | 12 | 172 | 576 | 23 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 41 | 82 | 1 | 37 | 92 | 172 | 16 | 408 | 13 | 187 | 626 | 25 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 264 | | | 83 | | | 755 | 503 | 82 | 634 | 417 | 178 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 264 | | | 83 | | | 755 | 503 | 82 | 634 | 417 | 178 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 98 | | | 0 | 8 | 99 | 0 | 0 | 97 |
| cM capacity (veh/h) | 1300 | | | 1515 | | | 0 | 445 | 978 | 75 | 497 | 865 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 124 | 301 | 437 | 838 |
| Volume Left | 41 | 37 | 16 | 187 |
| Volume Right | 1 | 172 | 13 | 25 |
| cSH | 1300 | 1515 | 0 | 222 |
| Volume to Capacity | 0.03 | 0.02 | Err | 3.77 |
| Queue Length 95th (ft) | 2 | 2 | Err | Err |
| Control Delay (s) | 2.8 | 1.1 | Err | Err |
| Lane LOS | A | A | F | F |
| Approach Delay (s) | 2.8 | 1.1 | Err | Err |
| Approach LOS | | | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 89.7% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 49 | 230 | 0 | 0 | 264 | 286 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 53 | 250 | 0 | 0 | 287 | 311 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 442 | 442 | 598 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 442 | 442 | 598 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 91 | 59 | 100 | | | |
| cM capacity (veh/h) | 573 | 615 | 979 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 303 | 598 |
| Volume Left | 53 | 0 |
| Volume Right | 250 | 311 |
| cSH | 607 | 1700 |
| Volume to Capacity | 0.50 | 0.35 |
| Queue Length 95th (ft) | 70 | 0 |
| Control Delay (s) | 16.7 | 0.0 |
| Lane LOS | C | |
| Approach Delay (s) | 16.7 | 0.0 |
| Approach LOS | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.6 | | |
| Intersection Capacity Utilization | 55.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 11 | 71 | 75 | 19 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 12 | 77 | 82 | 21 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 12 | 77 | 82 | 21 |
| Volume Left (vph) | 0 | 0 | 0 | 21 |
| Volume Right (vph) | 12 | 0 | 82 | 0 |
| Hadj (s) | -0.57 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 3.5 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.01 | 0.09 | 0.07 | 0.02 |
| Capacity (veh/h) | 983 | 889 | 1121 | 834 |
| Control Delay (s) | 6.6 | 7.3 | 6.4 | 7.3 |
| Approach Delay (s) | 6.6 | 6.9 | | 7.3 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 6.9 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 14.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 6 | 48 | 0 | 6 | 27 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 7 | 52 | 0 | 7 | 29 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 7 | | 108 | 3 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 7 | | 108 | 3 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 99 | 97 |
| cM capacity (veh/h) | | | 1614 | | 861 | 1081 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 7 | 52 | 7 | 29 |
| Volume Left | 0 | 52 | 7 | 0 |
| Volume Right | 7 | 0 | 0 | 29 |
| cSH | 1700 | 1614 | 861 | 1081 |
| Volume to Capacity | 0.00 | 0.03 | 0.01 | 0.03 |
| Queue Length 95th (ft) | 0 | 3 | 1 | 2 |
| Control Delay (s) | 0.0 | 7.3 | 9.2 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.3 | 8.6 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.3 | | |
| Intersection Capacity Utilization | 19.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 23 | 4 | 4 | 377 | 580 | 44 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 25 | 4 | 4 | 410 | 630 | 48 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 868 | 654 | 678 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 868 | 654 | 678 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 91 | 99 | 100 | | | |
| cM capacity (veh/h) | 290 | 409 | 910 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 25 | 4 | 4 | 205 | 205 | 678 |
| Volume Left | 25 | 0 | 4 | 0 | 0 | 0 |
| Volume Right | 0 | 4 | 0 | 0 | 0 | 48 |
| cSH | 290 | 409 | 910 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.09 | 0.01 | 0.00 | 0.12 | 0.12 | 0.40 |
| Queue Length 95th (ft) | 7 | 1 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 18.6 | 13.9 | 9.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | B | A | | | |
| Approach Delay (s) | 17.9 | | 0.1 | | | 0.0 |
| Approach LOS | C | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.5 | | |
| Intersection Capacity Utilization | 43.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 3373 | 24 | 0 | 4395 | 189 | 0 | 0 | 67 | 0 | 0 | 13 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 3666 | 26 | 0 | 4777 | 205 | 0 | 0 | 73 | 0 | 0 | 14 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.64 | | | 0.40 | | | 0.58 | 0.58 | 0.40 | 0.58 | 0.58 | 0.64 |
| vC, conflicting volume | 4983 | | | 3692 | | | 5273 | 8649 | 1833 | 6786 | 8572 | 1695 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 5250 | | | 4743 | | | 3236 | 9104 | 62 | 5866 | 8971 | 143 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 81 | 100 | 100 | 98 |
| cM capacity (veh/h) | 8 | | | 9 | | | 2 | 0 | 393 | 0 | 0 | 565 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 1833 | 1833 | 26 | 1911 | 1911 | 1161 | 73 | 14 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 26 | 0 | 0 | 205 | 73 | 14 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 393 | 565 |
| Volume to Capacity | 1.08 | 1.08 | 0.02 | 1.12 | 1.12 | 0.68 | 0.19 | 0.02 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 | 11.5 |
| Lane LOS | | | | | | | C | B |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 16.2 | 11.5 |
| Approach LOS | | | | | | | C | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 104.1% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

## *CUMULATIVE BUILDOUT PLUS PROJECT WITH MITIGATION*

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 25 | 123 | 70 | 27 | 129 | 128 | 152 | 477 | 74 | 123 | 281 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 27 | 134 | 76 | 29 | 140 | 139 | 165 | 518 | 80 | 134 | 305 | 21 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 161 | 76 | 170 | 139 | 424 | 340 | 286 | 173 |
| Volume Left (vph) | 27 | 0 | 29 | 0 | 165 | 0 | 134 | 0 |
| Volume Right (vph) | 0 | 76 | 0 | 139 | 0 | 80 | 0 | 21 |
| Hadj (s) | 0.12 | -0.67 | 0.12 | -0.67 | 0.23 | -0.13 | 0.27 | -0.05 |
| Departure Headway (s) | 8.4 | 7.6 | 8.3 | 7.5 | 7.5 | 7.1 | 7.9 | 7.6 |
| Degree Utilization, x | 0.38 | 0.16 | 0.39 | 0.29 | 0.88 | 0.67 | 0.63 | 0.37 |
| Capacity (veh/h) | 410 | 447 | 415 | 457 | 468 | 493 | 438 | 459 |
| Control Delay (s) | 15.2 | 10.9 | 15.3 | 12.3 | 43.1 | 22.2 | 22.1 | 13.7 |
| Approach Delay (s) | 13.8 | | 13.9 | | 33.8 | | 18.9 | |
| Approach LOS | B | | B | | D | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 23.8 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 61.4% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 14 | 303 | 71 | 165 | 266 | 10 | 77 | 401 | 81 | 36 | 396 | 31 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 329 | 77 | 179 | 289 | 11 | 84 | 436 | 88 | 39 | 430 | 34 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 422 | 479 | 608 | 503 |
| Volume Left (vph) | 15 | 179 | 84 | 39 |
| Volume Right (vph) | 77 | 11 | 88 | 34 |
| Hadj (s) | -0.07 | 0.10 | -0.03 | 0.01 |
| Departure Headway (s) | 9.5 | 9.7 | 9.5 | 9.6 |
| Degree Utilization, x | 1.11 | 1.29 | 1.61 | 1.34 |
| Capacity (veh/h) | 390 | 379 | 381 | 384 |
| Control Delay (s) | 111.2 | 175.7 | 310.3 | 196.2 |
| Approach Delay (s) | 111.2 | 175.7 | 310.3 | 196.2 |
| Approach LOS | F | F | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 208.0 | | |
| HCM Level of Service | F | | |
| Intersection Capacity Utilization | 102.7% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 17 | 49 | 561 | 79 | 93 | 443 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 18 | 53 | 610 | 86 | 101 | 482 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1096 | 348 | | | 696 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1096 | 348 | | | 696 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 90 | 92 | | | 89 | |
| cM capacity (veh/h) | 184 | 648 | | | 896 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 72 | 407 | 289 | 262 | 321 |
| Volume Left | 18 | 0 | 0 | 101 | 0 |
| Volume Right | 53 | 0 | 86 | 0 | 0 |
| cSH | 393 | 1700 | 1700 | 896 | 1700 |
| Volume to Capacity | 0.18 | 0.24 | 0.17 | 0.11 | 0.19 |
| Queue Length 95th (ft) | 16 | 0 | 0 | 10 | 0 |
| Control Delay (s) | 16.2 | 0.0 | 0.0 | 4.4 | 0.0 |
| Lane LOS | C | | | A | |
| Approach Delay (s) | 16.2 | 0.0 | | 2.0 | |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.7 | | |
| Intersection Capacity Utilization | 46.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 33 | 102 | 4 | 41 | 111 | 132 | 20 | 322 | 32 | 124 | 444 | 31 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 111 | 4 | 45 | 121 | 143 | 22 | 350 | 35 | 135 | 483 | 34 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 264 | | | 115 | | | 741 | 538 | 113 | 676 | 468 | 192 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 264 | | | 115 | | | 741 | 538 | 113 | 676 | 468 | 192 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 97 | | | 97 | | | 0 | 17 | 96 | 0 | 0 | 96 |
| cM capacity (veh/h) | 1300 | | | 1474 | | | 0 | 424 | 940 | 106 | 464 | 849 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 |
|---|---|---|---|---|
| Volume Total | 151 | 309 | 407 | 651 |
| Volume Left | 36 | 45 | 22 | 135 |
| Volume Right | 4 | 143 | 35 | 34 |
| cSH | 1300 | 1474 | 0 | 276 |
| Volume to Capacity | 0.03 | 0.03 | Err | 2.36 |
| Queue Length 95th (ft) | 2 | 2 | Err | 1289 |
| Control Delay (s) | 2.0 | 1.3 | Err | 649.7 |
| Lane LOS | A | A | F | F |
| Approach Delay (s) | 2.0 | 1.3 | Err | 649.7 |
| Approach LOS | | | F | F |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 81.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 67 | 191 | 0 | 0 | 277 | 304 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 73 | 208 | 0 | 0 | 301 | 330 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 466 | 466 | 632 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 466 | 466 | 632 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 87 | 65 | 100 | | | |
| cM capacity (veh/h) | 555 | 596 | 951 | | | |

| Direction, Lane # | EB 1 | SB 1 |
|---|---|---|
| Volume Total | 280 | 632 |
| Volume Left | 73 | 0 |
| Volume Right | 208 | 330 |
| cSH | 585 | 1700 |
| Volume to Capacity | 0.48 | 0.37 |
| Queue Length 95th (ft) | 65 | 0 |
| Control Delay (s) | 16.7 | 0.0 |
| Lane LOS | C | |
| Approach Delay (s) | 16.7 | 0.0 |
| Approach LOS | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.1 | | |
| Intersection Capacity Utilization | 55.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Stop | | | Stop |
| Volume (vph) | 0 | 0 | 114 | 101 | 32 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 124 | 110 | 35 | 0 |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 |
|---|---|---|---|---|
| Volume Total (vph) | 0 | 124 | 110 | 35 |
| Volume Left (vph) | 0 | 0 | 0 | 35 |
| Volume Right (vph) | 0 | 0 | 110 | 0 |
| Hadj (s) | 0.00 | 0.03 | -0.57 | 0.23 |
| Departure Headway (s) | 4.2 | 4.0 | 3.2 | 4.2 |
| Degree Utilization, x | 0.00 | 0.14 | 0.10 | 0.04 |
| Capacity (veh/h) | 823 | 894 | 1121 | 831 |
| Control Delay (s) | 7.2 | 7.6 | 6.5 | 7.4 |
| Approach Delay (s) | 0.0 | 7.1 | | 7.4 |
| Approach LOS | A | A | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 7.1 | | |
| HCM Level of Service | A | | |
| Intersection Capacity Utilization | 16.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 0 | 9 | 65 | 0 | 5 | 23 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 10 | 71 | 0 | 5 | 25 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 10 | | 146 | 5 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 10 | | 146 | 5 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 96 | | 99 | 98 |
| cM capacity (veh/h) | | | 1610 | | 809 | 1078 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 |
|---|---|---|---|---|
| Volume Total | 10 | 71 | 5 | 25 |
| Volume Left | 0 | 71 | 5 | 0 |
| Volume Right | 10 | 0 | 0 | 25 |
| cSH | 1700 | 1610 | 809 | 1078 |
| Volume to Capacity | 0.01 | 0.04 | 0.01 | 0.02 |
| Queue Length 95th (ft) | 0 | 3 | 1 | 2 |
| Control Delay (s) | 0.0 | 7.3 | 9.5 | 8.4 |
| Lane LOS | | A | A | A |
| Approach Delay (s) | 0.0 | 7.3 | 8.6 | |
| Approach LOS | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.0 | | |
| Intersection Capacity Utilization | 20.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 19 | 3 | 6 | 336 | 409 | 59 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 21 | 3 | 7 | 365 | 445 | 64 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | 800 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 672 | 477 | 509 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 672 | 477 | 509 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 95 | 99 | 99 | | | |
| cM capacity (veh/h) | 387 | 535 | 1053 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|---|
| Volume Total | 21 | 3 | 7 | 183 | 183 | 509 |
| Volume Left | 21 | 0 | 7 | 0 | 0 | 0 |
| Volume Right | 0 | 3 | 0 | 0 | 0 | 64 |
| cSH | 387 | 535 | 1053 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.05 | 0.01 | 0.01 | 0.11 | 0.11 | 0.30 |
| Queue Length 95th (ft) | 4 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 14.8 | 11.8 | 8.4 | 0.0 | 0.0 | 0.0 |
| Lane LOS | B | B | A | | | |
| Approach Delay (s) | 14.4 | | 0.1 | | | 0.0 |
| Approach LOS | B | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.4 | | |
| Intersection Capacity Utilization | 35.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (veh/h) | 0 | 2757 | 20 | 0 | 2981 | 139 | 0 | 0 | 55 | 0 | 0 | 21 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 2997 | 22 | 0 | 3240 | 151 | 0 | 0 | 60 | 0 | 0 | 23 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | 470 | | | 300 | | | | | | | |
| pX, platoon unblocked | 0.69 | | | 0.41 | | | 0.57 | 0.57 | 0.41 | 0.57 | 0.57 | 0.69 |
| vC, conflicting volume | 3391 | | | 3018 | | | 4100 | 6388 | 1498 | 4874 | 6334 | 1156 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 2904 | | | 3045 | | | 1709 | 5746 | 0 | 3075 | 5651 | 0 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 87 | 100 | 100 | 97 |
| cM capacity (veh/h) | 86 | | | 45 | | | 32 | 0 | 449 | 3 | 0 | 753 |

| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | WB 3 | NB 1 | SB 1 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 1498 | 1498 | 22 | 1296 | 1296 | 799 | 60 | 23 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 22 | 0 | 0 | 151 | 60 | 23 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 | 449 | 753 |
| Volume to Capacity | 0.88 | 0.88 | 0.01 | 0.76 | 0.76 | 0.47 | 0.13 | 0.03 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.2 | 9.9 |
| Lane LOS | | | | | | | B | A |
| Approach Delay (s) | 0.0 | | | 0.0 | | | 14.2 | 9.9 |
| Approach LOS | | | | | | | B | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 86.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 4 | 0 | 0 | 2 | 0 | 0 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 4 | 0 | 0 | 2 | 0 | 0 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | 820 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1 | 1 | | | 2 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1 | 1 | | | 2 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 1021 | 1083 | | | 1619 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 4 | 0 | 2 | 0 | 0 |
| Volume Left | 4 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 2 | 0 | 0 |
| cSH | 1021 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Queue Length 95th (ft) | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 8.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | |
| Approach Delay (s) | 8.5 | 0.0 | | 0.0 | |
| Approach LOS | A | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.7 | | |
| Intersection Capacity Utilization | 13.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 11 | 82 | 34 | 27 | 67 | 130 | 137 | 472 | 52 | 117 | 343 | 11 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 12 | 89 | 37 | 29 | 73 | 141 | 149 | 513 | 57 | 127 | 373 | 12 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 101 | 37 | 102 | 141 | 405 | 313 | 314 | 198 |
| Volume Left (vph) | 12 | 0 | 29 | 0 | 149 | 0 | 127 | 0 |
| Volume Right (vph) | 0 | 37 | 0 | 141 | 0 | 57 | 0 | 12 |
| Hadj (s) | 0.09 | -0.67 | 0.18 | -0.67 | 0.22 | -0.09 | 0.24 | -0.01 |
| Departure Headway (s) | 8.1 | 7.3 | 7.9 | 7.1 | 6.8 | 6.5 | 7.1 | 6.9 |
| Degree Utilization, x | 0.23 | 0.08 | 0.22 | 0.28 | 0.77 | 0.57 | 0.62 | 0.38 |
| Capacity (veh/h) | 417 | 455 | 427 | 478 | 516 | 530 | 485 | 507 |
| Control Delay (s) | 12.2 | 9.7 | 12.0 | 11.6 | 28.0 | 16.6 | 19.8 | 12.8 |
| Approach Delay (s) | 11.5 | | 11.8 | | 23.0 | | 17.1 | |
| Approach LOS | B | | B | | C | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 18.5 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 53.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 14 | 303 | 71 | 165 | 266 | 10 | 77 | 401 | 81 | 36 | 396 | 31 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 15 | 329 | 77 | 179 | 289 | 11 | 84 | 436 | 88 | 39 | 430 | 34 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 180 | 242 | 324 | 155 | 302 | 306 | 254 | 249 |
| Volume Left (vph) | 15 | 0 | 179 | 0 | 84 | 0 | 39 | 0 |
| Volume Right (vph) | 0 | 77 | 0 | 11 | 0 | 88 | 0 | 34 |
| Hadj (s) | 0.08 | -0.19 | 0.31 | -0.01 | 0.17 | -0.17 | 0.11 | -0.06 |
| Departure Headway (s) | 9.0 | 8.7 | 9.1 | 8.7 | 8.8 | 8.4 | 8.9 | 8.7 |
| Degree Utilization, x | 0.45 | 0.59 | 0.82 | 0.38 | 0.73 | 0.72 | 0.63 | 0.60 |
| Capacity (veh/h) | 376 | 393 | 387 | 388 | 402 | 416 | 391 | 398 |
| Control Delay (s) | 18.0 | 22.2 | 40.5 | 15.7 | 31.2 | 28.8 | 24.4 | 22.7 |
| Approach Delay (s) | 20.4 | | 32.5 | | 30.0 | | 23.6 | |
| Approach LOS | C | | D | | D | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 27.0 | | |
| HCM Level of Service | D | | |
| Intersection Capacity Utilization | 65.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 16 | 165 | 93 | 220 | 185 | 10 | 93 | 455 | 72 | 18 | 502 | 19 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 17 | 179 | 101 | 239 | 201 | 11 | 101 | 495 | 78 | 20 | 546 | 21 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 107 | 191 | 340 | 111 | 348 | 326 | 292 | 293 |
| Volume Left (vph) | 17 | 0 | 239 | 0 | 101 | 0 | 20 | 0 |
| Volume Right (vph) | 0 | 101 | 0 | 11 | 0 | 78 | 0 | 21 |
| Hadj (s) | 0.12 | -0.34 | 0.39 | -0.03 | 0.18 | -0.13 | 0.07 | -0.02 |
| Departure Headway (s) | 9.2 | 8.8 | 9.1 | 8.7 | 8.6 | 8.2 | 8.6 | 8.5 |
| Degree Utilization, x | 0.27 | 0.47 | 0.86 | 0.27 | 0.83 | 0.75 | 0.70 | 0.69 |
| Capacity (veh/h) | 371 | 386 | 386 | 401 | 415 | 427 | 408 | 413 |
| Control Delay (s) | 14.5 | 18.0 | 45.9 | 13.6 | 40.1 | 30.5 | 27.7 | 27.2 |
| Approach Delay (s) | 16.7 | | 37.9 | | 35.5 | | 27.4 | |
| Approach LOS | C | | E | | E | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 30.9 | | |
| HCM Level of Service | D | | |
| Intersection Capacity Utilization | 66.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 33 | 102 | 4 | 41 | 111 | 132 | 20 | 322 | 32 | 124 | 444 | 31 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 36 | 111 | 4 | 45 | 121 | 143 | 22 | 350 | 35 | 135 | 483 | 34 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 91 | 60 | 105 | 204 | 197 | 210 | 376 | 275 |
| Volume Left (vph) | 36 | 0 | 45 | 0 | 22 | 0 | 135 | 0 |
| Volume Right (vph) | 0 | 4 | 0 | 143 | 0 | 35 | 0 | 34 |
| Hadj (s) | 0.23 | -0.02 | 0.25 | -0.46 | 0.09 | -0.08 | 0.21 | -0.05 |
| Departure Headway (s) | 8.0 | 7.8 | 7.7 | 7.0 | 7.1 | 7.0 | 6.9 | 6.6 |
| Degree Utilization, x | 0.20 | 0.13 | 0.23 | 0.40 | 0.39 | 0.41 | 0.72 | 0.51 |
| Capacity (veh/h) | 419 | 430 | 440 | 487 | 488 | 499 | 512 | 529 |
| Control Delay (s) | 11.9 | 10.8 | 11.8 | 13.4 | 13.4 | 13.4 | 24.6 | 15.1 |
| Approach Delay (s) | 11.4 | | 12.9 | | 13.4 | | 20.6 | |
| Approach LOS | B | | B | | B | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 16.2 | | |
| HCM Level of Service | C | | |
| Intersection Capacity Utilization | 53.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Stop | | | Stop | |
| Volume (vph) | 38 | 75 | 1 | 34 | 85 | 158 | 15 | 375 | 12 | 172 | 576 | 23 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 41 | 82 | 1 | 37 | 92 | 172 | 16 | 408 | 13 | 187 | 626 | 25 |

