County of Los Angeles

Draft
Environmental Impact Report
SCH No. 2005051143

Volume VI
Appendix 4.2 (continued) –
Appendix 4.5

MISSION VILLAGE

Prepared for:

Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Prepared by:

IMPACT SCIENCES, INC.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012
Phone: (805) 437-1900

NEWHALL RANCH
Newhall Ranch Company

OCTOBER 2010

County of Los Angeles

Draft Environmental Impact Report

SCH No. 2005051143

Volume VI
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MISSION VILLAGE

Project No.	04-181
Vesting Tentative Tract Map No.	61105
SEA Conditional Use Permit No.	RCUP200500080
Oak Tree Permit No.	ROAK200500032
Oak Tree Permit No.	T200500043
Conditional Use Permit (Off-Site Improvements)	RCUP200500081

Substantial Conformance Determinations for Grading and Hillside Management Guidelines

NEWHALL RANCH
Newhall Ranch Company

Prepared for:

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Department of Regional Planning
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Los Angeles, California 90012

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OCTOBER 2010

DRAFT
ENVIRONMENTAL IMPACT REPORT
for
MISSION VILLAGE

SCH No. 2005051143

County Project No. 04-181
Vesting Tentative Tract Map No. 61105
SEA Conditional Use Permit No. RCUP200500080
Oak Tree Permit No. ROAK200500032

Oak Tree Permit No. T200500043
Conditional Use Permit RCUP200500081
(Off-Site Improvements)

Volume VI
Appendix 4.2 (continued)–Appendix 4.5

Prepared for:

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October 2010

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California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzeneg
Governor

COMMUNITY
JUN - 9 2008
DEVELOPMENT

May 20, 2008

Dean O. Efstathiou, Acting Director
Diego Cadena, Deputy Director
Department of Public Works
County of Los Angeles
700 South Fremont Avenue
Alhambra, California 91803

REVIEW OF NEWHALL RANCH SPECIFIC PLAN SUBREGIONAL STORMWATER MITIGATION PLAN, APRIL 2008

Dear Mr. Efstathiou and Mr. Cadena:

We have reviewed the Newhall Ranch Specific Plan (NRSP) Sub-Regional Storm Water Mitigation Plan (RSWMP), of April 18, 2008. The Los Angeles Water Board staff also previously reviewed the NRSP RSWMP (August 16, 2006), and determined that the plans contained in the report adequately covered the requirements of Part 4 Section D.9 of the Los Angeles County Municipal Separate Storm Sewer System Permit.

Our letter of November 26, 2007, indicated that the NRSP RSWMP is considered the Tier 1 of the three-tiered approach to RSWMP for the Newhall Ranch's 11,999-acre mixed-use development. The Tier 1 report (i.e., NRSP RSWMP) does not require approval from the Water Board's Executive Officer. The two addenda (i.e., water quality technical report and drainage concept report) in the Environmental Impact Report (in the Tier 2) are the reports subject to approval of the Water Board Executive Officer.

Please note that as Newhall Land proceeds with the development of the five villages, water quality technical reports and drainage concept reports for each or combination of the five villages need to be prepared. The two addenda should describe comprehensively the storm water management site plans (including operation and maintenance) for development activities. These plans should contain adequate technical information and analysis to allow the reviewing agency to determine whether the project meets the regulatory requirements.

If you have any questions, please call Dr. Xavier Swamikannu at (213) 620-2094 or Carlos D. Santos at (213) 620-2093.

Sincerely,

Tracy J. Egoscue
Executive Officer

cc: See next page

cc: Michael Levy, Office of the Chief Counsel, State Water Board
Bruce Fujimoto, Division of Water Quality, State Water Board
Sam Unger, Los Angeles Water Board
Mark Pestrella, DPW Los Angeles County, CA
Eric Strecker, Geosyntec Consultants, Los Angeles, CA
Lisa Austin, Geosyntec Consultants, Los Angeles, CA
Mark Subbotin, Newhall Land, Valencia, CA

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 17 2007

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 07-09-1726R

The Honorable Zev Yaroslavsky
Chairman, Los Angeles County
Board of Commissioners
821 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, CA 90012

Community: Los Angeles County, CA
Community No.: 065043

104

Dear Mr. Yaroslavsky:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for your community, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated August 6, 2007, Mr. Mark E. Krebs, P.E., President, Pacific Advanced Civil Engineering, Inc., requested that FEMA evaluate the effects that an updated hydraulic analysis and a proposed project along the Santa Clara River and an unnamed tributary to the Santa Clara River (unnamed tributary) would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project along the Santa Clara River will consist of channelization and construction of a 119-foot-wide bridge approximately 6,100 feet upstream of the confluence with Castiac Creek. The proposed project along the unnamed tributary will consist of construction of a storm drain. The proposed area of revision along the Santa Clara River will extend from approximately 2,400 feet upstream to approximately 9,600 feet upstream of the confluence with Castiac Creek. The proposed area of revision along the unnamed tributary will extend from approximately 600 feet upstream to approximately 3,300 feet upstream of the confluence with the Santa Clara River.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Mr. Krebs.

A preliminary study is being conducted for Los Angeles County, California and Incorporated Areas. Preliminary copies of the countywide FIRM and FIS report, which present information from the effective FIRMs and FIS reports for your community and other areas within Los Angeles County, will be submitted to Los Angeles County for review in approximately 1 month.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. The effective HEC-RAS hydraulic computer model used to prepare the FIS report dated December 2, 1980, and as revised by a Letter of Map Revision (LOMR) that was effective October 24, 2002 (Case No. 01-09-559P), was used as the base conditions model in our review of the proposed conditions model for this CLOMR request. We believe that, if the proposed project is constructed as shown on the topographic work map entitled "Topographic Workmap Mission Village," prepared by Pacific Advanced Civil Engineering, Inc., dated July 2007, and the data listed below are received, a revision to the FIRM would be warranted.

Santa Clara River

As a result of the proposed project, the Base (1-percent-annual-chance) Flood Elevations (BFEs) will increase in some areas throughout the area of revision compared to the effective BFEs for the Santa Clara River. The maximum increase in BFE, 1.3 feet, will occur approximately 6,350 feet upstream of the confluence with Castiac Creek.

As a result of the proposed project, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will increase in some areas and decrease in other areas throughout the area of revision compared to the effective SFHA width along the Santa Clara River. The maximum increase in SFHA width, approximately 350 feet, will occur approximately 2,500 feet upstream of the confluence with Castiac Creek. The maximum decrease in SFHA width, approximately 550 feet, will occur approximately 6,800 feet upstream of the confluence with Castiac Creek.

Unnamed Tributary to Santa Clara River

The effective SFHA along the unnamed tributary is designated Zone A, with no BFEs determined, throughout the area of revision. As a result of the proposed project, the width of the SFHA will decrease and will be contained in the proposed storm drain throughout the area of revision compared to the effective SFHA width along the unnamed tributary.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)

- The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

  Form 2, entitled "Riverine Hydrology & Hydraulics Form"

  Form 3, entitled "Riverine Structures Form"

  Hydraulic analyses, for as-built conditions, of the base flood and the 10-percent-, 2-percent-, and 0.2-percent-annual-chance floods, together with a topographic work map showing the revised floodplain boundaries, must be submitted with Form 2.

- Effective October 30, 2005, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is $4,000 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in

U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). The payment, along with the revision application, must be forwarded to the following address:

FEMA National Service Provider
3601 Eisenhower Avenue
Alexandria, VA 22304-6425

- As-built plans, certified by a registered professional engineer, of all proposed project elements

- Community acknowledgment of the map revision request

- Documentation of property owner notifications and, if possible, their acceptance of the increases in BFE and/or SFHA width along the Santa Clara River

- Because we are preparing a revised FIRM and FIS report for Los Angeles County in our countywide format, upon completion of the project for which this CLOMR is issued, please comply with one of the following alternative requirements:

  - If the countywide FIRM and FIS report for Los Angeles County become effective before completion of the Mission Village project, the hydraulic model submitted for the project LOMR that follows this CLOMR must tie into the hydraulic model used to prepare the newly effective FIRM and FIS report. Therefore, please submit a hydraulic model and an annotated FIRM in which the revised SFHA boundary delineations tie into the SFHA boundary delineations in the hydraulic model used to prepare the newly effective FIRM and FIS report at the upstream and downstream ends of the revision.

  - If the LOMR submittal for the Mission Village project is received before the countywide FIRM and FIS report for Los Angeles County become effective, then the SFHA boundary delineations must tie into the currently effective information.

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

The basis of this CLOMR is, in whole or in part, a channelization/bridge project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the channel and bridge rests with your community.

This CLOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Director, Mitigation Division of FEMA in Oakland, California, at (510) 627-7175. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Engineering Management Section
Mitigation Directorate

For: William R. Blanton Jr., CFM, Chief
Engineering Management Section
Mitigation Directorate

Enclosures

cc: Mr. Hector Bordas
Department of Public Works
Los Angeles County

Mr. Mark E. Krebs, P.E.
President
Pacific Advanced Civil Engineering, Inc.

Mr. Chet Van Horn, E.I.T.
Project Engineer
Pacific Advanced Civil Engineering, Inc.

Mr. Corey Harpole
Director of Community Development
Newhall Land

Mission Village TTM # 61105

Request for Conditional Letter Of Map Revision (CLOMR)

Santa Clara River Bank Protection and Commerce Center Drive Bridge

July 2007

Prepared For:

NEWHALL LAND
A LENNAR/LNR COMPANY

Prepared by:

Pacific Advanced Civil Engineering, Inc.
17520 Newhope Street, Suite 200
Fountain Valley, CA 92708
(714) 481-7300

Contact Person:
Mark Krebs, P.E.
Chet Van Horn, E.I.T.

PACE JN 8611E

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CLOMR Application Summary

Subject: County of Los Angeles, Mission Village TTM # 61105 CLOMR request

Attention: Los Angeles County Department of Public Works
Federal Emergency Management Agency (FEMA)

Please find enclosed an application for a Conditional Letter of Map Revision (CLOMR), for the proposed Mission Village development. An effective model was supplied by the FEMA Project Library for this project with the file name ***SC_EX60.prj*** for the appropriate portion of the Santa Clara River in Los Angeles County. The effective model was from the previously approved LOMR dated Oct. 24, 2002 by Sikand Engineering. Pacific Advanced Civil Engineering, Inc. (PACE) has used this effective model in analysis against a proposed model, ***PROP_Mission_Village.prj***, which includes all bank protection and the Commerce Center Drive Bridge.

The FIRM panels associated with this request are:

065043-0340B and **065043-0345B**

The CLOMR application is being submitted to request verification from FEMA that the construction of bank protection and Commerce Center Drive Bridge, if built as proposed, would justify a map revision to a reach of the Santa Clara River beginning just upstream of the Castaic Creek confluence and running approximately 7000 feet upstream. (please see *Figure A* in *Supplemental Report, Appendix B*).

The HEC-RAS models and all topographic mapping contained in this CLOMR submittal are based on the National Geodetic Vertical Datum of 1929 (NGVD 29).

The following summary highlights forms, models, and maps included within this CLOMR application and provides additional information with regards to the analysis developed.

In addition to the HEC-RAS models, the following items are being submitted:

- **Form 1: Overview and Concurrence Form**, which is the community acknowledgement of the map revision request.
    - A check in the amount of $4,000 made payable to National Flood Insurance Program is enclosed to begin processing this request.

- **Form 2: Riverine Hydrology and Hydraulics Form**, which includes the hydraulic analysis for this study reach.
    - As part of Section C, Form 2 (Mapping Requirements), we are submitting a certified **Topographic Workmap** *(Appendix A***)** and an **Annotated FIRM** (*Appendix A)* to show boundaries of the proposed 100-Year floodplain with upstream and downstream tie-in to the effective 100-Year floodplain. A "BFE" Summary Table is displayed on the Topographic Workmap and is also contained as "*Table 3"* in the *Supplemental Report* located in *Appendix B*.
    - Regarding Section D.4, Form 2, a letter addressing the Endangered Species Act (ESA) has been included and an approved EIR document letter for petition of both the U.S. Fish and Wildlife

Service (USFWS) and U.S. Army Corps Of Engineers (ACOE) for permitting to allow progress of the Mission Village project within the Santa Clara River area.

- The proposed HEC-RAS hydraulic model titled ***PROP_Mission_Village.prj*** contains a geometry file with cross sections in the exact locations of the effective model, ***SC_EX60.prj***.

- **Form 3: Riverine Structures Form**, which details any proposed project structures.

  - Plan and Profiles for the 3 pieces of soil cement bank protection, *"SR 126 HWY Widening at Commerce Drive Bridge", "Commerce Center Bridge South Bank*" and *"San Jose Flats"* (*Appendix C*).

  - As part of Section C, Form 3 (Bridge/Culvert), we are submitting Commerce Center Drive Bridge plans (*Appendix D)*.

  - As part of Section F, Form 3 (Sediment Transport), we are submitting sediment transport calculations for soil cement bank protection top and toe design(*Appendix F*), as well as scour calculations for the Commerce Center Drive Bridge, (*Supplemental Report, Appendix B*).

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires: August 31, 2007

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	City of Katy Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
065043	Los Angeles County	CA	065043	0340B	10/24/02
065043	Los Angeles County	CA	065043	0345B	10/24/02

2. Flooding Source: Santa Clara River

3. Project Name/Identifier: Mission Village VTTM# 61105

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☒ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4,000

☐ No, Attach Explanation

Please see the **DHS-FEMA Web site at** http://www.fema.gov/fhm/frm_fees.shtm **for Fee Amounts and** Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Corey Harpole, Director of Community Development	Company: Newhall Land	
Mailing Address: Newhall Land 23823 Valencia Blvd. Valencia, CA 91355-2194	Daytime Telephone No.: (661) 255-4000 ext. 4075	Fax No.: (661) 254-0761
	E-Mail Address: charpole@newhall.com	
Signature of Requester (required):		Date:

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Los Angeles County Department of Public Works		Telephone No.: (626) 458-~~5486~~ 5947
Community Name: Hector Bordas	Community Official's Signature (required):	Date: 8/2/07

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Mark E. Krebs	License No.: 49292	Expiration Date: 9/30/2008
Company Name: Pacific Advanced Civil Engineering	Telephone No.: 714-481-7300	Fax No.: 714-481-7299
Signature:		Date: 7-25-07

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

REGISTERED PROFESSIONAL ENGINEER
MARK EDWARD KREBS
No. 049292
Exp. 9-30-08
CIVIL
STATE OF CALIFORNIA

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires: August 31, 2007

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Santa Clara River
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section 2) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by DHS-FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☐ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	U/S of Castaic Creek confluence	32605	962.62	962.62
Upstream Limit	near I-5 and SR 126 junction	39755	1004.96	1004.96

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☐ Yes ☒ No Current version of Check-RAS is not compliant with HEC-RAS 3.1.3

4. Models Submitted ☒ Diskette Submitted

	Natural Run	Floodway Run	Datum
Duplicate Effective Model*	File Name:	File Name:	
Corrected Effective Model*	File Name: SC_EX60.prj	File Name:	NGVD 1929
Existing or Pre-Project Conditions Model	File Name:	File Name:	
Revised or Post-Project Conditions Model	File Name: PROP_Mission_Village.prj	File Name:	NGVD 1929
Other - (attach description)	File Name:	File Name:	

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by DHS-FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

☒ Annotated FIRM and/or FBFM Included ☒ Digital Mapping (GIS/CADD) Data Submitted (Recommended)

D. COMMON REGULATORY REQUIREMENTS*

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☒ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR/CLOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR/CLOMR requests, does this request have the potential to impact an endangered species? ☒ Yes ☐ No
PLEASE SEE COMMENT IMMEDIATELY FOLLOWING THIS SHEET.
If Yes, please submit documentation from the community to show that they have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA.

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA.

5. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☐ No
If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

Regarding Section D.4 of Form 2 :

Section 9 of the federal Endangered Species Act (ESA) has been complied with by obtaining a decision of no significant impact/negative declaration from the California Department of transportation (Caltrans) and the Federal Highway Administration. An application for an individual permit under section 404 of the Clean Water Act has been submitted to the Corps and the proposed project, which includes the subject area, has been reviewed by both the Corps and the USFWS under the Clean Water Act and the ESA. The Corps, as the federal lead agency, has prepared a joint Environmental Impact Statement/Environmental Impact Report under the National Environmental Policy Act in coordination with the USFWS. In addition, the California Department of Fish and Game (CDFG) is the state lead agency for the EIS/EIR pursuant to the California Environmental Quality Act.

Upon submitted EIS/EIR report, California Department of Transportation (Caltrans) and Federal Highway Administration (FHWA) have approved a,"Finding of No Significant Impact/ Negative Declaration" (FONSI/ND) and a filing as State Clearing House # 2003101127 has been performed. Caltrans approval letter and State Clearing House document are attached.

17C 4 Enviro.

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, DIVISION OF ENVIRONMENTAL PLANNING
100 S. MAIN STREET, SUITE 100, MS 16A
LOS ANGELES, CA 90012
Phone (213) 897-0703
Fax (213) 897-0685

Flex your power!
Be energy efficient!

September 1, 2006

File: 07-LA-126 KP R6.8 – R9.2 (PM R4.2 – R5.7)
SR 126/Commerce Center Drive Interchange Project
EA: 187220

Responsible Agencies, Review Agencies,
Trustee Agencies, and individuals
interested in the proposed project

Notice of Final Environmental Document
Notice of Findings of No Significant Impact/Negative Declaration

After considerable deliberation, the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) have approved a Finding of No Significant Impact/Negative Declaration (FONSI/ND) for improvements on SR-126 at the Commerce Center Drive interchange in the County of Los Angeles. The proposed action (Alternative C or the selected alternative) is to construct a grade-separated interchange at the State Route 126 and Commerce Center Drive intersection, with a new overpass structure for Commerce Center drive over SR 126. The new interchange will provide full movements for traffic between Commerce Center Drive and SR 126. The selected alternative will provide diamond ramps on SR 126 at Commerce Center Drive in the westbound direction. In the eastbound direction, a two-lane loop on-ramp will be constructed from southbound Commerce Center Drive to eastbound SR 126. From northbound Commerce Center Drive, a two-lane diagonal on-ramp will be provided near the intersection of Commerce Center Drive and Henry Mayo Drive. A one-lane off-ramp will also be provided from eastbound SR 126 to Henry Mayo Drive, which will be realigned to the south, and extended to the west.

Caltrans and FHWA have determined that project impacts can be mitigated to a level below significance allowing for the approval of this Finding of No Significant Impact/Negative Declaration (FONSI/ND). A Notice of Determination will be filed with the State Clearinghouse pursuant to the California Environmental Quality Act (CEQA) requirements.

A draft of the ND and technical studies was circulated for public and agency review from May 19, 2005 through July 8, 2005. Caltrans also conducted a public hearing on June 23, 2005, in the Board Conference Room at the Castaic Union School District in the City of Valencia. The deadline for submittal of comments to Caltrans was July 8, 2005. All comments received were considered and are addressed in the enclosed Environmental Assessment/Initial Study (EA/IS) in Appendix G.

After an extensive analysis of the comments received from the public, Caltrans and FHWA approved Alternative C of the EA/IS as the Recommended Alternative.

Enclosed please find a copy of the FONSI/ND and accompanying EA/IS for your records. Copies of the referenced technical studies are also available Monday through Friday, from 8:00 a.m. through 4:00 p.m. at Caltrans District 7, Division of Environmental Planning, 100 S. Main Street, Los Angeles, CA 90012. These studies can also be reviewed during normal business hours at the Los Angeles County Public Library, 23743 W. Valencia Blvd. Santa Clarita, CA 91355.

For additional information on this project, please call Chris Benz-Blumberg at (213) 897-0674. Thank you for your insightful contributions to this decision-making process.

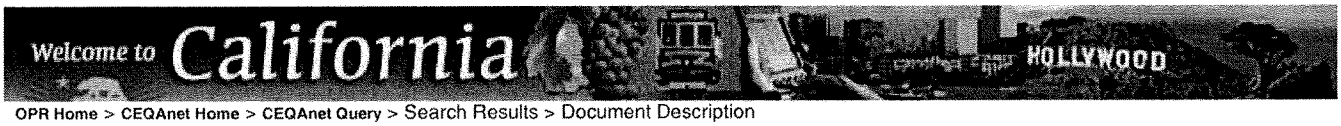
Sincerely,

Ronald Kosinski

RONALD KOSINSKI
Deputy District Director, District 7
California Department of Transportation

California Home

Friday, July 27, 2007



SR 126/Commerce Center Drive Interchange Project

SCH Number: 2003101127

Type: NOD

Project Description

The California Department of Transportation (Caltrans) District 7, in coordination with the Federal Highway Administration, Los Angeles County, the Newhall Land and Farming Company, proposes to construct a grade-separated interchange at the existing, signalized intersection of State Route 126 (SR-126) and Commerce Center Drive. The Commerce Center intersection with Henryo Mayo would also be reconfigured. The proposed project is located northwest of the City of Santa Clarita in Los Angeles County.

Project Lead Agency

Caltrans #7

Contact Information

Primary Contact:
Chris Benz-Blumberg
Department of Transportation, District 7
(213) 897-0674
100 South Main Street
Los Angeles
CA, 90012

Project Location

County: Los Angeles
City: Santa Clarita
Region:
Cross Streets: Commerce Center Drive and State Route 126
Parcel No:
Township:
Range:
Section:
Base:
Other Location Info:

Determinations

This is to advise that the ☒ Lead Agency ☐ Responsible Agency California Department of Transportation has approved the project described above on 6/22/2006 and has made the following determinations regarding the project described above.

1. The project ☐ will ☒ will not have a significant effect on the environment.

2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.

   ☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.

3. Mitigation measures ☒ were ☐ were not made a condition of the approval of the project.

4. A Statement of Overriding Considerations ☐ was ☒ was not adopted for this project.

5. Findings ☒ were ☐ were not made pursuant to the provisions of CEQA.

Final EIR Available at: California Department of Transportation

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Date Received: 9/14/2006

HEC-RAS Model

Effective Model
NGVD 29

SC_EX60.prj

HEC-RAS Plan: W.O. 1020-23 River: Reach #1 Reach: Santa Clara Rive Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	48025	PF 1	40300.00	1048.00	1065.42	1061.33	1066.47	0.005441	8.37	5068.79	618.29	0.47
Santa Clara Rive	47850	PF 1	40300.00	1046.00	1064.45	1059.13	1065.46	0.006161	8.08	4993.04	603.79	0.49
Santa Clara Rive	47645	PF 1	40300.00	1046.00	1061.02	1059.13	1063.54	0.025354	12.74	3163.40	538.23	0.93
Santa Clara Rive	47510	PF 1	40300.00	1044.00	1059.82	1053.34	1060.62	0.003867	7.18	5616.07	578.62	0.40
Santa Clara Rive	47345		Bridge									
Santa Clara Rive	47180	PF 1	40300.00	1042.00	1058.36	1052.62	1059.15	0.003484	7.09	5683.27	528.15	0.38
Santa Clara Rive	46885	PF 1	40300.00	1042.00	1056.34	1054.02	1058.09	0.010750	10.60	3802.04	450.52	0.64
Santa Clara Rive	46695	PF 1	40300.00	1038.00	1055.55	1051.46	1057.01	0.006597	9.70	4156.45	388.82	0.52
Santa Clara Rive	46622.5		Bridge									
Santa Clara Rive	46550	PF 1	40300.00	1038.00	1054.44	1049.90	1055.90	0.006183	9.71	4148.28	368.91	0.51
Santa Clara Rive	46370	PF 1	40300.00	1038.00	1051.91	1049.28	1054.03	0.011518	11.68	3449.04	371.81	0.68
Santa Clara Rive	46195	PF 1	40300.00	1035.00	1050.56	1046.20	1052.00	0.007362	9.65	4176.76	427.29	0.54
Santa Clara Rive	46020	PF 1	40300.00	1032.00	1049.40	1044.97	1050.68	0.007257	9.10	4428.31	488.85	0.53
Santa Clara Rive	45545	PF 1	40300.00	1030.00	1045.39	1042.14	1046.96	0.008240	10.07	4003.55	418.13	0.57
Santa Clara Rive	45030	PF 1	40300.00	1025.00	1041.88	1035.94	1043.07	0.006639	8.78	4592.20	500.40	0.51
Santa Clara Rive	44585	PF 1	40300.00	1022.00	1038.22	1034.51	1039.86	0.007577	10.29	3916.01	370.06	0.56
Santa Clara Rive	44210	PF 1	40300.00	1020.00	1036.06	1031.57	1037.19	0.005954	8.54	4720.94	495.28	0.49
Santa Clara Rive	43820	PF 1	40300.00	1018.00	1031.50	1029.11	1033.81	0.012592	12.20	3303.84	355.23	0.70
Santa Clara Rive	43610	PF 1	40300.00	1017.00	1029.06	1027.19	1031.07	0.013125	11.39	3537.38	435.63	0.70
Santa Clara Rive	43410	PF 1	40300.00	1016.00	1027.49	1024.70	1028.93	0.007538	9.84	4403.19	584.45	0.55
Santa Clara Rive	43200	PF 1	40300.00	1014.00	1025.22	1023.11	1026.99	0.011699	10.69	3848.53	586.19	0.66
Santa Clara Rive	42975	PF 1	40300.00	1012.00	1023.22	1020.74	1024.41	0.009704	8.80	4649.79	755.67	0.59
Santa Clara Rive	42815	PF 1	40300.00	1011.00	1021.37	1019.75	1022.56	0.013199	8.80	4630.02	870.60	0.66
Santa Clara Rive	42590	PF 1	40300.00	1010.00	1019.56	1017.01	1020.33	0.007142	7.07	5831.69	1047.55	0.50
Santa Clara Rive	42430	PF 1	40300.00	1008.00	1018.74	1015.25	1019.32	0.004783	6.12	6589.90	971.33	0.41
Santa Clara Rive	42215	PF 1	40300.00	1006.00	1018.08	1013.44	1018.45	0.003076	4.88	8263.73	1266.38	0.33
Santa Clara Rive	41940	PF 1	40300.00	1005.00	1016.79	1012.76	1017.33	0.005557	5.88	6850.09	1200.05	0.43
Santa Clara Rive	41730	PF 1	40300.00	1004.00	1015.67	1011.63	1016.25	0.004594	6.09	6619.70	954.72	0.41
Santa Clara Rive	41460	PF 1	40300.00	1002.00	1014.46	1010.41	1015.06	0.004340	6.21	6492.94	869.64	0.40
Santa Clara Rive	41280	PF 1	40300.00	1001.00	1013.02	1010.09	1014.01	0.007576	8.09	5130.66	760.59	0.53
Santa Clara Rive	41080	PF 1	40300.00	1000.00	1011.84	1008.45	1012.66	0.005538	7.44	5647.08	775.06	0.46
Santa Clara Rive	40825	PF 1	40300.00	999.50	1010.46	1007.56	1011.27	0.005341	7.56	5922.21	1001.08	0.45
Santa Clara Rive	40585	PF 1	40300.00	998.00	1009.26	1006.49	1009.90	0.005469	6.53	6341.72	997.86	0.44
Santa Clara Rive	40335	PF 1	40300.00	996.00	1008.33	1004.28	1008.81	0.003351	5.60	7582.12	1363.41	0.35
Santa Clara Rive	40130	PF 1	40300.00	995.00	1007.45	1004.32	1008.00	0.004549	6 10	7132.12	1422.08	0.41
Santa Clara Rive	39945	PF 1	40300.00	994.00	1006.51	1003.59	1007.12	0.004955	6.61	7017.15	1445.31	0.43
Santa Clara Rive	39755	PF 1	40300.00	994.00	1004.96	1002.49	1005.92	0.007592	7.91	5315.85	1051.85	0.53
Santa Clara Rive	39605	PF 1	40300.00	993.00	1004.17	1001.07	1004.92	0.005359	7.04	6121.09	1086.88	0.45
Santa Clara Rive	39310	PF 1	40300.00	992.00	1001.93	999.47	1002.95	0.007853	8.30	5314 01	1096.48	0.54
Santa Clara Rive	39100	PF 1	40300.00	990.00	1001.05	997.42	1001.66	0.004232	6.43	6681.76	1057.73	0.40
Santa Clara Rive	38925	PF 1	40300.00	989.50	1000.16	997.35	1000.82	0.005301	6.68	6397.00	1061.47	0.44
Santa Clara Rive	38710	PF 1	40300.00	988.00	999.14	995.89	999.76	0.004487	6 48	6542.33	963.68	0.41

U/S LIMIT →

HEC-RAS Plan: W.O. 1020-23 River: Reach #1 Reach: Santa Clara Rive Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	38475	PF 1	40300.00	986.00	996.78	994.93	998.12	0.011019	9.29	4348.84	672.89	0.63
Santa Clara Rive	38300	PF 1	40300.00	985.50	995.66	992.63	996.56	0.006236	7.60	5304.11	689.85	0.48
Santa Clara Rive	38065	PF 1	40300.00	984.00	994.47	990.62	995.25	0.004705	7.12	5661.11	657.58	0.43
Santa Clara Rive	37810	PF 1	40300.00	983.00	992.51	989.89	993.67	0.008011	8.63	4668.10	603.49	0.55
Santa Clara Rive	37655	PF 1	40300.00	982.00	990.28	989.28	991.88	0.016912	10.12	3981.49	713.38	0.75
Santa Clara Rive	37390	PF 1	40300.00	981.00	988.76	985.62	989.39	0.004916	6.36	6383.73	979.10	0.42
Santa Clara Rive	37135	PF 1	40300.00	980.00	987.34	984.71	987.97	0.006391	6.39	6307.05	1085.45	0.47
Santa Clara Rive	36930	PF 1	40300.00	978.00	986.43	982.89	986.95	0.003787	6.05	7213.20	1116.04	0.38
Santa Clara Rive	36735	PF 1	40300.00	977.00	985.58	982.82	986.15	0.004321	6.41	7005.16	1185.60	0.40
Santa Clara Rive	36515	PF 1	40300.00	975.00	984.83	981.50	985.32	0.003247	6.10	7788.23	1309.37	0.36
Santa Clara Rive	36265	PF 1	40300.00	974.00	983.98	981.30	984.46	0.003711	6.21	7783.18	1371.56	0.38
Santa Clara Rive	36080	PF 1	40300.00	973.00	983.07	980.80	983.66	0.005049	6.57	7113.08	1441.29	0.43
Santa Clara Rive	35845	PF 1	40300.00	971.00	981.96	979.31	982.56	0.004356	6.74	7240.06	1448.17	0.41
Santa Clara Rive	35725	PF 1	40300.00	970.00	981.22	978.89	981.96	0.005242	7.43	6623.31	1416.04	0.45
Santa Clara Rive	35515	PF 1	40300.00	969.00	980.06	977.09	980.82	0.005853	7.17	6253.96	1332.79	0.47
Santa Clara Rive	35245	PF 1	40300.00	968.00	978.28	975.64	979.07	0.007122	7.26	5961.22	1270.33	0.50
Santa Clara Rive	35040	PF 1	40300.00	967.00	976.94	975.00	977.64	0.006414	7.07	6454.96	1335.57	0.48
Santa Clara Rive	34860	PF 1	40300.00	966.00	975.53	973.56	976.36	0.008241	7.58	5839.51	1268.17	0.54
Santa Clara Rive	34720	PF 1	40300.00	965.50	974.17	972.47	975.13	0.008847	8.06	5546.55	1407.95	0.56
Santa Clara Rive	34495	PF 1	40300.00	964.00	972.45	970.60	973.26	0.007592	7.46	5920.55	1263.01	0.52
Santa Clara Rive	34310	PF 1	40300.00	963.00	971.37	968.48	972.05	0.005183	6.81	6478.40	1257.36	0.44
Santa Clara Rive	34090	PF 1	40300.00	962.00	970.10	967.39	970.83	0.006036	6.92	6162.37	1261.77	0.47
Santa Clara Rive	33880	PF 1	40300.00	960.00	968.87	966.33	969.58	0.005963	6.93	6331.39	1281.35	0.46
Santa Clara Rive	33710	PF 1	40300.00	959.00	967.67	965.42	968.46	0.006802	7.36	6091.67	1316.60	0.50
Santa Clara Rive	33500	PF 1	40300.00	958.00	966.48	963.63	967.16	0.005359	6.94	6651.71	1445.74	0.45
Santa Clara Rive	33310	PF 1	40300.00	957.00	965.46	962.98	966.13	0.005552	6.96	6727.60	1471.87	0.45
Santa Clara Rive	33115	PF 1	40300.00	956.00	964.72	961.18	965.20	0.003535	5.88	7797.12	1572.37	0.37
Santa Clara Rive	32795	PF 1	40300.00	954.00	963.42	960.32	964.00	0.004223	6.38	7069.24	1311.69	0.40
Santa Clara Rive	32605	PF 1	40300.00	952.00	962.62	959.24	963.19	0.004095	6.36	7329.05	1632.90	0.39
Santa Clara Rive	32265	PF 1	60000.00	950.00	960.99	958.57	961.68	0.005158	7.42	9861.61	1907.12	0.45
Santa Clara Rive	31875	PF 1	60000.00	949.00	958.29	957.27	959.30	0.007926	9.31	8757.56	2377.47	0.55
Santa Clara Rive	31585	PF 1	60000.00	946.00	956.59	954.92	957.29	0.005780	7.87	10158.57	2175.61	0.47
Santa Clara Rive	31360	PF 1	60000.00	944.00	955.42	952.52	955.96	0.005419	5.92	10131.79	1725.53	0.43
Santa Clara Rive	31060	PF 1	60000.00	944.00	954.39	950.20	954.81	0.002893	5.77	11898.45	1685.97	0.34
Santa Clara Rive	30720	PF 1	60000.00	940.00	953.65	947.95	953.99	0.001782	4.96	13789.60	1852.40	0.27
Santa Clara Rive	30445	PF 1	60000.00	938.00	953.33	946.50	953.58	0.001108	4.13	15425.66	1634.96	0.22
Santa Clara Rive	30095	PF 1	60000.00	936.00	952.99	944.31	953.24	0.000870	4.13	15273.17	1247.44	0.20
Santa Clara Rive	29815	PF 1	60000.00	935.00	952.59	943.58	952.95	0.001163	5.05	12973.92	1152.56	0.23
Santa Clara Rive	29565	PF 1	60000.00	934.00	952.30	942.51	952.67	0.001069	5.08	13003.21	1166.37	0.22
Santa Clara Rive	29385	PF 1	60000.00	933.00	951.87	943.40	952.42	0.001666	6.29	11043.96	1101.63	0.28
Santa Clara Rive	29140	PF 1	60000.00	932.00	950.68	945.31	951.84	0.003807	9.82	7894.72	865.95	0.42
Santa Clara Rive	28895	PF 1	60000.00	930.00	945.26	945.26	949.79	0.017728	17.36	3747.14	498.84	0.87