| Direction, Lane # | EB 1 | EB 2 | WB 1 | WB 2 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|---|
| Volume Total (vph) | 82 | 42 | 83 | 218 | 220 | 217 | 500 | 338 |
| Volume Left (vph) | 41 | 0 | 37 | 0 | 16 | 0 | 187 | 0 |
| Volume Right (vph) | 0 | 1 | 0 | 172 | 0 | 13 | 0 | 25 |
| Hadj (s) | 0.29 | 0.02 | 0.26 | -0.52 | 0.07 | -0.01 | 0.22 | -0.02 |
| Departure Headway (s) | 8.5 | 8.2 | 8.1 | 7.3 | 7.3 | 7.2 | 6.9 | 6.7 |
| Degree Utilization, x | 0.19 | 0.10 | 0.19 | 0.44 | 0.45 | 0.44 | 0.96 | 0.63 |
| Capacity (veh/h) | 408 | 419 | 430 | 479 | 480 | 485 | 511 | 522 |
| Control Delay (s) | 12.3 | 10.9 | 11.7 | 14.8 | 14.9 | 14.5 | 56.1 | 19.2 |
| Approach Delay (s) | 11.8 | | 13.9 | | 14.7 | | 41.2 | |
| Approach LOS | B | | B | | B | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Delay | 27.4 | | |
| HCM Level of Service | D | | |
| Intersection Capacity Utilization | 57.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 237 | 1059 | 97 | 362 | 1251 | 88 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 258 | 1151 | 105 | 393 | 1360 | 96 |
| RTOR Reduction (vph) | 0 | 335 | 0 | 315 | 0 | 0 |
| Lane Group Flow (vph) | 258 | 816 | 105 | 78 | 1360 | 96 |
| Turn Type | | pm+ov | | Perm | Prot | |
| Protected Phases | 8 | 1 | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 14.5 | 50.4 | 12.6 | 12.6 | 35.9 | 52.5 |
| Effective Green, g (s) | 14.5 | 50.4 | 12.6 | 12.6 | 35.9 | 52.5 |
| Actuated g/C Ratio | 0.19 | 0.67 | 0.17 | 0.17 | 0.48 | 0.70 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 342 | 2022 | 595 | 266 | 1643 | 1304 |
| v/s Ratio Prot | c0.15 | 0.19 | 0.03 | | c0.40 | 0.05 |
| v/s Ratio Perm | | 0.10 | | c0.05 | | |
| v/c Ratio | 0.75 | 0.40 | 0.18 | 0.29 | 0.83 | 0.07 |
| Uniform Delay, d1 | 28.6 | 5.5 | 26.8 | 27.3 | 16.9 | 3.6 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.1 | 0.1 | 0.6 | 2.8 | 3.6 | 0.1 |
| Delay (s) | 37.7 | 5.7 | 27.4 | 30.1 | 20.5 | 3.7 |
| Level of Service | D | A | C | C | C | A |
| Approach Delay (s) | 11.5 | | 29.5 | | | 19.4 |
| Approach LOS | B | | C | | | B |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 17.6 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.70 | | |
| Actuated Cycle Length (s) | 75.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 64.8% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 359 | 1278 | 99 | 435 | 1219 | 91 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 1.00 | 0.88 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 0.85 | 1.00 | 1.00 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 1770 | 2787 | 3539 | 1583 | 3433 | 1863 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 390 | 1389 | 108 | 473 | 1325 | 99 |
| RTOR Reduction (vph) | 0 | 309 | 0 | 348 | 0 | 0 |
| Lane Group Flow (vph) | 390 | 1080 | 108 | 125 | 1325 | 99 |
| Turn Type | | pm+ov | | Perm | Prot | |
| Protected Phases | 8 | 1 | 2 | | 1 | 6 |
| Permitted Phases | | 8 | | 2 | | |
| Actuated Green, G (s) | 18.9 | 55.3 | 12.7 | 12.7 | 36.4 | 53.1 |
| Effective Green, g (s) | 18.9 | 55.3 | 12.7 | 12.7 | 36.4 | 53.1 |
| Actuated g/C Ratio | 0.24 | 0.69 | 0.16 | 0.16 | 0.45 | 0.66 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 418 | 2066 | 562 | 251 | 1562 | 1237 |
| v/s Ratio Prot | c0.22 | 0.24 | 0.03 | | c0.39 | 0.05 |
| v/s Ratio Perm | | 0.15 | | c0.08 | | |
| v/c Ratio | 0.93 | 0.52 | 0.19 | 0.50 | 0.85 | 0.08 |
| Uniform Delay, d1 | 29.9 | 6.0 | 29.2 | 30.7 | 19.3 | 4.8 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 27.7 | 0.2 | 0.8 | 6.9 | 4.5 | 0.1 |
| Delay (s) | 57.7 | 6.2 | 30.0 | 37.6 | 23.8 | 4.9 |
| Level of Service | E | A | C | D | C | A |
| Approach Delay (s) | 17.5 | | 36.2 | | | 22.5 |
| Approach LOS | B | | D | | | C |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 22.3 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.81 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 68.4% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 60 | 1560 | 35 | 426 | 1552 | 299 | 32 | 7 | 348 | 121 | 7 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 0.98 | | 1.00 | 0.85 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 3528 | | 1770 | 3453 | | 1770 | 1589 | | 1770 | 1616 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 1770 | 3528 | | 1770 | 3453 | | 1770 | 1589 | | 1770 | 1616 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 65 | 1696 | 38 | 463 | 1687 | 325 | 35 | 8 | 378 | 132 | 8 | 60 |
| RTOR Reduction (vph) | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 355 | 0 | 0 | 54 | 0 |
| Lane Group Flow (vph) | 65 | 1733 | 0 | 463 | 2003 | 0 | 35 | 31 | 0 | 132 | 14 | 0 |
| Turn Type | Prot | | | Prot | | | Prot | | | Prot | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | | | | | | | | | | | | |
| Actuated Green, G (s) | 9.5 | 75.8 | | 38.0 | 104.3 | | 5.6 | 9.2 | | 11.0 | 14.6 | |
| Effective Green, g (s) | 9.5 | 75.8 | | 38.0 | 104.3 | | 5.6 | 9.2 | | 11.0 | 14.6 | |
| Actuated g/C Ratio | 0.06 | 0.51 | | 0.25 | 0.70 | | 0.04 | 0.06 | | 0.07 | 0.10 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 112 | 1783 | | 448 | 2401 | | 66 | 97 | | 130 | 157 | |
| v/s Ratio Prot | 0.04 | c0.49 | | c0.26 | 0.58 | | 0.02 | c0.02 | | c0.07 | 0.01 | |
| v/s Ratio Perm | | | | | | | | | | | | |
| v/c Ratio | 0.58 | 0.97 | | 1.03 | 0.83 | | 0.53 | 0.32 | | 1.02 | 0.09 | |
| Uniform Delay, d1 | 68.3 | 36.1 | | 56.0 | 16.6 | | 70.9 | 67.4 | | 69.5 | 61.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 7.4 | 15.1 | | 51.4 | 2.6 | | 8.0 | 8.6 | | 83.1 | 0.2 | |
| Delay (s) | 75.8 | 51.2 | | 107.4 | 19.2 | | 78.9 | 76.0 | | 152.6 | 61.9 | |
| Level of Service | E | D | | F | B | | E | E | | F | E | |
| Approach Delay (s) | | 52.1 | | | 35.7 | | | 76.2 | | | 121.7 | |
| Approach LOS | | D | | | D | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 48.7 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.95 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 109.8% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 20 | 1824 | 96 | 269 | 1626 | 320 | 104 | 0 | 270 | 346 | 0 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 0.95 | 1.00 | | 1.00 | 1.00 | 0.95 | 0.95 | |
| Frt | 1.00 | 0.99 | | 1.00 | 1.00 | 0.85 | | 1.00 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.95 | 1.00 | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 3513 | | 1770 | 3539 | 1583 | | 1770 | 1583 | 1681 | 1665 | |
| Flt Permitted | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | | 0.35 | 1.00 | 0.60 | 0.59 | |
| Satd. Flow (perm) | 1770 | 3513 | | 1770 | 3539 | 1583 | | 647 | 1583 | 1055 | 1018 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 22 | 1983 | 104 | 292 | 1767 | 348 | 113 | 0 | 293 | 376 | 0 | 23 |
| RTOR Reduction (vph) | 0 | 3 | 0 | 0 | 0 | 48 | 0 | 0 | 5 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 22 | 2084 | 0 | 292 | 1767 | 300 | 0 | 113 | 288 | 199 | 196 | 0 |
| Turn Type | Prot | | | Prot | | Perm | Perm | | pm+ov | Perm | | |
| Protected Phases | 7 | 4 | | 3 | 8 | | | 2 | 3 | | 6 | |
| Permitted Phases | | | | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 2.0 | 66.0 | | 21.4 | 85.4 | 85.4 | | 20.6 | 42.0 | 20.6 | 20.6 | |
| Effective Green, g (s) | 2.0 | 66.0 | | 21.4 | 85.4 | 85.4 | | 20.6 | 42.0 | 20.6 | 20.6 | |
| Actuated g/C Ratio | 0.02 | 0.55 | | 0.18 | 0.71 | 0.71 | | 0.17 | 0.35 | 0.17 | 0.17 | |
| Clearance Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 30 | 1932 | | 316 | 2519 | 1127 | | 111 | 607 | 181 | 175 | |
| v/s Ratio Prot | 0.01 | c0.59 | | c0.17 | 0.50 | | | | 0.08 | | | |
| v/s Ratio Perm | | | | | | 0.19 | | 0.17 | 0.10 | 0.19 | c0.19 | |
| v/c Ratio | 0.73 | 1.08 | | 0.92 | 0.70 | 0.27 | | 1.02 | 0.47 | 1.10 | 1.12 | |
| Uniform Delay, d1 | 58.7 | 27.0 | | 48.5 | 10.0 | 6.2 | | 49.7 | 30.4 | 49.7 | 49.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 63.0 | 45.3 | | 31.5 | 0.9 | 0.1 | | 90.3 | 0.6 | 96.0 | 103.6 | |
| Delay (s) | 121.7 | 72.3 | | 80.0 | 10.9 | 6.3 | | 140.0 | 31.0 | 145.7 | 153.3 | |
| Level of Service | F | E | | E | B | A | | F | C | F | F | |
| Approach Delay (s) | | 72.9 | | | 18.6 | | | 61.3 | | | 149.5 | |
| Approach LOS | | E | | | B | | | E | | | F | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 53.2 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.06 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 95.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 30 | 1883 | 151 | 418 | 2143 | 493 | 139 | 0 | 359 | 455 | 0 | 28 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.95 | 0.91 | 0.95 | 0.95 | 0.95 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.86 | 0.85 | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.96 | |
| Satd. Flow (prot) | 1770 | 5085 | 1583 | 3433 | 5085 | 1583 | 1681 | 1454 | 1504 | 1681 | 1666 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.96 | |
| Satd. Flow (perm) | 1770 | 5085 | 1583 | 3433 | 5085 | 1583 | 1681 | 1454 | 1504 | 1681 | 1666 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 2047 | 164 | 454 | 2329 | 536 | 151 | 0 | 390 | 495 | 0 | 30 |
| RTOR Reduction (vph) | 0 | 0 | 85 | 0 | 0 | 100 | 0 | 128 | 4 | 0 | 5 | 0 |
| Lane Group Flow (vph) | 33 | 2047 | 79 | 454 | 2329 | 436 | 136 | 74 | 199 | 262 | 258 | 0 |
| Turn Type | Prot | | Perm | Prot | | pm+ov | Split | | pm+ov | Split | | |
| Protected Phases | 7 | 4 | | 3 | 8 | 6 | 2 | 2 | 3 | 6 | 6 | |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | |
| Actuated Green, G (s) | 2.4 | 39.2 | 39.2 | 13.6 | 50.4 | 70.0 | 11.6 | 11.6 | 25.2 | 19.6 | 19.6 | |
| Effective Green, g (s) | 2.4 | 39.2 | 39.2 | 13.6 | 50.4 | 70.0 | 11.6 | 11.6 | 25.2 | 19.6 | 19.6 | |
| Actuated g/C Ratio | 0.02 | 0.39 | 0.39 | 0.14 | 0.50 | 0.70 | 0.12 | 0.12 | 0.25 | 0.20 | 0.20 | |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 42 | 1993 | 621 | 467 | 2563 | 1171 | 195 | 169 | 439 | 329 | 327 | |
| v/s Ratio Prot | 0.02 | c0.40 | | c0.13 | c0.46 | 0.07 | c0.08 | 0.05 | 0.06 | c0.16 | 0.16 | |
| v/s Ratio Perm | | | 0.05 | | | 0.20 | | | 0.07 | | | |
| v/c Ratio | 0.79 | 1.03 | 0.13 | 0.97 | 0.91 | 0.37 | 0.70 | 0.44 | 0.45 | 0.80 | 0.79 | |
| Uniform Delay, d1 | 48.5 | 30.4 | 19.5 | 43.0 | 22.7 | 6.1 | 42.5 | 41.2 | 31.6 | 38.3 | 38.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 62.3 | 27.4 | 0.1 | 34.3 | 5.2 | 0.2 | 18.7 | 8.0 | 0.7 | 12.5 | 12.0 | |
| Delay (s) | 110.8 | 57.8 | 19.5 | 77.3 | 27.9 | 6.3 | 61.2 | 49.2 | 32.3 | 50.8 | 50.2 | |
| Level of Service | F | E | B | E | C | A | E | D | C | D | D | |
| Approach Delay (s) | | 55.8 | | | 31.2 | | | 45.9 | | | 50.5 | |
| Approach LOS | | E | | | C | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 42.2 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.88 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 78.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 222 | 2311 | 160 | 358 | 2728 | 462 | 75 | 93 | 360 | 580 | 95 | 251 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 0.97 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | 1.00 |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 5085 | 1583 | 3433 | 5085 | 1583 | 3433 | 3539 | 1583 | 3433 | 3539 | 1583 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 241 | 2512 | 174 | 389 | 2965 | 502 | 82 | 101 | 391 | 630 | 103 | 273 |
| RTOR Reduction (vph) | 0 | 0 | 32 | 0 | 0 | 52 | 0 | 0 | 2 | 0 | 0 | 6 |
| Lane Group Flow (vph) | 241 | 2512 | 142 | 389 | 2965 | 450 | 82 | 101 | 389 | 630 | 103 | 267 |
| Turn Type | Prot | | pm+ov | Prot | | pm+ov | Prot | | pm+ov | Prot | | pm+ov |
| Protected Phases | 7 | 4 | 5 | 3 | 8 | 1 | 5 | 2 | 3 | 1 | 6 | 7 |
| Permitted Phases | | | 4 | | | 8 | | | 2 | | | 6 |
| Actuated Green, G (s) | 10.0 | 74.0 | 80.9 | 17.0 | 81.0 | 114.3 | 6.9 | 9.7 | 26.7 | 33.3 | 36.1 | 46.1 |
| Effective Green, g (s) | 10.0 | 74.0 | 80.9 | 17.0 | 81.0 | 114.3 | 6.9 | 9.7 | 26.7 | 33.3 | 36.1 | 46.1 |
| Actuated g/C Ratio | 0.07 | 0.49 | 0.54 | 0.11 | 0.54 | 0.76 | 0.05 | 0.06 | 0.18 | 0.22 | 0.24 | 0.31 |
| Clearance Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 229 | 2509 | 854 | 389 | 2746 | 1248 | 158 | 229 | 324 | 762 | 852 | 487 |
| v/s Ratio Prot | 0.07 | 0.49 | 0.01 | 0.11 | c0.58 | 0.08 | 0.02 | 0.03 | c0.14 | c0.18 | 0.03 | c0.04 |
| v/s Ratio Perm | | | 0.08 | | | 0.20 | | | 0.11 | | | 0.13 |
| v/c Ratio | 1.05 | 1.00 | 0.17 | 1.00 | 1.08 | 0.36 | 0.52 | 0.44 | 1.20 | 0.83 | 0.12 | 0.55 |
| Uniform Delay, d1 | 70.0 | 38.0 | 17.5 | 66.5 | 34.5 | 5.9 | 69.9 | 67.5 | 61.6 | 55.6 | 44.5 | 43.3 |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 73.9 | 18.2 | 0.1 | 45.6 | 43.3 | 0.2 | 2.9 | 6.1 | 116.5 | 7.3 | 0.3 | 1.3 |
| Delay (s) | 143.9 | 56.2 | 17.6 | 112.1 | 77.8 | 6.0 | 72.8 | 73.6 | 178.2 | 62.9 | 44.8 | 44.5 |
| Level of Service | F | E | B | F | E | A | E | E | F | E | D | D |
| Approach Delay (s) | | 61.2 | | | 71.9 | | | 144.7 | | | 56.1 | |
| Approach LOS | | E | | | E | | | F | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 71.2 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 1.05 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 93.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1392 | 1419 | 226 | 1635 | 0 | 0 | 0 | 0 | 91 | 0 | 1485 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.95 | 0.86 | 0.91 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 1681 | 1365 | 2882 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 1770 | 5085 | | | | | 1681 | 1365 | 2882 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 1513 | 1542 | 246 | 1777 | 0 | 0 | 0 | 0 | 99 | 0 | 1614 |
| RTOR Reduction (vph) | 0 | 0 | 771 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 9 |
| Lane Group Flow (vph) | 0 | 1513 | 771 | 246 | 1777 | 0 | 0 | 0 | 0 | 89 | 539 | 1072 |
| Turn Type | | | Perm | Prot | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | 3 | 8 | | | | | | 6 | |
| Permitted Phases | | | 4 | | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 19.0 | 19.0 | 9.0 | 32.0 | | | | | 25.0 | 25.0 | 25.0 |
| Effective Green, g (s) | | 19.0 | 19.0 | 9.0 | 32.0 | | | | | 25.0 | 25.0 | 25.0 |
| Actuated g/C Ratio | | 0.29 | 0.29 | 0.14 | 0.49 | | | | | 0.38 | 0.38 | 0.38 |
| Clearance Time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1486 | 815 | 245 | 2503 | | | | | 647 | 525 | 1108 |
| v/s Ratio Prot | | c0.30 | | c0.14 | 0.35 | | | | | | | |
| v/s Ratio Perm | | | 0.28 | | | | | | | 0.05 | 0.39 | 0.37 |
| v/c Ratio | | 1.02 | 0.95 | 1.00 | 0.71 | | | | | 0.14 | 1.03 | 0.97 |
| Uniform Delay, d1 | | 23.0 | 22.5 | 28.0 | 12.9 | | | | | 13.0 | 20.0 | 19.6 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 28.0 | 19.5 | 58.5 | 0.9 | | | | | 0.4 | 46.1 | 20.3 |
| Delay (s) | | 51.0 | 42.0 | 86.5 | 13.8 | | | | | 13.4 | 66.1 | 39.9 |
| Level of Service | | D | D | F | B | | | | | B | E | D |
| Approach Delay (s) | | 46.5 | | | 22.7 | | | 0.0 | | | 46.9 | |
| Approach LOS | | D | | | C | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 39.5 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.02 | | |
| Actuated Cycle Length (s) | 65.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 83.8% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Volume (vph) | 0 | 1855 | 1585 | 90 | 1947 | 0 | 0 | 0 | 0 | 38 | 0 | 1965 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.91 | 0.88 | 1.00 | 0.91 | | | | | 0.95 | 0.86 | 0.91 |
| Frt | | 1.00 | 0.85 | 1.00 | 1.00 | | | | | 1.00 | 0.85 | 0.85 |
| Flt Protected | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (prot) | | 5085 | 2787 | 1770 | 5085 | | | | | 1681 | 1363 | 2882 |
| Flt Permitted | | 1.00 | 1.00 | 0.95 | 1.00 | | | | | 0.95 | 1.00 | 1.00 |
| Satd. Flow (perm) | | 5085 | 2787 | 1770 | 5085 | | | | | 1681 | 1363 | 2882 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 0 | 2016 | 1723 | 98 | 2116 | 0 | 0 | 0 | 0 | 41 | 0 | 2136 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Lane Group Flow (vph) | 0 | 2016 | 1723 | 98 | 2116 | 0 | 0 | 0 | 0 | 37 | 708 | 1429 |
| Turn Type | | | Free | Prot | | | | | | Perm | | Perm |
| Protected Phases | | 4 | | 3 | 8 | | | | | | 6 | |
| Permitted Phases | | | Free | | | | | | | 6 | | 6 |
| Actuated Green, G (s) | | 40.0 | 110.0 | 6.0 | 50.0 | | | | | 52.0 | 52.0 | 52.0 |
| Effective Green, g (s) | | 40.0 | 110.0 | 6.0 | 50.0 | | | | | 52.0 | 52.0 | 52.0 |
| Actuated g/C Ratio | | 0.36 | 1.00 | 0.05 | 0.45 | | | | | 0.47 | 0.47 | 0.47 |
| Clearance Time (s) | | 4.0 | | 4.0 | 4.0 | | | | | 4.0 | 4.0 | 4.0 |
| Vehicle Extension (s) | | 3.0 | | 3.0 | 3.0 | | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1849 | 2787 | 97 | 2311 | | | | | 795 | 644 | 1362 |
| v/s Ratio Prot | | c0.40 | | 0.06 | c0.42 | | | | | | | |
| v/s Ratio Perm | | | 0.62 | | | | | | | 0.02 | 0.52 | 0.50 |
| v/c Ratio | | 1.09 | 0.62 | 1.01 | 0.92 | | | | | 0.05 | 1.10 | 1.05 |
| Uniform Delay, d1 | | 35.0 | 0.0 | 52.0 | 28.0 | | | | | 15.6 | 29.0 | 29.0 |
| Progression Factor | | 1.00 | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 50.2 | 1.0 | 94.2 | 6.2 | | | | | 0.1 | 65.7 | 38.5 |
| Delay (s) | | 85.2 | 1.0 | 146.2 | 34.2 | | | | | 15.7 | 94.7 | 67.5 |
| Level of Service | | F | A | F | C | | | | | B | F | E |
| Approach Delay (s) | | 46.4 | | | 39.2 | | | 0.0 | | | 75.5 | |
| Approach LOS | | D | | | D | | | A | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 52.2 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.10 | | |
| Actuated Cycle Length (s) | 110.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 142.6% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

# APPENDIX D

## Freeway Mainline Level of Service Worksheets

## *EXISTING CONDITION*

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1136 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 309 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 417 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 417 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 6.0 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1073 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 292 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 393 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 393 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 5.6 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1788 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 486 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 656 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 656 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 9.4 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1893 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 514 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 694 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 694 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 9.9 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2384 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 648 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 874 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 874 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.5 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2524 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 686 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 925 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 925 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 13.2 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2145 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 583 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 786 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 786 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 11.2 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2271 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 617 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 833 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 833 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 11.9 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2670 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 726 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 979 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 979 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 14.0 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2826 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 768 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1036 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1036 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 14.8 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1997 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 543 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 732 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 732 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 10.5 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2115 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 575 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 775 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 775 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 11.1 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

## *EXISTING PLUS PROJECT*

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1215 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 330 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 445 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 445 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 6.4 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1245 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 338 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 456 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 456 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 6.5 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1877 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 510 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 688 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 688 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 9.8 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2080 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 565 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 763 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 763 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 10.9 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2442 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 664 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 895 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 895 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.8 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2890 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 785 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1060 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1060 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 15.1 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2439 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 663 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 894 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 894 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.8 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2591 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 704 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 950 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 950 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 13.6 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3085 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 838 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1131 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1131 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 16.2 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3267 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 888 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1198 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1198 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.1 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2372 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 645 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 870 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 870 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.4 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Existing+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2529 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 687 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 927 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 927 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 13.2 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

## *CUMULATIVE BUILDOUT BASELINE*

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1294 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 352 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 474 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 474 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 6.8 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1605 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 436 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 588 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 588 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 8.4 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2349 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 638 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 861 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 861 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.3 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2342 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 636 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 859 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 859 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.3 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2778 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 755 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1019 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1019 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 14.6 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3370 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 916 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1236 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1236 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.7 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3202 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 870 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1174 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1174 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 16.8 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3384 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 920 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1241 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1241 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.7 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3370 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 916 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1236 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1236 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.7 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3844 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1045 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1409 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1409 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.5 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 20.3 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3387 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 920 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1242 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1242 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.7 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3251 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 883 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1192 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1192 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 17.0 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

## *CUMULATIVE BUILDOUT PLUS PROJECT*

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1436 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 390 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 527 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 527 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 7.5 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 1714 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 466 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 628 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 628 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 9.0 | pc/mi/ln |
| Level of service, LOS | A | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2438 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 662 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 894 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 894 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 12.8 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | AM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2529 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 687 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 927 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 927 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 13.2 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 2836 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 771 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1040 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1040 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 70.0 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 14.9 | pc/mi/ln |
| Level of service, LOS | B | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3736 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1015 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1370 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1370 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.7 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 19.7 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3496 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 950 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1282 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1282 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.9 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 18.3 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | PM |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3704 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1007 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1358 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1358 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.7 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 19.5 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3785 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1029 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1388 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1388 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.6 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 19.9 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/NB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 4285 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1164 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1571 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1571 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 68.4 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 23.0 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | North of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3762 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 1022 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1379 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1379 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.6 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 19.8 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

## Operational Analysis

| | |
|---|---|
| Analyst: | |
| Agency or Company: | |
| Date Performed: | 10/21/2014 |
| Analysis Time Period: | SAT |
| Freeway/Direction: | SR 99/SB |
| From/To: | South of Woollomes |
| Jurisdiction: | |
| Analysis Year: | Cumulative+Project |
| Description: | |

## Flow Inputs and Adjustments

| | | |
|---|---|---|
| Volume, V | 3665 | veh/h |
| Peak-hour factor, PHF | 0.92 | |
| Peak 15-min volume, v15 | 996 | v |
| Trucks and buses | 2 | % |
| Recreational vehicles | 1 | % |
| Terrain type: | Level | |
| Grade | - | % |
| Segment length | - | mi |
| Trucks and buses PCE, ET | 1.5 | |
| Recreational vehicle PCE, ER | 1.2 | |
| Heavy vehicle adjustment, fHV | 0.988 | |
| Driver population factor, fp | 1.00 | |
| Flow rate, vp | 1344 | pc/h/ln |

## Speed Inputs and Adjustments

| | | |
|---|---|---|
| Lane width | - | ft |
| Right-side lateral clearance | - | ft |
| Total ramp density, TRD | - | ramps/mi |
| Number of lanes, N | 3 | |
| Free-flow speed: | Measured | |
| FFS or BFFS | 70.0 | mi/h |
| Lane width adjustment, fLW | - | mi/h |
| Lateral clearance adjustment, fLC | - | mi/h |
| TRD adjustment | - | mi/h |
| Free-flow speed, FFS | 70.0 | mi/h |

## LOS and Performance Measures

| | | |
|---|---|---|
| Flow rate, vp | 1344 | pc/h/ln |
| Free-flow speed, FFS | 70.0 | mi/h |
| Average passenger-car speed, S | 69.8 | mi/h |
| Number of lanes, N | 3 | |
| Density, D | 19.3 | pc/mi/ln |
| Level of service, LOS | C | |

Overall results are not computed when free-flow speed is less than 55 mph.

# APPENDIX E

## Merge-Diverge (Ramp) Level of Service Worksheets

## *EXISTING CONDITION*

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1073 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 180 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 1073 | 180 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 292 | 49 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1166 | 196 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 684 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 1362 | 7200 | No |
| $v_3$ or $v_{av34}$ | 482 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 684 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 1362 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.301 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.6 | mph |
| Space mean speed in outer lanes, | $S_0$ = 70.0 | mph |
| Space mean speed for all vehicles, | $S$ = 64.3 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1893 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 106 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 1893 | 106 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 514 | 29 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 2058 | 115 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1225 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2173 | 7200 | No |
| $v_3$ or $v_{av34}$ | 833 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1225 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2173 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 12.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.280 | |
| Space mean speed in ramp influence area, | $S_R$ = 62.2 | mph |
| Space mean speed in outer lanes, | $S_0$ = 68.8 | mph |
| Space mean speed for all vehicles, | $S$ = 64.6 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2384 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 254 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2384 | 254 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 648 | 69 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2591 | 276 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1520 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2867 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1071 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1520 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2867 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.315 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.2 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.9 | mph |
| Space mean speed for all vehicles, | $S$ = 63.5 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2271 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 213 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2271 | 213 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 617 | 58 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 2468 | 232 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1468 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2700 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1000 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1468 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2700 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.286 | |
| Space mean speed in ramp influence area, | $S_R$ = 62.0 | mph |
| Space mean speed in outer lanes, | $S_0$ = 68.2 | mph |
| Space mean speed for all vehicles, | $S$ = 64.2 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2670 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 279 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2670 | 279 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 726 | 76 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2902 | 303 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1703 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3205 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1199 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1703 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3205 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.320 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.0 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.5 | mph |
| Space mean speed for all vehicles, | $S$ = 63.3 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2115 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 124 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2115 | 124 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 575 | 34 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2299 | 135 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1368 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2434 | 7200 | No |
| $v_3$ or $v_{av34}$ | 931 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1368 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2434 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.282 | |
| Space mean speed in ramp influence area, | $S_R$ = 62.1 | mph |
| Space mean speed in outer lanes, | $S_0$ = 68.4 | mph |
| Space mean speed for all vehicles, | $S$ = 64.4 | mph |

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1136 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 292 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 1136 | | 292 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 309 | | 79 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1235 | 317 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.715 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 973 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 1235 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 918 | 7200 | No |
| $v_R$ | 317 | 2100 | No |
| $v_3$ or $v_{av34}$ | 262 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 973 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 973 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.327 | |
| Space mean speed in ramp influence area, | $S_R$ = 60.9 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 63.7 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1788 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 179 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 1788 | | 179 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 486 | | 49 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1943 | 195 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.702 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1423 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 1943 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1748 | 7200 | No |
| $v_R$ | 195 | 2100 | No |
| $v_3$ or $v_{av34}$ | 520 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1423 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1423 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.316

Space mean speed in ramp influence area, $S_R$ = 61.2 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 64.7 mph

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2524 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 341 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2524 | | 341 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 686 | | 93 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2743 | 371 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.674 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1971 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2743 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2372 | 7200 | No |
| $v_R$ | 371 | 2100 | No |
| $v_3$ or $v_{av34}$ | 772 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1971 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1971 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.331

Space mean speed in ramp influence area, $S_R$ = 60.7 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, S = 64.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2145 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 224 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2145 | | 224 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 583 | | 61 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2332 | 243 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.691 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1686 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2332 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2089 | 7200 | No |
| $v_R$ | 243 | 2100 | No |
| $v_3$ or $v_{av34}$ | 646 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1686 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1686 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 15.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.320

Space mean speed in ramp influence area, $S_R$ = 61.0 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 64.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2826 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 231 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2826 | | 231 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 768 | | 63 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3072 | 251 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.672 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2146 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3072 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2821 | 7200 | No |
| $v_R$ | 251 | 2100 | No |
| $v_3$ or $v_{av34}$ | 926 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2146 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2146 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.321 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.0 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 65.0 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1997 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 238 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 1997 | | 238 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 543 | | 65 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2171 | 259 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.694 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1586 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2171 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1912 | 7200 | No |
| $v_R$ | 259 | 2100 | No |
| $v_3$ or $v_{av34}$ | 585 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1586 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1586 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.321

Space mean speed in ramp influence area, $S_R$ = 61.0 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 64.6 mph

## *EXISTING PLUS PROJECT*

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1215 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 328 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 1215 | 328 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 330 | 89 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 1321 | 357 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 775 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 1678 | 7200 | No |
| $v_3$ or $v_{av34}$ | 546 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 775 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 1678 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.303 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.5 | mph |
| Space mean speed in outer lanes, | $S_0$ = 69.8 | mph |
| Space mean speed for all vehicles, | $S$ = 64.0 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

| | |
|---|---|
| Analyst: | |
| Agency/Co.: | |
| Date performed: | 10/23/2014 |
| Analysis time period: | AM |
| Freeway/Dir of Travel: | SR 99/SB |
| Junction: | Woollomes |
| Jurisdiction: | |
| Analysis Year: | EXISTING+PROJ |
| Description: | |

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2080 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 253 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2080 | 253 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 565 | 69 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 2261 | 275 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1345 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2536 | 7200 | No |
| $v_3$ or $v_{av34}$ | 916 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1345 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2536 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.284 | |
| Space mean speed in ramp influence area, | $S_R$ = 62.0 | mph |
| Space mean speed in outer lanes, | $S_0$ = 68.5 | mph |
| Space mean speed for all vehicles, | $S$ = 64.2 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2442 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 665 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2442 | 665 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 664 | 181 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2654 | 723 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1557 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3377 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1097 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1557 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3377 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.329 | |
| Space mean speed in ramp influence area, | $S_R$ = 60.8 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.9 | mph |
| Space mean speed for all vehicles, | $S$ = 62.9 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2591 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 533 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2591 | 533 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 704 | 145 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2816 | 579 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1676 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3395 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1140 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1676 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3395 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.302 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.5 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.7 | mph |
| Space mean speed for all vehicles, | $S$ = 63.5 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3085 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 816 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3085 | 816 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 838 | 222 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3353 | 887 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1967 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 4240 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1386 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1967 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 4240 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.359 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.9 | mph |
| Space mean speed in outer lanes, | $S_0$ = 66.8 | mph |
| Space mean speed for all vehicles, | $S$ = 62.0 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2529 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 538 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2529 | 538 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 687 | 146 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2749 | 585 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1636 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3334 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1113 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1636 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3334 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.301 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.6 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.8 | mph |
| Space mean speed for all vehicles, | S = 63.5 | mph |

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1245 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 401 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 1245 | | 401 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 338 | | 109 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1353 | 436 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.706 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1084 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 1353 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 917 | 7200 | No |
| $v_R$ | 436 | 2100 | No |
| $v_3$ or $v_{av34}$ | 269 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1084 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1084 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 10.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.337 | |
| Space mean speed in ramp influence area, | $S_R$ = 60.6 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 63.2 | mph |

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1877 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 298 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 1877 | | 298 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 510 | | 81 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2040 | 324 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.694 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1515 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2040 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1716 | 7200 | No |
| $v_R$ | 324 | 2100 | No |
| $v_3$ or $v_{av34}$ | 525 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1515 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1515 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.327

Space mean speed in ramp influence area, $S_R$ = 60.8 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 64.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2890 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 707 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2890 | | 707 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 785 | | 192 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3141 | 768 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.646 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2301 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3141 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2373 | 7200 | No |
| $v_R$ | 768 | 2100 | No |
| $v_3$ or $v_{av34}$ | 840 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2301 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2301 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.367