D/S LIMIT

HEC-RAS Plan: W.O. 1020-23 River: Reach #1 Reach: Santa Clara Rive Profile: PF 1 (Continued)

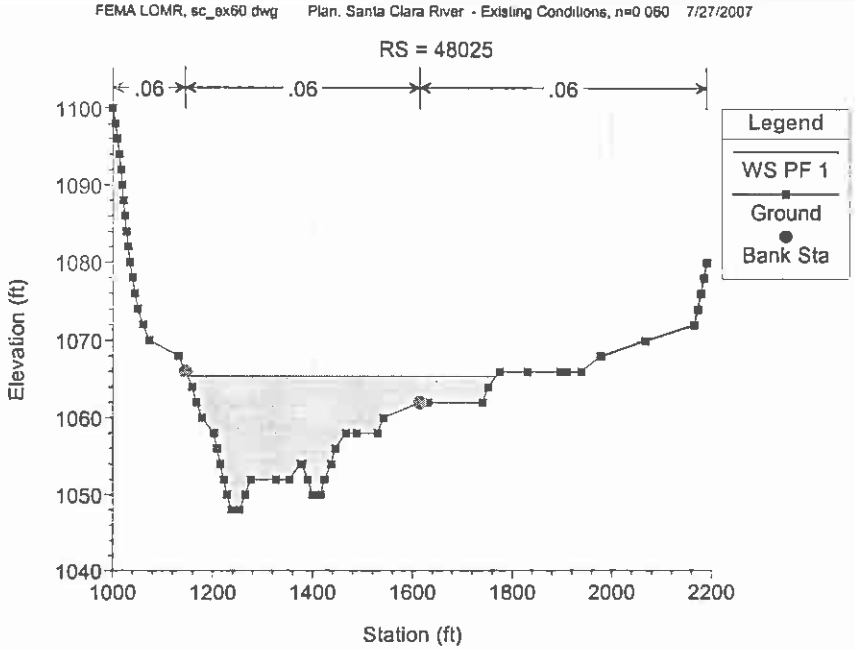
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	28695	PF 1	60000.00	928.00	942.94	941.38	945.97	0.011594	14.27	4563.58	531.28	0.71
Santa Clara Rive	28500	PF 1	60000.00	927.50	941.37	938.36	943.53	0.010732	11 81	5079.68	512.42	0.66
Santa Clara Rive	28280	PF 1	60000.00	926.00	940.14	935.54	941.67	0.005730	10.03	6174.02	557.80	0.50
Santa Clara Rive	28080	PF 1	60000.00	925.00	939.20	934.44	940.51	0.005213	9.35	6589.32	578.82	0.48
Santa Clara Rive	27925	PF 1	60000.00	924.00	938.17	933.68	939.66	0.005620	9.94	6193.82	525.01	0.50
Santa Clara Rive	27725	PF 1	60000.00	923.00	936.55	932.23	938.39	0.006749	10.89	5583.11	516.90	0.54
Santa Clara Rive	27545	PF 1	60000.00	922.00	935.50	931.61	937.11	0.006767	10.25	6008.47	623.65	0.54
Santa Clara Rive	27335	PF 1	60000.00	921.00	934.39	930.03	935.73	0.005815	9.35	6646.44	757.61	0.50
Santa Clara Rive	27155	PF 1	60000.00	920.50	932.98	929.54	934.52	0.007353	10.15	6262.21	799.79	0.55
Santa Clara Rive	26990	PF 1	60000.00	920.00	931.70	929.52	933.15	0.008572	10.05	6635.45	1025.50	0.58
Santa Clara Rive	26780	PF 1	60000.00	918.00	930.59	927.37	931.57	0.005608	8.42	8110.95	1193.35	0.48
Santa Clara Rive	26575	PF 1	60000.00	917.00	929.67	926.37	930.49	0.004591	7.65	8789.97	1245.55	0.43
Santa Clara Rive	26355	PF 1	60000.00	916.00	928.46	925.65	929.38	0.005462	8.17	8364.15	1266.75	0.47
Santa Clara Rive	26170	PF 1	60000.00	915.00	927.41	924.76	928.38	0.005404	8.39	8375.87	1343.81	0 47
Santa Clara Rive	25965	PF 1	60000.00	914.00	926.21	923.04	927.22	0.005963	8.45	8046.50	1281.89	0.49
Santa Clara Rive	25785	PF 1	60000.00	913.50	925.28	922.57	926.18	0.004974	8.22	8663.38	1337.64	0.45
Santa Clara Rive	25600	PF 1	60000.00	912.50	924 55	921.76	925.26	0.004245	7.56	9897.71	1644.06	0.42
Santa Clara Rive	25425	PF 1	60000.00	911.00	923.84	921.55	924.52	0.003910	7.73	10668.45	1940.33	0.41
Santa Clara Rive	25215	PF 1	60000.00	910.00	922.48	920.83	923.42	0.006197	8.67	8791.78	1682.18	0.50
Santa Clara Rive	25000	PF 1	60000.00	909.00	921.06	919.36	922.07	0.006259	9.02	8806.58	2066.97	0.50
Santa Clara Rive	24795	PF 1	60000.00	908.00	919.02	918.84	920.37	0.009827	10.68	8096.39	2309.89	0.62
Santa Clara Rive	24550	PF 1	60000.00	906.00	918.20	916.48	918.75	0.003960	7.48	11599.56	2233.24	0.40
Santa Clara Rive	24335	PF 1	60000.00	905.00	916.69	915.93	917.64	0.007371	9.58	9156.57	2083.79	0.54
Santa Clara Rive	24115	PF 1	60000.00	904.00	915.28	914.17	916.14	0.006663	8.75	9320.19	2016.42	0.51
Santa Clara Rive	23975	PF 1	60000.00	903.50	914.42	912.71	915.06	0.005220	7.75	10227.41	1918.63	0.45
Santa Clara Rive	23755	PF 1	60000.00	902.00	913.18	911.60	913.85	0.005768	7.92	9974.83	1937.42	0.47
Santa Clara Rive	23565	PF 1	60000.00	900.00	911.87	910.71	912.64	0.006685	8.83	9596.17	2030.64	0.51
Santa Clara Rive	23365	PF 1	60000.00	900.00	910.74	909.11	911.40	0.005785	7.98	10019.27	1997.72	0.47
Santa Clara Rive	23180	PF 1	60000.00	899.00	909.95	907.60	910.47	0.003737	6.97	11416.72	2071.61	0.39
Santa Clara Rive	23000	PF 1	60000.00	898.00	909.42	906.37	909.84	0.002929	6.16	12326.98	2017.95	0.35
Santa Clara Rive	22790	PF 1	60000.00	897.50	908.71	905.78	909.22	0.003165	6.75	11581.42	1906.27	0.36
Santa Clara Rive	22600	PF 1	60000.00	896.00	907.99	905.06	908.56	0.003603	7.17	10844.63	1729.42	0.39
Santa Clara Rive	22415	PF 1	60000.00	895.50	907.24	903.83	907.88	0.003730	7.32	10019.40	1462.40	0.39
Santa Clara Rive	22195	PF 1	60000.00	894.00	905.69	903.36	906.80	0.006333	9.29	7766.94	1185.59	0.51
Santa Clara Rive	22010	PF 1	60000.00	892.00	904.19	901.47	905.50	0.007602	9.37	6894.94	1193.58	0.55
Santa Clara Rive	21790	PF 1	60000.00	891.50	902.42	899.79	903.74	0.008459	9.20	6618.87	1081.81	0.57
Santa Clara Rive	21615	PF 1	60000.00	892.00	901.29	898.90	902.29	0.006987	8.26	7774.94	1203.10	0.51
Santa Clara Rive	21440	PF 1	60000.00	890.00	900.14	897.34	901.07	0.006586	7.97	8349.09	1633.68	0.50
Santa Clara Rive	21225	PF 1	60000.00	888.00	898.30	897.07	899.39	0.009468	8.78	7958.53	2205.69	0.59
Santa Clara Rive	21020	PF 1	60000.00	887.00	897.43	894.46	898.03	0.004014	6.65	10554.23	1936.12	0.40
Santa Clara Rive	20845	PF 1	60000.00	886.00	896.53	894.53	897.18	0.005755	7.06	10167.29	2378.56	0.46
Santa Clara Rive	20595	PF 1	60000.00	885.00	895.32	893.03	895.94	0.004432	6.91	10945.81	2405.92	0.41

HEC-RAS Plan: W.O. 1020-23 River: Reach #1 Reach: Santa Clara Rive Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	20435	PF 1	60000.00	884.00	894.81	891.71	895.26	0.003387	6.11	12436.87	2476.64	0.36
Santa Clara Rive	20280	PF 1	60000.00	883.70	893.89	892.27	894.54	0.006154	7.31	10153.85	2249.87	0.48
Santa Clara Rive	20070	PF 1	60000.00	882.00	892.05	890.28	893.05	0.008111	8.53	8262.41	2414.70	0.55
Santa Clara Rive	19855	PF 1	60000.00	880.50	890.91	888.74	891.58	0.005059	7.14	10077.05	2042.94	0.44
Santa Clara Rive	19630	PF 1	60000.00	880.00	890.05	887.07	890.57	0.003751	6.19	11155.94	1934.44	0.38
Santa Clara Rive	19440	PF 1	60000.00	878.00	889.30	886.64	889.84	0.003803	6.64	11251.04	2051.13	0.39
Santa Clara Rive	19240	PF 1	60000.00	877.50	888.40	886.09	889.01	0.004415	7.17	10699.85	2066.76	0.42
Santa Clara Rive	19050	PF 1	60000.00	876.00	887.80	885.35	888.29	0.003093	6.80	12138.81	2104.73	0.36
Santa Clara Rive	18830	PF 1	60000.00	874.00	887.15	884.39	887.63	0.003034	6.77	12052.48	2007.95	0.36
Santa Clara Rive	18650	PF 1	60000.00	873.50	886.45	883.63	887.05	0.003385	7.66	11379.16	1991.04	0.39
Santa Clara Rive	18475	PF 1	60000.00	872.00	886.18	881.92	886.53	0.001924	5.84	13852.25	1922.35	0.29
Santa Clara Rive	18290	PF 1	60000.00	871.50	885.63	881.42	886.12	0.002529	6.61	11986.18	1743.50	0.33
Santa Clara Rive	18025	PF 1	60000.00	870.00	885.22	879.85	885.56	0.001505	5.49	13784.40	1589.61	0.26
Santa Clara Rive	17785	PF 1	60000.00	868.00	884.71	879.58	885.17	0.001852	6.29	12111.59	1387.96	0.29
Santa Clara Rive	17510	PF 1	60000.00	868.00	883.16	879.89	884.35	0.004502	9.76	7833.09	1005.87	0.45
Santa Clara Rive	17360	PF 1	60000.00	868.00	881.66	880.18	883.40	0.008478	11.99	6373.48	906.83	0.60
Santa Clara Rive	17110	PF 1	60000.00	864.00	878.38	876.88	880.83	0.011916	13.96	5882.85	1229.11	0.71
Santa Clara Rive	16970	PF 1	60000.00	863.70	875.70	875.70	878.68	0.017708	14.98	4805.87	803.85	0.85
Santa Clara Rive	16720	PF 1	60000.00	863.50	874.07	872.83	875.16	0.007892	10.37	8037.57	1521.64	0.57
Santa Clara Rive	16515	PF 1	60000.00	862.00	872.13	871.26	873.39	0.009920	11.02	7955.69	1860.58	0.63
Santa Clara Rive	16305	PF 1	60000.00	860.00	870.95	869.41	871.70	0.005625	8.63	9764.86	1871.17	0.48
Santa Clara Rive	16130	PF 1	60000.00	860.00	870.01	867.63	870.64	0.005575	7.25	10051.86	1933.39	0.46
Santa Clara Rive	15960	PF 1	60000.00	859.00	869.04	867.38	869.61	0.005564	7.53	10672.33	2190.83	0.46
Santa Clara Rive	15745	PF 1	60000.00	858.00	868.26	865.72	868.65	0.003447	6.14	12652.99	2277.82	0.37
Santa Clara Rive	15540	PF 1	60000.00	857.50	867.41	865.54	867.88	0.003969	7.02	12004.72	2319.44	0.40
Santa Clara Rive	15335	PF 1	60000.00	856.00	865.39	865.02	866.55	0.010513	10.42	8352.71	2236.01	0.64
Santa Clara Rive	15125	PF 1	60000.00	854.00	863.99	862.28	864.81	0.006156	8.43	9007.30	1609.02	0.49
Santa Clara Rive	14900	PF 1	60000.00	853.00	862.70	860.52	863.44	0.005725	7.72	9389.73	1670.36	0.47
Santa Clara Rive	14720	PF 1	60000.00	852.00	861.56	859.83	862.32	0.006820	7.82	9157.12	1781.99	0.50
Santa Clara Rive	14480	PF 1	60000.00	850.50	859.94	858.00	860.72	0.006722	7.72	9114.06	1780.61	0.50
Santa Clara Rive	14315	PF 1	60000.00	850.00	859.13	856.82	859.75	0.004718	6.94	10254.51	1865.48	0.43
Santa Clara Rive	14090	PF 1	60000.00	849.00	858.16	855.61	858.74	0.004155	6.68	10537.01	1762.31	0.40
Santa Clara Rive	13850	PF 1	60000.00	848.00	857.02	854.92	857.64	0.005395	7.12	9911.56	1730.75	0.45
Santa Clara Rive	13635	PF 1	60000.00	846.00	855.20	853.99	856.16	0.008357	8.67	8287.63	1680.12	0.56
Santa Clara Rive	13425	PF 1	60000.00	845.00	853.97	851.81	854.60	0.005899	7.03	9909.65	1868.43	0.46
Santa Clara Rive	13190	PF 1	60000.00	844.00	852.83	850.36	853.38	0.004497	6.56	10677.99	1842.95	0.41
Santa Clara Rive	13030	PF 1	60000.00	843.00	852.20	849.36	852.69	0.003885	5.99	10994.71	1757.92	0.38
Santa Clara Rive	12835	PF 1	60000.00	842.00	851.41	848.18	851.92	0.003986	5.82	10616.39	1593.62	0.38
Santa Clara Rive	12615	PF 1	60000.00	841.00	850.68	846.61	851.14	0.003023	5.59	11124.10	1459.31	0.34
Santa Clara Rive	12395	PF 1	60000.00	840.00	849.94	845.87	850.46	0.003249	5.86	10651.61	1416.39	0.35
Santa Clara Rive	12195	PF 1	60000.00	838.50	849.29	845.11	849.81	0.003175	5.91	10610.46	1376.51	0.35
Santa Clara Rive	11995	PF 1	60000.00	837.00	848.46	844.57	849.12	0.003565	6.95	9735.91	1260.41	0.38