Space mean speed in ramp influence area, $S_R$ = 59.7 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 63.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2439 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 616 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2439 | | 616 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 663 | | 167 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2651 | 670 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.663 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1983 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2651 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1981 | 7200 | No |
| $v_R$ | 670 | 2100 | No |
| $v_3$ or $v_{av34}$ | 668 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1983 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1983 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.358 | |
| Space mean speed in ramp influence area, | $S_R$ = 60.0 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 63.5 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3267 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 672 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 3267 | | 672 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 888 | | 183 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3551 | 730 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.638 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2529 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3551 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2821 | 7200 | No |
| $v_R$ | 730 | 2100 | No |
| $v_3$ or $v_{av34}$ | 1022 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2529 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2529 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.364 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.8 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.7 | mph |
| Space mean speed for all vehicles, | $S$ = 63.9 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: EXISTING+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2372 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 743 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2372 | | 743 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 645 | | 202 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2578 | 808 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.658 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1973 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2578 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1770 | 7200 | No |
| $v_R$ | 808 | 2100 | No |
| $v_3$ or $v_{av34}$ | 605 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1973 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1973 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.371

Space mean speed in ramp influence area, $S_R$ = 59.6 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 62.9 mph

## *CUMULATIVE BUILDOUT BASELINE*

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1294 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 401 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 1294 | 401 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 352 | 109 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1407 | 436 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 826 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 1843 | 7200 | No |
| $v_3$ or $v_{av34}$ | 581 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 826 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 1843 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.305 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.5 | mph |
| Space mean speed in outer lanes, | $S_0$ = 69.7 | mph |
| Space mean speed for all vehicles, | S = 63.8 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2342 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 555 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2342 | 555 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 636 | 151 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 2546 | 603 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1515 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3149 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1031 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}/2$ No

If yes, $v_{12A}$ = 1515 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3149 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.297 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.7 | mph |
| Space mean speed in outer lanes, | $S_0$ = 68.1 | mph |
| Space mean speed for all vehicles, | $S$ = 63.6 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

| | |
|---|---|
| Analyst: | |
| Agency/Co.: | |
| Date performed: | 10/23/2014 |
| Analysis time period: | PM |
| Freeway/Dir of Travel: | SR 99/NB |
| Junction: | Woollomes |
| Jurisdiction: | |
| Analysis Year: | CUMUL |
| Description: | |

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2778 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 648 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2778 | 648 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 755 | 176 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3020 | 704 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1772 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3724 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1248 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1772 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3724 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.338 | |
| Space mean speed in ramp influence area, | $S_R$ = 60.5 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.3 | mph |
| Space mean speed for all vehicles, | S = 62.7 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3384 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1326 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3384 | 1326 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 920 | 360 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 3678 | 1441 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2188 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5119 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1490 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2188 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 5119 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{R12} - 0.00627 L_A$ = 29.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.412 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.5 | mph |
| Space mean speed in outer lanes, | $S_0$ = 66.4 | mph |
| Space mean speed for all vehicles, | $S$ = 60.6 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3370 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 979 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3370 | 979 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 916 | 266 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3663 | 1064 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2149 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 4727 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1514 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2149 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 4727 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.388 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.1 | mph |
| Space mean speed in outer lanes, | $S_0$ = 66.3 | mph |
| Space mean speed for all vehicles, | S = 61.3 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3251 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1260 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3251 | 1260 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 883 | 342 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3534 | 1370 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2103 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 4904 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1431 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2103 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 4904 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{R12} - 0.00627\, L_A$ = 28.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.390 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.1 | mph |
| Space mean speed in outer lanes, | $S_0$ = 66.6 | mph |
| Space mean speed for all vehicles, | $S$ = 61.1 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1605 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 702 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 1605 | | 702 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 436 | | 191 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1745 | 763 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.681 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1432 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 1745 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 982 | 7200 | No |
| $v_R$ | 763 | 2100 | No |
| $v_3$ or $v_{av34}$ | 313 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1432 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1432 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.367 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.7 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 62.2 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2349 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 740 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2349 | | 740 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 638 | | 201 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2553 | 804 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.659 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1957 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2553 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1749 | 7200 | No |
| $v_R$ | 804 | 2100 | No |
| $v_3$ or $v_{av34}$ | 596 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1957 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1957 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.370

Space mean speed in ramp influence area, $S_R$ = 59.6 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 62.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3370 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1187 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 3370 | | 1187 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 916 | | 323 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3663 | 1290 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.609 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2735 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3663 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2373 | 7200 | No |
| $v_R$ | 1290 | 2100 | No |
| $v_3$ or $v_{av34}$ | 928 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2735 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2735 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.414 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 62.2 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3202 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1281 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 3202 | | 1281 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 870 | | 348 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3480 | 1392 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.609 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2664 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3480 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2088 | 7200 | No |
| $v_R$ | 1392 | 2100 | No |
| $v_3$ or $v_{av34}$ | 816 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2664 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2664 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.423

Space mean speed in ramp influence area, $S_R$ = 58.1 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, S = 61.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3844 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1249 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 3844 | | 1249 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 1045 | | 339 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4178 | 1358 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.593 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3030 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4178 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2820 | 7200 | No |
| $v_R$ | 1358 | 2100 | No |
| $v_3$ or $v_{av34}$ | 1148 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 3030 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3030 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.420 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.2 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.2 | mph |
| Space mean speed for all vehicles, | $S$ = 62.3 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3387 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1628 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 3387 | | 1628 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 920 | | 442 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3682 | 1770 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.587 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2891 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3682 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1912 | 7200 | No |
| $v_R$ | 1770 | 2100 | No |
| $v_3$ or $v_{av34}$ | 791 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2891 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2891 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.457 | |
| Space mean speed in ramp influence area, | $S_R$ = 57.2 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 60.5 | mph |

## *CUMULATIVE BUILDOUT PLUS PROJECT*

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1436 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 543 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 1436 | 543 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 390 | 148 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1561 | 590 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 916 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 2151 | 7200 | No |
| $v_3$ or $v_{av34}$ | 645 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 916 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 2151 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.309 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 69.5 | mph |
| Space mean speed for all vehicles, | S = 63.6 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2529 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 742 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2529 | 742 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 687 | 202 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2749 | 807 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1636 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 3556 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1113 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1636 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 3556 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.310 | |
| Space mean speed in ramp influence area, | $S_R$ = 61.3 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.8 | mph |
| Space mean speed for all vehicles, | $S$ = 63.2 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2836 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 965 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 2836 | 965 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 771 | 262 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3083 | 1049 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1809 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 4132 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1274 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 1809 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 4132 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.359 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.9 | mph |
| Space mean speed in outer lanes, | $S_0$ = 67.2 | mph |
| Space mean speed for all vehicles, | $S$ = 62.0 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

| | |
|---|---|
| Analyst: | |
| Agency/Co.: | |
| Date performed: | 10/23/2014 |
| Analysis time period: | PM |
| Freeway/Dir of Travel: | SR 99/SB |
| Junction: | Woollomes |
| Jurisdiction: | |
| Analysis Year: | CUMUL+PROJ |
| Description: | |

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3704 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1645 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3704 | 1645 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 1007 | 447 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4026 | 1788 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2395 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5814 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1631 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2395 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 5814 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{R12} - 0.00627\, L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.520 | |
| Space mean speed in ramp influence area, | $S_R$ = 55.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 65.9 | mph |
| Space mean speed for all vehicles, | S = 58.0 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3785 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1394 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3785 | 1394 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 1029 | 379 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4114 | 1515 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.587 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2414 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5629 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1700 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2414 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 5629 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{R12} - 0.00627\, L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.490 | |
| Space mean speed in ramp influence area, | $S_R$ = 56.3 | mph |
| Space mean speed in outer lanes, | $S_0$ = 65.7 | mph |
| Space mean speed for all vehicles, | S = 58.8 | mph |

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3665 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1675 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3665 | 1675 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 996 | 455 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 3984 | 1821 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.595 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2370 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5805 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1614 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2370 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{R12}$ | 5805 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{R12} - 0.00627 L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.522 | |
| Space mean speed in ramp influence area, | $S_R$ = 55.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 66.0 | mph |
| Space mean speed for all vehicles, | $S$ = 58.0 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 1714 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 811 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 1714 | | 811 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 466 | | 220 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 1863 | 882 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.673 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1542 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 1863 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 981 | 7200 | No |
| $v_R$ | 882 | 2100 | No |
| $v_3$ or $v_{av34}$ | 321 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 1542 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 1542 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.377 | |
| Space mean speed in ramp influence area, | $S_R$ = 59.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 61.8 | mph |

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: AM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 2438 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 829 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 2438 | | 829 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 662 | | 225 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 2650 | 901 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.652 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2042 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 2650 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1749 | 7200 | No |
| $v_R$ | 901 | 2100 | No |
| $v_3$ or $v_{av34}$ | 608 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 2042 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2042 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.379

Space mean speed in ramp influence area, $S_R$ = 59.4 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 62.6 mph

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3736 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1553 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 3736 | | 1553 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 1015 | | 422 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4061 | 1688 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.581 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3066 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4061 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2373 | 7200 | No |
| $v_R$ | 1688 | 2100 | No |
| $v_3$ or $v_{av34}$ | 995 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 3066 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3066 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $D_S$ = 0.450 | |
| Space mean speed in ramp influence area, | $S_R$ = 57.4 | mph |
| Space mean speed in outer lanes, | $S_0$ = 76.8 | mph |
| Space mean speed for all vehicles, | $S$ = 61.2 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3496 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1576 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | | |
|---|---|---|---|---|---|---|---|
| Volume, V (vph) | 3496 | | 1576 | | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | | |
| Peak 15-min volume, v15 | 950 | | 428 | | | | v |
| Trucks and buses | 0 | | 0 | | | | % |
| Recreational vehicles | 0 | | 0 | | | | % |
| Terrain type: | Level | | Level | | | | |
| Grade | 0.00 | % | 0.00 | % | | % | |
| Length | 0.00 | mi | 0.00 | mi | | mi | |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3800 | 1713 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.586 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2936 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 3800 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2087 | 7200 | No |
| $v_R$ | 1713 | 2100 | No |
| $v_3$ or $v_{av34}$ | 864 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 2936 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 2936 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.452

Space mean speed in ramp influence area, $S_R$ = 57.3 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 60.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 4285 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1690 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 4285 | | 1690 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 1164 | | 459 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4658 | 1837 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.559 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3414 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4658 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2821 | 7200 | No |
| $v_R$ | 1837 | 2100 | No |
| $v_3$ or $v_{av34}$ | 1244 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 3414 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3414 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 30.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.463

Space mean speed in ramp influence area, $S_R$ = 57.0 mph

Space mean speed in outer lanes, $S_0$ = 75.8 mph

Space mean speed for all vehicles, $S$ = 61.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3762 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 2003 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 3762 | | 2003 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 1022 | | 544 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4089 | 2177 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.558 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3243 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4089 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1912 | 7200 | No |
| $v_R$ | 2177 | 2100 | Yes |
| $v_3$ or $v_{av34}$ | 846 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | No | |

If yes, $v_{12A}$ = 3243 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3243 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.494

Space mean speed in ramp influence area, $S_R$ = 56.2 mph

Space mean speed in outer lanes, $S_0$ = 76.8 mph

Space mean speed for all vehicles, $S$ = 59.5 mph

## *CUMULATIVE BUILDOUT PLUS PROJECT WITH MITIGATION*

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: PM-MIT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ-MIT
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3704 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 2 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1645 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | 500 | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3704 | 1645 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 1007 | 447 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4026 | 1788 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2234 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5814 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1792 pc/h | (Equation 13-14 or 13-17) | |
| Is $v_3$ or $v_{av34}$ > 2700 pc/h? | | No | |
| Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 | | Yes | |

If yes, $v_{12A}$ = 2300 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12A}$ | 5814 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.396 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.9 | mph |
| Space mean speed in outer lanes, | $S_0$ = 65.6 | mph |
| Space mean speed for all vehicles, | $S$ = 60.7 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ-MIT
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 4285 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 2 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1690 | vph |
| Length of first accel/decel lane | 325 | ft |
| Length of second accel/decel lane | 325 | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 4285 | | 1690 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 1164 | | 459 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4658 | 1837 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3106 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4658 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 2821 | 7200 | No |
| $v_R$ | 1837 | 4200 | No |
| $v_3$ or $v_{av34}$ | 1552 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 3106 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3106 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.463

Space mean speed in ramp influence area, $S_R$ = 57.0 mph

Space mean speed in outer lanes, $S_0$ = 74.6 mph

Space mean speed for all vehicles, $S$ = 61.9 mph

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT
Freeway/Dir of Travel: SR 99/NB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3785 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 2 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1394 | vph |
| Length of first accel/decel lane | 330 | ft |
| Length of second accel/decel lane | 500 | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3785 | 1394 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 1029 | 379 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, $f_{HV}$ | 1.000 | 1.000 | |
| Driver population factor, $f_P$ | 1.00 | 1.00 | |
| Flow rate, $v_p$ | 4114 | 1515 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2283 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5629 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1831 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 Yes

If yes, $v_{12A}$ = 2350 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12A}$ | 5629 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.403 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.7 | mph |
| Space mean speed in outer lanes, | $S_0$ = 65.4 | mph |
| Space mean speed for all vehicles, | $S$ = 60.7 | mph |

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

## Diverge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT-MIT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ-MIT
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Diverge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3762 | vph |

## Off Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 2 | |
| Free-Flow speed on ramp | 45.0 | mph |
| Volume on ramp | 2003 | vph |
| Length of first accel/decel lane | 375 | ft |
| Length of second accel/decel lane | 375 | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent ramp | | vph |
| Position of adjacent ramp | | |
| Type of adjacent ramp | | |
| Distance to adjacent ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | | Ramp | | Adjacent Ramp | |
|---|---|---|---|---|---|---|
| Volume, V (vph) | 3762 | | 2003 | | | vph |
| Peak-hour factor, PHF | 0.92 | | 0.92 | | | |
| Peak 15-min volume, v15 | 1022 | | 544 | | | v |
| Trucks and buses | 0 | | 0 | | | % |
| Recreational vehicles | 0 | | 0 | | | % |
| Terrain type: | Level | | Level | | | |
| Grade | 0.00 | % | 0.00 | % | | % |
| Length | 0.00 | mi | 0.00 | mi | | mi |
| Trucks and buses PCE, ET | 1.5 | | 1.5 | | | |
| Recreational vehicle PCE, ER | 1.2 | | 1.2 | | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 4089 | 2177 | pcph |

## Estimation of V12 Diverge Areas

$L_{EQ}$ = (Equation 13-12 or 13-13)

$P_{FD}$ = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3037 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{Fi} = v_F$ | 4089 | 7200 | No |
| $v_{FO} = v_F - v_R$ | 1912 | 7200 | No |
| $v_R$ | 2177 | 4200 | No |
| $v_3$ or $v_{av34}$ | 1052 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 No

If yes, $v_{12A}$ = 3037 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Diverge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12}$ | 3037 | 4400 | No |

## Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

Intermediate speed variable, $D_S$ = 0.494

Space mean speed in ramp influence area, $S_R$ = 56.2 mph

Space mean speed in outer lanes, $S_0$ = 76.6 mph

Space mean speed for all vehicles, $S$ = 60.3 mph

Phone: Fax:
E-mail:

## Merge Analysis

Analyst:
Agency/Co.:
Date performed: 10/23/2014
Analysis time period: SAT-MIT
Freeway/Dir of Travel: SR 99/SB
Junction: Woollomes
Jurisdiction:
Analysis Year: CUMUL+PROJ-MIT
Description:

## Freeway Data

| | | |
|---|---|---|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 70.0 | mph |
| Volume on freeway | 3665 | vph |

## On Ramp Data

| | | |
|---|---|---|
| Side of freeway | Right | |
| Number of lanes in ramp | 2 | |
| Free-flow speed on ramp | 45.0 | mph |
| Volume on ramp | 1675 | vph |
| Length of first accel/decel lane | 625 | ft |
| Length of second accel/decel lane | 500 | ft |

## Adjacent Ramp Data (if one exists)

| | | |
|---|---|---|
| Does adjacent ramp exist? | No | |
| Volume on adjacent Ramp | | vph |
| Position of adjacent Ramp | | |
| Type of adjacent Ramp | | |
| Distance to adjacent Ramp | | ft |

## Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|---|---|---|---|---|
| Volume, V (vph) | 3665 | 1675 | | vph |
| Peak-hour factor, PHF | 0.92 | 0.92 | | |
| Peak 15-min volume, v15 | 996 | 455 | | v |
| Trucks and buses | 0 | 0 | | % |
| Recreational vehicles | 0 | 0 | | % |
| Terrain type: | Level | Level | | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 1.5 | 1.5 | | |
| Recreational vehicle PCE, ER | 1.2 | 1.2 | | |

| | | | |
|---|---|---|---|
| Heavy vehicle adjustment, fHV | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | |
| Flow rate, vp | 3984 | 1821 | pcph |

## Estimation of V12 Merge Areas

$L_{EQ}$ = (Equation 13-6 or 13-7)

$P_{FM}$ = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2211 pc/h

## Capacity Checks

| | Actual | Maximum | LOS F? |
|---|---|---|---|
| $v_{FO}$ | 5805 | 7200 | No |
| $v_3$ or $v_{av34}$ | 1773 pc/h | (Equation 13-14 or 13-17) | |

Is $v_3$ or $v_{av34}$ > 2700 pc/h? No

Is $v_3$ or $v_{av34}$ > 1.5 $v_{12}$/2 Yes

If yes, $v_{12A}$ = 2276 (Equation 13-15, 13-16, 13-18, or 13-19)

## Flow Entering Merge Influence Area

| | Actual | Max Desirable | Violation? |
|---|---|---|---|
| $v_{12A}$ | 5805 | 4600 | No |

## Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

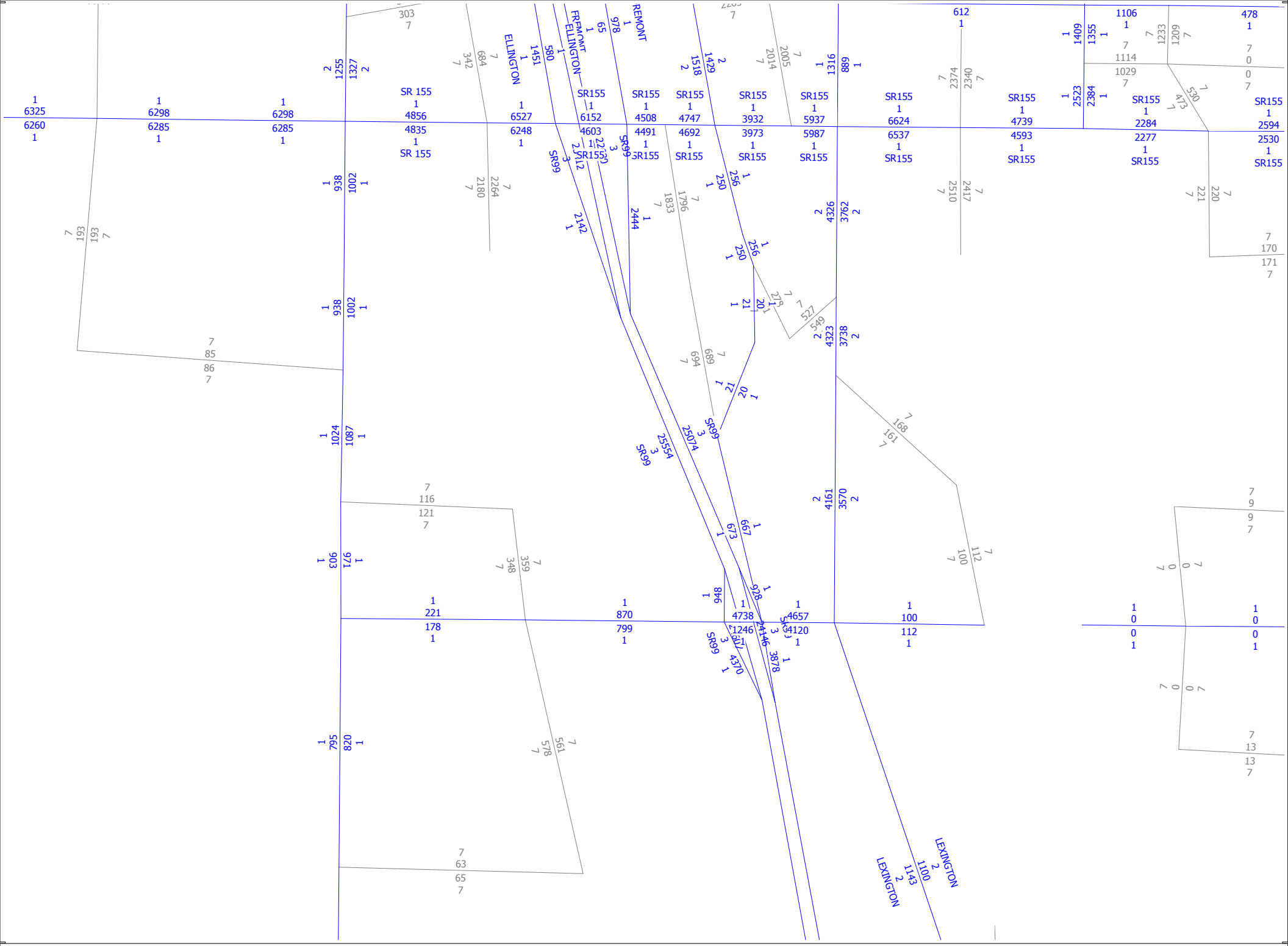
Level of service for ramp-freeway junction areas of influence C

## Speed Estimation

| | | |
|---|---|---|
| Intermediate speed variable, | $M_S$ = 0.398 | |
| Space mean speed in ramp influence area, | $S_R$ = 58.9 | mph |
| Space mean speed in outer lanes, | $S_0$ = 65.7 | mph |
| Space mean speed for all vehicles, | $S$ = 60.7 | mph |

# APPENDIX F

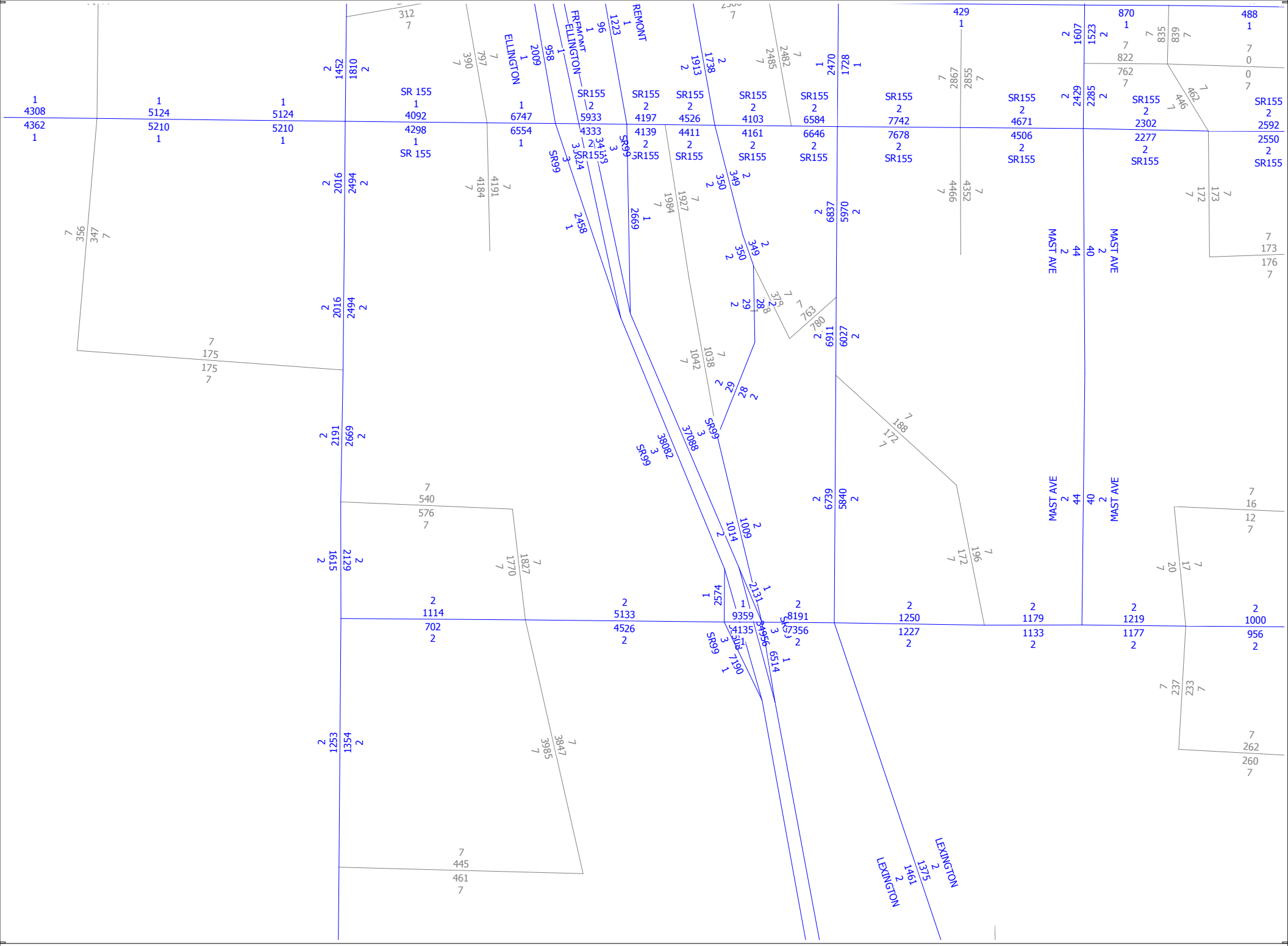
# Kern COG Model Plots and 2040 Post-Processing Worksheets




9/26/2014 2008 ADT and Lanes Kern COG Model

cube

(Licensed to San Joaquin Valley Regional Planning Agencies' Dir)




9/26/2014 2040 ADTs and lanes Kern COG Model

cube

(Licensed to San Joaquin Valley Regional Planning Agencies' Dir)

# APPENDIX G

# Cumulative Projects Traffic Data

**Table 4**
**Project Traffic With Captured-Trip Reductions**

| Time Period | Trips Entering Site | Trips Exiting Site |
|---|---|---|
| Weekday | 11,147 | 11,147 |
| Weekday AM Peak Hour | 588 | 547 |
| Weekday PM Peak Hour | 863 | 901 |
| Weekend Peak Hour | 1,391 | 1,295 |

Pass-by reductions were not applied to the project traffic volumes since the existing traffic volumes are minimal on Woollomes Avenue.

The distribution of project traffic to the adjacent road network was performed by manual methods based on a review of the traffic volumes projected using the Kern County travel model. The anticipated project traffic volumes with captured-trip reductions at the study intersections are shown in Figures 4 and 5 for weekday and weekend conditions, respectively.

## 4.2 – Approved Projects

The traffic volumes expected to be generated by approved projects in the vicinity of the project site are included in the analyses. The City of Delano provided the approved projects and indicated the scenarios in which the approved projects are expected to be complete. Based on information provided by City of Delano staff, the following projects are expected to be completed in the near future and are included in the Year 2007 Existing Plus Opening Year Approved Projects analyses:

- Vineyard Plaza Phase I Shopping Center – northeast of the intersection of Woollomes Avenue and Dover Parkway
- Tract 6326 – north of project site
- Tract 6327 - north of project site
- Pad 4 of the Delano Marketplace – southwest of the intersection of Woollomes and Garzoli Avenues

City of Delano staff indicated that the following approved projects are not expected to be complete by opening day of the project:

- Tract 6470 – northwest of the project site, east side of Albany Street
- Industrial Park – immediately south of the project site
- Belmont Meadows Apartments – northwest of the project site.

These projects are included in the Near-Term With Approved Projects analyses that are based on projected conditions in approximately the year 2010. The locations of the approved projects are presented in Figure 6.

Table 5 presents the trip generation characteristics of the approved projects affecting the study intersections and road segments and included in the analyses as provided by the City of Delano.

**Table 5**
**Approved Projects**

| Project | ITE Code | Units | Peak Hour Traffic Volumes | | | | | | Weekday Traffic Volumes |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM | | PM | | Weekend | | |
| | | | Enter | Exit | Enter | Exit | Enter | Exit | |
| Delano Vineyard Plaza Phase I (Pacific Advisors) Shopping Center | 820 | 58,342 sf | 37 | 24 | 106 | 114 | 151 | 140 | 2,506 |
| Ennis Homes (Tract 6326) | 210 | 137 homes | 26 | 78 | 88 | 52 | 70 | 60 | 1,312 |
| Ennis Homes (Tract 6327) | 210 | 128 homes | 25 | 73 | 82 | 48 | 65 | 56 | 1,226 |
| Marketplace 1 Pad 4 | 934 | 3,176 sf | 87 | 83 | 58 | 53 | 96 | 93 | 1,576 |
| Marketplace 1 Pad 4 | 814 | 4,005 sf | 7 | 9 | 14 | 18 | 14 | 18 | 210 |
| Marketplace 1 Pad 4 | 932 | 3,176 sf | 20 | 18 | 22 | 14 | 34 | 31 | 404 |
| Kern County Housing Authority/Self-Help Enterprises | 210 | 84 homes | 16 | 47 | 54 | 31 | 43 | 36 | 804 |
| **Opening Year Subtotals** | | | **218** | **332** | **424** | **330** | **473** | **434** | **8,038** |
| Pacific Holt Corporation (Tract 6470) | 210 | 165 homes | 31 | 93 | 105 | 62 | 84 | 72 | 1,580 |
| Commercial-Industrial Parcels (Millennium III, LLC) (Industrial Park) | 110 | 17.65 ac | 111 | 23 | 29 | 100 | 15 | 3 | 916 |
| Belmont Meadows Apartments | 221 | 70 units | 7 | 26 | 27 | 15 | 9 | 33 | 462 |
| | | **Totals** | **367** | **474** | **585** | **507** | **581** | **542** | **10,996** |

sf – square feet ac - acres

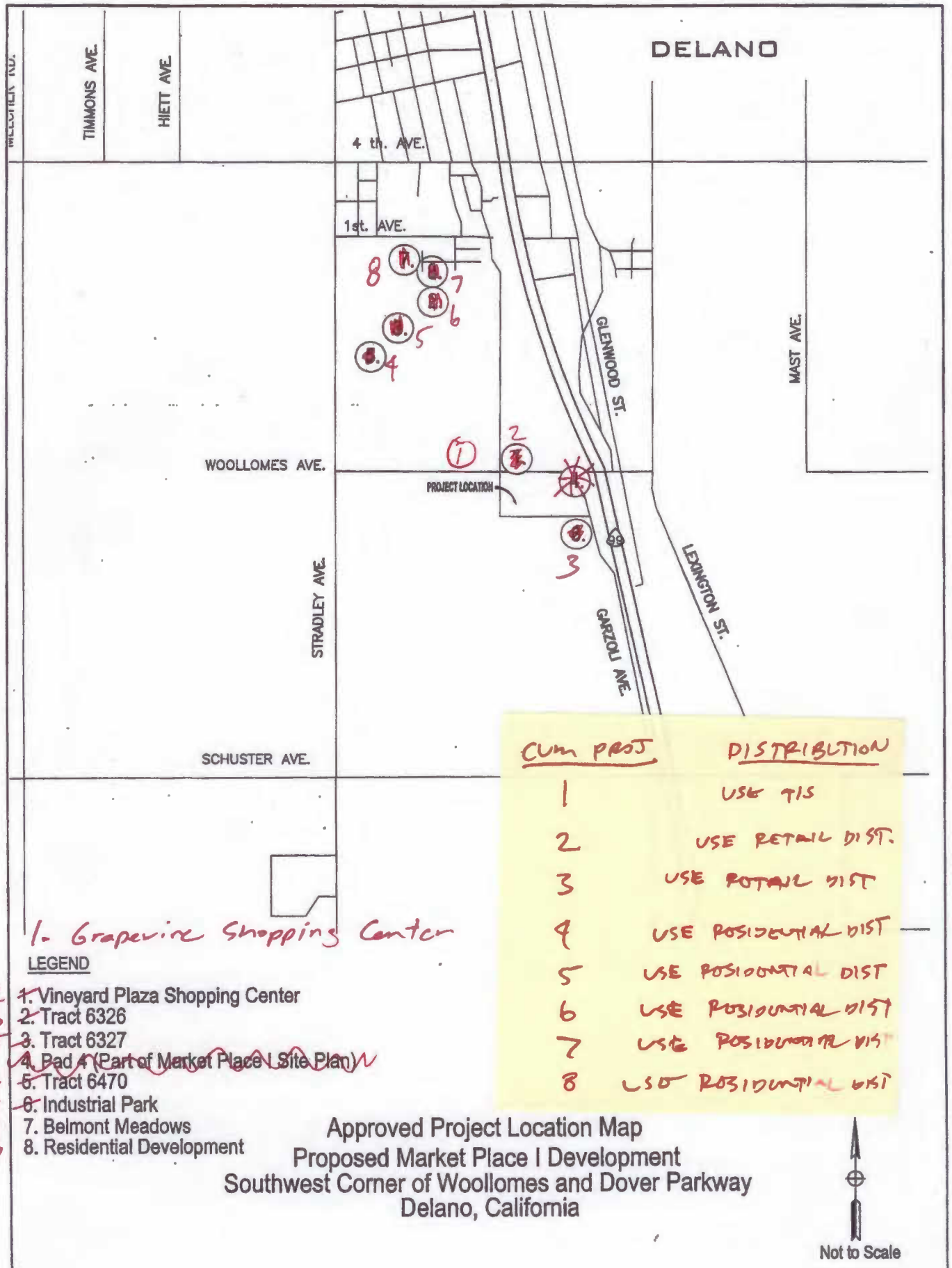
The Opening Year Approved Projects traffic volumes are presented in Figures 7 and 8 for weekday and weekend conditions, respectively. The Approved Projects traffic volumes are presented in Figures 9 and 10 for weekday and weekend conditions, respectively, and also include the Opening Year Approved Projects.

## 4.3 – Lane Configurations

The existing lane configurations at each of the study intersections are shown in Figure 11.

The construction of the opening year approved projects is expected to result in the construction of Dover Parkway north of Woollomes Avenue. The lane configurations anticipated for the Existing Plus Opening Year Approved Projects scenario and the Near-Term With Approved Projects scenario are shown in Figure 12.

Based on information provided to Peters Engineering Group, the proposed main project site access intersection on Woollomes will align with the existing Home Depot site access. According to the site plan provided to Peters Engineering Group there is an additional site access to the east of the main site access that will only allow right turns in and out of the project site. Woollomes Avenue is




| CUM PROJ | DISTRIBUTION |
|---|---|
| 1 | USE TIS |
| 2 | USE RETAIL DIST. |
| 3 | USE RETAIL DIST |
| 4 | USE RESIDENTIAL DIST |
| 5 | USE RESIDENTIAL DIST |
| 6 | USE RESIDENTIAL DIST |
| 7 | USE RESIDENTIAL DIST |
| 8 | USE RESIDENTIAL DIST |

Approved Project Location Map
Proposed Market Place I Development
Southwest Corner of Woollomes and Dover Parkway
Delano, California

PETERS ENGINEERING GROUP

Figure 6

Table 5 presents the trip generation characteristics of the approved projects affecting the study intersections and road segments and included in the analyses as provided by the City of Delano.

**Table 5**
**Approved Projects**

| | Project | ITE Code | Units | Peak Hour Traffic Volumes | | | | | | Weekday Traffic Volumes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AM | | PM | | Weekend | | |
| | | | | Enter | Exit | Enter | Exit | Enter | Exit | |
| 2(a) (ADD 2b) | Delano Vineyard Plaza Phase I (Pacific Advisors) Shopping Center | 820 | 58,342 sf | 37 | 24 | 106 | 114 | 151 | 140 | 2,506 |
| 6 | Ennis Homes (Tract 6326) | 210 | 137 homes | 26 | 78 | 88 | 52 | 70 | 60 | 1,312 |
| 5 | Ennis Homes (Tract 6327) | 210 | 128 homes | 25 | 73 | 82 | 48 | 65 | 56 | 1,226 |
| | ~~Marketplace 1 Pad 4~~ | ~~934~~ | ~~3,176 sf~~ | ~~87~~ | ~~83~~ | ~~58~~ | ~~53~~ | ~~96~~ | ~~93~~ | ~~1,576~~ |
| | ~~Marketplace 1 Pad 4~~ | ~~814~~ | ~~4,005 sf~~ | ~~7~~ | ~~9~~ | ~~14~~ | ~~18~~ | ~~14~~ | ~~18~~ | ~~210~~ |
| | ~~Marketplace 1 Pad 4~~ | ~~932~~ | ~~3,176 sf~~ | ~~20~~ | ~~18~~ | ~~22~~ | ~~14~~ | ~~34~~ | ~~31~~ | ~~404~~ |
| 7 | Kern County Housing Authority/Self-Help Enterprises | 210 | 84 homes | 16 | 47 | 54 | 31 | 43 | 36 | 804 |
| | **Opening Year Subtotals** | | | **218** | **332** | **424** | **330** | **473** | **434** | **8,038** |
| 4 | Pacific Holt Corporation (Tract 6470) | 210 | 165 homes | 31 | 93 | 105 | 62 | 84 | 72 | 1,580 |
| 3 | Commercial-Industrial Parcels (Millennium III, LLC) (Industrial Park) | 110 | 17.65 ac | 111 | 23 | 29 | 100 | 15 | 3 | 916 |
| 8 | Belmont Meadows Apartments | 221 | 70 units | 7 | 26 | 27 | 15 | 9 | 33 | 462 |
| | | | **Totals** | **367** | **474** | **585** | **507** | **581** | **542** | **10,996** |

sf – square feet ac - acres

The Opening Year Approved Projects traffic volumes are presented in Figures 7 and 8 for weekday and weekend conditions, respectively. The Approved Projects traffic volumes are presented in Figures 9 and 10 for weekday and weekend conditions, respectively, and also include the Opening Year Approved Projects.

## 4.3 – Lane Configurations

The existing lane configurations at each of the study intersections are shown in Figure 11.

The construction of the opening year approved projects is expected to result in the construction of Dover Parkway north of Woollomes Avenue. The lane configurations anticipated for the Existing Plus Opening Year Approved Projects scenario and the Near-Term With Approved Projects scenario are shown in Figure 12.

Based on information provided to Peters Engineering Group, the proposed main project site access intersection on Woollomes will align with the existing Home Depot site access. According to the site plan provided to Peters Engineering Group there is an additional site access to the east of the main site access that will only allow right turns in and out of the project site. Woollomes Avenue is

model runs which were used in the traffic analysis. The model output illustrating the daily traffic volumes for the year 2030 is included in Appendix C.

The use of travel models is intended to accommodate all future projects conforming to the General Plan. Future projects that were not specifically included in the model runs were added to the resulting 2030 traffic volumes. The traffic expected to be generated by the projects included in Table 6 was added to the modeling results. The projects described in Table 5 were also added to the modeling results and included in the cumulative analyses.

**Table 6**
**Future Projects**

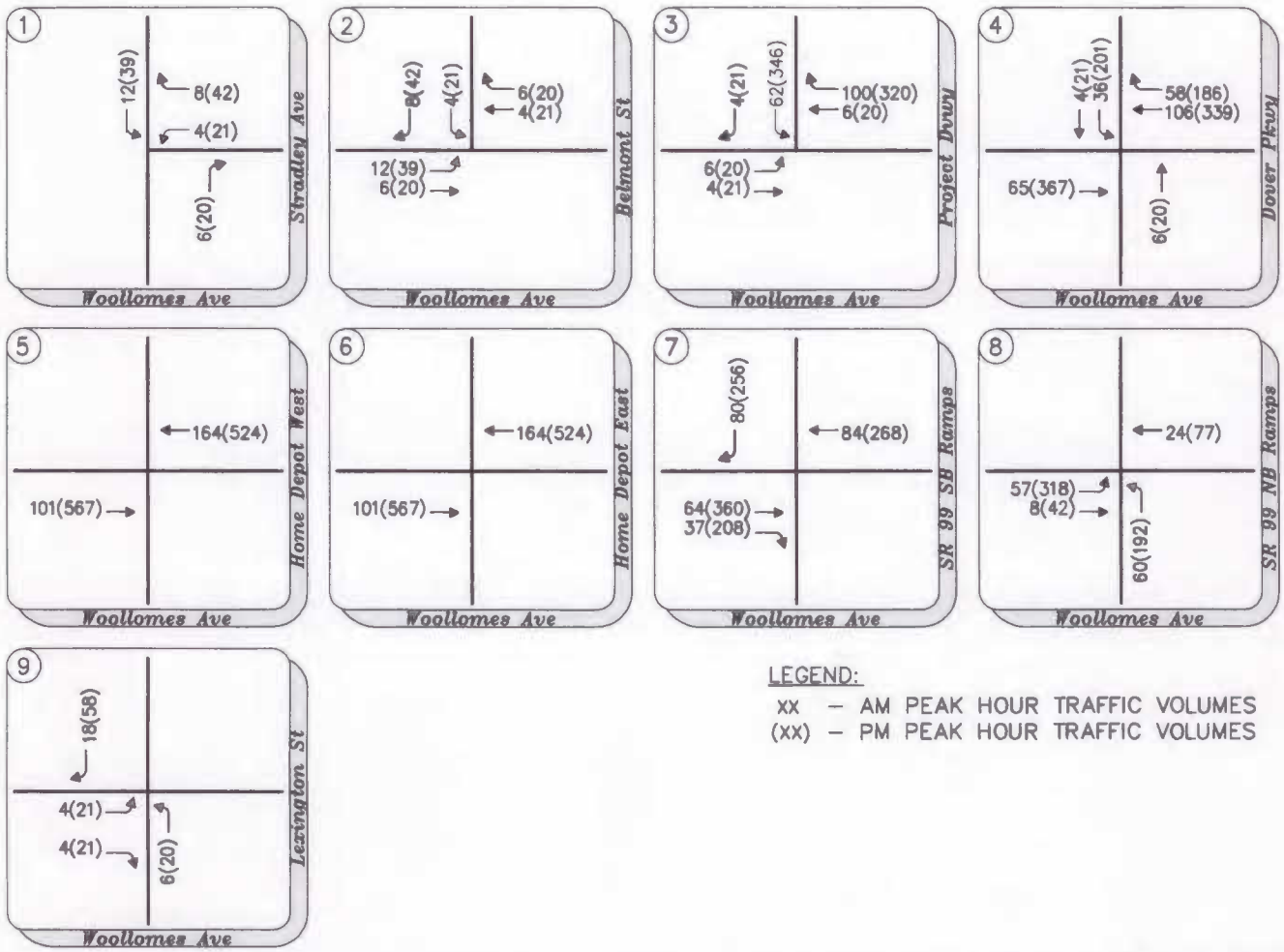
| Land Use | ITE Code | Units | Peak Hour Traffic Volumes | | | | | | Weekday Traffic Volumes |
|---|---|---|---|---|---|---|---|---|---|
| | | | AM | | PM | | Weekend | | |
| | | | Enter | Exit | Enter | Exit | Enter | Exit | |
| Delano Vineyard Plaza Phase II (Pacific Advisors) (Shopping Center) | 820 | 599,000 sq. ft. | 377 | 241 | 1,079 | 1,169 | 1,549 | 1,429 | 25,722 |
| Delano Marketplace II (Shopping Center) | 820 | 549,000 sq. ft. | 342 | 219 | 980 | 1,061 | 1,406 | 1,298 | 23,360 |
| Delano Marketplace III (Shopping Center) | 820 | 541,658 sq. ft. | 341 | 218 | 955 | 1,057 | 1,400 | 1,293 | 23,260 |
| Delano Marketplace II (Low-Rise Apartment) | 221 | 112 Units | 13 | 48 | 49 | 27 | 14 | 52 | 962 |
| Delano Marketplace II (Single Family Detached Housing) | 210 | 141 Homes | 27 | 79 | 90 | 53 | 72 | 61 | 1,350 |
| Delano Marketplace III (Single Family Detached Housing) | 210 | 195 Homes | 37 | 110 | 124 | 73 | 99 | 85 | 1,868 |
| Reynen & Bardis/Villas at Vintage Park (Annexation)Single Family Detached Housing | 210 | 1671 Homes | 314 | 940 | 1,064 | 625 | 849 | 723 | 15,992 |
| Centex Homes/Workman Bros.Single Family Detached Housing | 210 | 399 Homes | 75 | 225 | 254 | 149 | 203 | 173 | 3,820 |
| | | Totals | 1,526 | 2,080 | 4,535 | 4,214 | 5,592 | 5,114 | 96,334 |

2(b) (ADD 2a)

The future projects traffic volumes are presented in Figures 24 and 25 for weekday and weekend conditions, respectively.

Year 2030 traffic volumes resulting from the sum of the modeling results and the values in Table 6 were compared to the existing traffic volumes to verify that a minimum annual growth rate of three percent resulted from the traffic projections. Projected 2030 traffic volumes without the project (assuming a vacant project site) at the study intersections are presented in Figures 26 and 27 for weekday and weekend conditions, respectively. Projected 2030 traffic volumes with the project at the study intersections are presented in Figures 28 and 29 for weekday and weekend conditions, respectively.

1 GRAPEVINE SHOPPING CENTER




LEGEND:

xx – AM PEAK HOUR TRAFFIC VOLUMES
(xx) – PM PEAK HOUR TRAFFIC VOLUMES

Grapevine Commercial TIAR

Figure 8A

"Project Only" AM & PM Peak Hour Volumes

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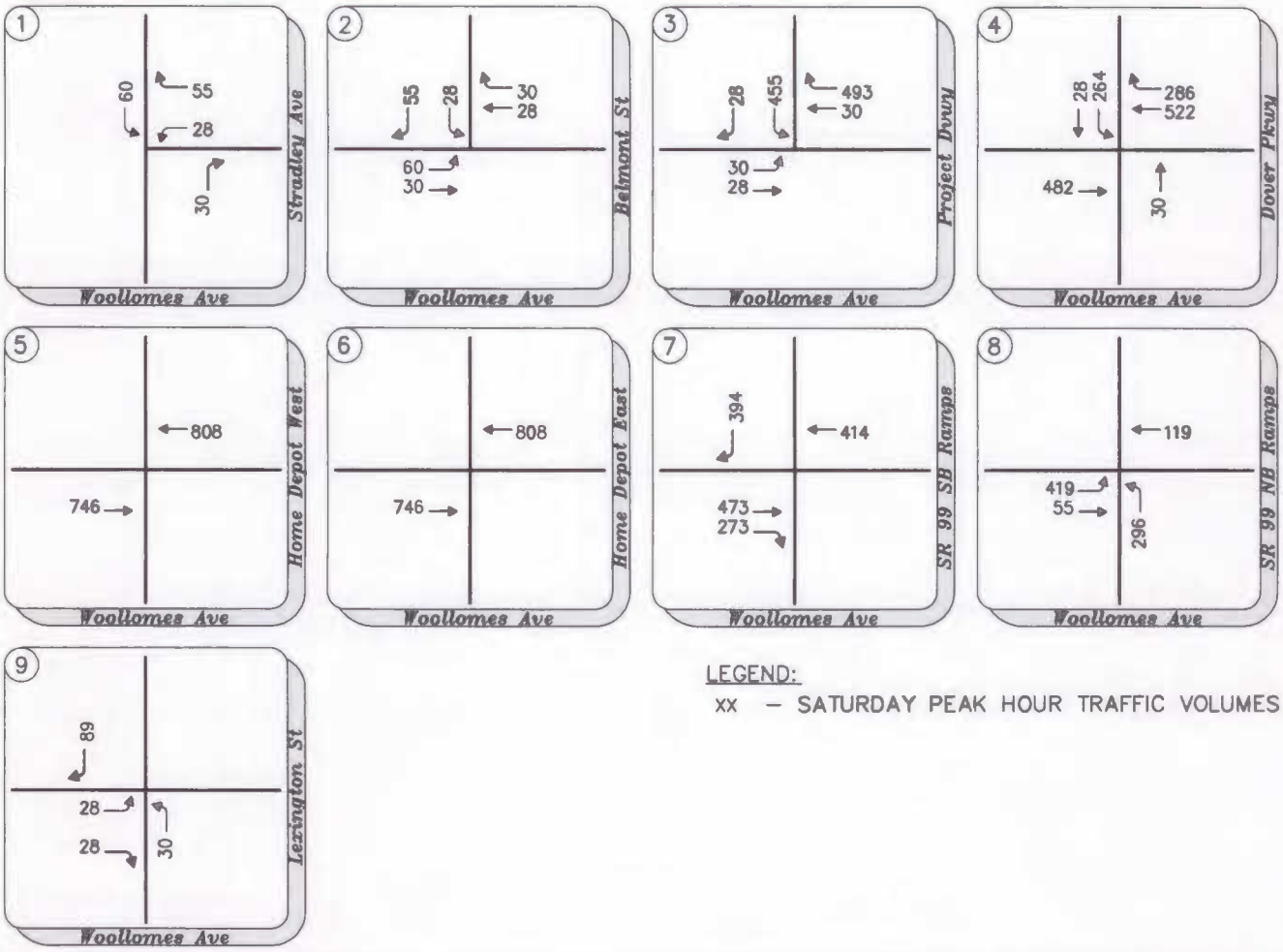
1 GRAPELINE SHOPPING CENTER




LEGEND:
xx – SATURDAY PEAK HOUR TRAFFIC VOLUMES

Grapevine Commercial TIAR

Figure 8B

"Project Only" Saturday Peak Hour Volumes

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# APPENDIX H

# City of Delano Development Impact Fee Program

# RESOLUTION NO. 2007 - 42

## A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DELANO ADOPTING UPDATED DEVELOPMENT IMPACT FEES FOR TRAFFIC AND CIRCULATION

**WHEREAS**, the City Council adopted Ordinance No. 928 establishing the authority for imposing and charging Development Impact Fees; and

**WHEREAS**, the City Council adopted Ordinance No. 999 regarding Development Impact Fees related to circulation and traffic impacts; and

**WHEREAS**, the City Council has considered the information provided in the Development Fee Study entitled "Analysis and Calculation of Traffic Impact Fee" prepared by staff, which analyzes the need for new traffic and circulation improvements required by future developments through the year 2026; and

**WHEREAS**, the study as modified sets forth the relationship between contemplated future development, needed facilities, and the estimated cost of those improvements; and

**WHEREAS**, the study has been made available for public inspection, and public hearing notice was provided as required by law; and

**WHEREAS**, the City Council has determined that:

A. The purpose of these fees is to finance public facilities and improvements and/or compensation measures to reduce the impacts caused by future developments as shown in the modified fee study. Such improvements or compensation measures include traffic signals and roadway circulation facilities.

B. The fees collected pursuant to this resolution shall be used to finance the traffic and circulation facilities identified in the "Analysis and Calculation of Traffic Impact Fee" incorporated by reference and the City Capital Improvement Program as budgeted by the City Council from time-to-time to serve proposed development.

C. After considering the studies and testimony received at this public hearing, the Council approves and adopts the studies as modified, and incorporates such herein, and further finds that the future development in the City of Delano will generate the need for such additional public facilities and/or compensation measures and these facilities and/or measures are consistent with the General Plan.

D. The fees are statutorily exempt from CEQA under Section 15273 (a) (4) of the State CEQA Guidelines, and/or categorically exempt from CEQA

under Sections 15301 (h), 15301 (i), 15304, 15307, 15308, 15313, and/or 15317 of the State CEQA Guidelines.

E. The studies and the testimony establish:

1. That there is a reasonable relationship between the need for traffic and circulation facilities and/or compensation measures and the impacts of the types of development for which the corresponding fees are charged; and

2. That there is a reasonable relationship between the fees' use and the type of development for which the fees are charged; and

3. That there is a reasonable relationship between the amount of the fees and the cost of the public facilities and/or compensation measures, or portion thereof, of the public facilities attributable to the development on which the fees are imposed; and

4. That the cost estimates set forth in the modified Development Fee Study are reasonable cost estimates for construction of these facilities, and the fees expected to be generated by future developments will not exceed the total costs of construction of the public facilities.

F. The method of allocation of the Development Impact Fees to a particular development bears a fair and reasonable relationship to each development's burden on, and benefit from, the facilities and/or compensation measures to be funded by the fee.

**NOW, THEREFORE, BE IT RESOLVED** BY THE CITY COUNCIL OF THE CITY OF DELANO AS FOLLOWS:

SECTION 1: City Of Delano Resolution 2006-10, February 21, 2006, is hereby modified with regards to traffic and circulation impact fees only. All references to a "Circulation" fee shall include consideration of a traffic impact fee.

SECTION 2: Circulation Impact Fees for projects approved by the City Council on or before June 18, 2007, shall be calculated using the attached Exhibit A under the column, "2007 Fees-Cost per unit- Phase One." Exhibit A shall also apply to projects with an approved site plan or complete application for a building permit as of June 18, 2007, except as provided below.

SECTION 3: Circulation Impact Fees for projects approved by the City Council after June 18, 2007, shall be calculated using the attached Exhibit B under the column, "2007 Fees-Cost per unit- Final Phase." Exhibit A shall also apply to projects with a site plan or complete application for a building permit accepted as complete before June 18, 2007, provided that a building permit for the respective lots of the project are issued by July 1, 2012, after which date the higher fee shall apply to the remaining lots.

SECTION 4: Circulation Impact Fees collected in accordance with this Resolution shall be placed in two separate funds, entitle "Circulation Impact Fees- State" and "Circulation Impact Fees-Local". Fees, as determined by the City Engineer, up to $289 per trip shall be deposited in the "Circulation Impact Fees- State" fund; fees in excess of $289 per trip shall be deposited in the "Circulation Impact Fees- Local" fund.

SECTION 5: Fees in the accounts established herein shall be expended only for the purpose for which the fee is collected with consideration to areas of the City in which development has taken place and in which the fees have been paid.

SECTION 6: The standards upon which the needs for facilities are based are the City General Plan and those regulations and standards of practice to provide acceptable levels of service. The City will remedy any existing deficiencies without using the proceeds of the Development Impact Fees.

SECTION 7: Effective Date

The fees provided in this resolution shall be effective sixty (60) days from the effective date of this resolution.

The foregoing Resolution was duly passed and adopted by the City Council at a regular meeting held on the 18th day of June, 2007, by the following vote:

AYES: Hill, Ramirez, Rios, Vallejo

NOES: none

ABSENT: none

ABSTAIN: none

Attest:

Pedro Rios, Mayor

Phyllis A. Kraft, City Clerk

# EXHIBIT A: CIRCULATION FEE: FIRST PHASE

| Note # | Schedule of Impact Fees | CIRCULATION (PROPOSED 4-23-07) | | | | |
|---|---|---|---|---|---|---|
| | **Category** | Unit of Measure | Trip-ends/unit | Pass-By Factor | 2006 Fees Cost per Unit | 2007 Fees** Cost per unit |
| 2 | **Residential** | | | | | |
| | Single Family | per unit | 10 | 1 | $ 1,356 | $ 2,890 |
| | Apartments | per unit | 7 | 1 | $ 949 | $ 2,023 |
| | Mobile Home Park | per unit | 5 | 1 | $ 678 | $ 1,445 |
| | Residential | per acre | 40 | 1 | $ 5,422 | $ 11,560 |
| | Single Trip End- Residential | each | 1 | 1 | $ 135.56 | $ 289 |
| 1,2 | **Non-Residential** | | | | | |
| | Retail | | | | | |
| | Shopping Center | per gross sf of leasable area | 43 | 0.65 | $ 3.79 | $ 8.08 |
| | Specialty Retail Center | per gross sf of leasable area | 41 | 0.65 | $ 3.61 | $ 7.70 |
| | Discount Store | per gross sf of leasable area | 57 | 0.65 | $ 5.02 | $ 10.71 |
| | Quality Restaurant | per sf of gross floor area | 90 | 0.65 | $ 7.93 | $ 16.91 |
| | High Turnover Sit-Down Restaurant | per sf of gross floor area | 130 | 0.65 | $ 11.45 | $ 24.42 |
| | Fast Food w/Drive Thru Restaurant | per sf of gross floor area | 496 | 0.65 | $ 43.70 | $ 93.17 |
| | Convenience Market - 24 hours open | per gross square feet | 738 | 0.65 | $ 65.03 | $ 138.63 |
| | Office | | | | | |
| | General Office | per gross square feet | 11 | 0.8 | $ 1.19 | $ 2.54 |
| | Medical-Dental Office | per gross square feet | 36 | 0.8 | $ 3.90 | $ 8.32 |
| | Government Office | per gross square feet | 39 | 0.65 | $ 3.44 | $ 7.33 |
| | Post Office | per sf of gross floor area | 108 | 0.65 | $ 9.52 | $ 20.29 |
| | Office Park | per sf of gross floor area | 12 | 0.8 | $ 1.30 | $ 2.77 |
| | Service | | | | | |
| | Bank (walk-in) | per gross square feet | 156 | 0.65 | $ 13.75 | $ 29.30 |
| | Bank (drive-in) | per gross square feet | 265 | 0.65 | $ 23.35 | $ 49.78 |
| | Lodging | | | | | |
| | Hotel | per room | 8 | 0.8 | $ 867.55 | $ 1,849.53 |
| | Motel | per room | 9 | 0.8 | $ 976.00 | $ 2,080.72 |
| | Medical | | | | | |
| | Hospital | per gross square feet | 17 | 0.8 | $ 1.84 | $ 3.93 |
| | Nursing Home | per bed | 3 | 0.8 | $ 325.33 | $ 693.57 |
| | Clinic | per gross square feet | 31 | 0.8 | $ 3.36 | $ 7.17 |
| | Industrial | Study Required | | | | |

Notes:
1. Cost per unit includes application of pass-by factor. Actual pass-by factors must be proposed in traffic study for adoption for a
2. Residential fees will be calculated based on larger of fee determined by lot size or number of units.