HEC-RAS Plan: W.O. 1020-23 River: Reach #1 Reach: Santa Clara Rive Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	11780	PF 1	60000.00	836.00	847.52	843.98	848.29	0.004105	7.51	9235.01	1341.29	0.41
Santa Clara Rive	11605	PF 1	60000.00	835.50	846.61	842.61	847.52	0.004708	7.74	8126.23	1077.20	0.44
Santa Clara Rive	11405	PF 1	60000.00	834.00	845.56	841.16	846.58	0.004458	8.32	7847.40	935.90	0.44
Santa Clara Rive	11180	PF 1	60000.00	833.00	844.15	840.16	845.41	0.006078	9.03	6720.78	747.24	0.50
Santa Clara Rive	11015	PF 1	60000.00	831.50	842.73	839.30	844.27	0.007224	10.01	6128.75	653.73	0.55
Santa Clara Rive	10835	PF 1	60000.00	831.00	840.88	839.06	842.65	0.011256	10.77	5729.97	775.58	0.66
Santa Clara Rive	10575	PF 1	60000.00	830.00	839.33	836.81	840.26	0.006351	8.08	7977.68	1121.61	0.49
Santa Clara Rive	10390	PF 1	60000.00	828.00	838.42	835.44	839.11	0.005380	6.97	9024.74	1378.09	0.45
Santa Clara Rive	10225	PF 1	60000.00	827.50	837.54	834.72	838.26	0.004980	7.26	9178.37	1389.01	0.44
Santa Clara Rive	10000	PF 1	60000.00	826.00	835.85	833.88	836.83	0.007611	8.34	7937.50	1363.19	0.53
Santa Clara Rive	9820	PF 1	60000.00	824.00	834.87	832.23	835.60	0.005472	7.27	9093.67	1433.95	0.46
Santa Clara Rive	9595	PF 1	60000.00	823.80	833.58	831.18	834.36	0.005770	7.61	9022.93	1534.02	0.47
Santa Clara Rive	9385	PF 1	60000.00	823.00	832.27	830.28	833.07	0.006962	7.98	8998.59	1769.12	0.51
Santa Clara Rive	9220	PF 1	60000.00	822.00	831.20	829.24	831.91	0.006356	7.57	9409.63	1768.39	0.49
Santa Clara Rive	9025	PF 1	60000.00	821.00	830.15	827.66	830.83	0.005000	7.55	9894.36	1744.06	0.44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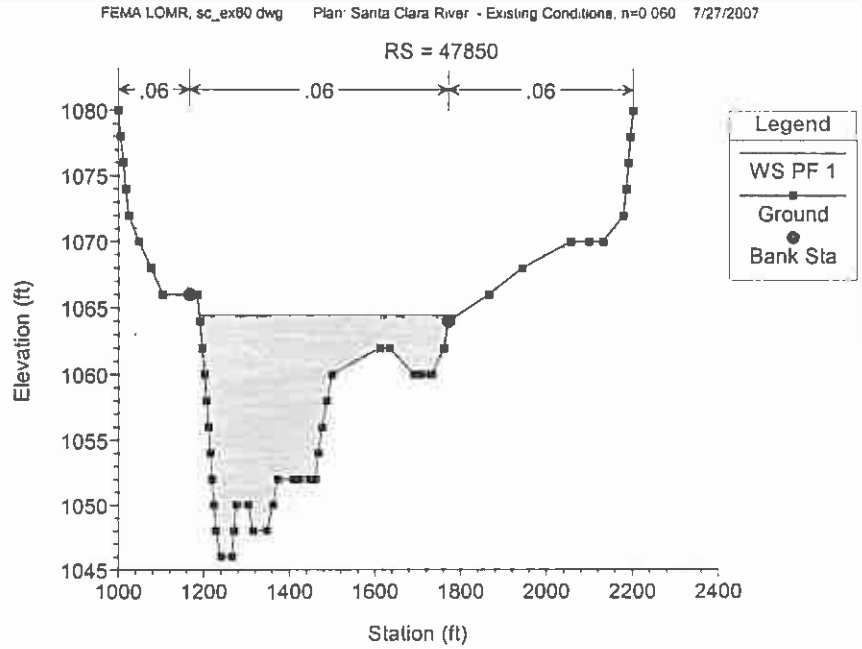
RS = 48025
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 47850
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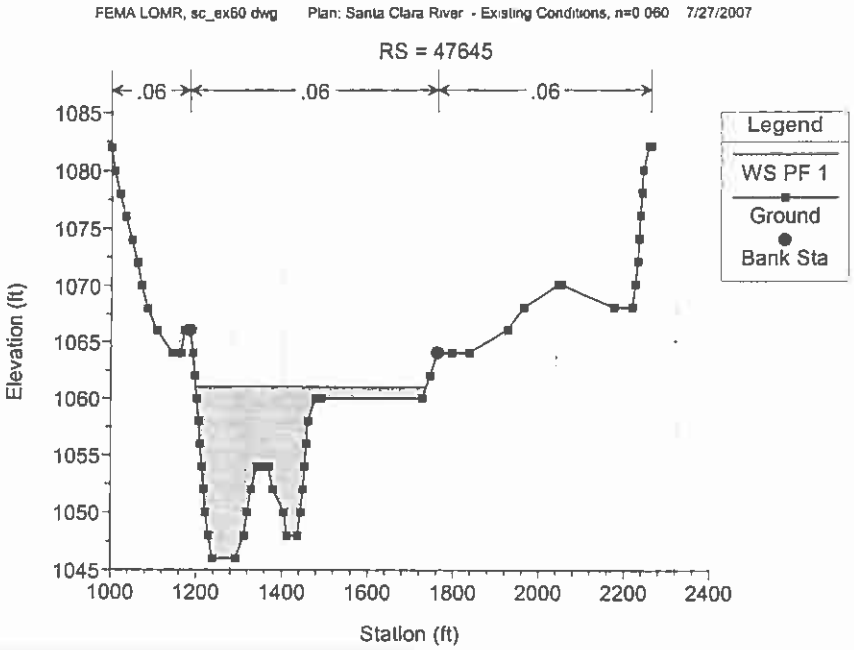
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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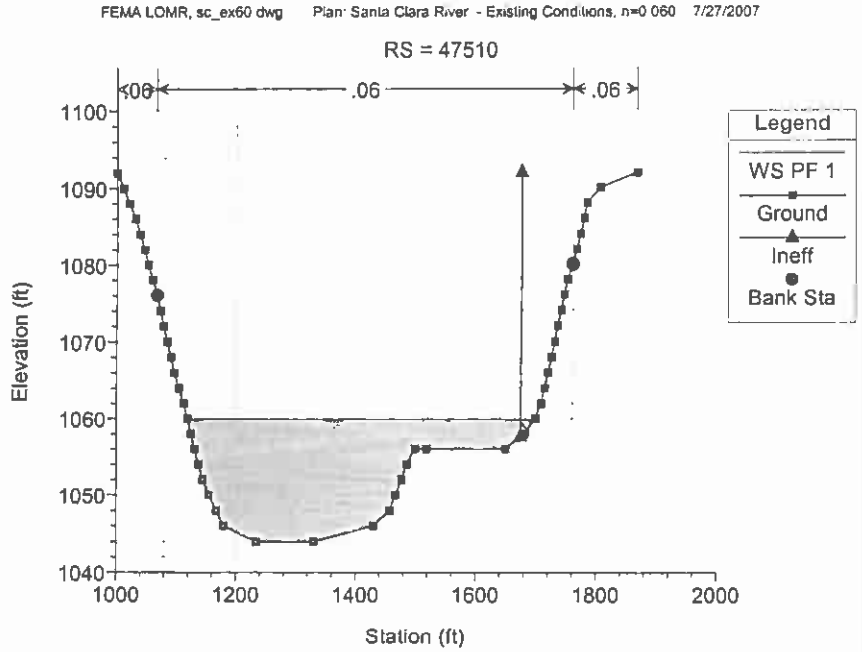
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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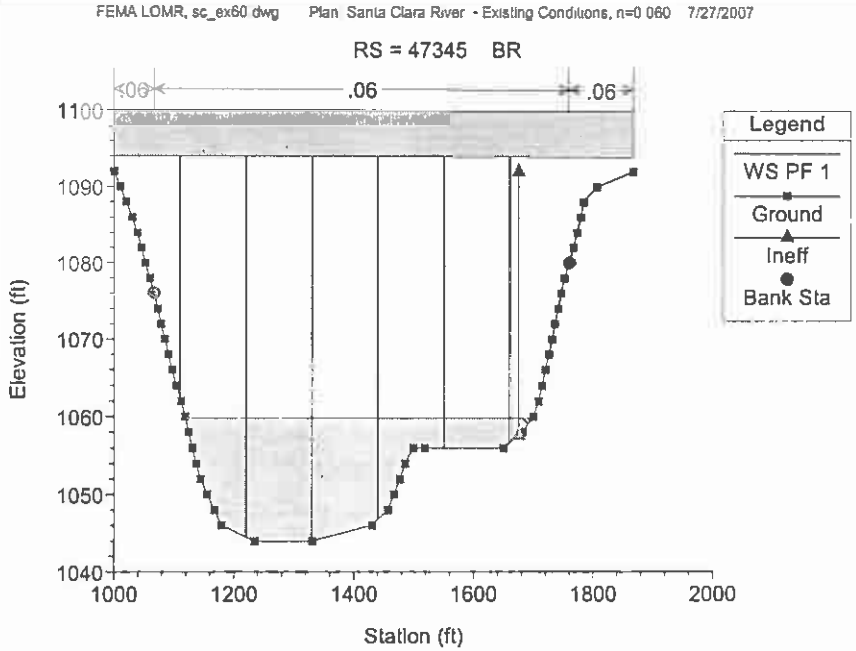
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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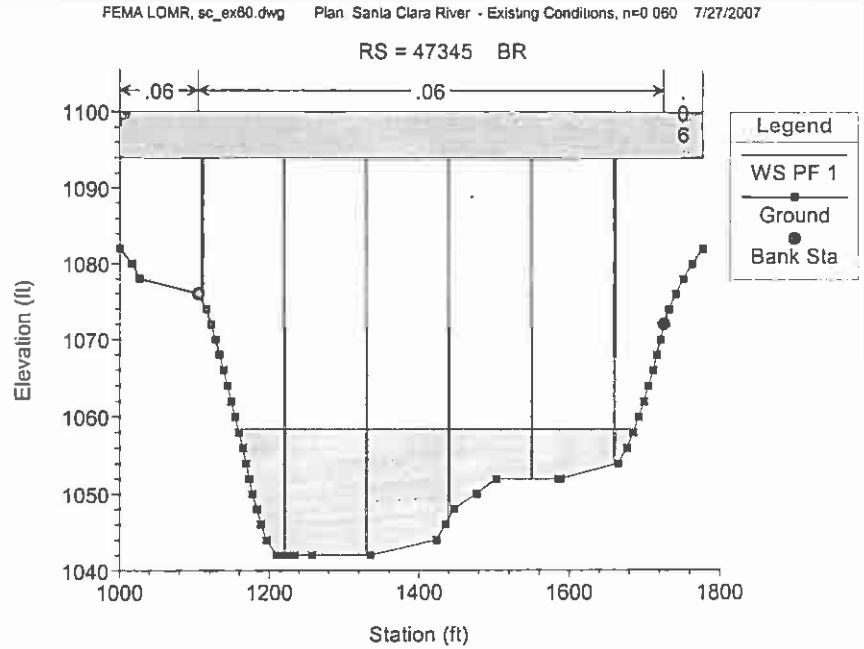
Legend
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 47345 BR
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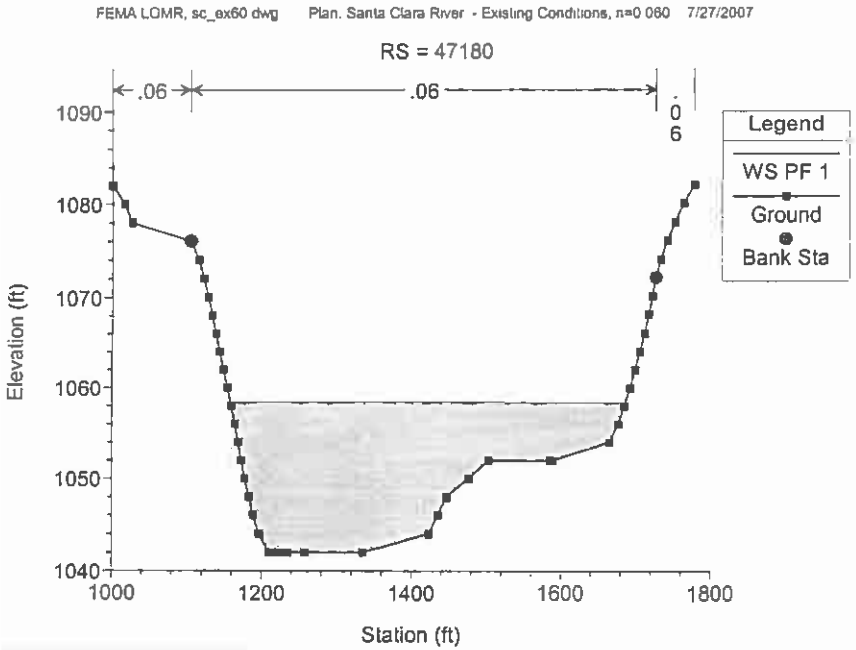
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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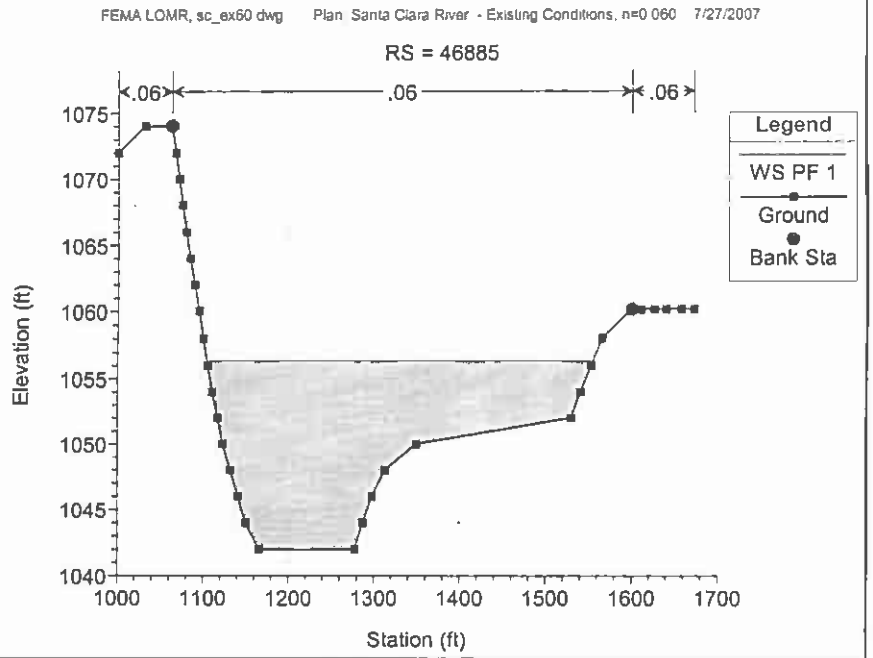
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 46885
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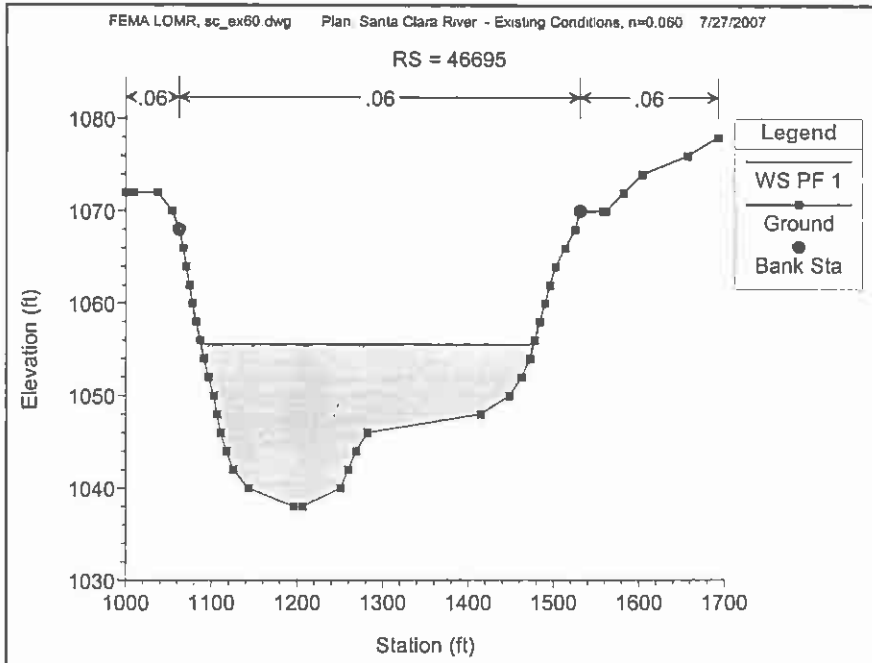
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 46695
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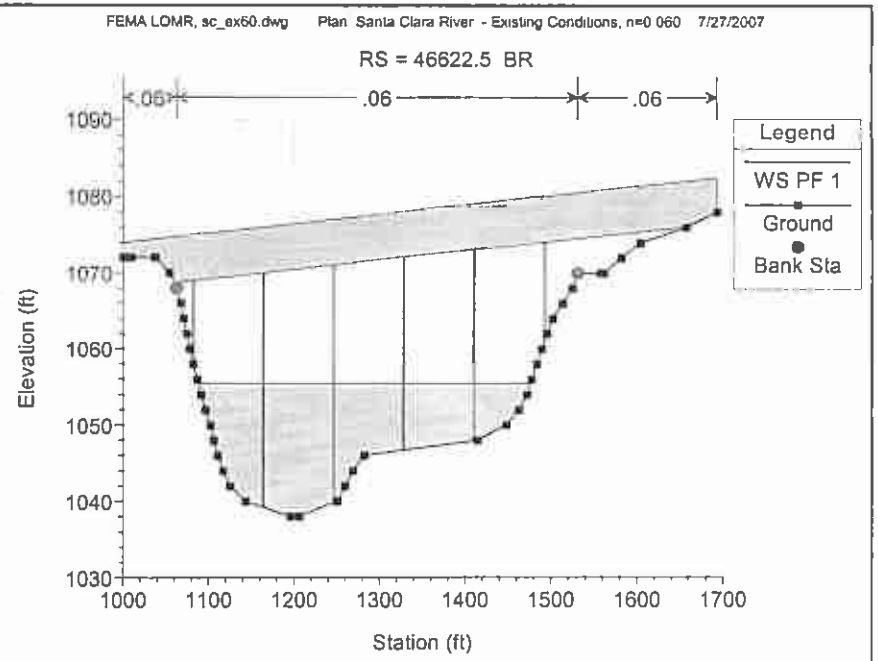
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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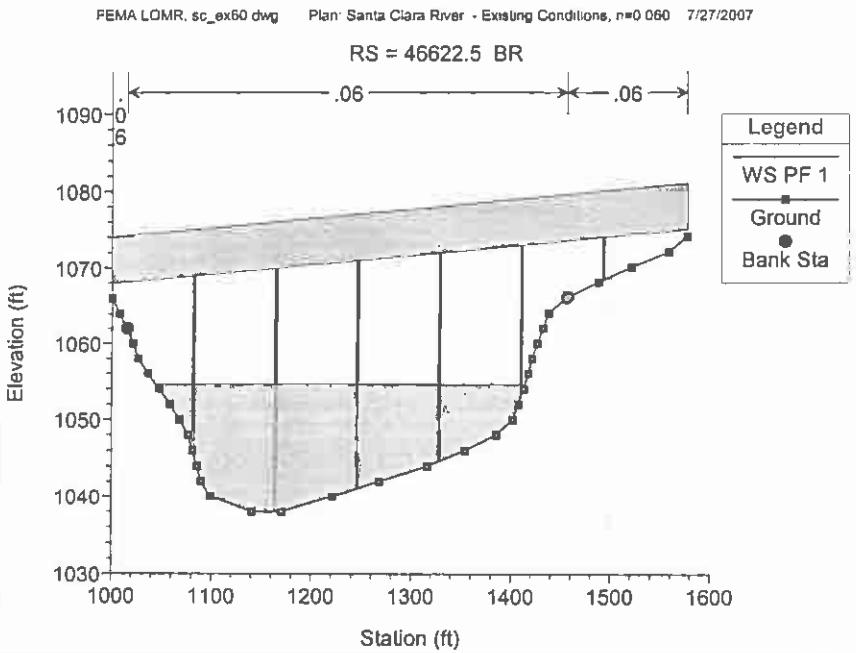
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 46622.5 BR
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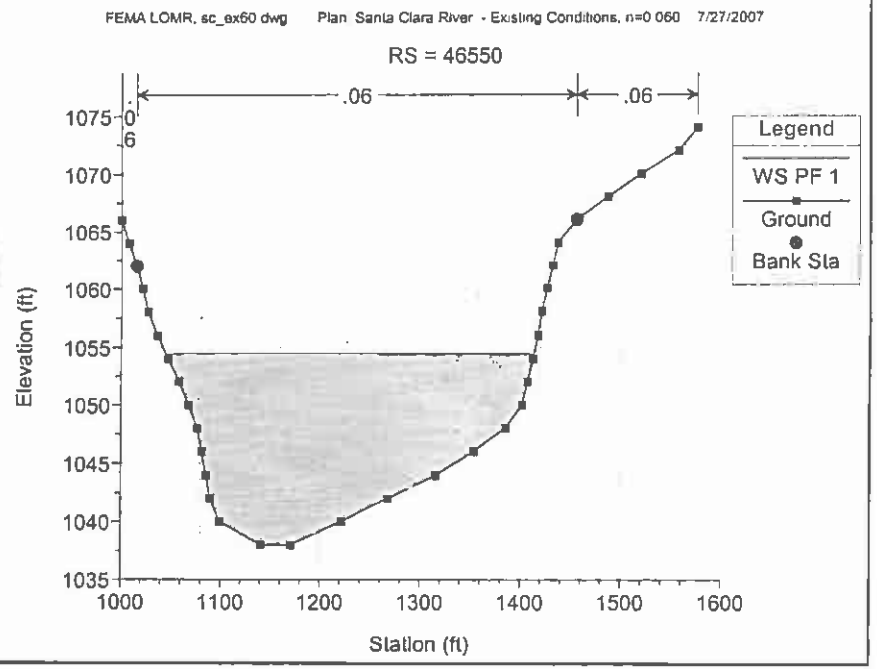
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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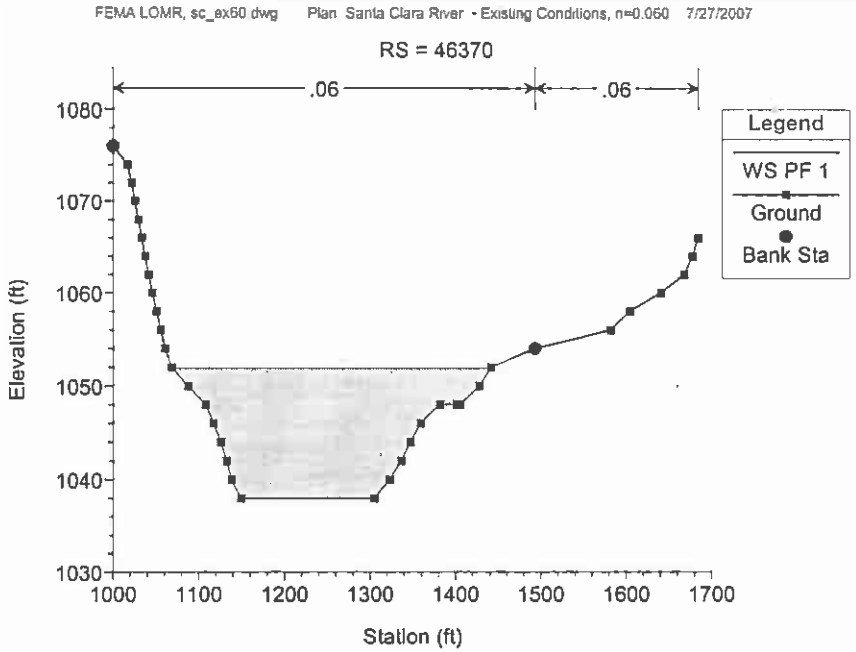
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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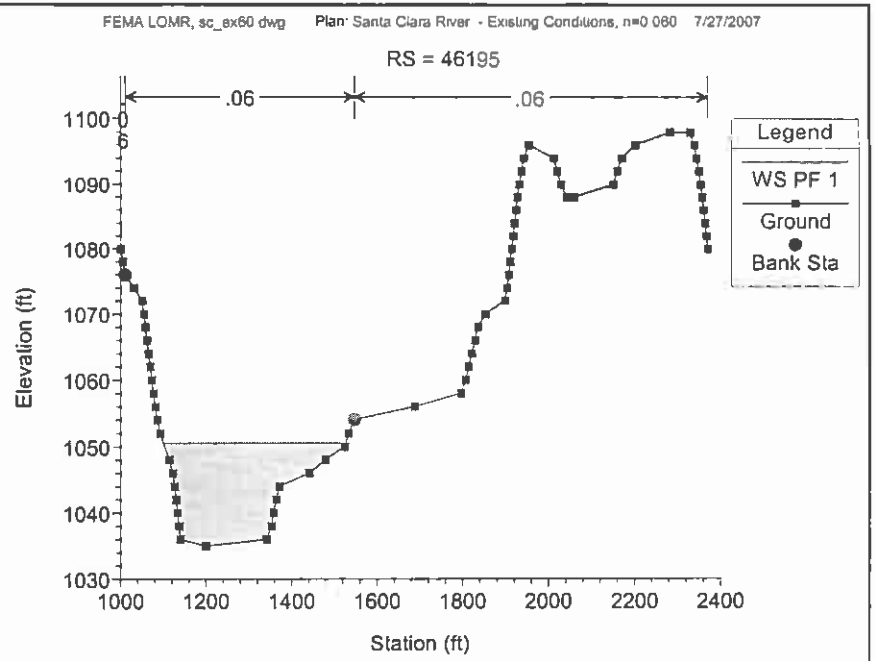
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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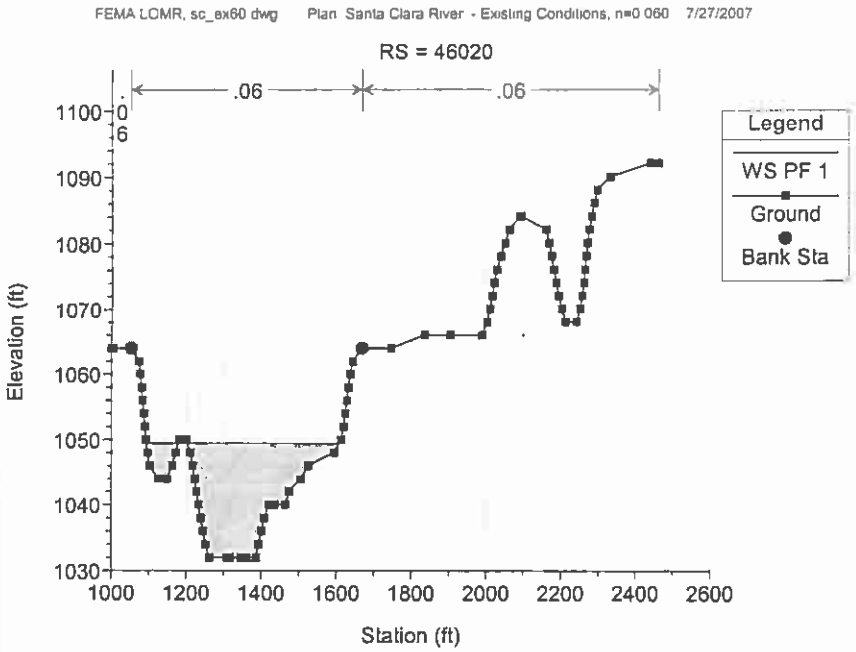
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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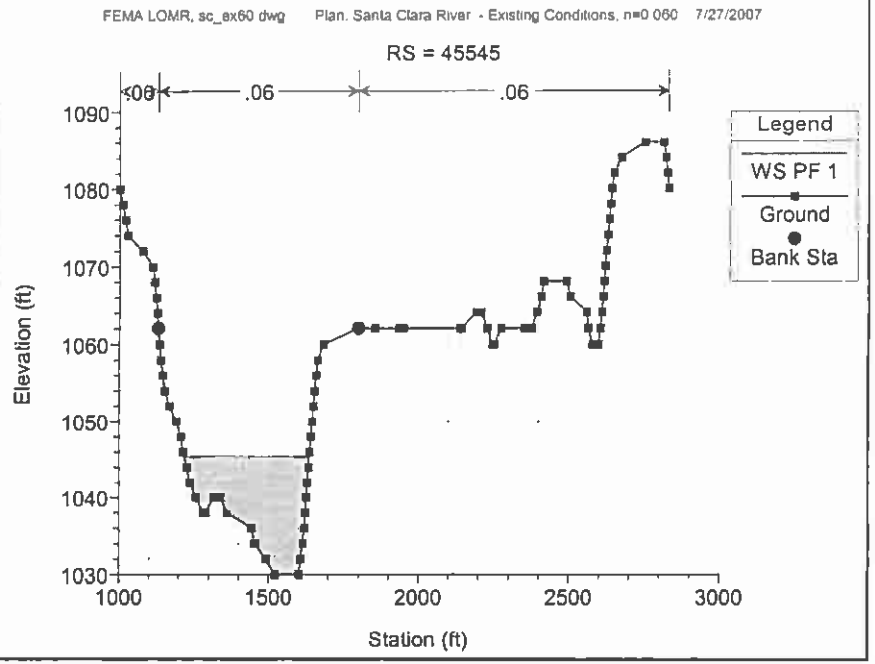
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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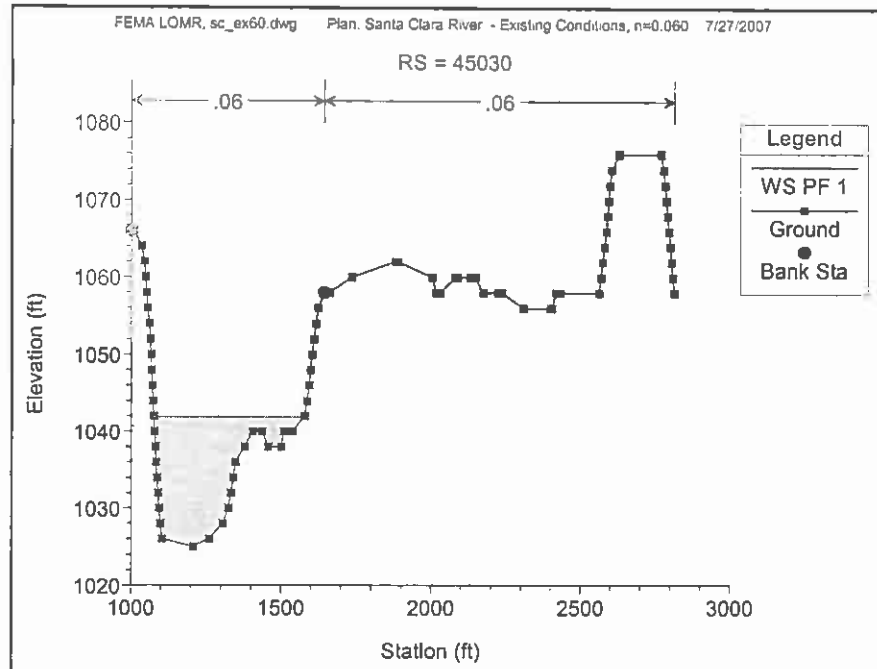
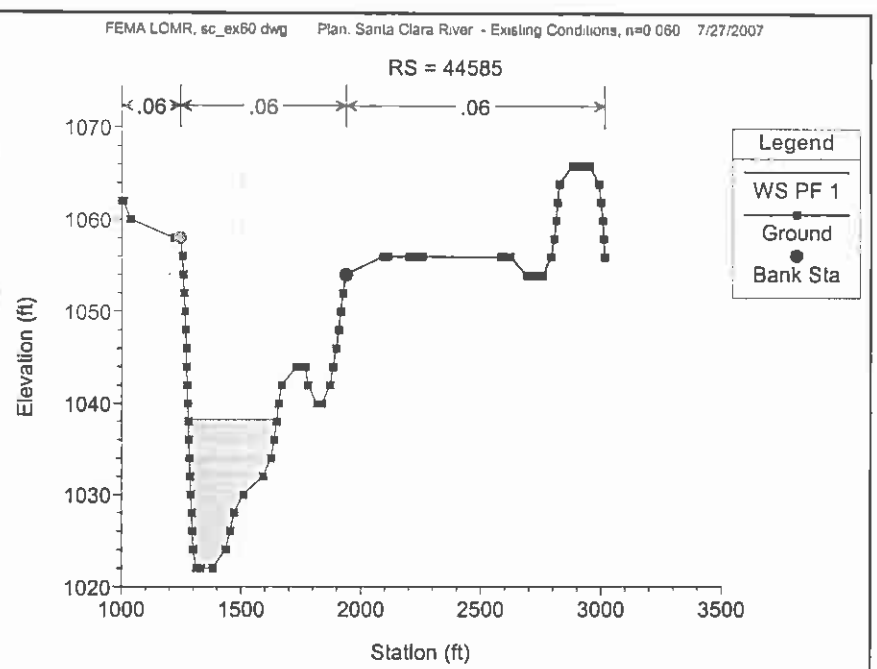
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 45030
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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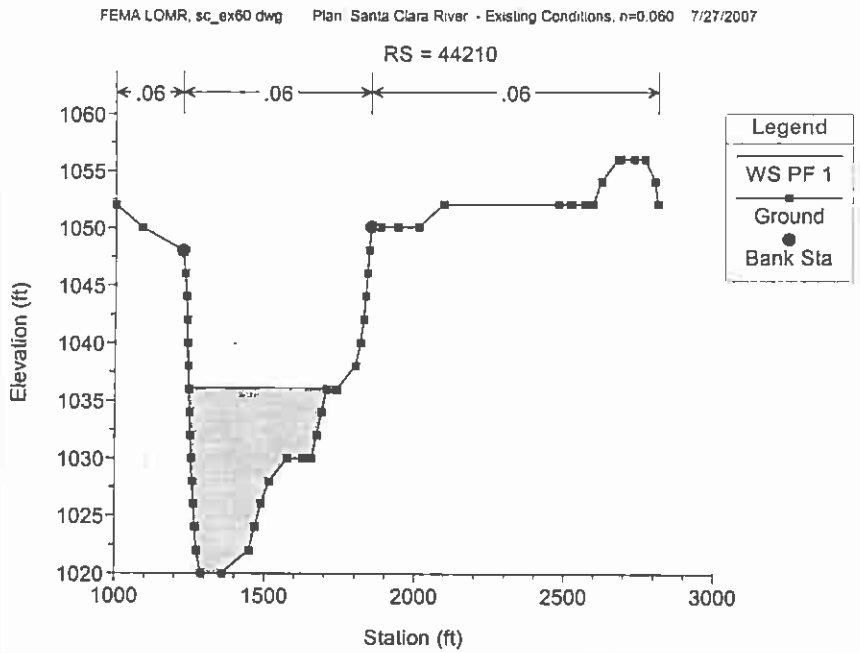
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 44210
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.06
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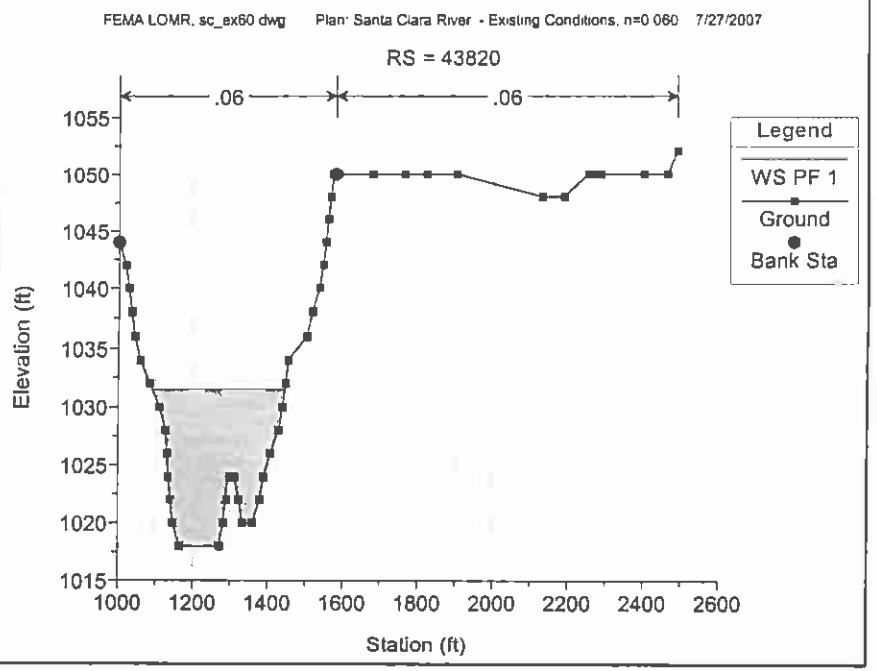
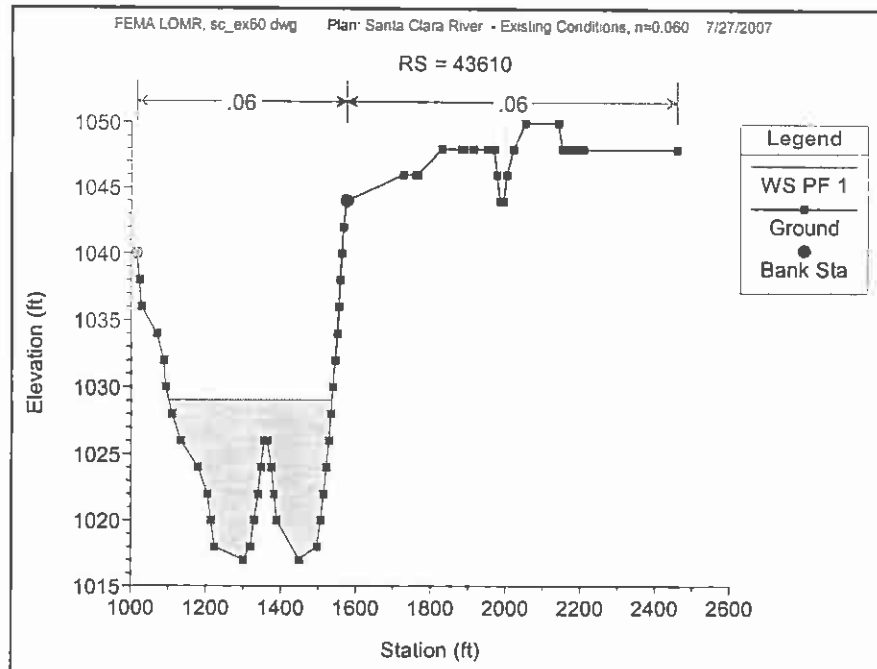
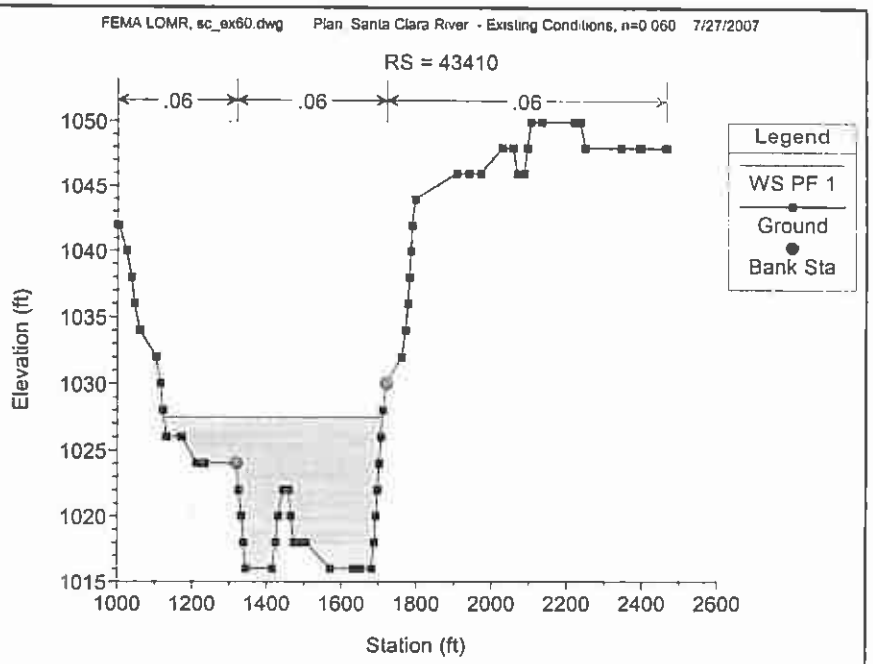
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 43820
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 43610
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 43410
.06
.06
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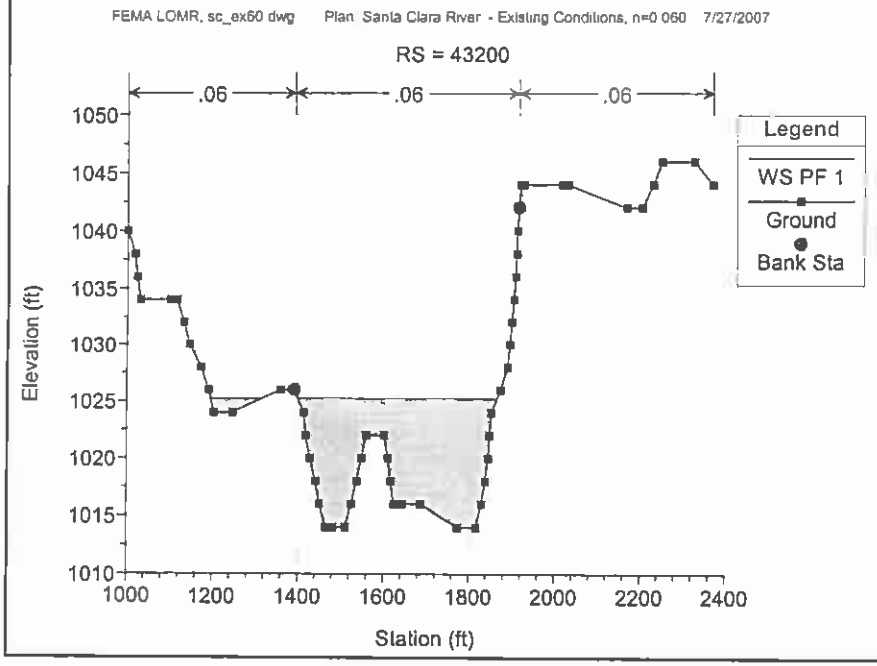
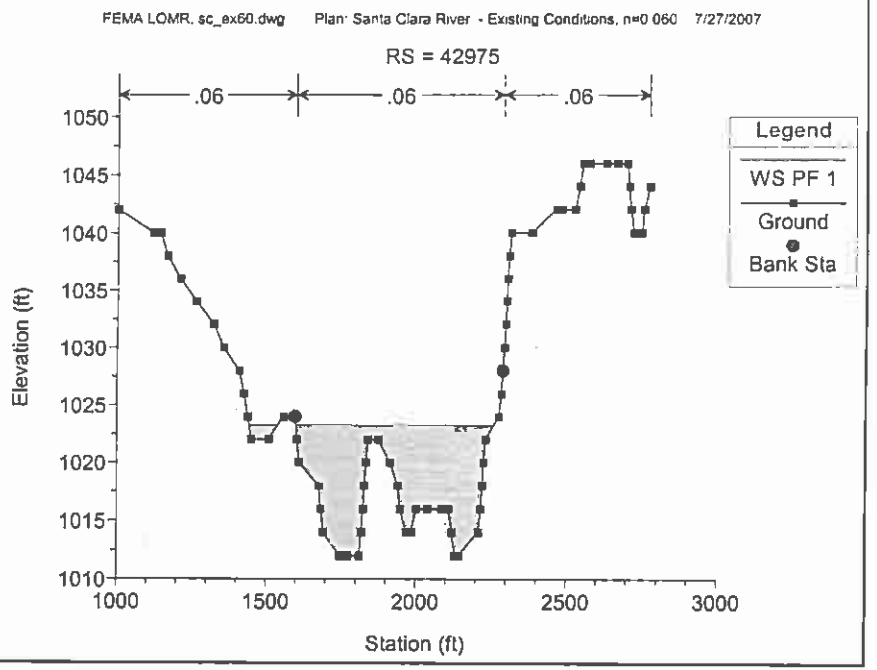
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 43200
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 42975
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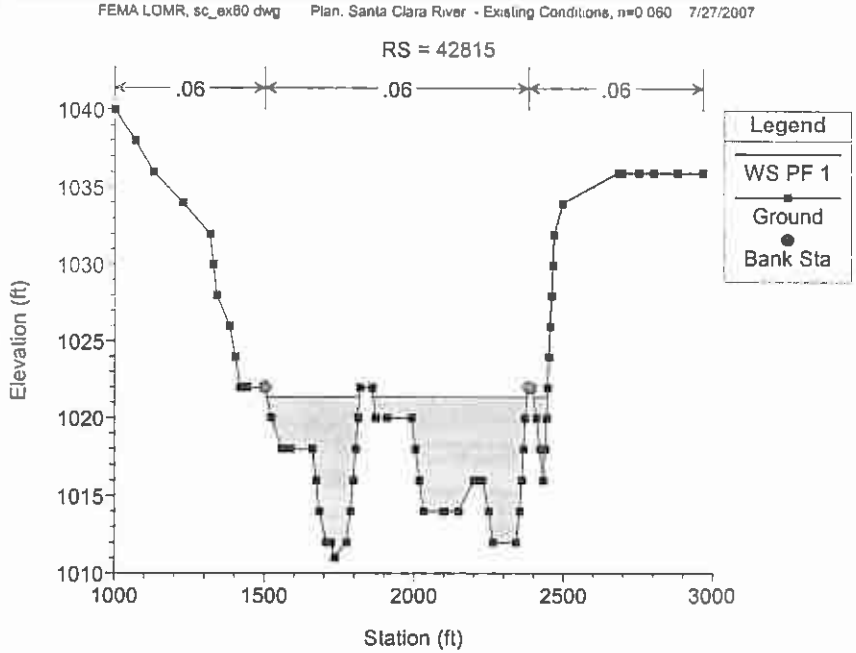
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 42815
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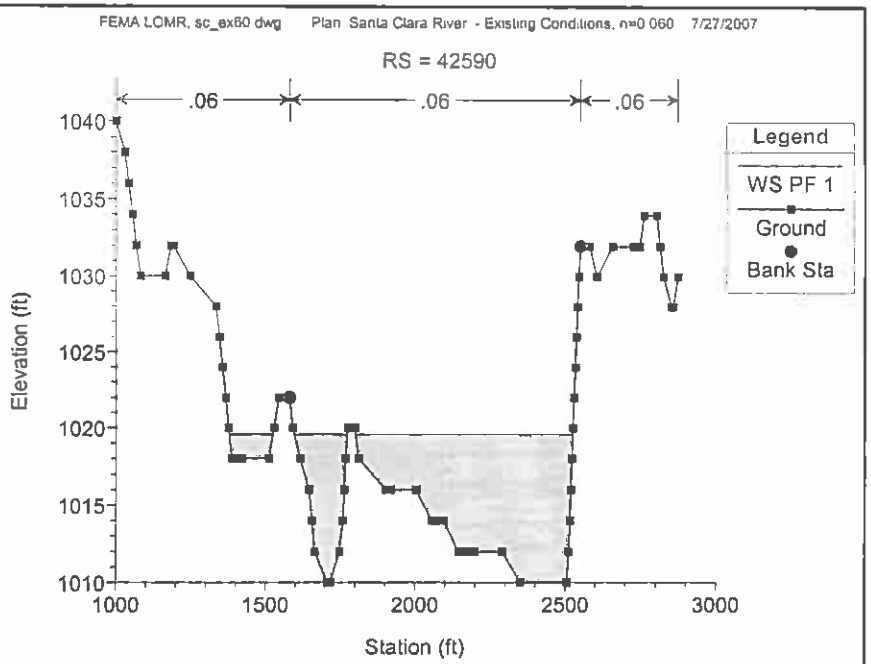
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 42590
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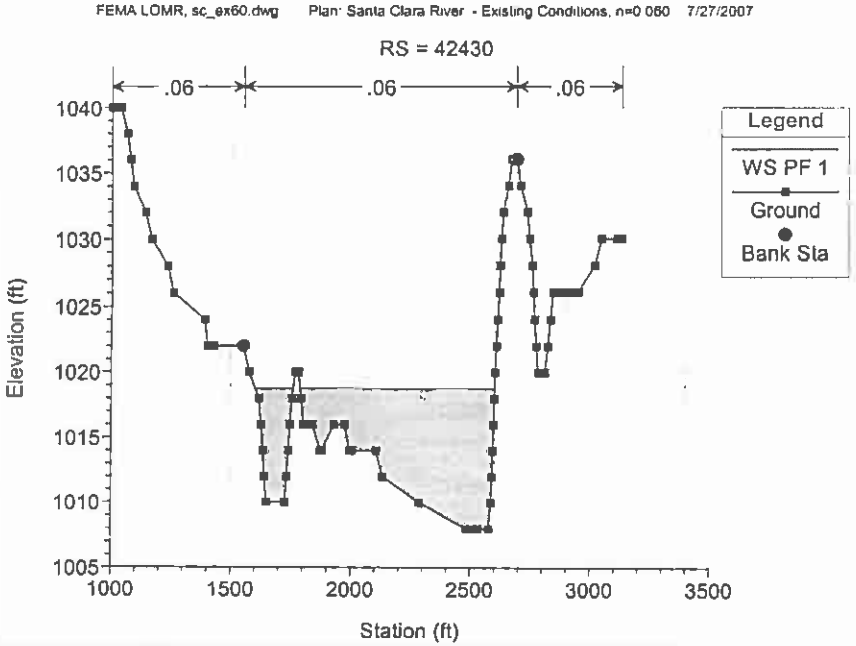
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 42430
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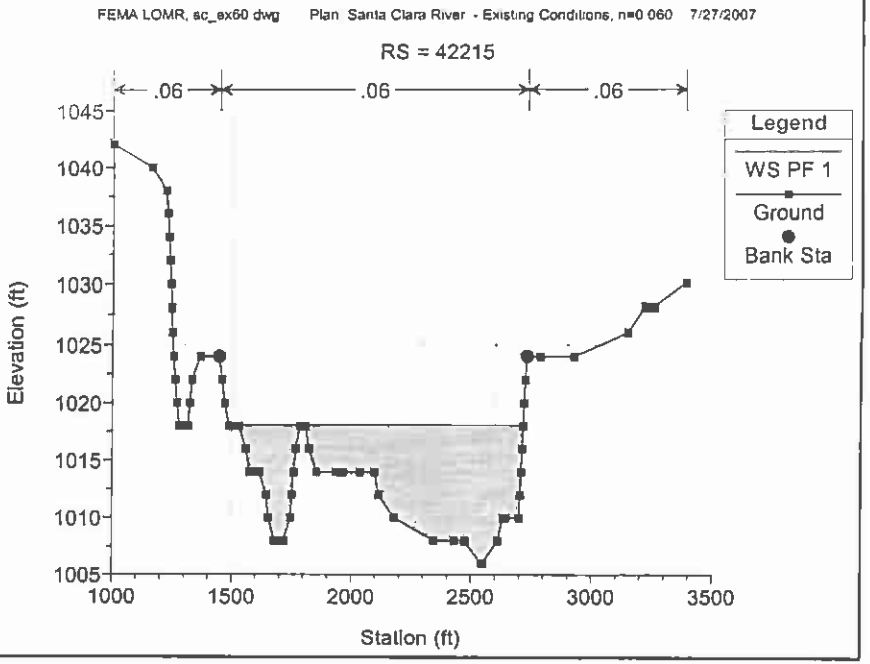
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 42215
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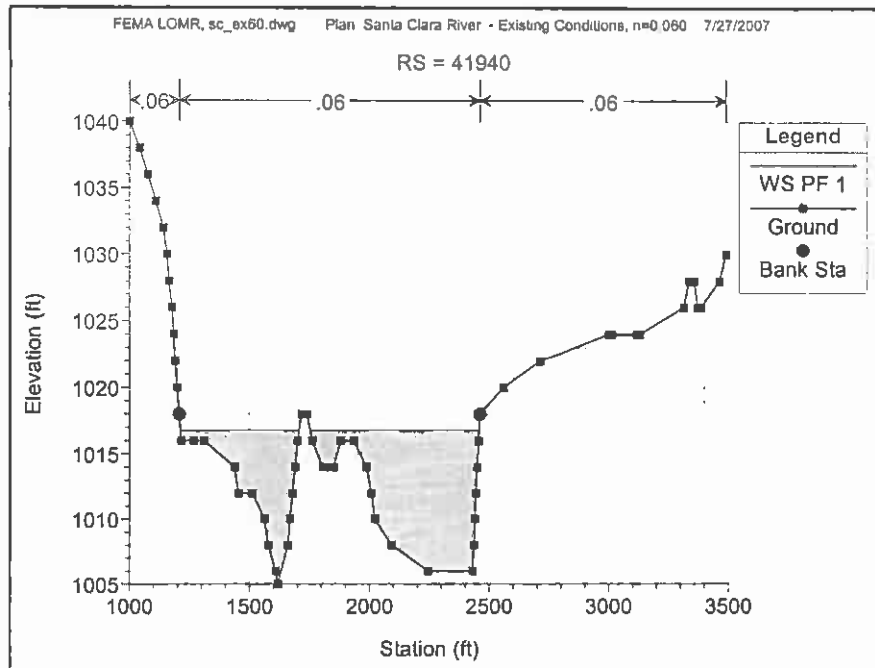
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 41940
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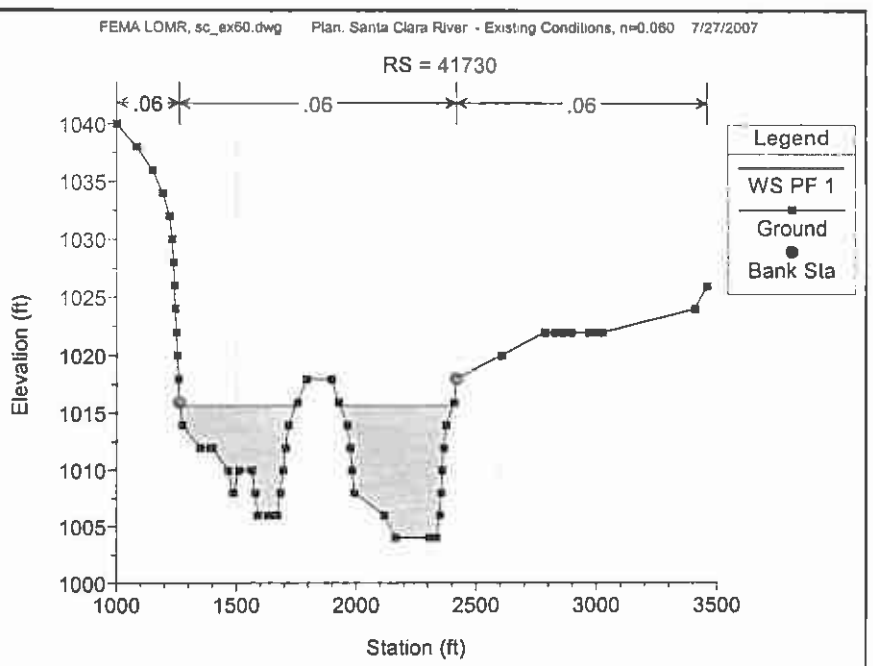
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 41730
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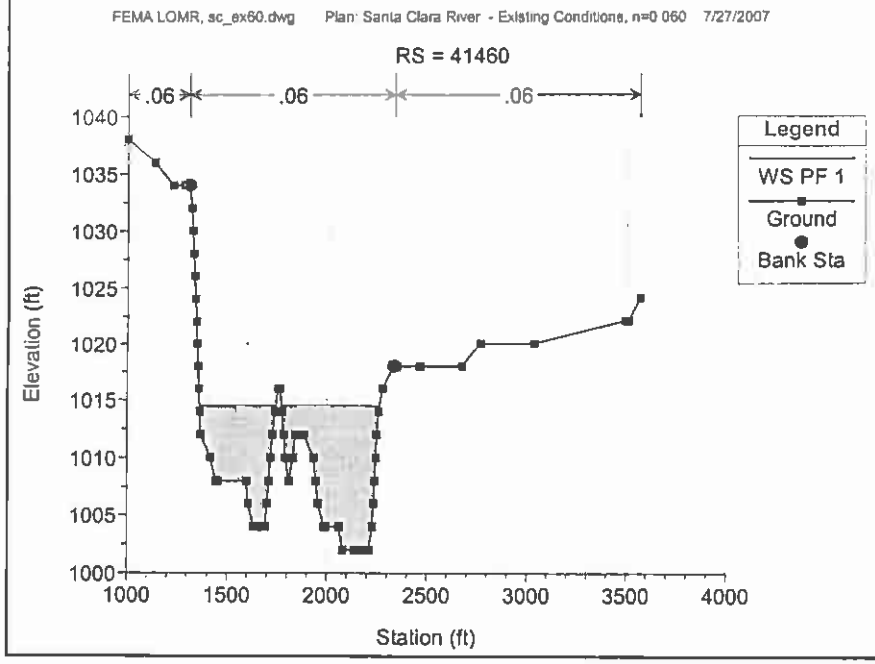
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 41460
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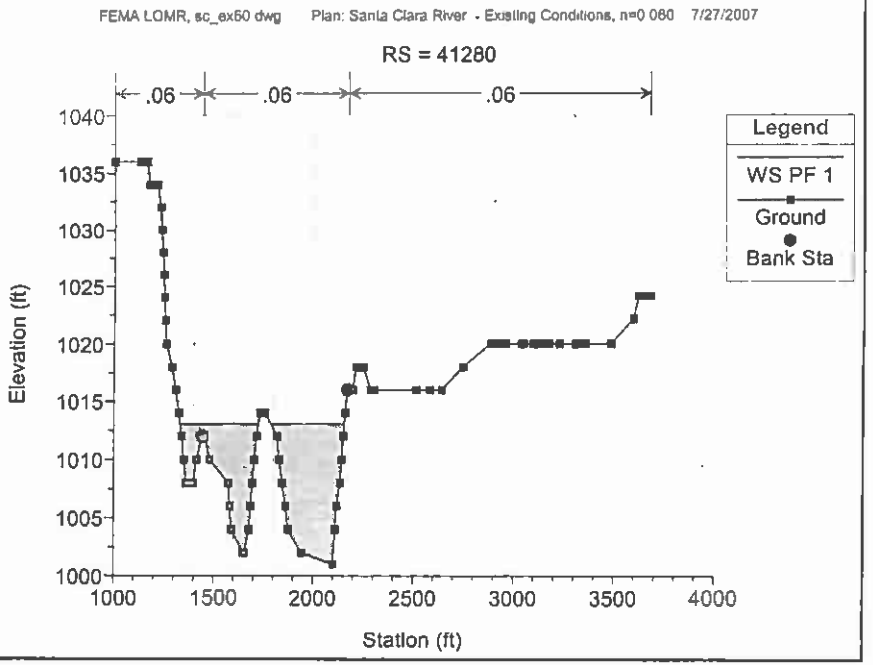
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 41280
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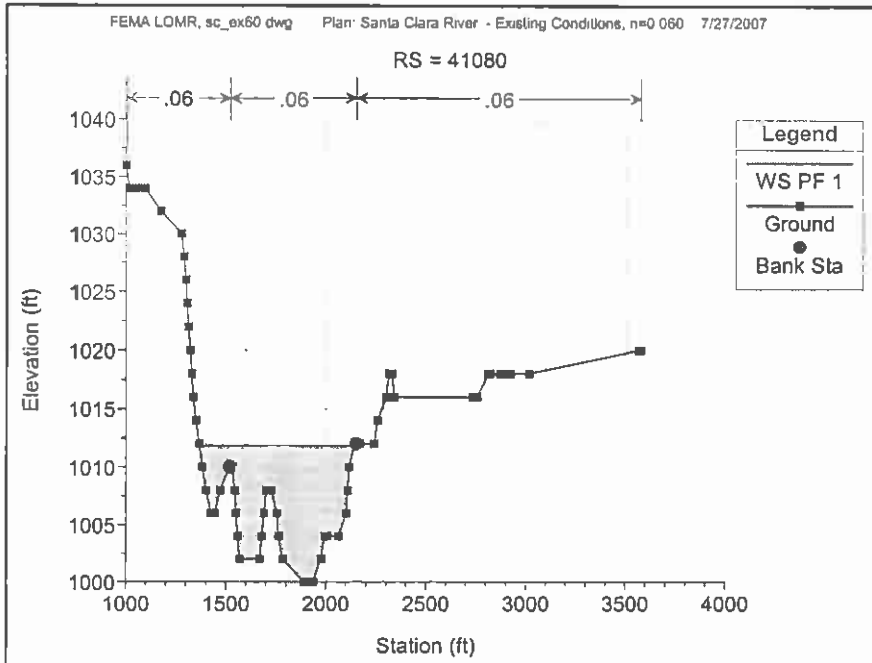
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 41080
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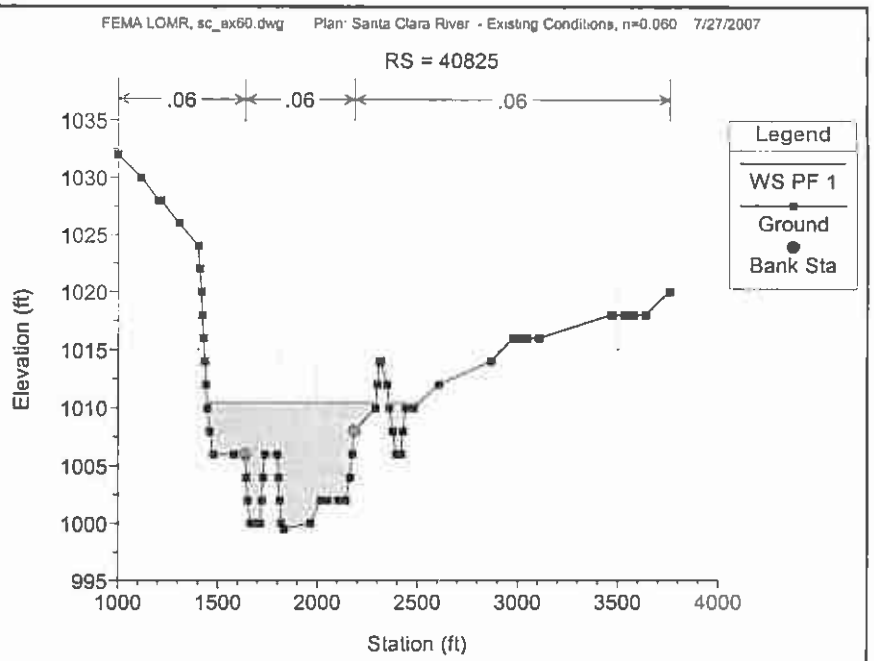
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 40825
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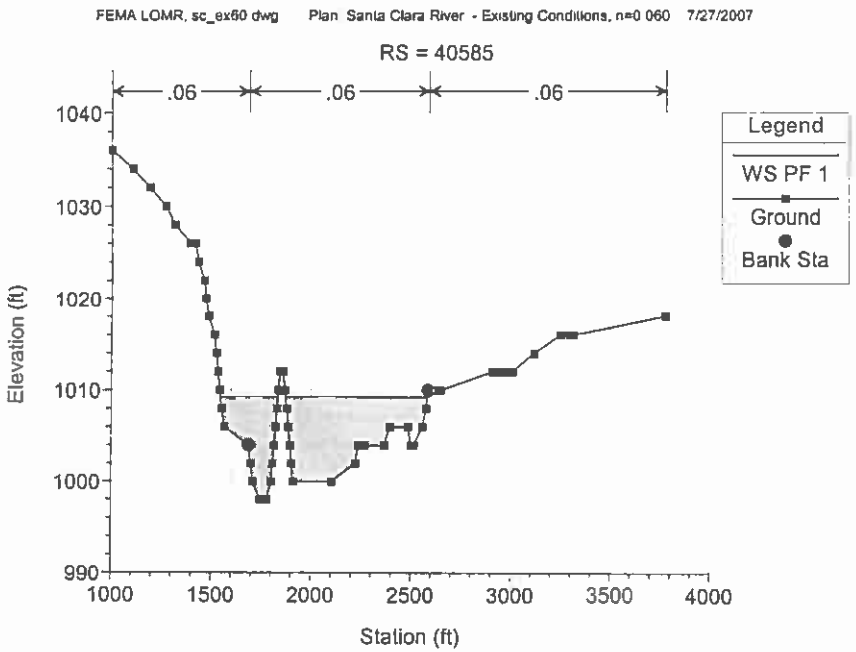
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 40585
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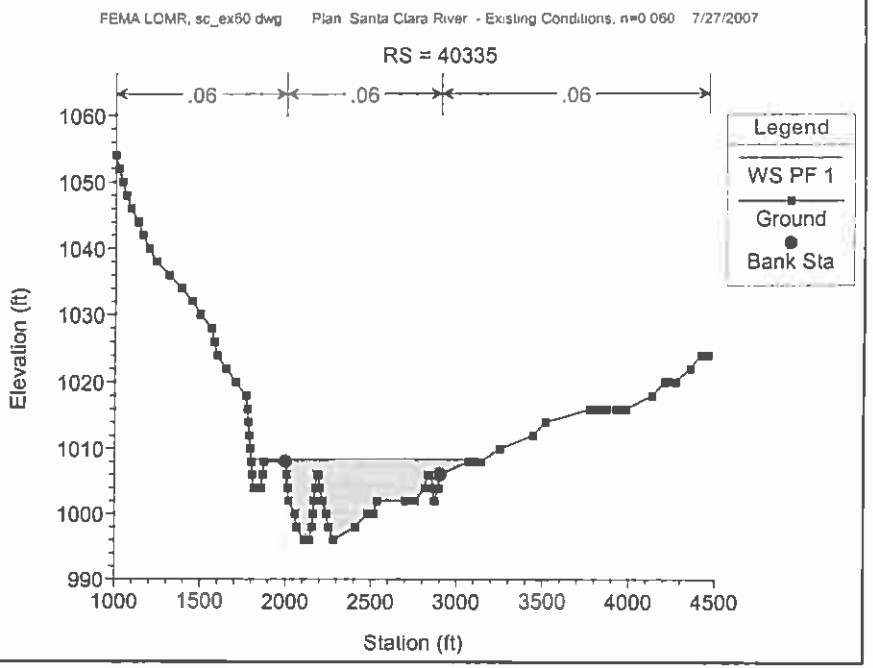
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 40335
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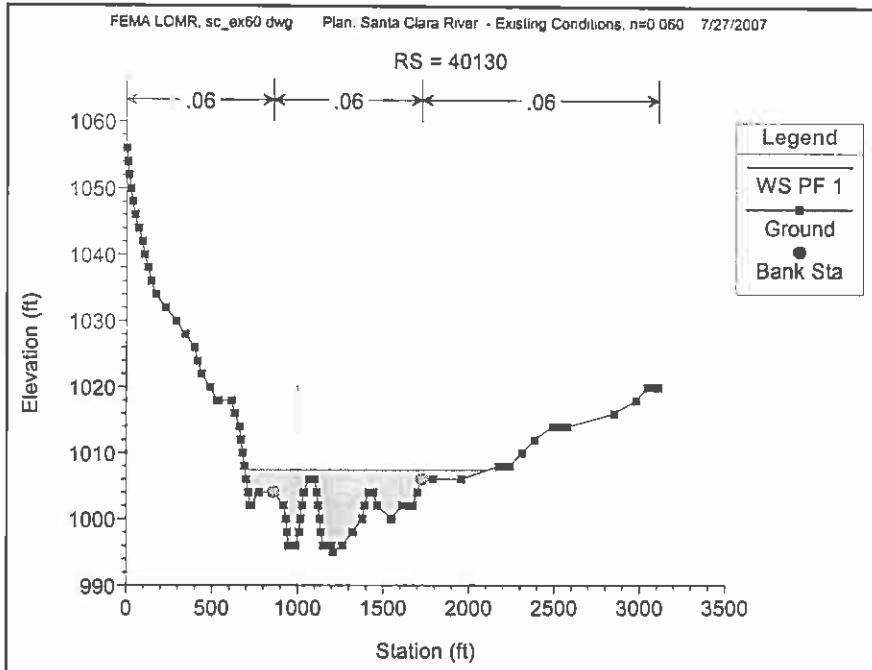
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 40130
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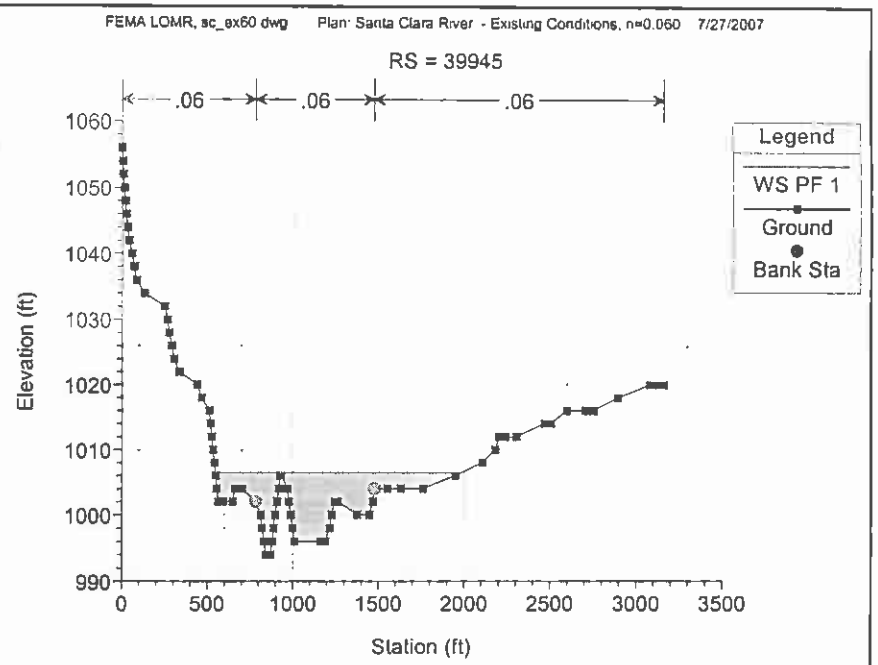
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 39945
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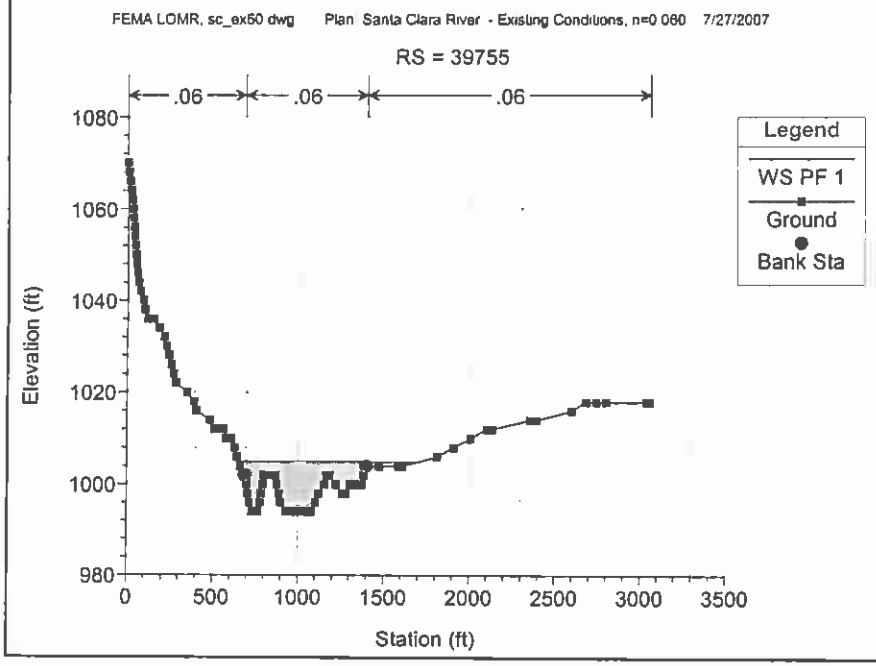
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 39755
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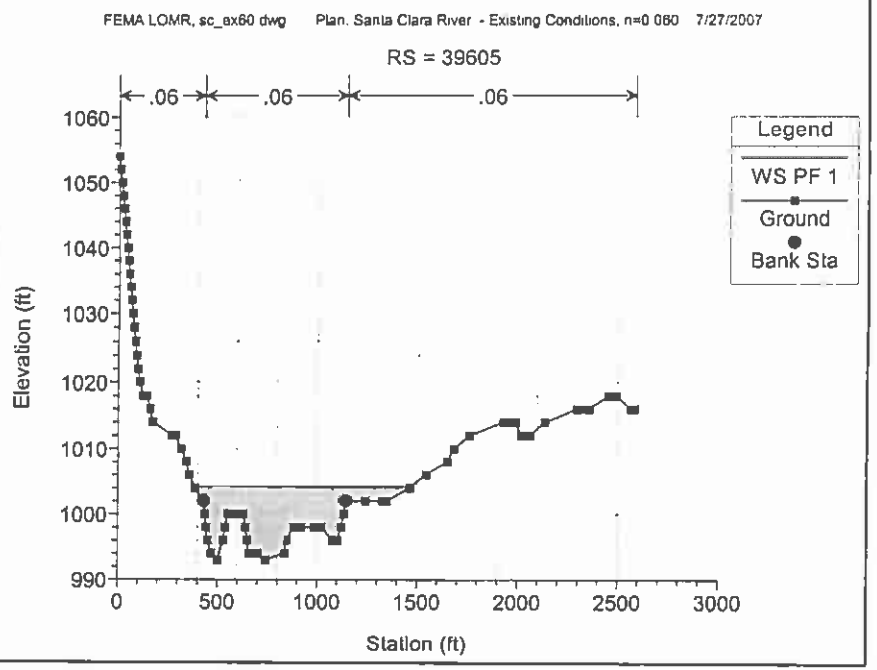
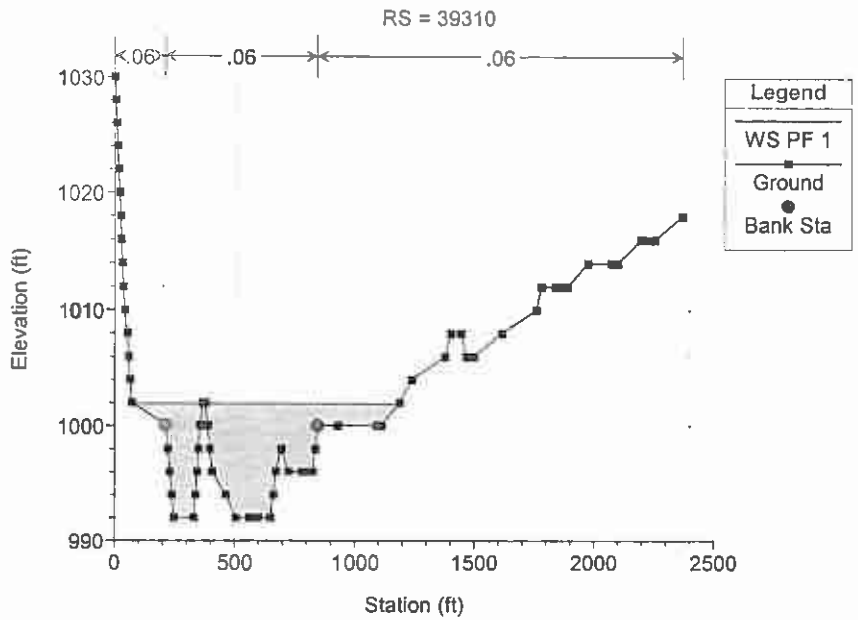
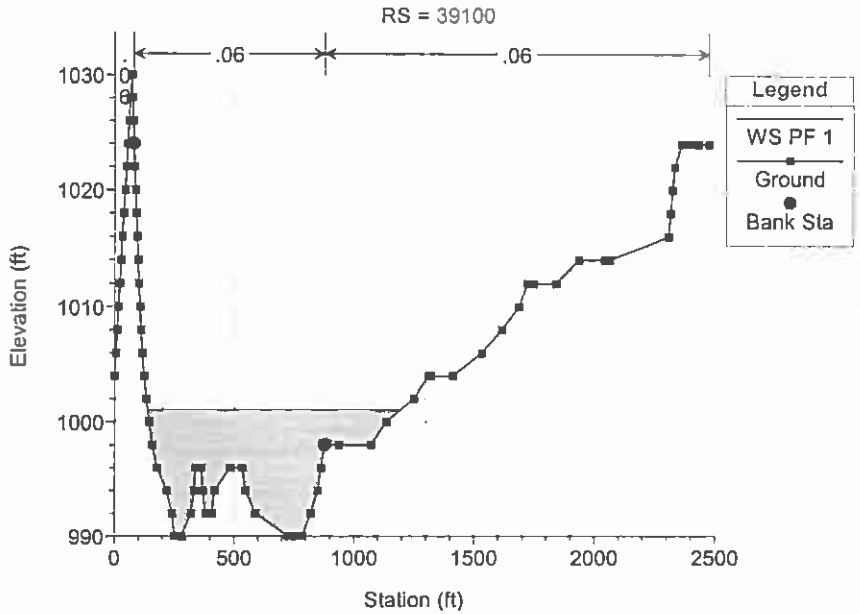
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 39605
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

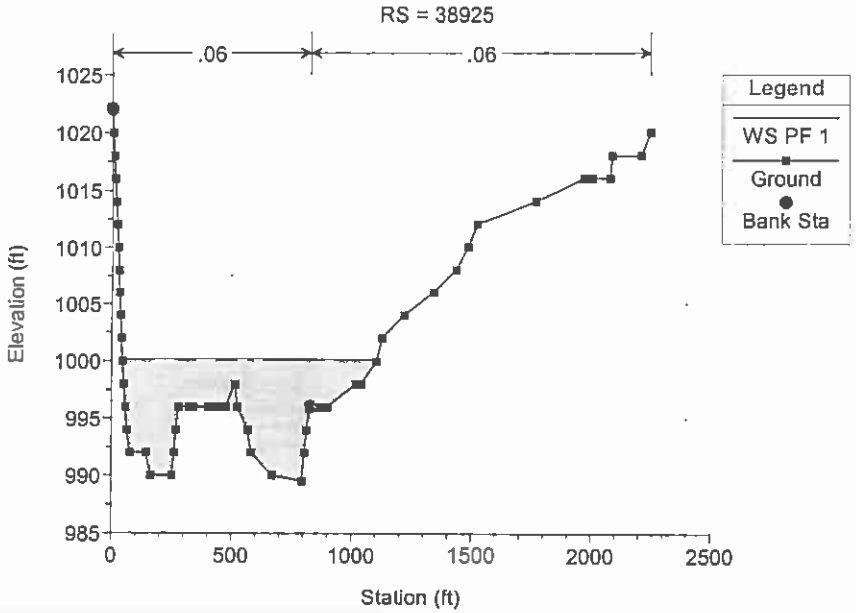
FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007