# CIRCULATION FEE EXHIBIT B: FINAL PHASE

**Schedule of Impact Fees** — **CIRCULATION (PROPOSED 4-23-07)**

| Note # | Category | Unit of Measure | Trip-ends/unit | Pass-By Factor | 2006 Fees Cost per Unit | 2007 Fees** Cost per unit |
|---|---|---|---|---|---|---|
| 2 | **Residential** | | | | | |
| | Single Family | per unit | 10 | 1 | $ 1,356 | $ 4,000 |
| | Apartments | per unit | 7 | 1 | $ 949 | $ 2,800 |
| | Mobile Home Park | per unit | 5 | 1 | $ 678 | $ 2,000 |
| | Residential | per acre | 40 | 1 | $ 5,422 | $ 15,999 |
| | Single Trip End- Residential | each | 1 | 1 | $ 135.56 | $ 400 |
| 1,2 | **Non-Residential** | | | | | |
| | Retail | | | | | |
| | Shopping Center | per gross sf of leasable area | 43 | 0.65 | $ 3.79 | $ 11.18 |
| | Specialty Retail Center | per gross sf of leasable area | 41 | 0.65 | $ 3.61 | $ 10.66 |
| | Discount Store | per gross sf of leasable area | 57 | 0.65 | $ 5.02 | $ 14.82 |
| | Quality Restaurant | per sf of gross floor area | 90 | 0.65 | $ 7.93 | $ 23.40 |
| | High Turnover Sit-Down Restaurant | per sf of gross floor area | 130 | 0.65 | $ 11.45 | $ 33.80 |
| | Fast Food w/Drive Thru Restaurant | per sf of gross floor area | 496 | 0.65 | $ 43.70 | $ 128.96 |
| | Convenience Market - 24 hours open | per gross square feet | 738 | 0.65 | $ 65.03 | $ 191.87 |
| | Office | | | | | |
| | General Office | per gross square feet | 11 | 0.8 | $ 1.19 | $ 3.52 |
| | Medical-Dental Office | per gross square feet | 36 | 0.8 | $ 3.90 | $ 11.52 |
| | Government Office | per gross square feet | 39 | 0.65 | $ 3.44 | $ 10.14 |
| | Post Office | per sf of gross floor area | 108 | 0.65 | $ 9.52 | $ 28.08 |
| | Office Park | per sf of gross floor area | 12 | 0.8 | $ 1.30 | $ 3.84 |
| | Service | | | | | |
| | Bank (walk-in) | per gross square feet | 156 | 0.65 | $ 13.75 | $ 40.56 |
| | Bank (drive-in) | per gross square feet | 265 | 0.65 | $ 23.35 | $ 68.90 |
| | Lodging | | | | | |
| | Hotel | per room | 8 | 0.8 | $ 867.55 | $ 2,559.91 |
| | Motel | per room | 9 | 0.8 | $ 976.00 | $ 2,879.89 |
| | Medical | | | | | |
| | Hospital | per gross square feet | 17 | 0.8 | $ 1.84 | $ 5.44 |
| | Nursing Home | per bed | 3 | 0.8 | $ 325.33 | $ 959.96 |
| | Clinic | per gross square feet | 31 | 0.8 | $ 3.36 | $ 9.92 |
| | Industrial | Study Required | | | | |

Notes:
1. Cost per unit includes application of pass-by factor. Actual pass-by factors must be proposed in traffic study for adoption for a particular
2. Residential fees will be calculated based on larger of fee determined by lot size or number of units.

APRIL 23, 2007

# CITY OF DELANO
# ANALYSIS AND CALCULATION OF TRAFFIC IMPACT FEE
## April 23, 2007; Revised June 5, 2007

## I. Introduction

The analysis and calculation of the City of Delano recommended traffic impact fee is based on the projected build-out of the City's current General Plan as adopted in December, 2005. As part of the General Plan process the firm of Peters Engineering Group (PEG) completed a computer model of the City's circulation system and submitted a report entitled "City of Delano Circulation Element Update", dated December, 2006.

PEG has also performed traffic impact fee calculations using the findings and the number of trips discussed in the study. The report provided three categories with the estimated funding requirements as follows:

| | |
|---|---|
| Traffic Signal/ Intersection Improvements: | $12,525,000 |
| Arterial / Collector Improvements: | $48,200,000 |
| Interchange / Railroad Crossing Improvements*: | $26,100,000 |
| Total* | $86,825,000 |

*Indicates that the planning amounts will be modified as follows in this analysis.

Using the above project listing, PEG proposed a new traffic impact fee of $170.51 per average daily trip generated by a project.

A list of the projects included in the PEG study to this analysis as "City of Delano – Traffic Impact Fee Program" by PEG and dated August 31, 2006 is attached.

City of Delano staff is in agreement with the costs of the first two items. In subsequent drafts of the revised Traffic Impact Fee, the California Department of Transportation (Caltrans) has recommended the City use a larger planning budget for interchange and railroad crossing improvements. A copy of the March 27, 2007 letter from Caltrans is attached and discussed as follows.

## II. Discussion of Caltrans Recommendations for Interchange and Railroad Crossing Improvements

**County Line Road:** Caltrans has encouraged the City of Delano to set aside a larger amount of money ($30-35 million) for the County Line Road interchange, rather than the $5.5 million estimated in the Peters report of December, 2006.

City of Delano staff recommendation is to leave the amount of the Peters study for County Line Road intact, subject to the following considerations:

1. Caltrans acknowledges that a detailed cost estimate and study is needed. A detailed study would, therefore, be desirable prior to ignoring the recommendations of the Peters study.
2. The subject interchange has had very limited development activity and might not generate the need for additional freeway improvements.
3. The Caltrans recommendation is based on the assumption that there will be substantial urban development north of County Line Road, which would normally account for half of the need for interchange improvements. It is not clear at this time whether said development will occur.
4. Detailed study might render large-scale intersection improvements un-necessary. For example, High Street and Girard Street, between County Line Road and 21st Avenue could be configured as a one-way couple, which would make the existing interchange considerably more effective.

The Caltrans letter also recommends provisions for future grade separation with Union Pacific Railroad. The proximity of UPRR to High Street and Highway 99 would, on the surface appear to preclude a grade separation, so additional study, as well as an assessment of the need for such a separation should be the approach.

**Cecil Avenue**: Caltrans estimates $17 to $19 million for the widening of the Cecil Avenue overcrossing at Highway 99. This estimate appears adequate and consistent with the analysis of the Peters report.

**9th and 13th Avenue Ramps**: City staff and Council have previously discussed the viability of the one-way couple suggested by Caltrans. The estimated ramp costs appear high at $14 to $16 million, but will be used as a budget figure pending further study.

**Garces Highway Grade Separation**: The budget figure for this work remains at $8 million.

**Woollomes Avenue Interchange**: The City staff and Caltrans agree that the grade separation and interchange improvements will total approximately $68 million for both the interim and ultimate improvements.

**Pond Road Interchange**: The Peters study identifies $1.2 million in improvements to accommodate the present General Plan, but Caltrans has recommended a $20 million budget for this interchange. It is probable that the $20 million figure will be the ultimate interchange cost but the extent of the current General Plan in this area is limited. Future analysis of a revised plan area will probably confirm the higher cost but will also provide a larger number of trips for cost-sharing. For the present, therefore, a $6.2 million figure will be used.

The revised table of Interchange improvements, therefore is:

**Revised Table 3**
**Interchange Analysis and Cost Summary**

| Interchange | Improvements | Cost ($) |
|---|---|---|
| 1 County Line Rd / State Route 99 | Realign northbound on /off ramps and southbound off ramp. Abandon hook ramps on Girard Street. | $5,500,000 |
| 2 Cecil Ave / State Route 99 | Construct new northbound off and southbound on ramps; widen bridge | $18,000,000 |
| 3 9th Ave / State Route 99 13th Ave / State Route 99 | Abandon Ramps & Construct new ramps | $15,000,000 |
| 4 4th Ave (Garces Hwy) State Route 99 | Construct new northbound on / off and southbound on / off ramps. | $8,000,000 |
| 5 Woollomes Ave / State Route 99 | Construct Interchange Improvements * | $68,000,000 |
| 6 Pond Road / State Route 99 | Signalize Ramp Intersections | $6,200,000 |

**SUB- TOTAL $120,700,000**

In addition, Caltrans has estimated that the design and other soft costs for the above should be approximately $45 million. For purposes of budgeting the figure of $20 million will be used; this amount provides for a 20% design budget and some contingency. The modified total amount to be funded is, therefore, as follows:

| | |
|---|---|
| Traffic Signal/ Intersection Improvements: | $12,525,000 |
| Arterial / Collector Improvements: | $48,200,000 |
| Interchange / Railroad Crossing Improvements: | $120,700,000 |
| Design and Contingencies | $20,000,000 |
| Total | $201,425,000 |

## III. Modified Fee Calculation

The PEG report proposes that the total cost of improvements be divided into future and existing trips. It is proposed that the total funding required be proportioned between new and existing users as follows:

| Description | Trips- ADT | % | Cost- $ |
|---|---|---|---|
| Future users: | 332,930 trips | (66.0%) | 132,885,000 |

| | | | |
|---|---|---|---|
| Existing users | 171,721 trips | (34.0%) | 68,540,000 |
| **Total trips:** | **504,651** | **(100%)** | **$201,425,000** |

The cost per ADT for future trips generated by new development, therefore would be as follows:

Fee per trip generated = **+$132,885,000/ 332,930 trips = $399.13/ trip, say $400**

A trip is defined by the Institute of Traffic Generators and standard tables for trip generators for a project would yield a project's impact fee after adjustments for pass-by trips is considered.

There is, however, no available funding mechanism for existing development to pay for the new improvements in the amount of $68,540,000 except for a state bond issue, an additional gas tax, federal funding, and redevelopment agency funding.
In addition, there should be regional funding for some of the above projects. For purposes of fee calculation, it is assumed that all of the proportion attributed to existing users be derived from one or more of these possible funding possibilities. The present traffic impact fee is 135.56 per trip end.

## IV. Fee Phasing

The City of Delano has been asked to consider the phasing of the Circulation Impact Fee, particularly for approved projects such as tentative maps, conditional use permits, approved site plans, and pending building permits. It is necessary, however, to provide full funding for improvements to projects at State Highways 99 and 155 (Garces Highway) in order to assure project progress. The remaining projects on the impact fee schedule can be funded by newly approved projects.

The list of projects eligible for funding by the first phase of the fee increase are shown on the attached sheets and summarized as follows:

| | |
|---|---|
| I. Intersections | $ 5,955,000 |
| II. Local Road Segments | $ 3,900,000 |
| III. Interchange/Railroad Crossings | $120,700,000 |
| IV. Design and Contingencies | $ 15,000,000 |
| Total, | $144,555,000 |

As described above, new users should absorb 66% of the above costs, distributed among 332,930 new trips:

Estimated fee, first phase: $144,555,000 * 0.66 / 332930 = $288.55

There are alternative ways to phase the fee which could include:

1. Adopt 50% of the fee increase for approved projects and 100% of the fee increase for future projects. This method would yield a first phase fee of approximately $270 per trip.
2. Exempt the first 50% of the units in a development from the new fee increase. This method would have the same effect as the first alternative, but would be difficult to apply to single-lot projects.

Staff recommends the phasing of the fee as described above for a $289 fee per trip. This alternative assures full funding of projects on the State highway corridor. This alternative also leaves City locations off the State system as under-funded unless the ultimate fee is increased . The attached list estimates that the phasing plan would create a shortfall of $2,534,130 by phasing the fee for 22,830 trips. The revised final fee, therefore would be:

($132,885,000-6,597,870) / (332,930-22830) = $407.25

The increase of the final fee is within estimating tolerances and, therefore, it is not necessary to revise the final recommended fee of $400 per trip.

Staff recommends the phasing of the fee at $289 per trip for projects approved prior to June 18, 2007, and $400 per trip for projects approved thereafter. Staff also recommends segregating the new fee into State facilities and Local Facilities components.

Attach. City of DelanoTraffic Impact Fee Program by Peters Engineering Group
March 27, 2007 letter from California Department of Transportation

G:\Engineering\Impact Fees\Circulation Impact Fee\impact fee rev 04 07.doc

| Road | Segment | Length (miles) | Existing Configuration | Future Configuration | Remarks | Cost ($) | State Facilities |
|---|---|---|---|---|---|---|---|
| Benner Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 2 Lane Undivided | Kern County Prison | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 2 Lane Undivided | Kern County Prison | 0 | |
| Lytle Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Kern County Prison/Rural Residential Area | 1,000,000 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 2 Lane Undivided | State Prison/Water Treatment/Industrial | 1,000,000 | |
| Casey Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Rural Residential | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 2 Lane Undivided | Water Treatment Facility | 0 | |
| Mettler Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Future Development Area | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Water Treatment Fac./Rural Residential | 1,000,000 | |
| Melcher Road | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Futre Development Area | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Future Development Area | 0 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Voice of america/Agricultural | 1,000,000 | |
| Heitt Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Residential Devcelopment | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Residential Development/Community | 0 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Residential Development/Community | 0 | |
| Albany Street | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Low Residential | 1,000,000 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Low Residential | 2,000,000 | |
| Stradley Avenue | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Future Housing Development | 0 | |
| | Woollomes to Schuster | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Futre Development | 0 | |
| | Schuster to Pond | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/Future Development | 0 | |
| Ellington (SR 155) | Cecil to 11th | 0.50 | 2 Lane Undivided | 3 Lane Couplet | AC Paved: Commercial, In SR 99 Ramps | 0 | |
| | 11th to Garces | 0.50 | 2 Lane Undivided | 3 Lane Couplet | AC Paved: Commercial, In SR 99 Ramps | 0 | |
| SR 99 | Avenue 16 to County line | 2.00 | 2 Lane Undivided | 4 Lane Undivided | CALTRANS | 0 | |
| | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | CALTRANS | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | CALTRANS | 0 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | CALTRANS | 0 | |
| | Woollomes to Pond | 2.00 | 2 Lane Undivided | 4 Lane Undivided | CALTRANS | 0 | |
| Fremont Street | Cecil to 11th | 0.50 | 2 Lane Undivided | 3 Lane Couplet | AC Paved: Commercial, In SR 99 Ramps | 0 | |
| | 11th to Garces | 0.50 | 2 Lane Undivided | 3 Lane Couplet | AC Paved: Commercial, In SR 99 Ramps | 0 | |
| High Street | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Service Commercial Area | 1,000,000 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Service Commercial Area | 2,000,000 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: Service Commercial Area | 200,000 | |
| Lexington Street | Cecil to Garces | 1.00 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: Commercial/Residential Area | 0 | |
| | Garces to Woollomes | 1.00 | 4 Lane Undivided | 4 Lane Undivided | AC Paved: Community/Residentia/Industrial | 0 | |
| Norwalk Street | County Line to Cecil | 1.00 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: Residential/Community Services | 0 | |
| Randolph Street | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Low Residential/Community Services | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential/Community Fac./Com. | 0 | |
| Mast Avenue | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural/Commercial | 0 | |
| | Schuster to Pond | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Industrial | 0 | |
| Browning Road | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential//Future Development Area | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential/Agricultural | 0 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 0 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Woollomes to Schuster | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 0 | |
| | Schuster to Pond | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 0 | |
| Bowman Avenue | County Line to Cecil | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural | 0 | |
| | Cecil to Garces | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt/Semi-AC: Agricultural | 0 | |
| | Garces to Woollomes | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural | 0 | |
| | Woollomes to Schuster | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Semi AC/Dirt Road: Agricultural | 0 | |
| | Schuster to Pond | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural | 0 | |
| County Line Road | Wasco-Pond to Benner | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural/County Prison Area | 2,000,000 | |
| | Benner to Casey | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural/County Prison Area | 2,000,000 | |
| | Casey to Melcher | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural/Future Development Area | 1,000,000 | |
| | Melcher to Heitt | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural/Future Development Area | 1,000,000 | |
| | Heitt to Albany | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: New Residential Development | 1,000,000 | |
| | Albany to SR 99 | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 1,000,000 | 500,000 |
| | SR 99 to Randolph | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Commercial/Residential Area | 2,000,000 | 400,000 |
| | Randolph to Browning | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential/Agricultural | 1,000,000 | |
| | Browning to Bowman | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: New & Future Development Area | 1,000,000 | |
| 20th Avenue | Wasco-Pond to Benner | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Agricultural/State Prison | 0 | |
| | Benner to Casey | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: North Prison/Water Treatment | 0 | |
| | Casey to Melcher | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Residential/Agricultural | 0 | |
| | Melcher to Albany | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road/AC: Future Development Area | 0 | |
| | Albany to SR 99 | 0.50 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: Residential | 0 | |
| | Girard to Randolph | 0.50 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: Residential/Community | 0 | |
| | Randolph to Bowman | 0.50 | 2 Lane Undivided | 2 Lane Undivided | AC Paved: New & Future Development Area | 0 | |
| Cecil Avenue | Wasco-Pond to Benner | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: North Prison/State Prison | 2,000,000 | |
| | Benner to Casey | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Prison/Treatment Plant | 2,000,000 | |
| | Casey to Melcher | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Treatment Plt./Agricultural | 2,000,000 | |
| | Melcher to Heitt | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 1,000,000 | |
| | Heitt to Albany | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential | 1,000,000 | |
| | Albany to SR 99 | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: ResidentiaL | 1,000,000 | 200,000 |
| | SR 99 to Randolph | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential/Commercial | 2,000,000 | 400,000 |
| | Randolph to Browning | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Commercial/Residential | 1,000,000 | |
| | Browning to Bowman | 0.50 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Agricultural | 1,000,000 | |
| 11th Avenue | Wasco-Pond to Benner | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Delano Prison | 0 | |
| | Benner to Casey | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Prison/Treatment Plt. | 0 | |
| | Casey to Melcher | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: Nfuture Development Area | 0 | |
| | Melcher to Heitt | 0.50 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road: New/Future Development | 0 | |
| | Heitt to Albany | 0.50 | 4 Lane Undivided | 4 Lane Undivided | AC Paved: Residential | 0 | |
| | Albany to Freemont | 0.50 | 4 Lane Undivided | 4 Lane Undivided | AC Paved: Residential | 0 | |
| 9th Avenue | Freemont to Randolph | 2.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Resdiential/Commercial | 0 | |
| | Randolph to Bowman | 1.00 | 2 Lane Undivided | 4 Lane Undivided | AC Paved: Residential/Future Development Area | 0 | |
| Garces Highway | Wasco-Pond to Benner | 0.50 | 2 Lane Undivided | 4 Lane Undivided | Delano Prison/Agricultural | 1,000,000 | |
| | Benner to Casey | 0.50 | 2 Lane Undivided | 4 Lane Undivided | Industrial | 1,000,000 | |
| | Casey to Melcher | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Voice of America/Rural Residential | 2,000,000 | |
| | Melcher to Albany | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Low Residential/Agricultural | 0 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Albany/Stradley to SR 99 | 0.50 | 2 Lane Undivided | 4 Lane Undivided | City of Delano | 2,000,000 | 400,000 |
| | SR99 to Randolph/Mast | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Service Commercial | 2,000,000 | 2,000,000 |
| | Randolph/Mast to Bowman | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/CA 155 | 0 | |
| Del Sol Parkway | Melcher to Albany | 1.00 | | 2 Lane Undivided | | 0 | |
| | Albany to Dover Parkway | 0.50 | | 2 Lane Undivided | | 0 | |
| | SR 99 to Mast | 1.00 | | 2 Lane Undivided | Airport | 0 | |
| | Mast to Bowman | 1.00 | | 2 Lane Undivided | | 0 | |
| Woollomes | Stradley to Lexington | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Future Commercial Development Artea | 0 | |
| | Lexington to Mast | 0.50 | Airport | Airport | Airport | 0 | |
| | Mast to Bowman | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Agricultural | 0 | |
| Brooks Road | Mast to Bowman | 1.00 | 2 Lane Undivided | 2 Lane Undivided | Agricultural | 0 | |
| Schuster Road | Stradley to garzoli | 1.50 | 2 Lane Undivided | 4 Lane Undivided | Agricultural/New Development | 0 | |
| | Lexington to Browning | 1.00 | 2 Lane Undivided | 4 Lane Undivided | New AC | 0 | |
| | Browning to Bowman | 0.5 | 2 Lane Undivided | 4 Lane Undivided | Industrial | 0 | |
| Spangler Road | SR99 to Bowman | 2.00 | 2 Lane Undivided | 4 Lane Undivided | Dirt Road-Agricultural | 0 | |
| Pond Road | Stradley to Garzoli | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Paved AC, Agricultural | 0 | |
| | Garzoli to Mast | 0.50 | 2 Lane Undivided | 4 Lane Undivided | Paved AC/Bridge | 0 | |
| | Mast to Bowman | 1.00 | 2 Lane Undivided | 4 Lane Undivided | Paved AC, Agricultural | 0 | |
| | | | | | **SUB-TOTAL** | 43,200,000 | 3,900,000 |