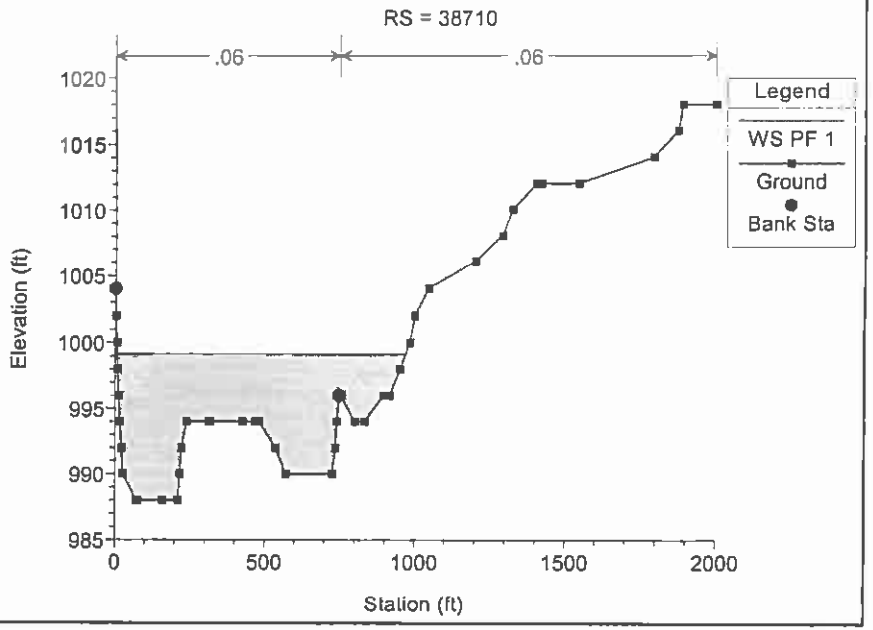
FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007

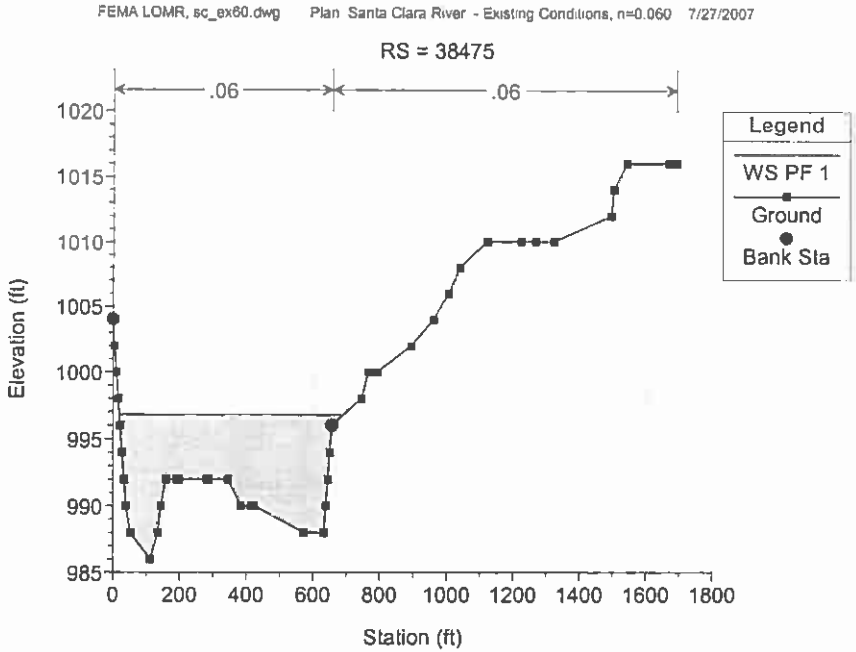


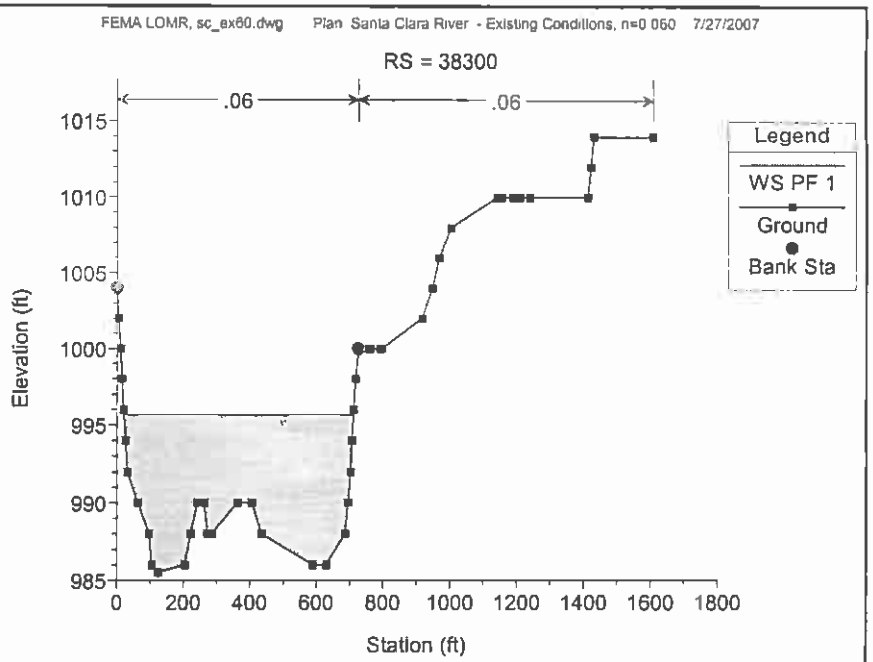
FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007



FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007




FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 38475
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 38300
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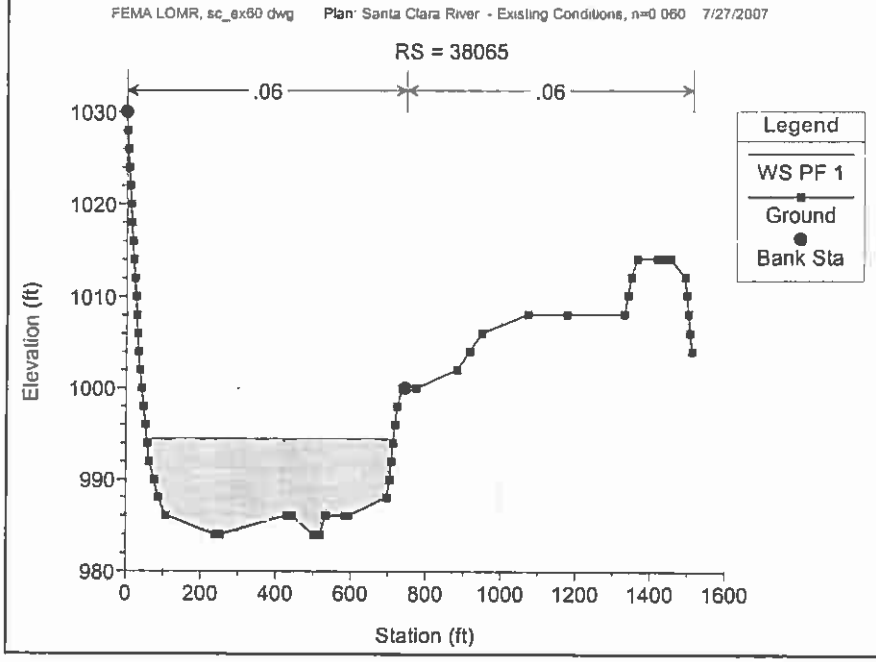
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 38065
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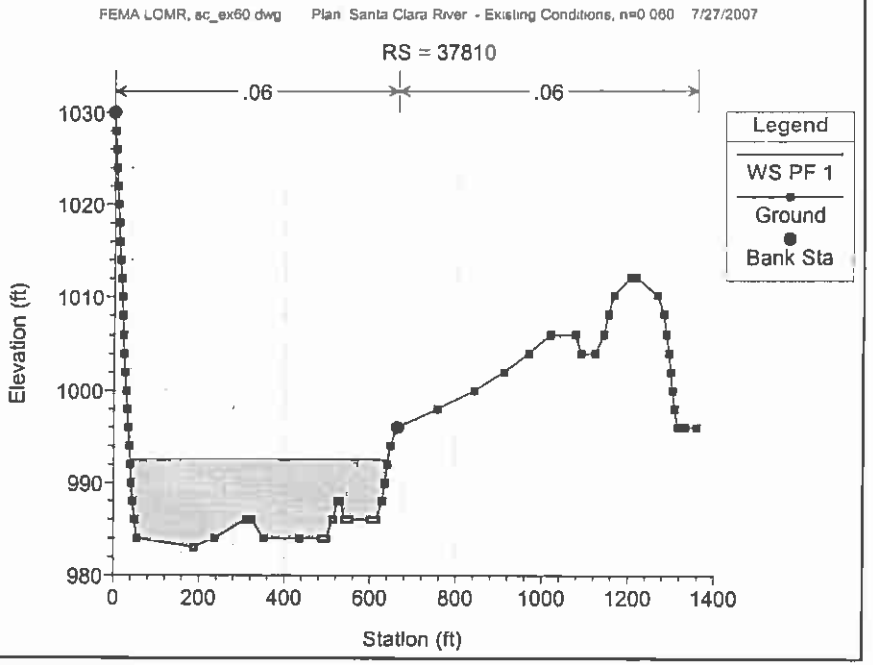
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 37810
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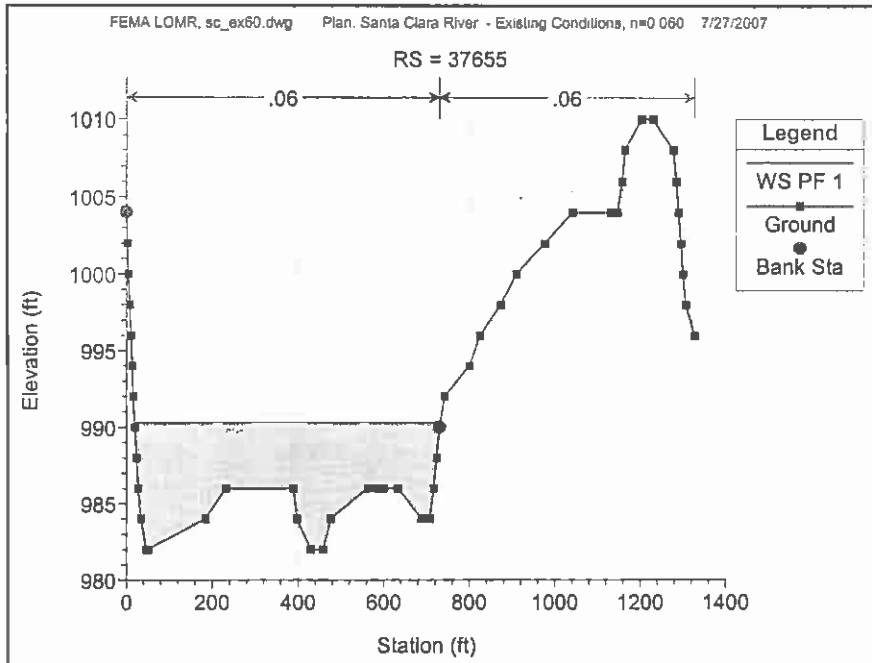
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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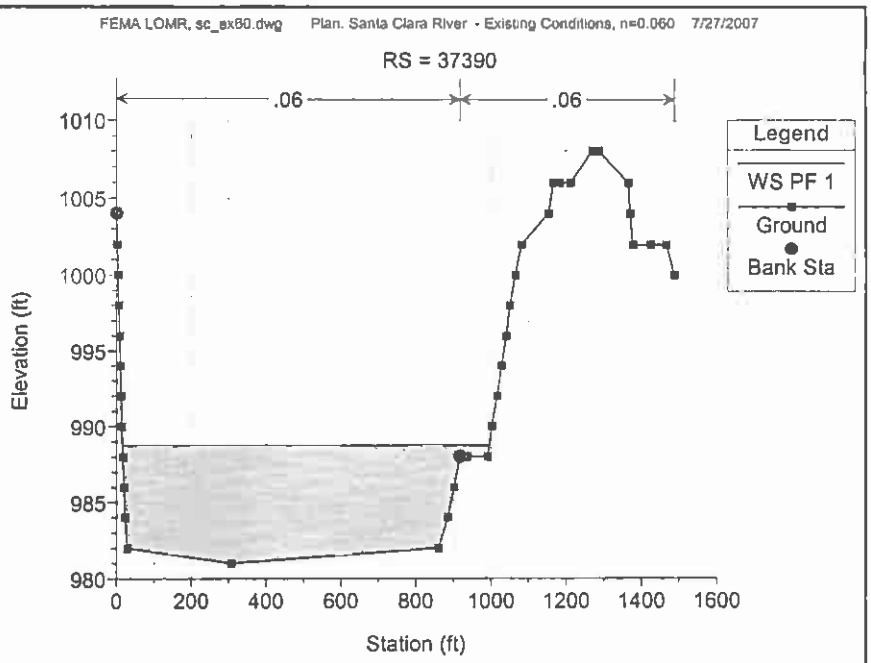
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 37390
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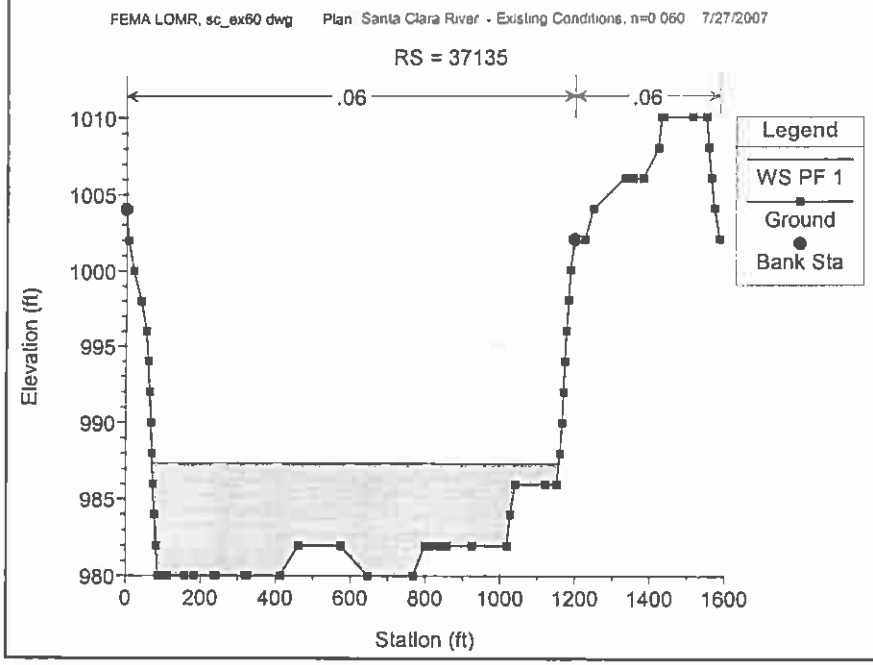
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 37135
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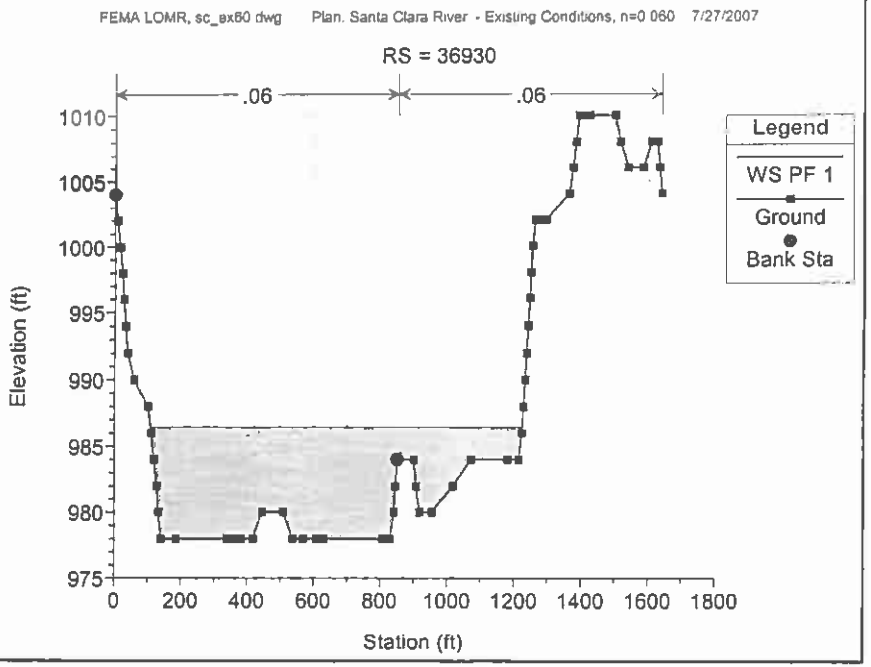
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 36930
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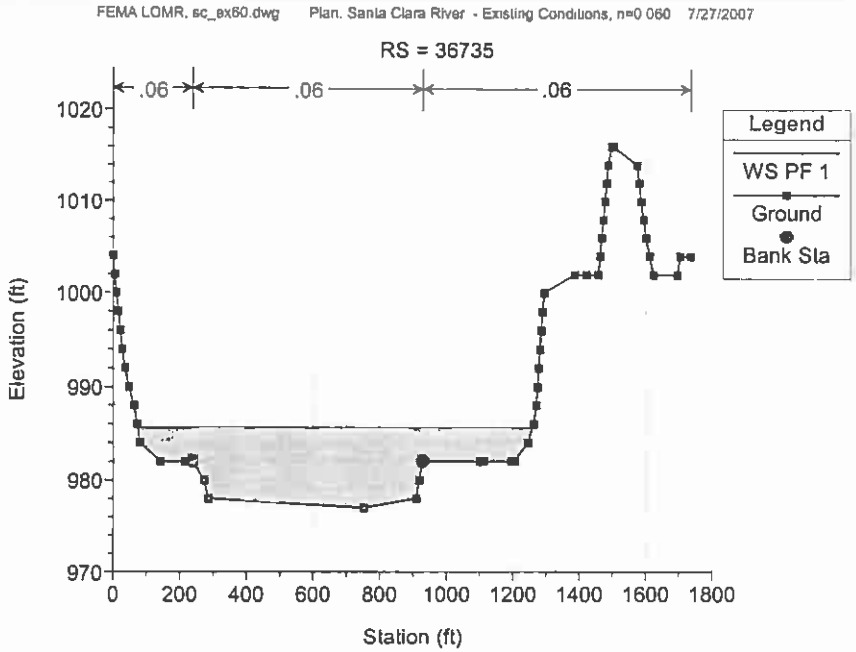
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 36735
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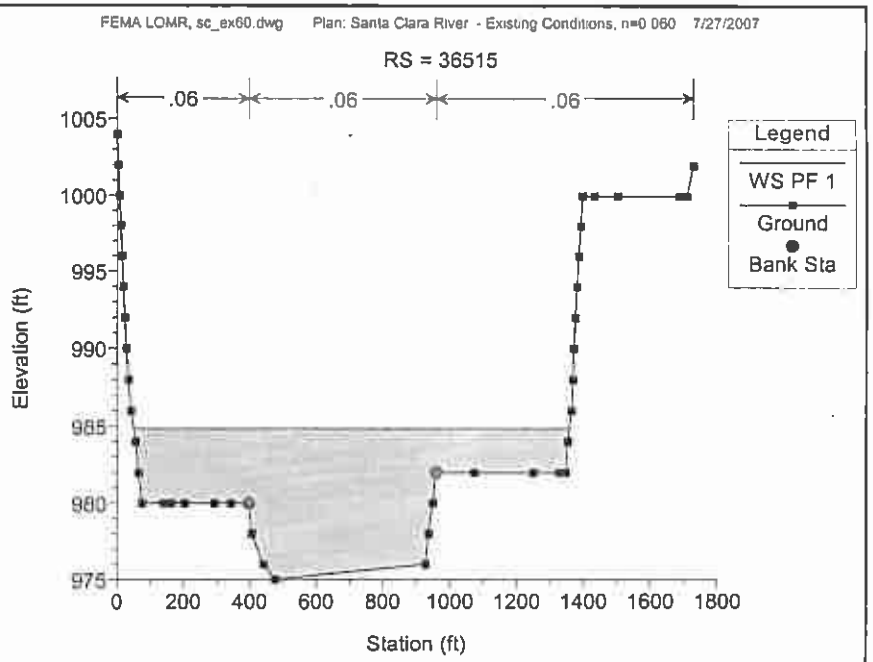
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 36515
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.06
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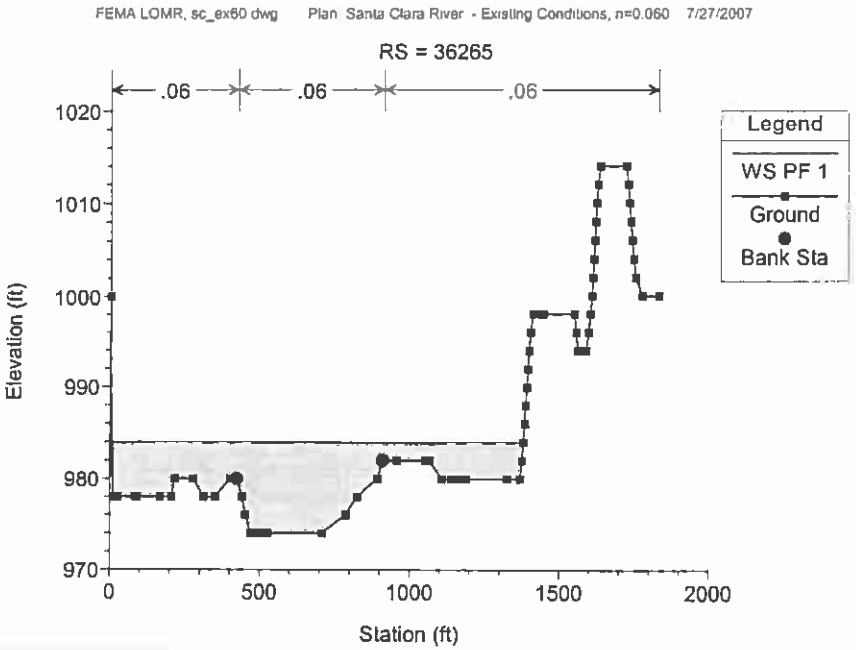
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 36265
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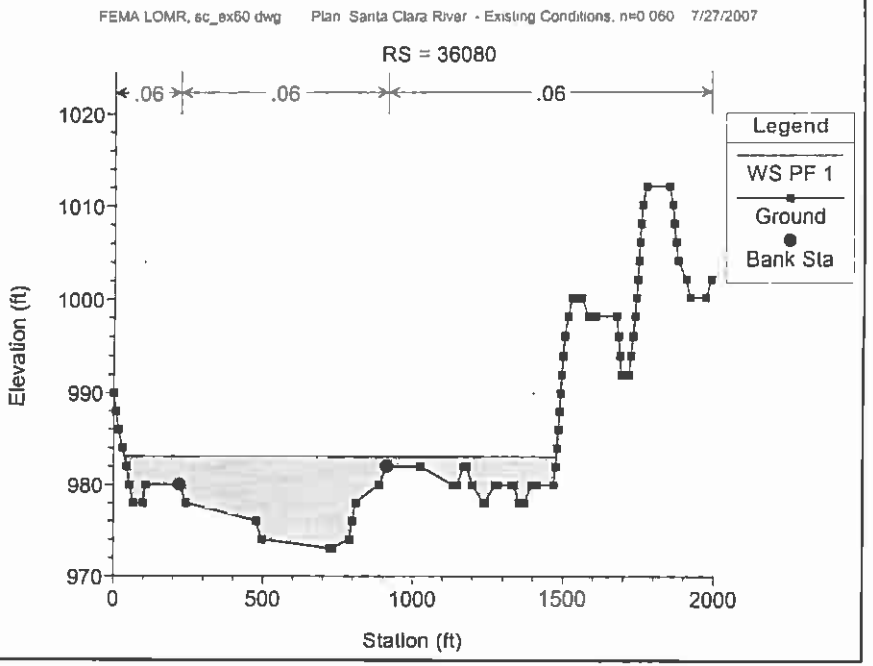
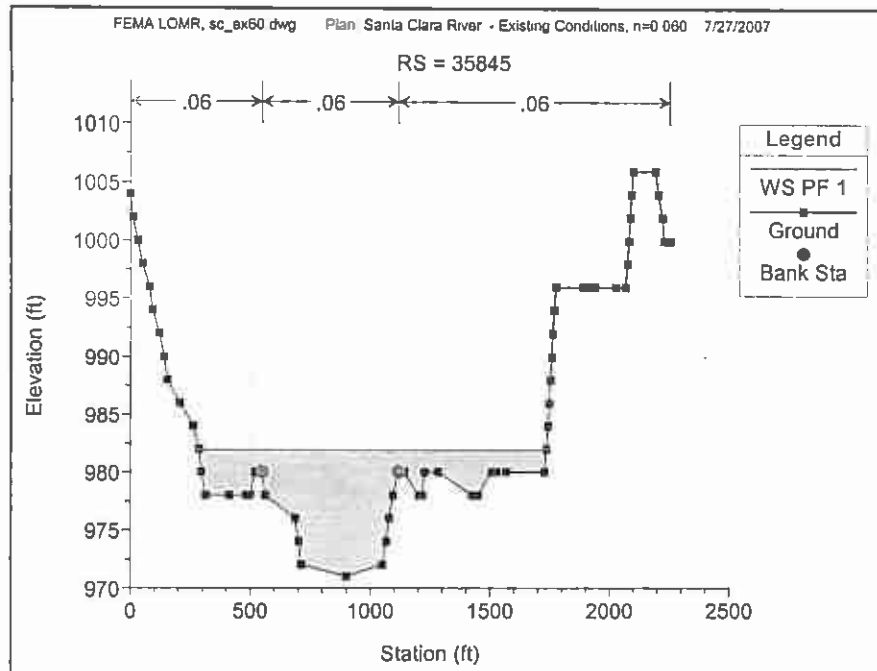
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 36080
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 35845
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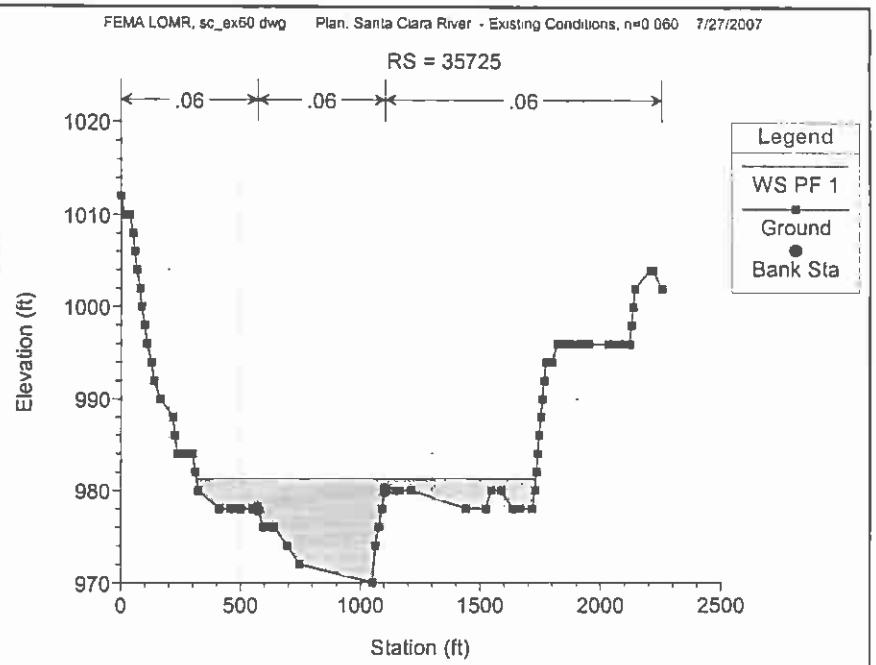
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 35725
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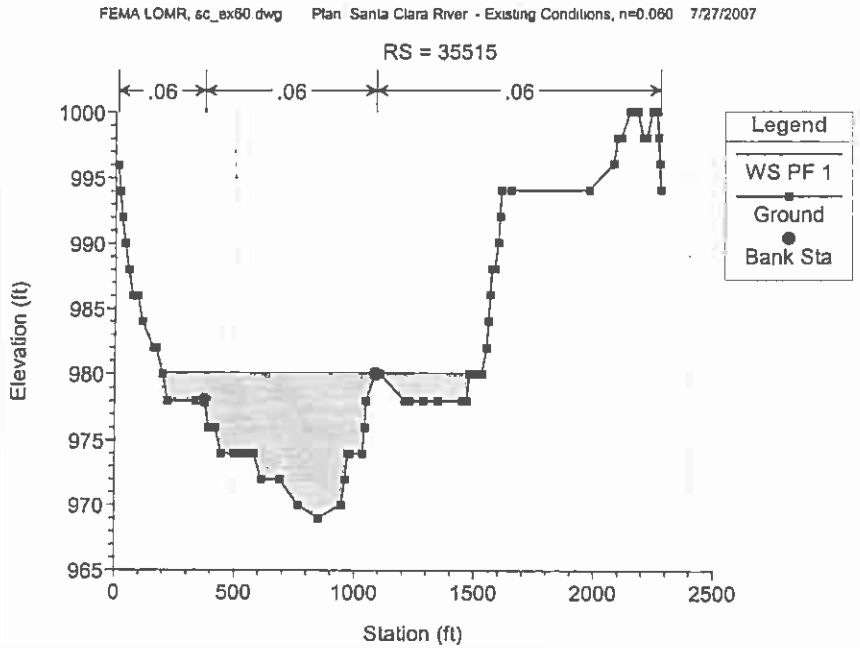
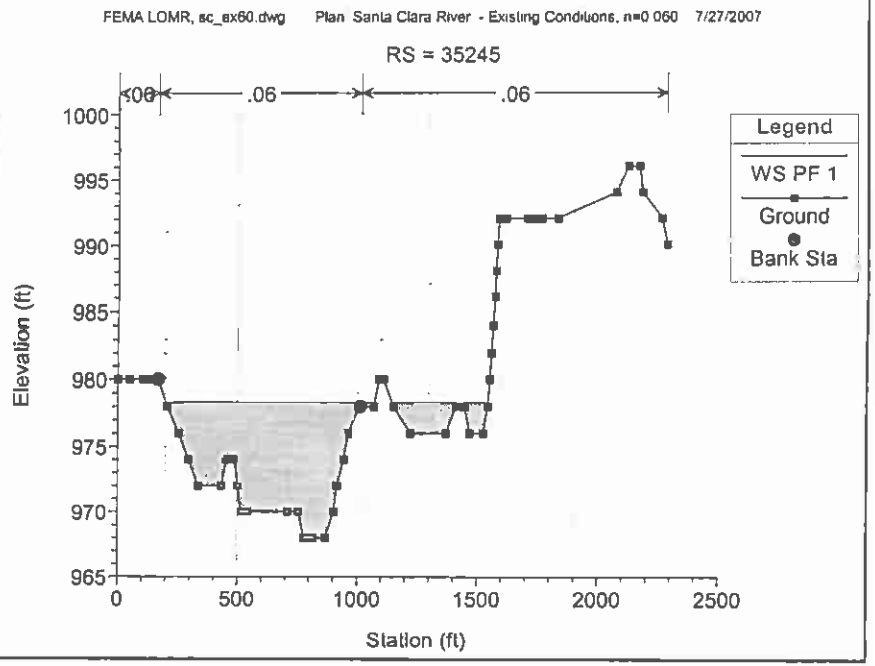
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 35515
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 35245
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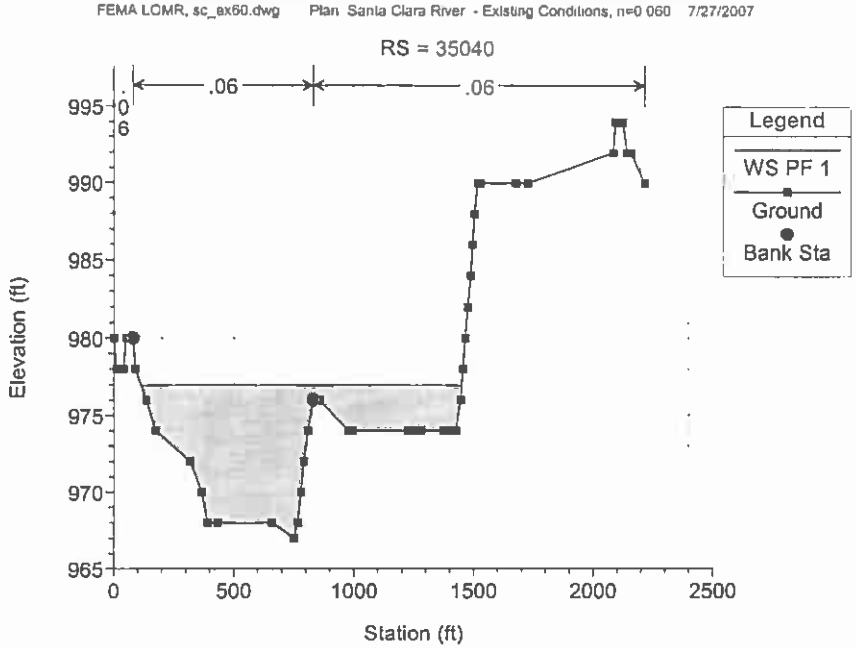
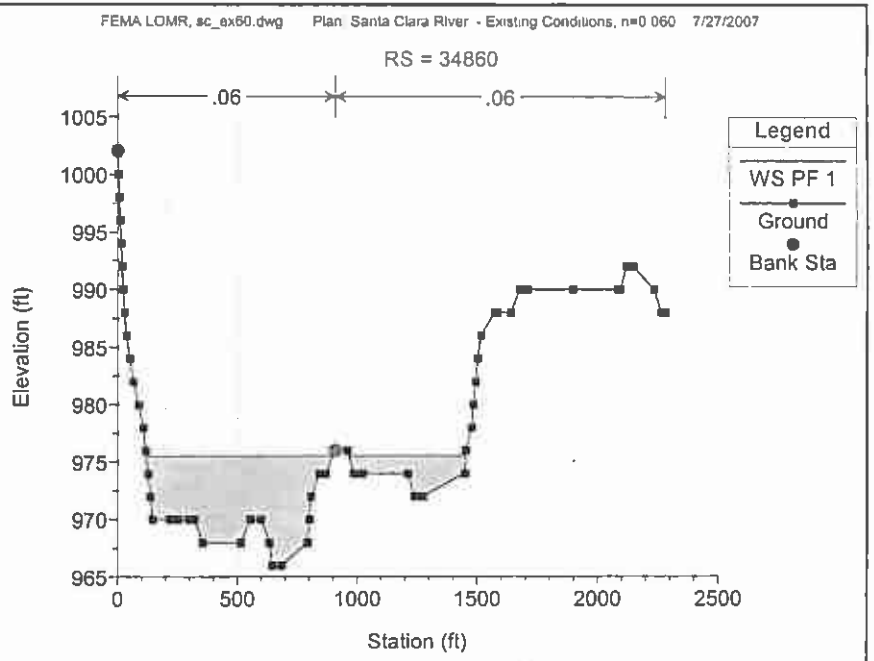
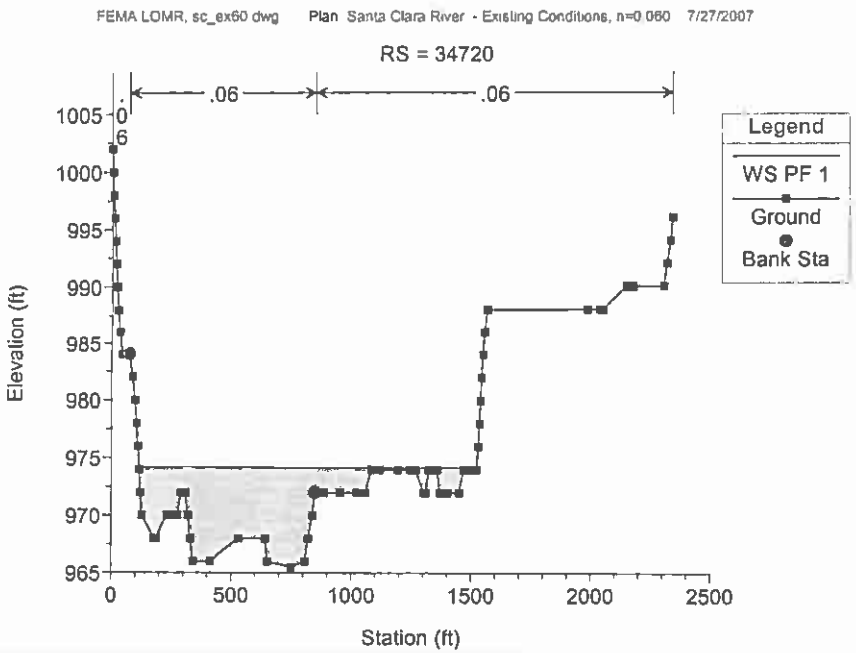
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 35040
.06
.06
0
6
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 34860
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 34720
.06
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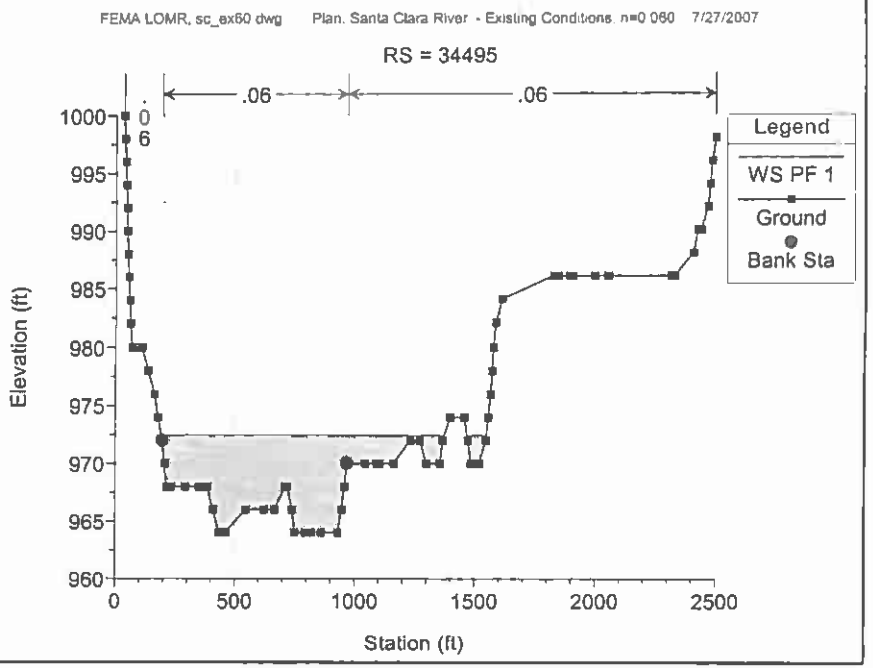
0
6
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 34495
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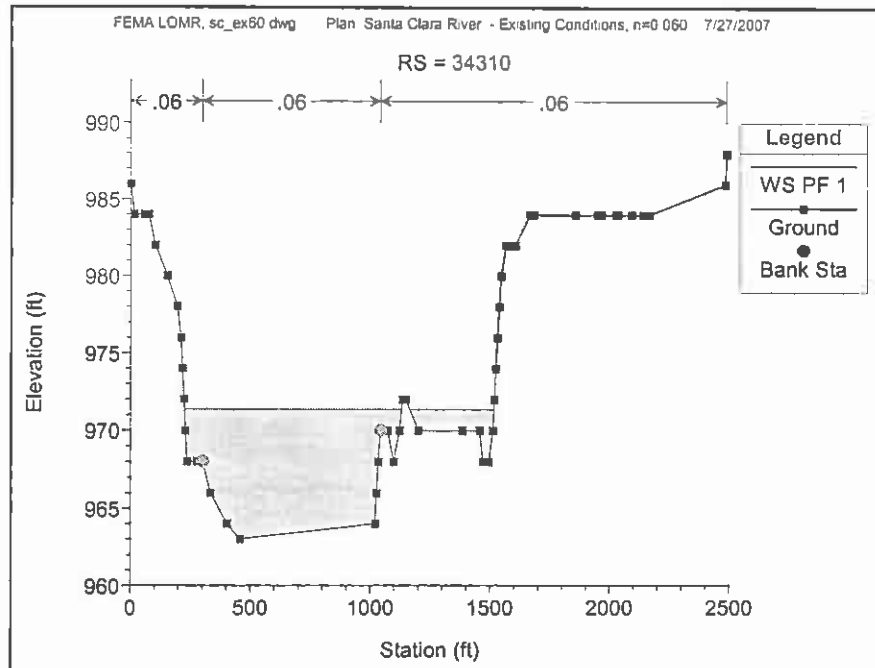
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 34310
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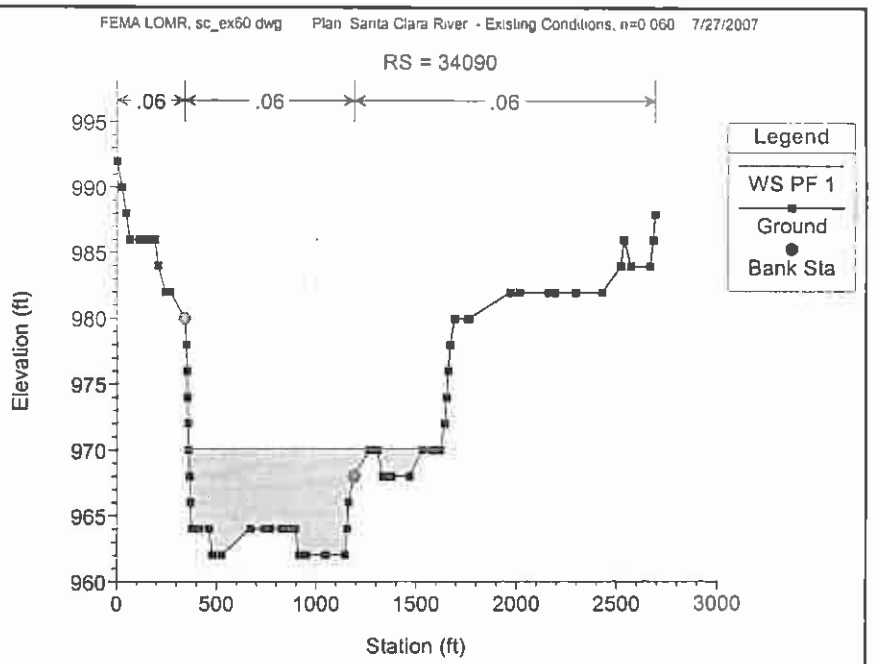
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 34090
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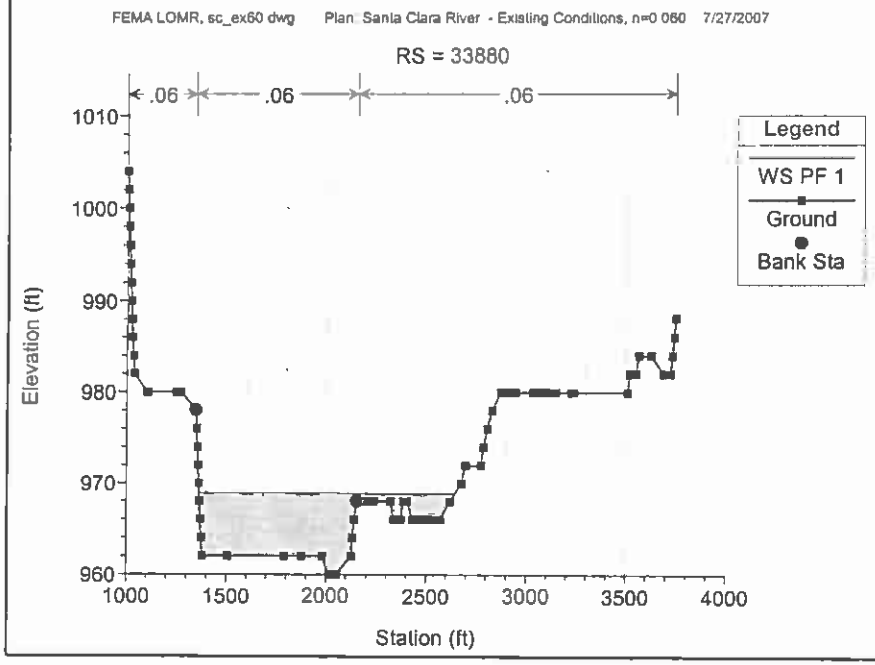
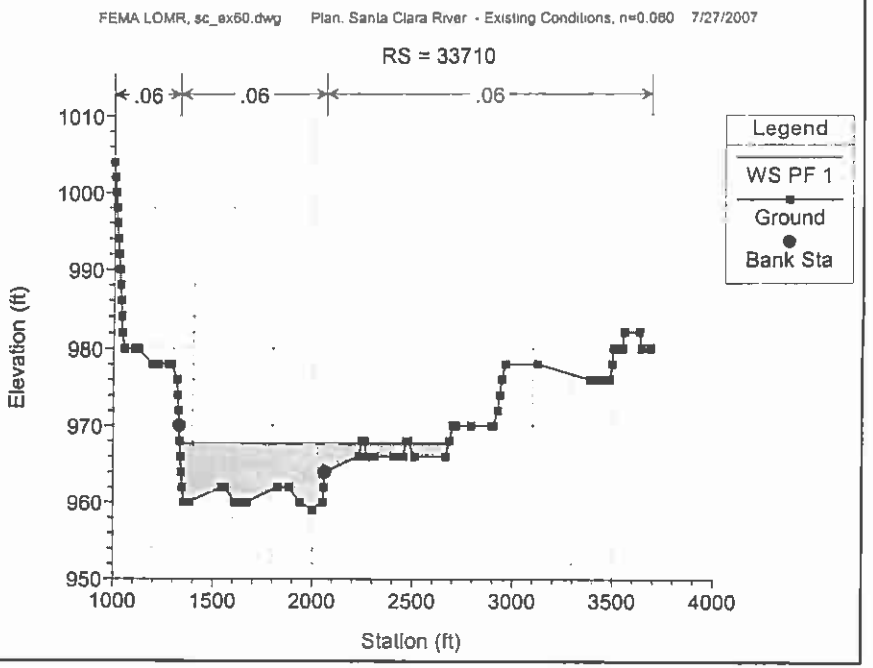
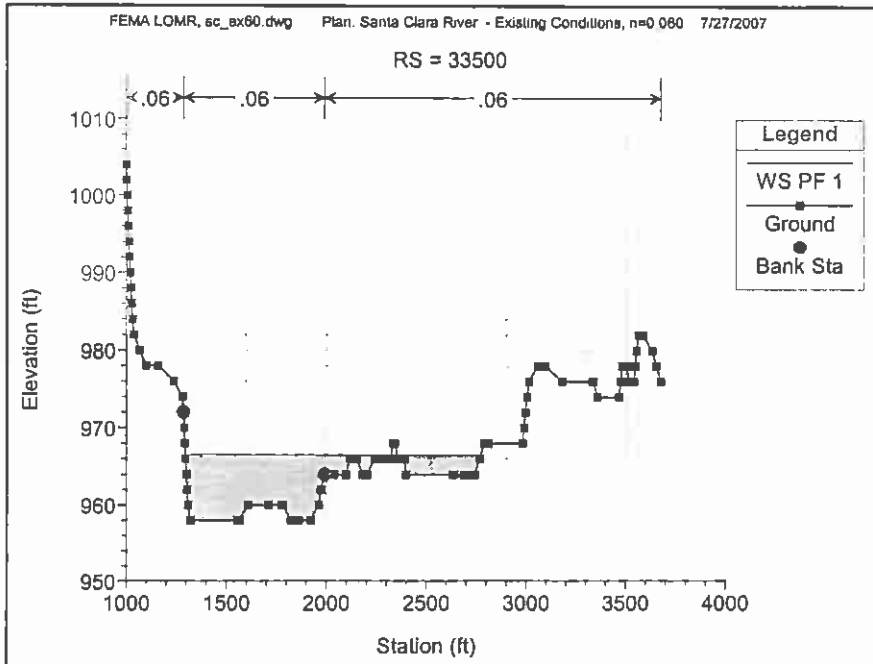
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 33880
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 33710
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 33500
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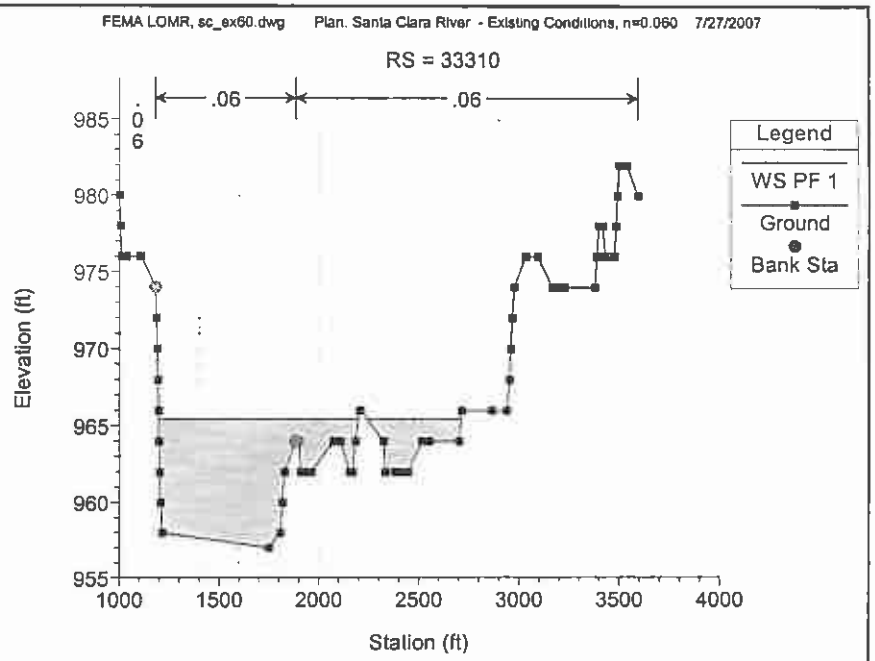
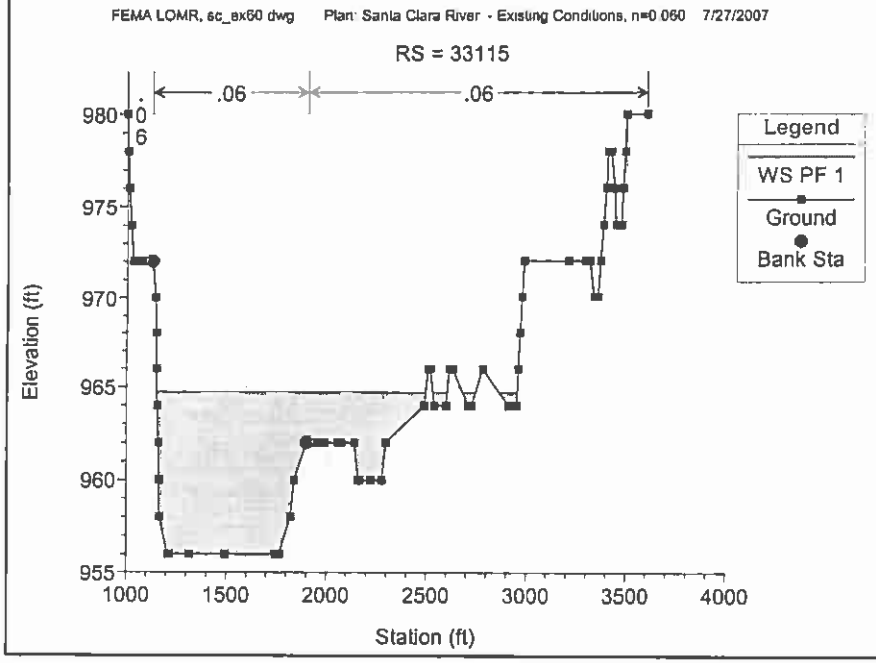
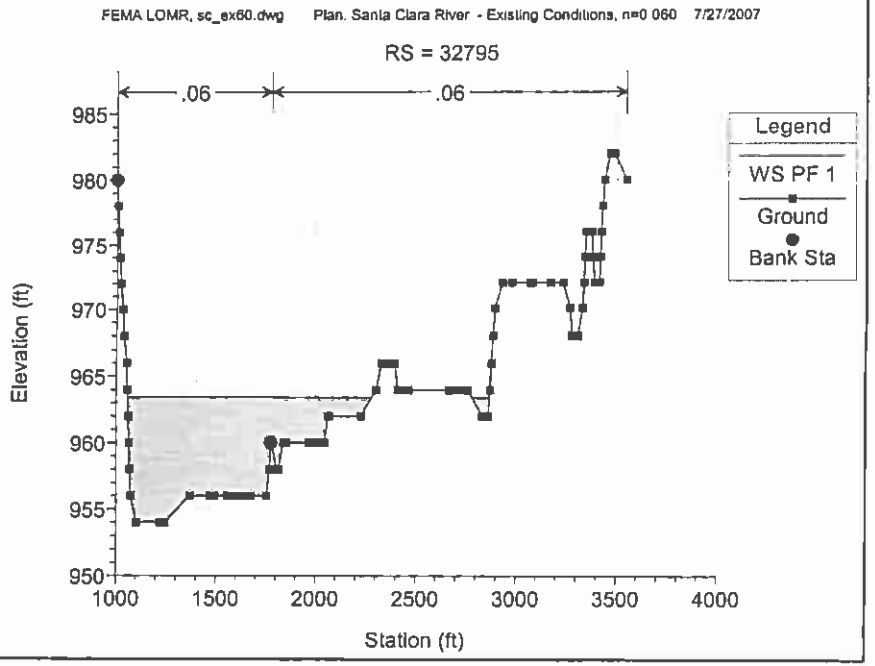
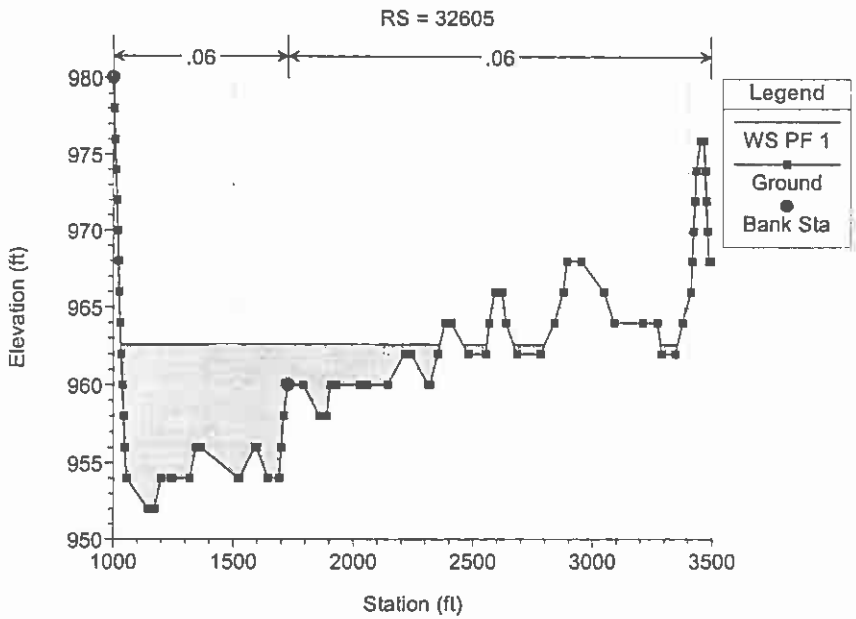
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 33310
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

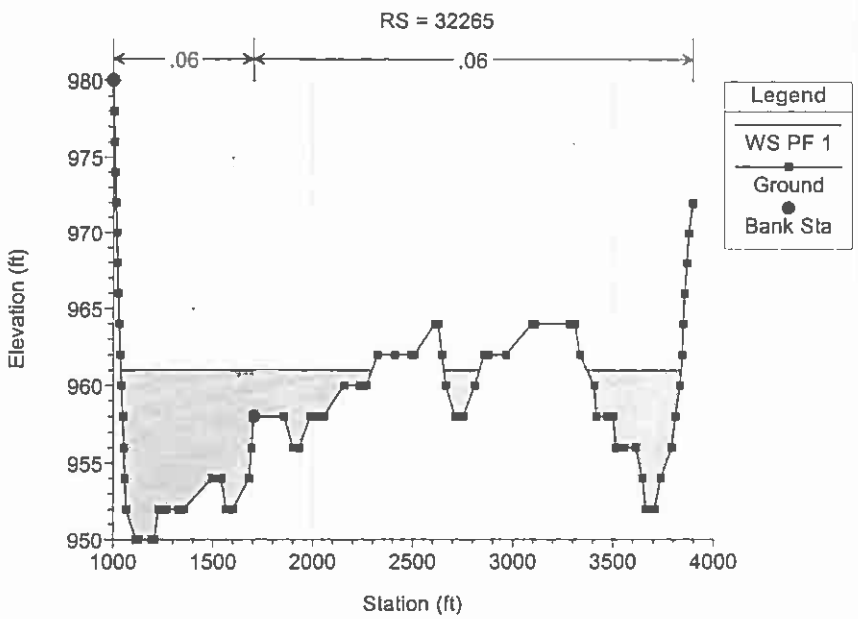

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 33115
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 32795
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

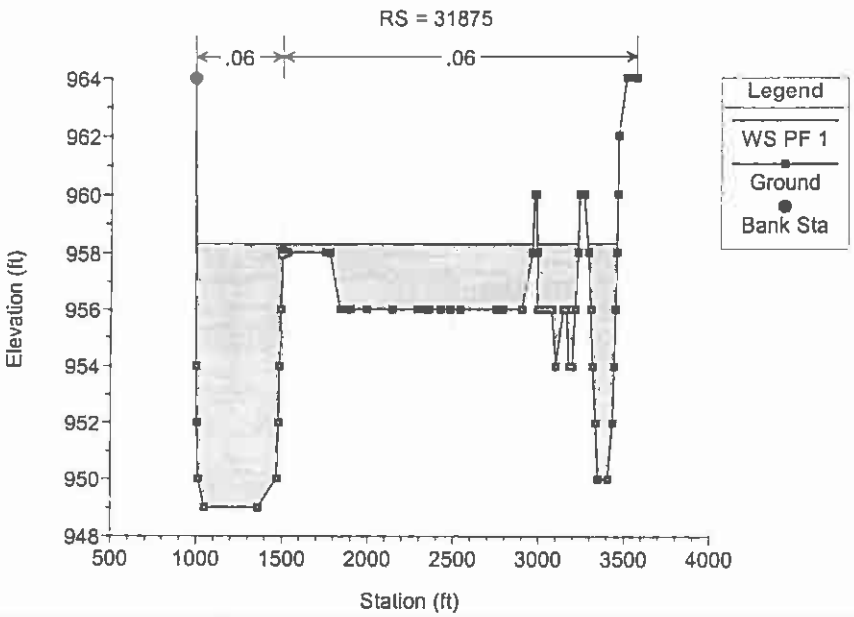
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



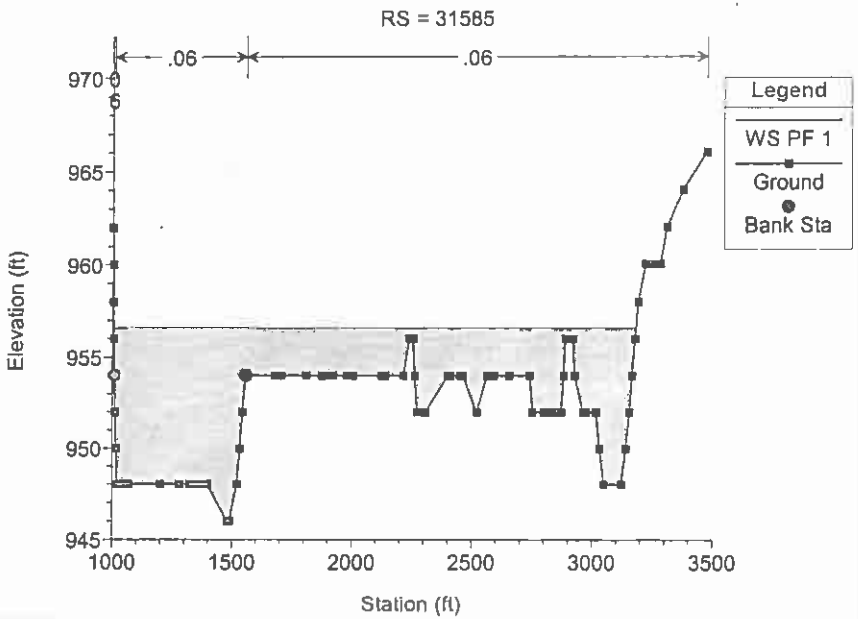
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

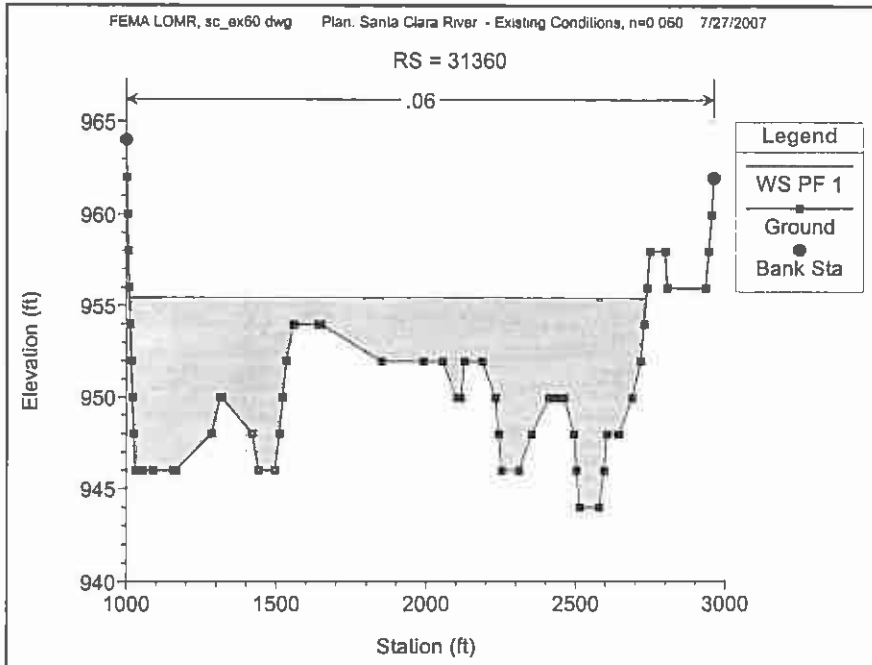


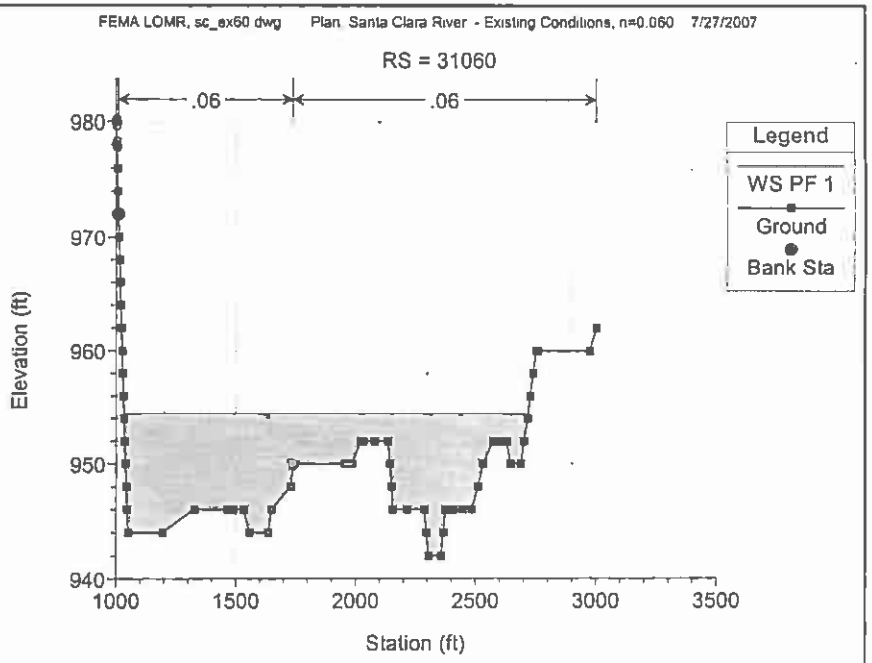
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

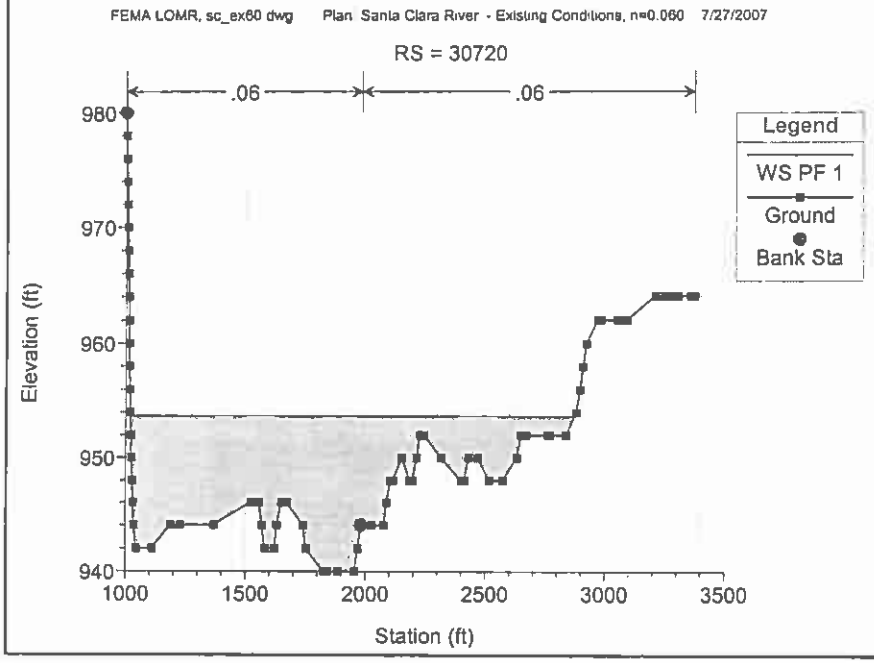


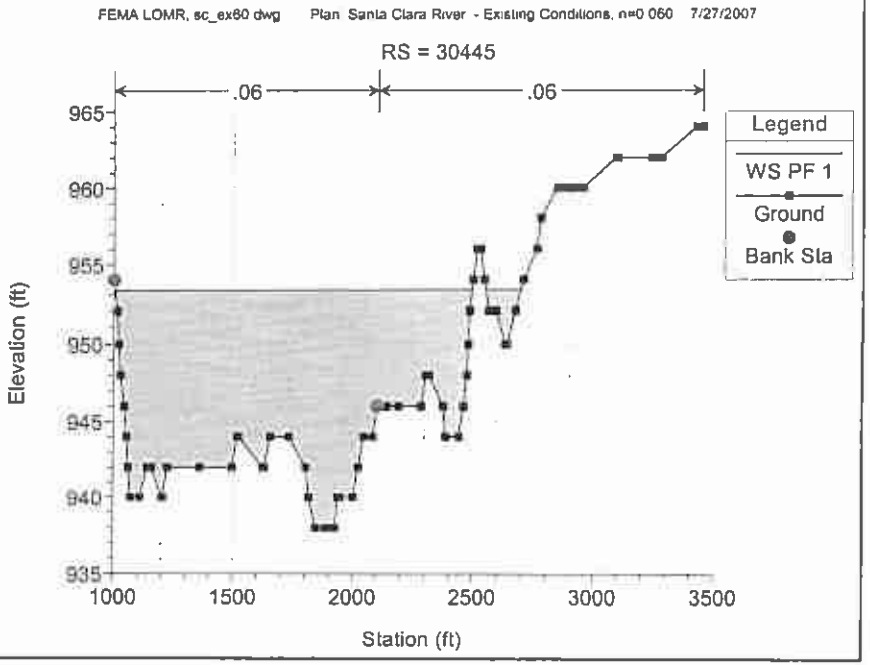
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

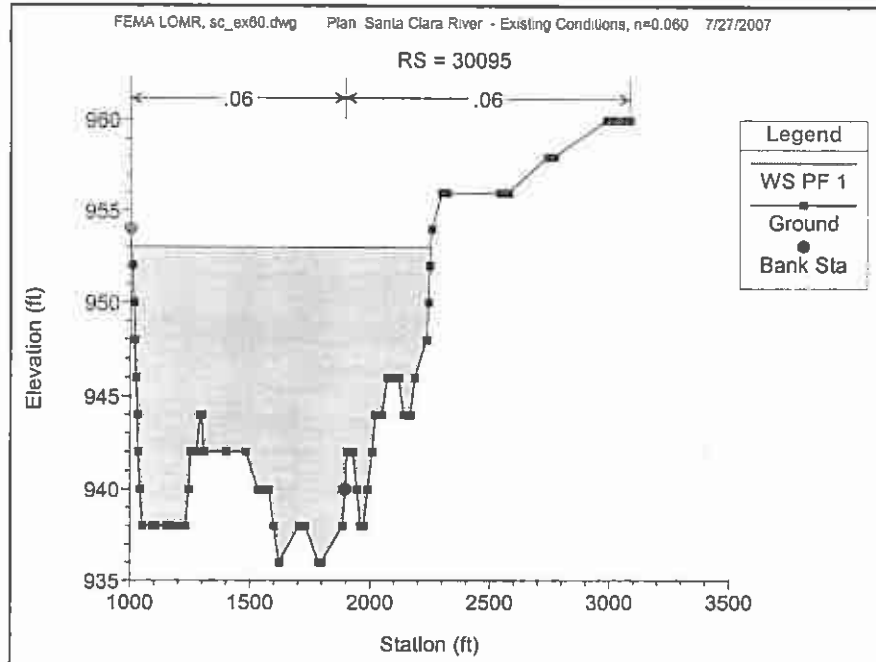


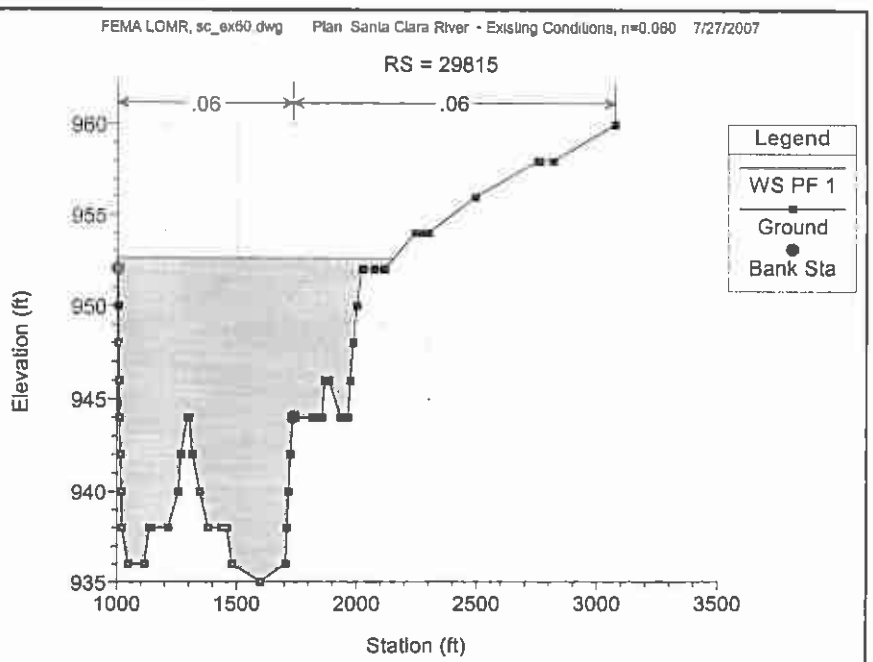

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 31360
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

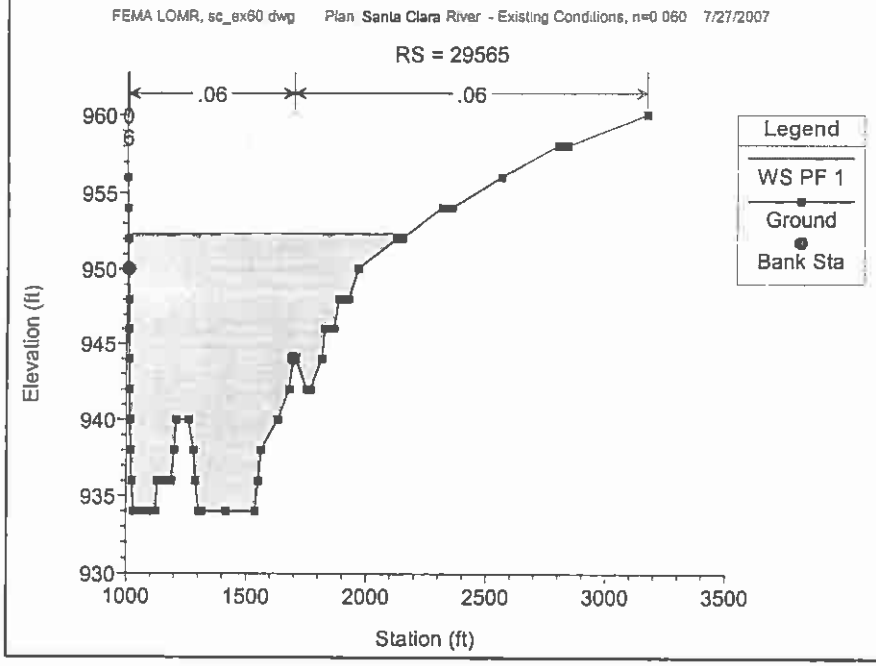

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 31060
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

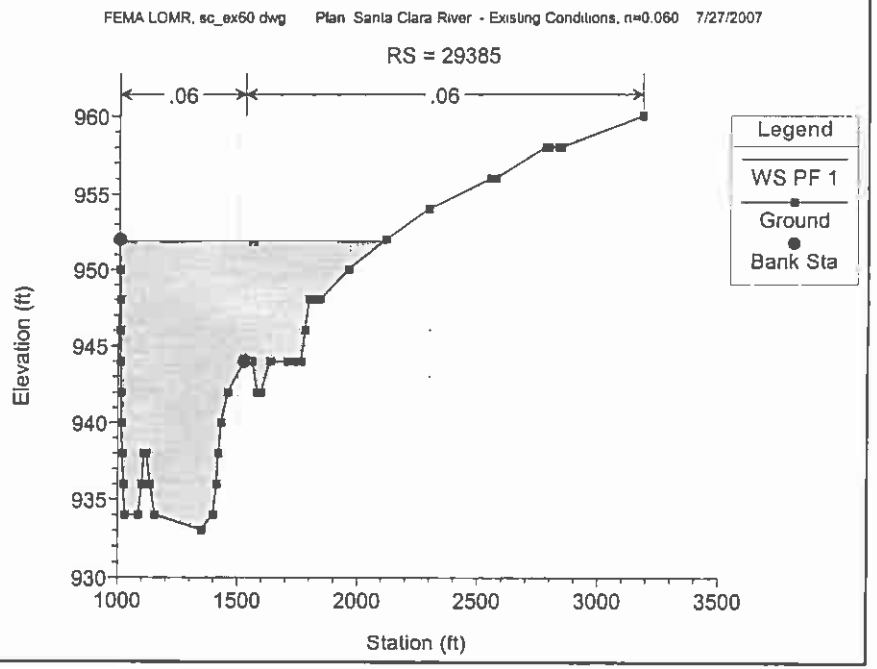

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 30720
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

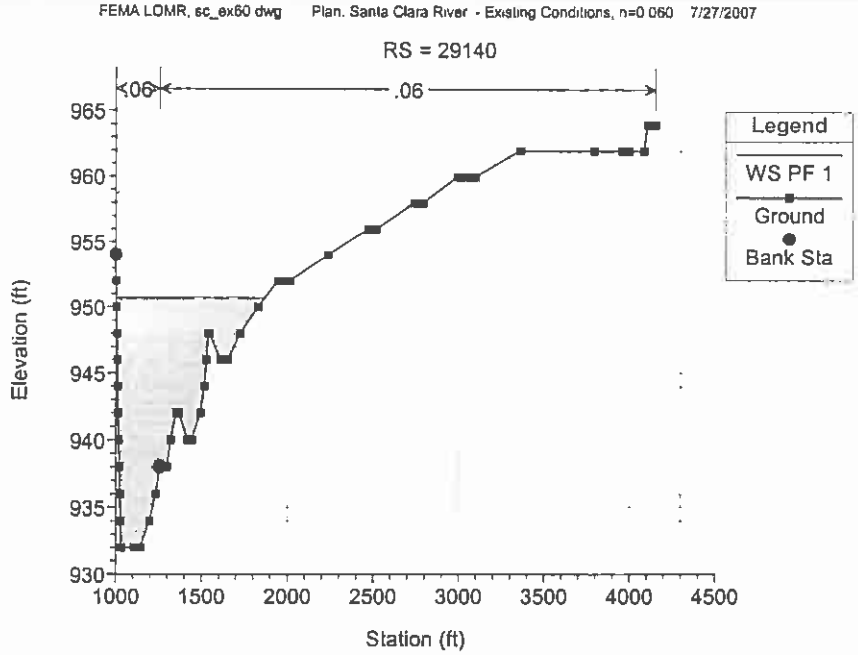

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 30445
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

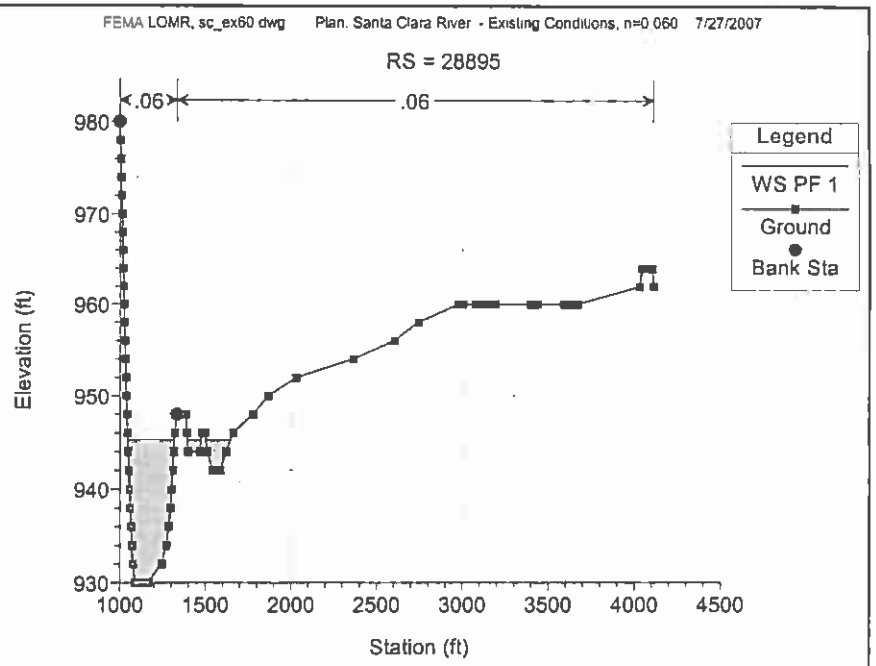

FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 30095
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

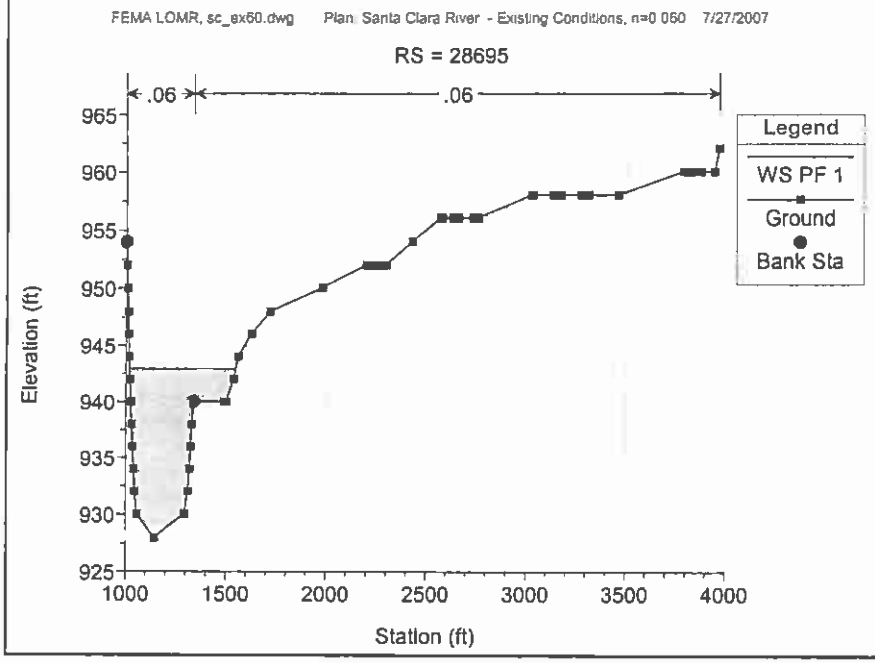

FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 29815
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

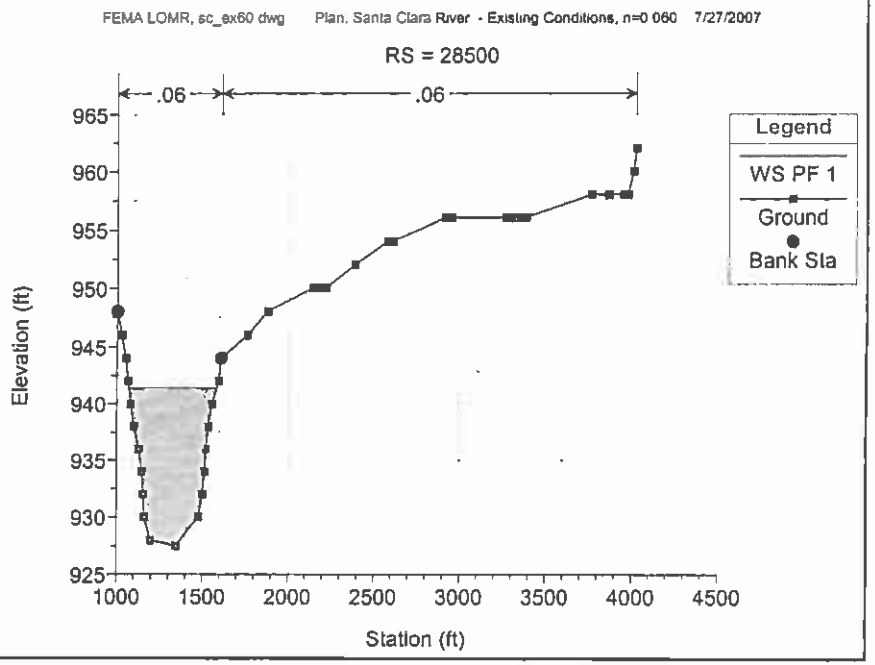

FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 29565
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 29385
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 29140
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 28895
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 28695
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 28500
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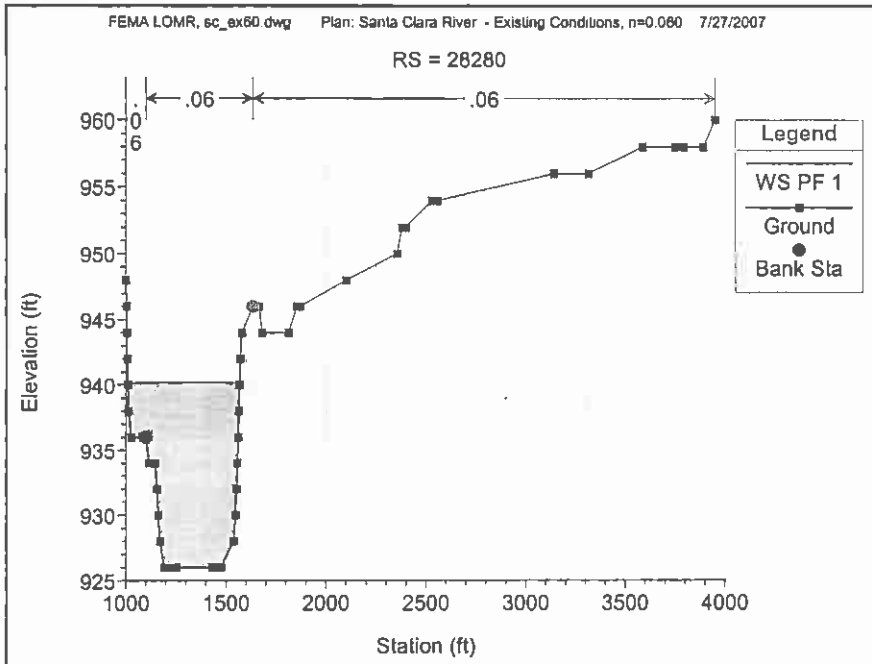
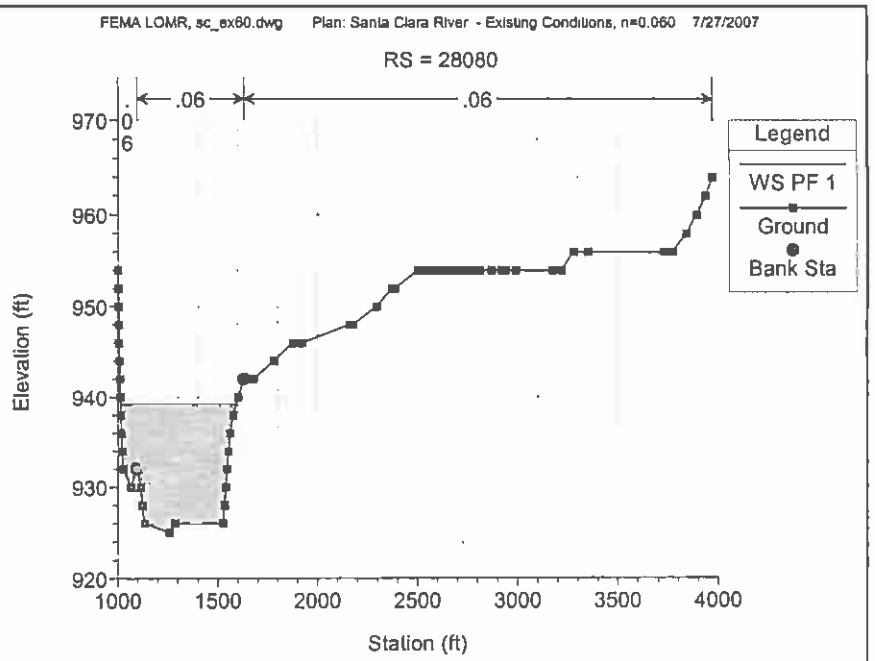
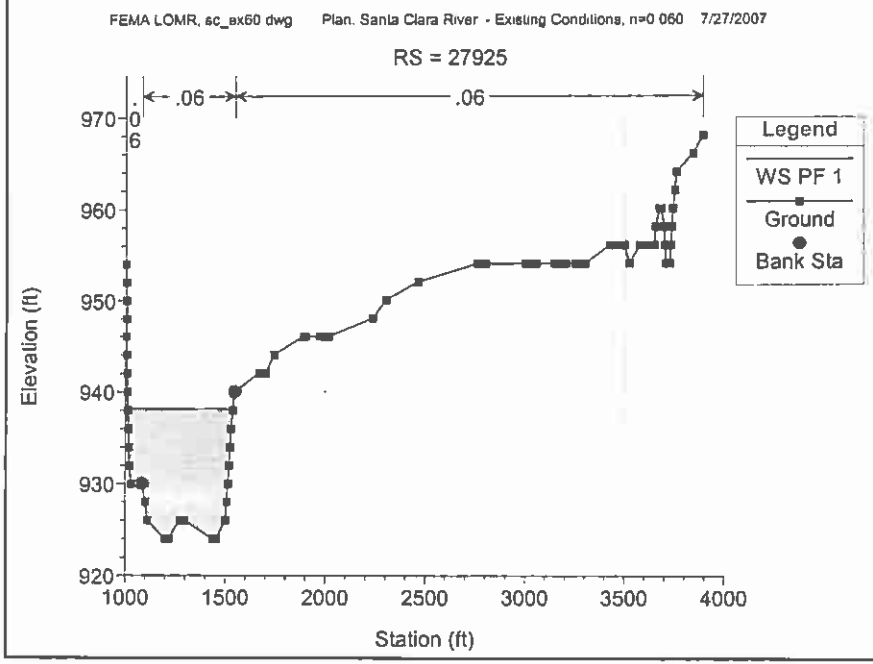
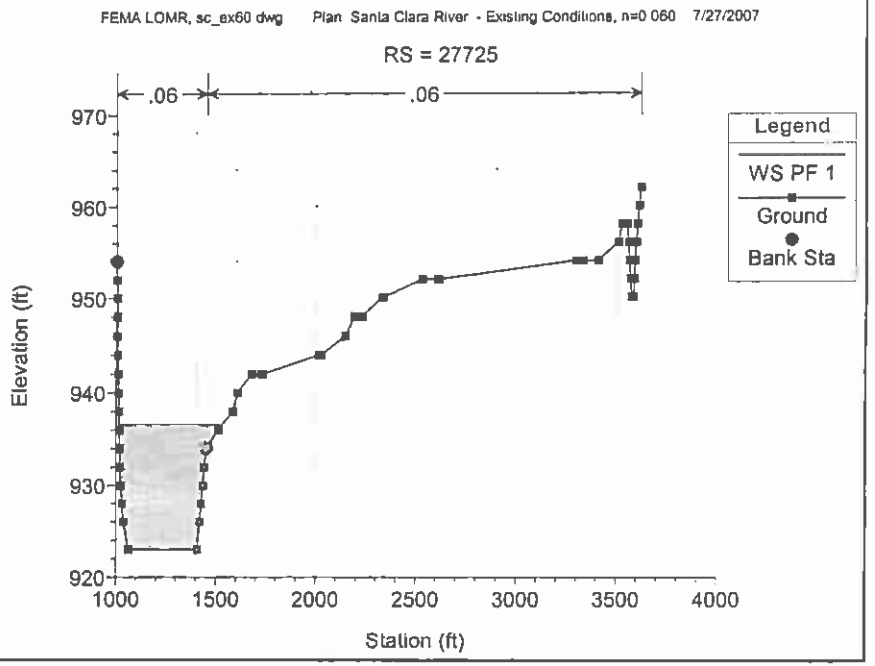
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

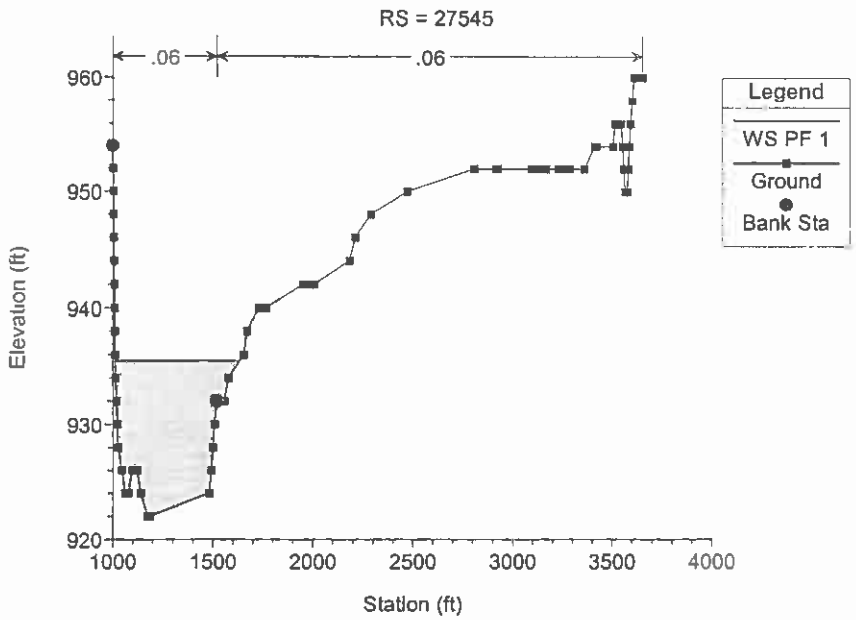

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 28280
.06
.06
0
6
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 28080
.06
.06
0
6
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