**PECIAL PROJECTS**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cecil Avenue Widening/ Medians | Albany to Browning | | | | Widening, Medians- Matching Funds | 2,500,000 | |
| Garces Highway Railroad Grade Separation | At Union Pacific Railroad | | | | Matching Funds Only | 2,000,000 | 2,000,000 |
| Millenium Avennue | At Soccer Fields | 0.5 | | 2 Lane Undivided | One lane by Delano Marketplace | 500,000 | |
| | | | | | **SUB-TOTAL** | 5,000,000 | 2,000,000 |
| | | | | | **SUB-TOTAL** | 48,200,000 | 5,900,000 |

| I. | Intersection Improvements | | | | |
|---|---|---|---|---|---|
| Number | Intersection | Cost | State | | Future (2030) Mitigations* |
| 1 | Garces Hwy (4th Ave) & Albany | | | 0 | Signalize, 2LT & 1 RT on all approaches, 2NBT,2SBT, 2WBT,2EBT |
| 2 | Cecil Ave. & Hiett Ave. | | | 0 | Signalize, 1 SBLT, 1, SBRT, 2 EBT, 2 WBT, 1 WBRT, 1 NBRT |
| 3 | Garces Hwy (4th Ave) &Hiett | | | 0 | Signaliza, 1ELBT, 2EBT, 2WBT, 1SBLT, 1SBRT, 1SBT, 1NBLT, 1NBRT, 1NBT |
| 4 | County Line Rd & Melcher Rd | | | 0 | No Mitigation needed |
| 5 | Cecil Ave. & Melcher Rd | | | 0 | Signalize, 1RT on all approaches, 2SBLT, 1WBLT, 2WBT, 2EBT |
| 6 | Garces Hwy (4th Ave) & Melcher Rd | | | | Signalize , 2SBLT, 1SBRT, 2EBLT, 2WBT, 2WBRT |
| 7 | County Line Rd & High St. | 100000 | 1 | 100000 | Add WB left Turn Lane |
| 8 | Cecil Ave. & High St. | | | 0 | Signalize 2LT & 1RT on all approaches, 2SBT, 1SBRT, 2NBT, 3WBT,3EBT |
| 9 | Garces Hwy (4th Ave) & High St. | | | 0 | Signalize, 1RT on all approaches, 2EBT, 2WBT |
| 10 | County Line Rd & Browning Rd | | | 0 | Convert to all way stop, 1 WBLT, 2WBT |
| 11 | Cecil Ave. & Browning Rd | | | 0 | Signalize, 2SBT, 1SBRT, 1NBLT, 2NBT, 1EBRT |
| 12 | Garces Hwy (4th Ave) & Browning Rd | 750000 | 0.5 | 375000 | Signalize, 1RT on all approaches, INBLT, 3NBT, 3SBT, 1EBLT, 2EBT, 1WBLT, 2WBT |
| 13 | Woollomes Ave. Browning Rd. | | | 0 | Signalize, 1EBLT, 3EBT, EWBT, 1WBRT, 1SBRT, 2SBT, 2NBT |
| 14 | 1st Ave. & Ellington St. | | | 0 | No Mitigation needed |
| 15 | Garces Hwy (4th Ave) & Ellington St. | 425000 | 0.5 | 212500 | Signalize, 1RT on all approaches, 3EBT, 3WBT |
| 16 | 12th Ave. & Ellington St. | | | 0 | 1EBRT, 2SBT |
| 17 | Cecil Ave. & Ellington St. | 475000 | 0.25 | 118750 | Modify signals, 3EBT, 1EBRT, 1NBRT, 2WBLT, 3WBT, 1SBRT |
| 18 | 1st Ave. & SR 99 on Ramp | | | 0 | No Mitigation needed |
| 19 | Garces Hwy (4th Ave) & Fremont St. | 450000 | 0.5 | 225000 | Signalize, 1NBRT, 1SBRT, 2WBT, 1WBRT, 2EBT |
| 20 | 12th Ave. & Fremont St. | | | 0 | No Mitigation needed |
| 21 | Cecil Ave. & Fremont St. | 650000 | 0.25 | 162500 | Modify signals, 2EBLT, 2EBT, 1EBRT, 2WBT, 1WBRT, 2NBLT, 1NBRT |
| 22 | County Line Rd & SR 99 on ramp | | | 0 | No Mitigation needed |
| 23 | 99 NB Ramps & Girard St. | 325000 | 0.5 | 162500 | Signalize, 1RT on all approaches |
| 24 | Garces Hwy (4th Ave) & Randolph St./Mast | | | 0 | No Mitigation needed |
| 25 | 13th & Ellington St | | | 0 | Signalize, 1SBLT |
| 26 | 13th Ave. & Fremont St | | | 0 | Convert to all way stop |
| 27 | 9th Ave & Ellington St | | | 0 | Convert to all way stop, 1 WBLT, 1EBLT |
| 28 | 9th Ave (99 NB Ramps) & Fremont St | 80000 | 0.5 | 40000 | Construct 1EBLT |

| | | | | | |
|---|---|---|---|---|---|
| 29 | Cecil. Ave. & Mast Ave. | | | 0 | Modify signals, 1NBLT, 1NBT, 1NBRT, 1EBLT, 2EBT, 2WBT, 2WBRT |
| 30 | Woollomes Ave. & 99 SB Off Ramps | 750000 | 0.5 | 375000 | Signalize, 3EBT, 1EBRT, 2WBLT, 2WBT, 2SBLT, 1SBT, 2SBRT |
| 31 | Woollomes Ave. & 99 NB Ramps | 825000 | 0.5 | 412500 | Signalize, 2ELBT, 3EBT, 1NBRT, 3WBT, 1wBRT, 1SBRT |
| 32 | Pond Rd & 99 NB Ramps | 625000 | 0.5 | 312500 | Signalize, 2EBT, 1NBRt, 2WBT, 1WBRT |
| 33 | Pond Rd. & 99 SB Ramps | 500000 | 0.5 | 250000 | Signalize, 1WBRT, 2SBLT, 1SBRT |
| 34 | Wollomes Ave. & Stradely St. | | | - | Signalize, 2SBLT, 2NBT, 1NBRT, 1WBRT |
| | **Sub-total** | **5955000** | | **2746250** | |
| **III.** | **State Highway Segments** | | | | |
| 1 | County Line Rd, Sr 99 | 5500000 | 1 | 5500000 | |
| 2 | Cecil Avenue, SR99 | 18000000 | 1 | 18000000 | |
| 3 | 9th , 13th Avenue/ SR 99 | 15000000 | 1 | 15000000 | |
| 4 | Garcès/ SR99 | 8000000 | 1 | 8000000 | |
| 5 | Woollomes/ Sr99 | 68000000 | 1 | 68000000 | |
| 6 | Pond Rd/ SR99 | 6200000 | 1 | 6200000 | |
| | **Sub-total** | **120700000** | | **120700000** | |

# CIRCULATION IMPACT FEE: PHASING EFFECTS

Final Maps

| Tract | Pending Units | Trips | Phase 1 Fee at $289 | Original Prop. Fee @ $400 |
|---|---|---|---|---|
| 6224 | 232 | 2320 | $670,480 | $928,000 |
| 6235 | 267 | 2670 | $771,630 | $1,068,000 |
| 6326 | 135 | 1350 | $390,150 | $540,000 |
| 6327 | 126 | 1260 | $364,140 | $504,000 |
| 6470 | 165 | 1650 | $476,850 | $660,000 |
| 6550 | 167 | 1670 | $482,630 | $668,000 |
| 6682 | 359 | 3590 | $1,037,510 | $1,436,000 |
| 6727 | 352 | 3520 | $1,017,280 | $1,408,000 |
| 6728 | 341 | 3410 | $985,490 | $1,364,000 |
| 6176* | N/A | | | |
| 6225* | N/A | | | |
| | | | | |
| **Sub-total, tracts** | | **21440** | **$6,196,160** | **$8,576,000** |

| Multi-Family Projects | Pending Units | Trips | Phase 1 Fee at $289 | Original Prop. Fee @ $400 |
|---|---|---|---|---|
| Miscellaneous Projects | 40 | 280 | $80,920 | $112,000 |
| **Sub-total, multi-family** | | **280** | **$80,920** | **$112,000** |

| **Commercail/ Industrial/Misc.** | Pending Units | Trips | Phase 1 Fee at $289 | Original Prop. Fee @ $400 |
|---|---|---|---|---|
| Glenwood Shopping Center | N/A | 150 | 43350 | 60000 |
| Delano Marketplace (Starbuck | N/A | 200 | 57800 | 80000 |
| Glenwood Starbucks | N/A | 200 | 57800 | 80000 |
| Ellington St. Arco | N/A | 100 | 28900 | 40000 |
| Batch Plant- Westside Ind. | N/A | 60 | 17340 | 24000 |
| Kern County School District | N/A | 200 | 57800 | 80000 |
| Other & Misc. | N/A | 200 | 57800 | 80000 |
| **Sub-total, Non-residential** | | **1110** | **$320,790** | **$444,000** |
| **Totals** | | **22830** | **$6,597,870** | **$9,132,000** |
| **Less Phase 1 fee** | | | | **-$6,597,870** |
| **Un-captured fee** | | | | **$2,534,130** |

*Projects have vesting tentative maps and are not affected by new fee
** Trip estimates are approximate and should not be construed as fee calculation

# APPENDIX 6.0-A
# ENERGY CONSUMPTION DATA

Vineyard at Delano West Pavilion
Total Construction
Fuel Usage

| Project Action | CO2e (Metric tons) | Total Gallons of Fuel Consumed |
|---|---|---|
| **Construction** | | |
| **Vineyard at Delano & W. Pavilion** | **6946** | 684,335 |

Notes:
Fuel used by vehicle hauling trips and processing equipment assumed to be diesel.

Sources:
Carbon Dioxide Equivalent Emissions: See Section 3.6; Conversion Ratios: California Climate Action Registry 2009

Title : Project Fuel Consumption
Version : Emfac2011-LDV V2.50.57.246 ** WIS Enabled **
Run Date : 2014/11/20 10:21:48
Scen Year: 2025 -- All model years in the range 1981 to 2025 selected
Season : Annual
Area : Kern County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 49 Kern (SJV)
**********

| | LDA-CAT | LDA-DSL | LDA-TOT | LDT1-CAT | LDT1-DSL | LDT1-TOT | LDT2-CAT | LDT2-DSL | LDT2-TOT | MDV-CAT | MDV-DSL | MDV-TOT | LHDT1-CAT | LHDT1-DSL | LHDT1-TOT | LHDT2-CAT | LHDT2-DSL | LHDT2-TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicles | 1860 | 6 | 1867 | 285 | 0 | 286 | 740 | 0 | 741 | 902 | 1 | 903 | 172 | 117 | 289 | 16 | 35 | 51 |
| VMT/1000 | 74 | 0 | 74 | 11 | 0 | 11 | 30 | 0 | 30 | 36 | 0 | 36 | 7 | 5 | 12 | 1 | 1 | 2 |
| Trips | 11789 | 38 | 11826 | 1741 | 2 | 1744 | 4660 | 2 | 4662 | 5560 | 4 | 5564 | 2556 | 1478 | 4034 | 235 | 446 | 681 |
| Fuel Consumption (000 gallons) | | | | | | | | | | | | | | | | | | |
| Gasoline | 3.28 | 0 | 3.28 | 0.56 | 0 | 0.56 | 1.81 | 0 | 1.81 | 2.78 | 0 | 2.78 | 0.85 | 0 | 0.85 | 0.08 | 0 | 0.08 |
| Diesel | 0 | 0.01 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.26 | 0.26 | 0 | 0.08 | 0.08 |

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| T6TS-CAT | T6TS-TOT | T7IS-CAT | T7IS-TOT | OBUS-CAT | OBUS-TOT | SBUS-CAT | SBUS-TOT | UB-CAT | UB-DSL | UB-TOT | MH-CAT | MH-DSL | MH-TOT | MCY-NCAT | MCY-CAT | MCY-TOT | ALL-TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 | 0 | 0 | 3 | 3 | 1 | 1 | 0 | 1 | 2 | 40 | 9 | 49 | 46 | 84 | 130 | 4332 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 169 |
| 198 | 198 | 9 | 9 | 116 | 116 | 5 | 5 | 2 | 6 | 8 | 4 | 1 | 5 | 92 | 169 | 261 | 29113 |
| | | | | | | | | | | | | | | | | | |
| 0.06 | 0.06 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0 | 0.01 | 0.04 | 0 | 0.04 | 0.02 | 0.03 | 0.05 | 9.55 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.06 | 0 | 0.01 | 0.01 | 0 | 0 | 0 | 0.42 |

Title : Kern County Fuel Consumption
Version : Emfac2011-LDV V2.50.57.246
Run Date : 2014/11/20 10:14:28
Scen Year: 2025 -- All model years in the range 1981 to 2025 selected
Season : Annual
Area : Kern County Average
I/M Stat : Enhanced Interim (2005) -- Using I/M schedule for area 49 Kern (SJV)
**********

| | LDA-CAT | LDA-DSL | LDA-TOT | LDT1-CAT | LDT1-DSL | LDT1-TOT | LDT2-CAT | LDT2-DSL | LDT2-TOT | MDV-NCAT | MDV-CAT | MDV-DSL | MDV-TOT | LHDT1-CAT | LHDT1-DSL | LHDT1-TOT | LHDT2-CAT | LHDT2-DSL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vehicles | 294074 | 957 | 295031 | 45117 | 65 | 45182 | 117029 | 60 | 117088 | 2 | 142601 | 104 | 142707 | 27121 | 18571 | 45691 | 2488 | 5606 |
| VMT/1000 | 11631 | 35 | 11665 | 1710 | 2 | 1713 | 4755 | 2 | 4758 | 0 | 5649 | 4 | 5653 | 1155 | 789 | 1944 | 106 | 236 |
| Trips | 1863370 | 5969 | 1869330 | 275239 | 392 | 275631 | 736531 | 370 | 736900 | 7 | 878782 | 647 | 879436 | 404059 | 233594 | 637653 | 37073 | 70514 |
| Fuel Consumption (000 gallons) | | | | | | | | | | | | | | | | | | |
| Gasoline | 518.79 | 0 | 518.79 | 88.81 | 0 | 88.81 | 286.73 | 0 | 286.73 | 0 | 439.16 | 0 | 439.16 | 134.84 | 0 | 134.84 | 12.3 | 0 |
| Diesel | 0 | 1.43 | 1.43 | 0 | 0.1 | 0.1 | 0 | 0.09 | 0.09 | 0 | 0 | 0.17 | 0.17 | 0 | 40.97 | 40.97 | 0 | 12.26 |

'**********

| LHDT2-TOT | T6TS-CAT | T6TS-TOT | T7IS-CAT | T7IS-TOT | OBUS-CAT | OBUS-TOT | SBUS-CAT | SBUS-TOT | UB-CAT | UB-DSL | UB-TOT | MH-CAT | MH-DSL | MH-TOT | MCY-NCAT | MCY-CAT | MCY-TOT | ALL-TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8094 | 1564 | 1564 | 72 | 72 | 402 | 402 | 207 | 207 | 73 | 228 | 302 | 6353 | 1419 | 7772 | 7268 | 13355 | 20623 | 684736 |
| 342 | 105 | 105 | 13 | 13 | 27 | 27 | 12 | 12 | 13 | 39 | 51 | 85 | 19 | 104 | 89 | 175 | 263 | 26651 |
| 107587 | 31293 | 31293 | 1445 | 1445 | 18337 | 18337 | 828 | 828 | 294 | 914 | 1207 | 636 | 142 | 777 | 14535 | 26708 | 41242 | 4601670 |
| | | | | | | | | | | | | | | | | | | |
| 12.3 | 8.83 | 8.83 | 1.02 | 1.02 | 2.31 | 2.31 | 1.19 | 1.19 | 1.15 | 0 | 1.15 | 6.89 | 0 | 6.89 | 2.67 | 5.26 | 7.93 | 1509.96 |
| 12.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.08 | 9.08 | 0 | 2.22 | 2.22 | 0 | 0 | 0 | 66.33 |