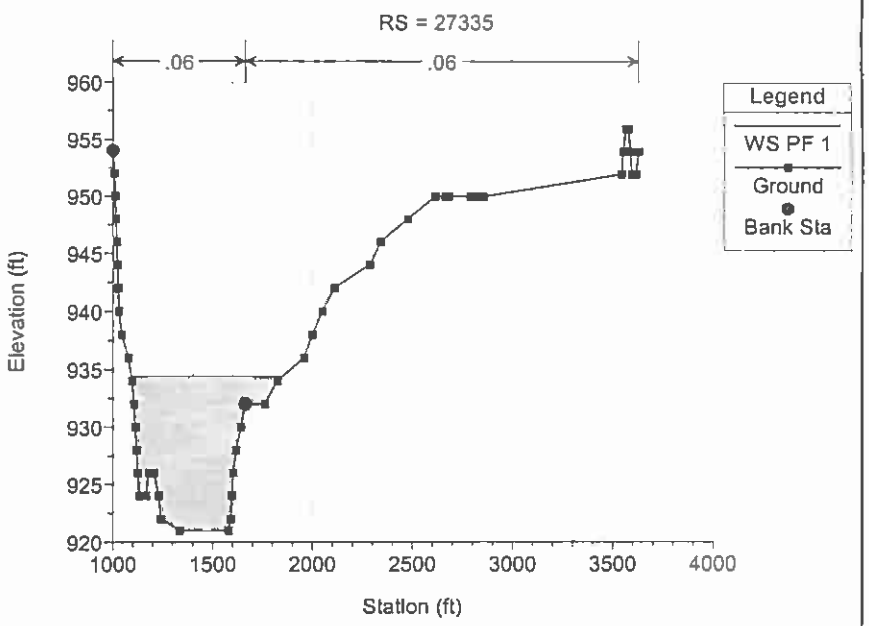

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 27925
.06
.06
0
6
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 27725
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

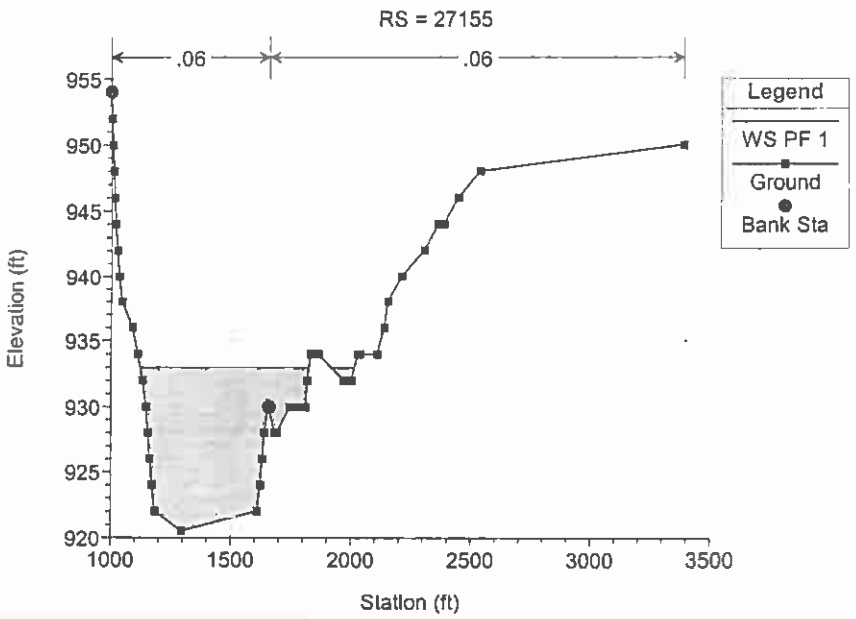
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



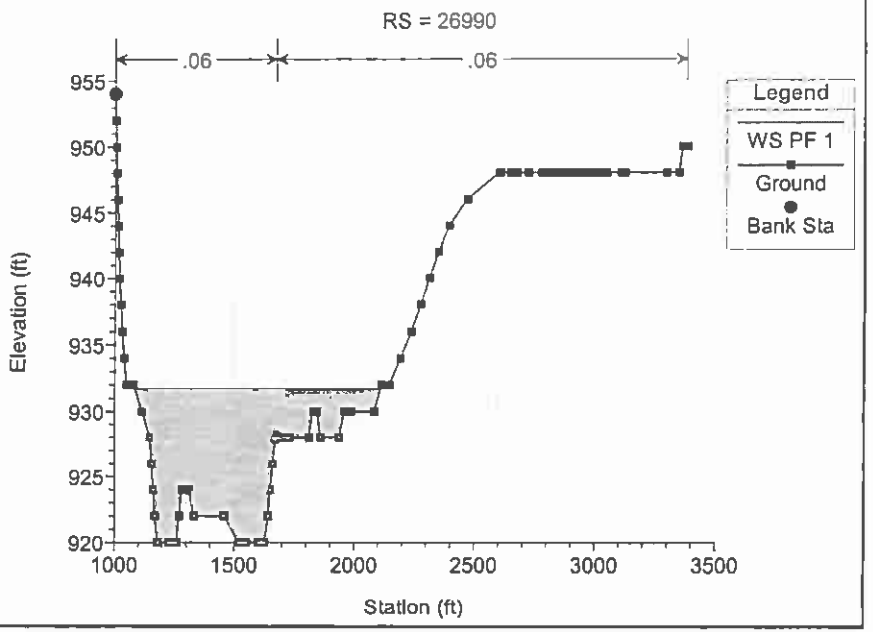
FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

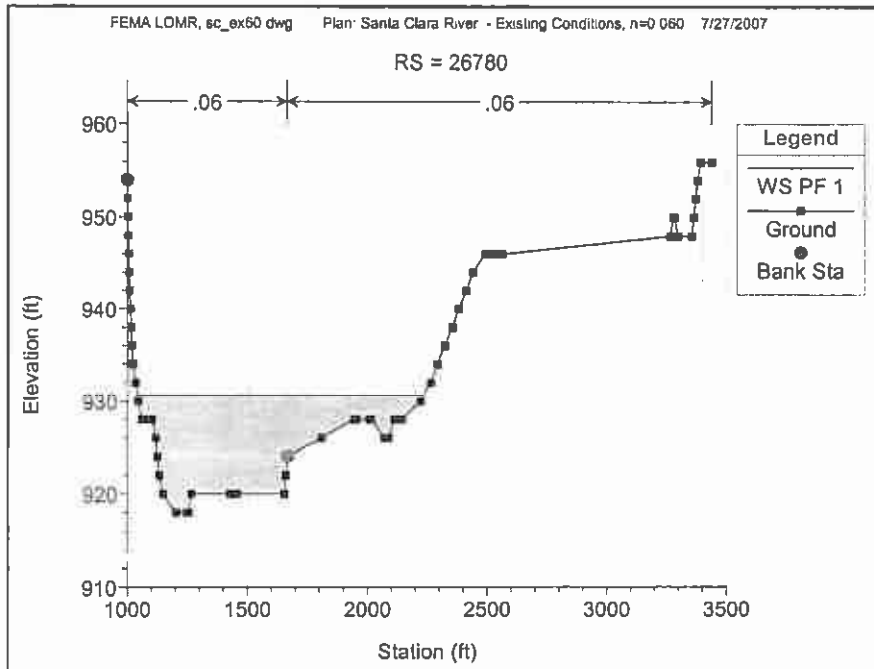


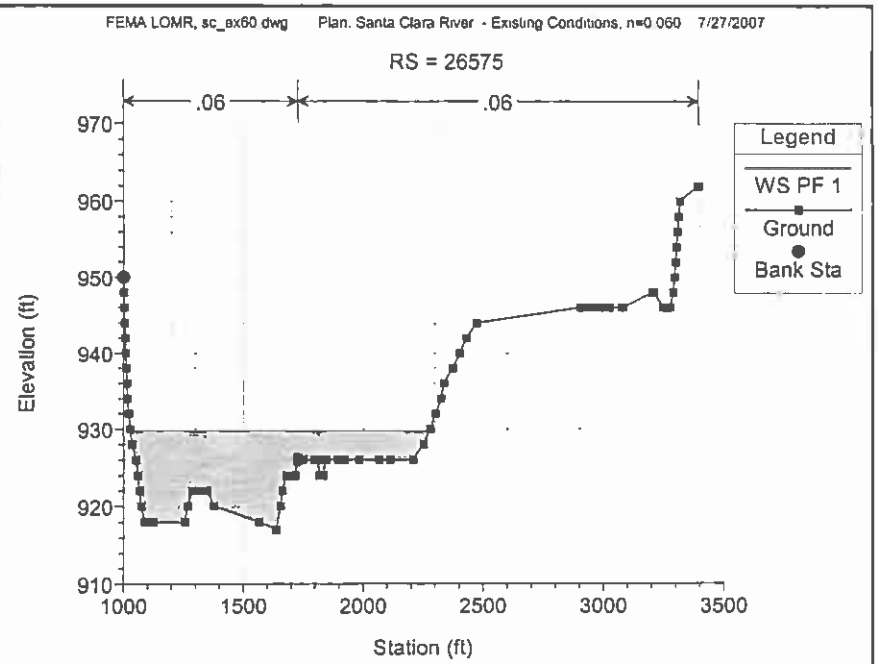
FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

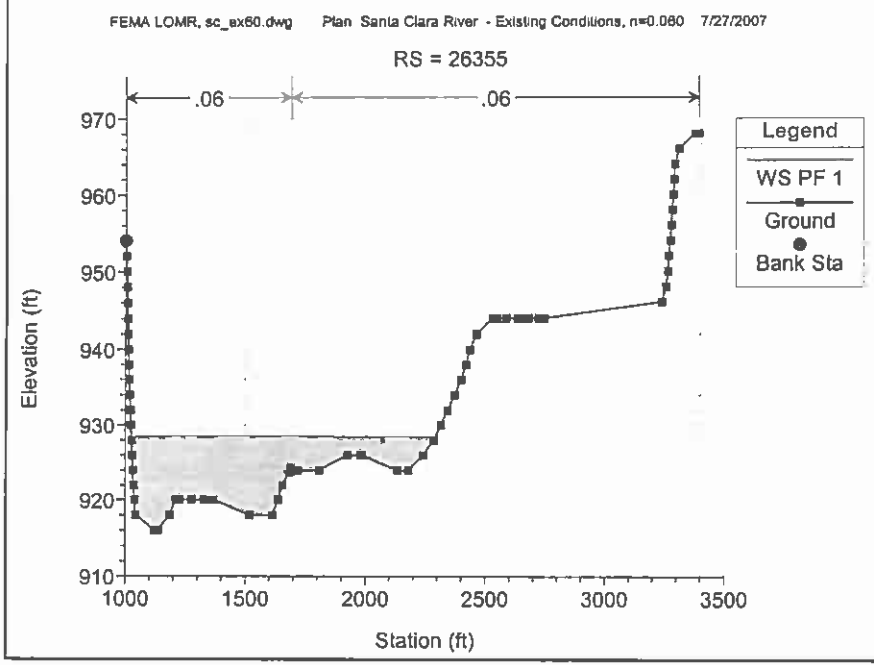


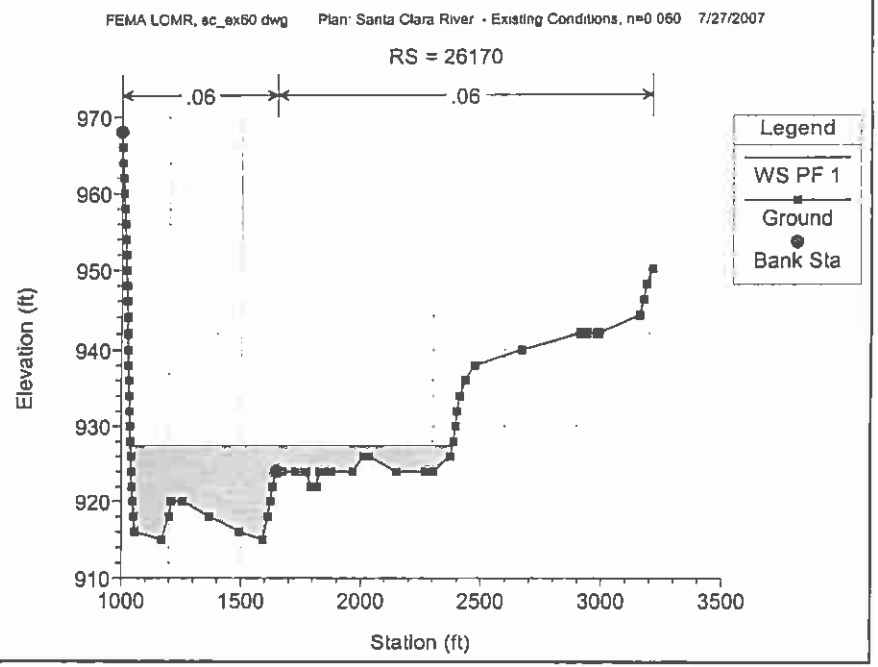
FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

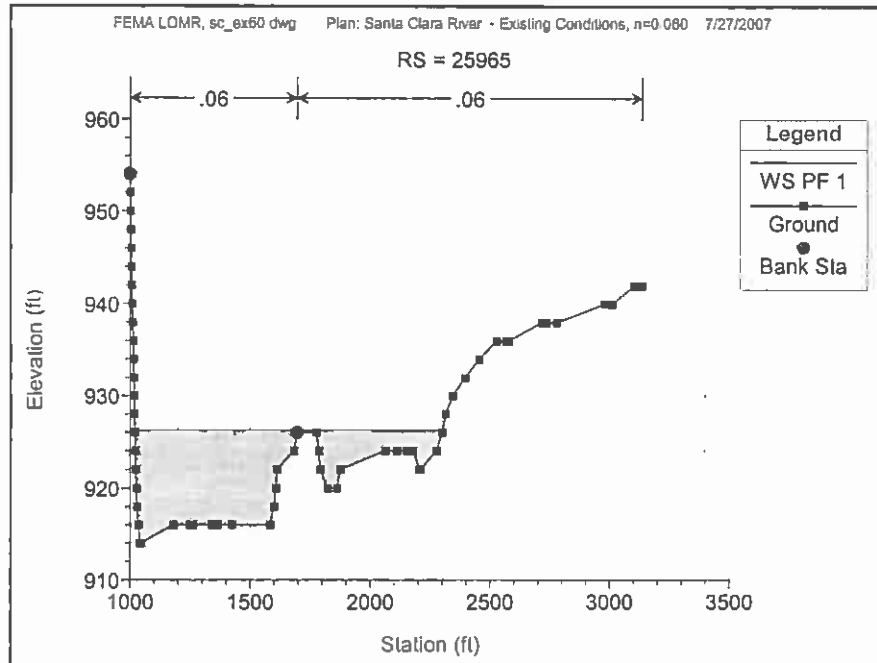


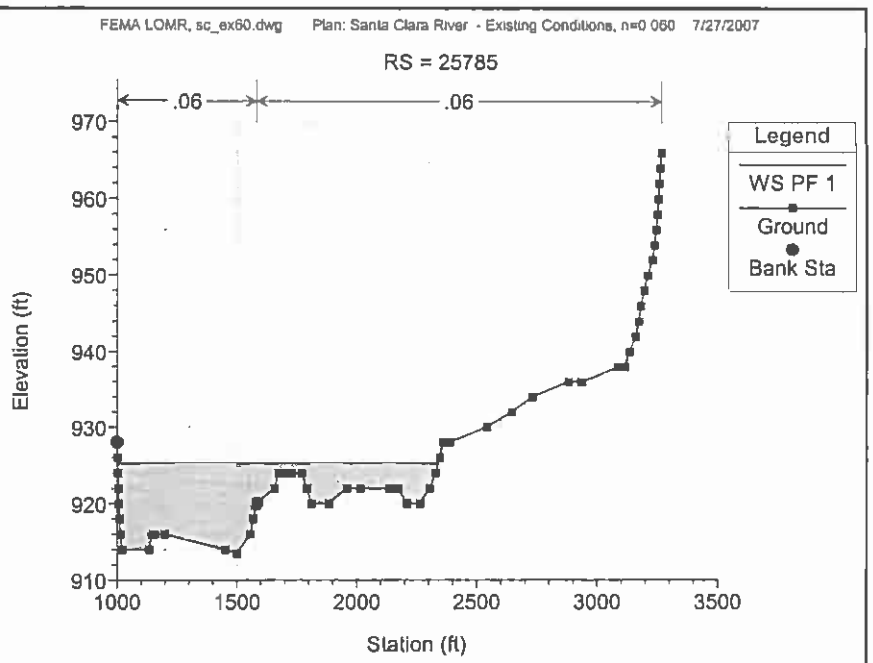

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 26780
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

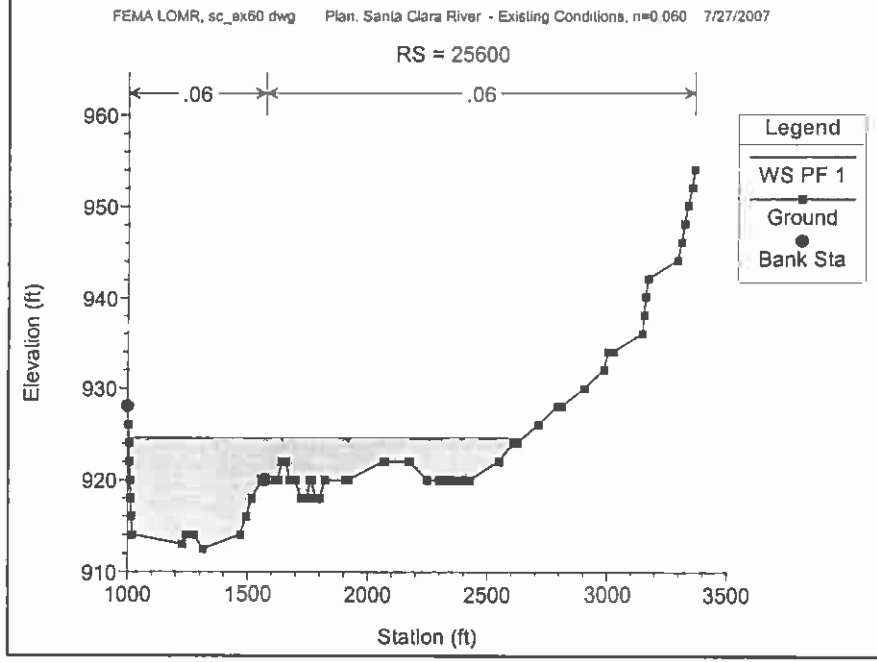

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 26575
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

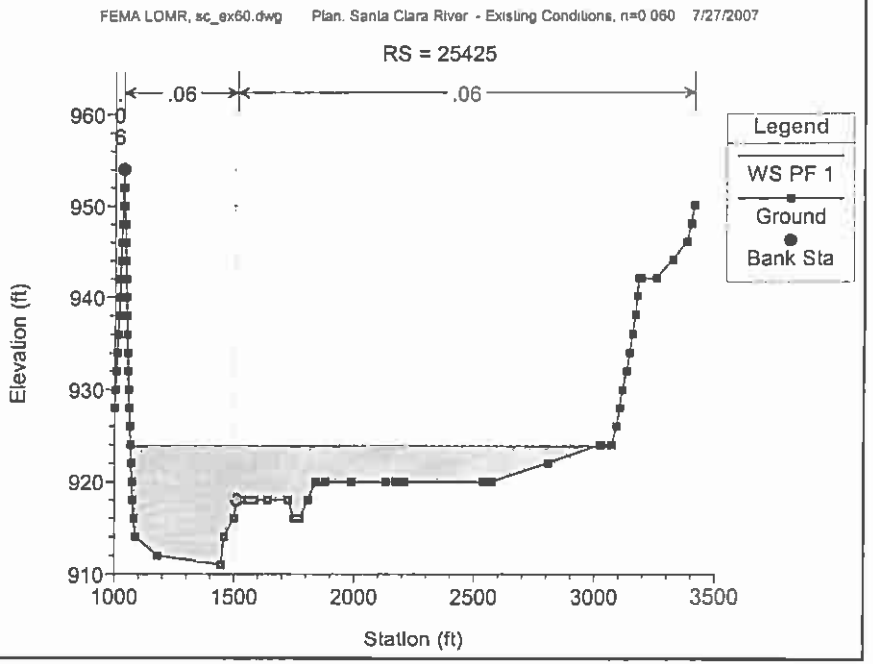

FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 26355
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 26170
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 25965
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 25785
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 25600
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 25425
.06
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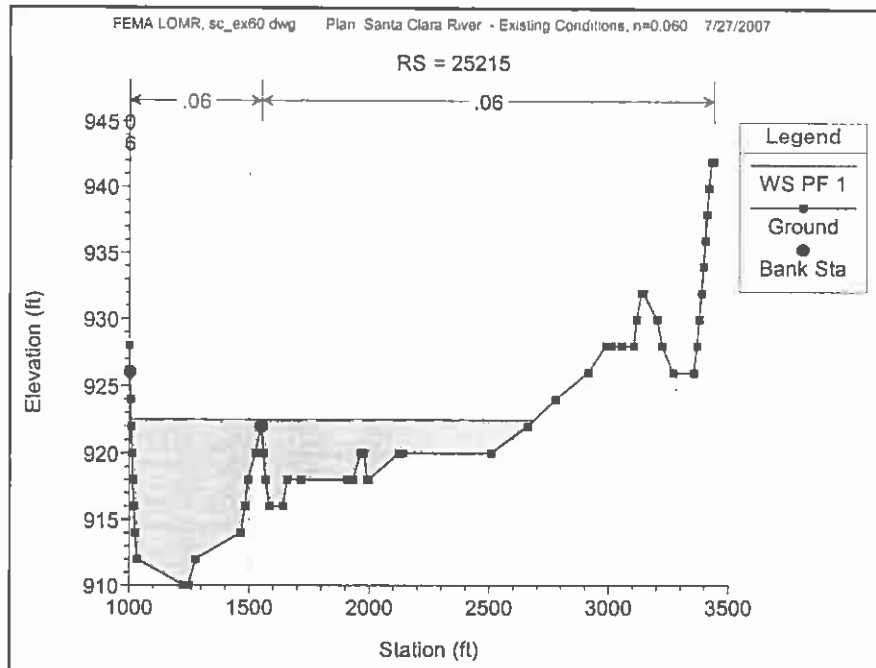
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 25215
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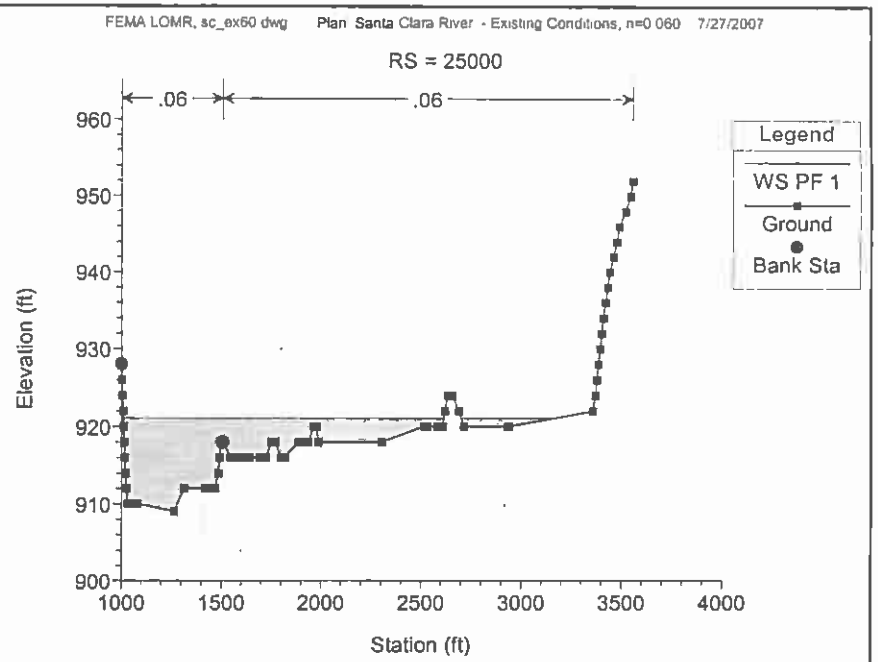
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 25000
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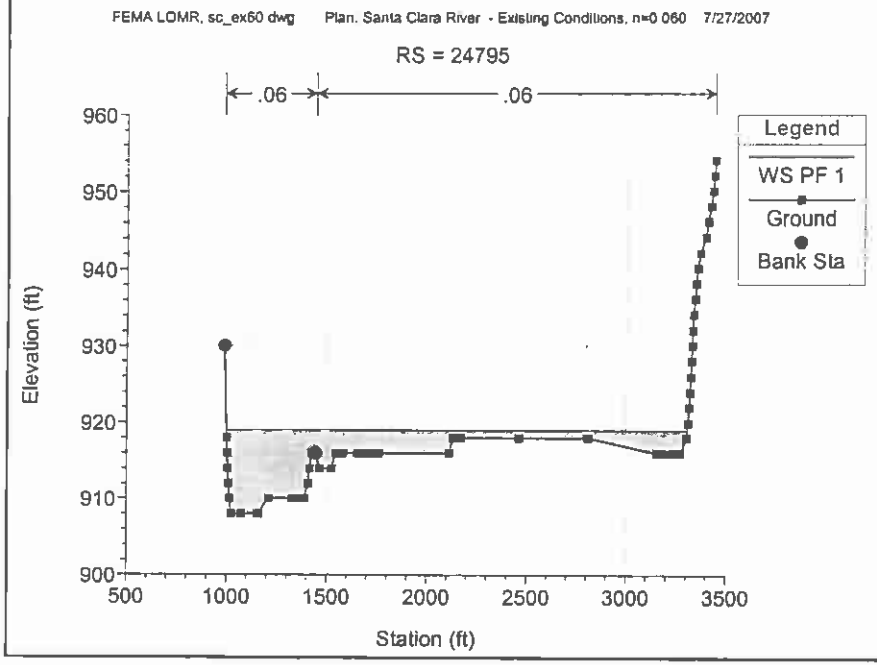
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 24795
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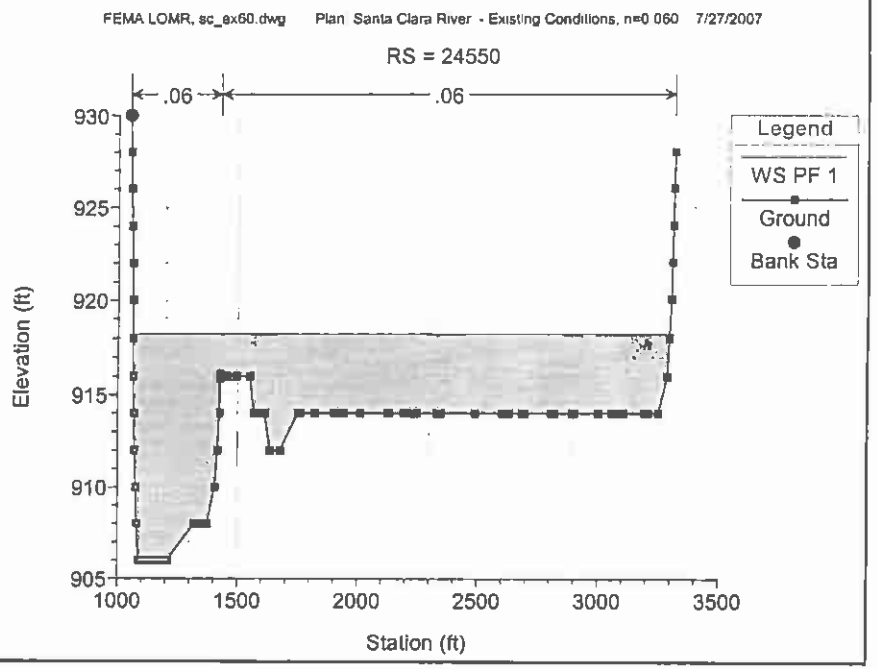
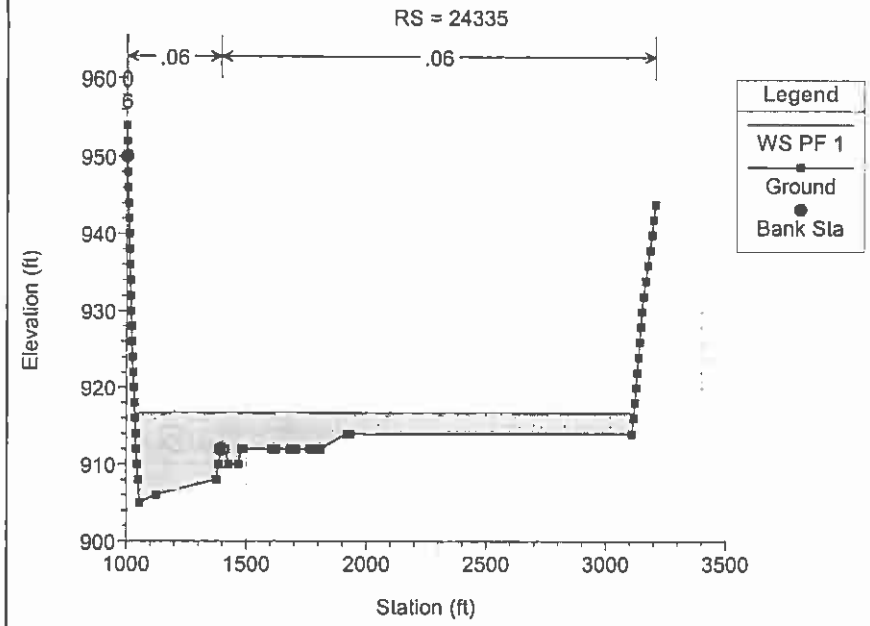
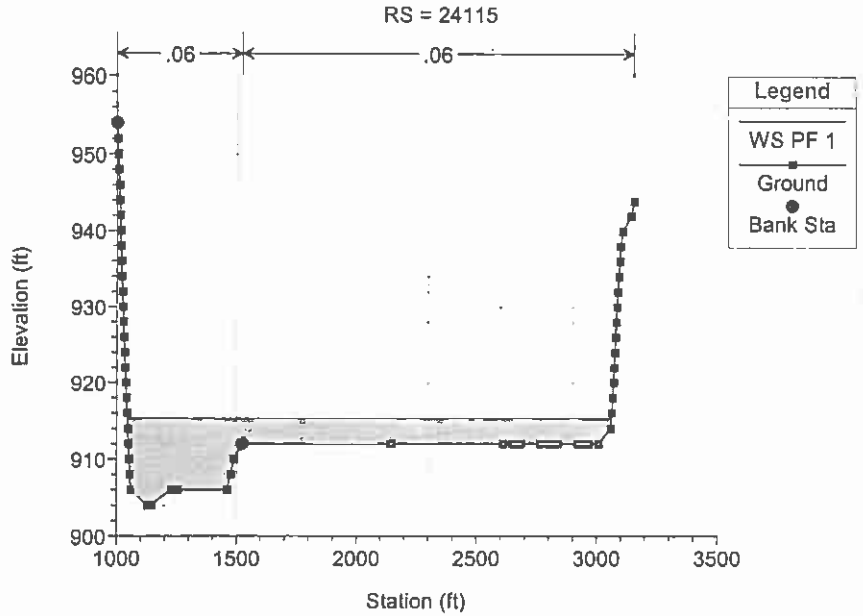
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 24550
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

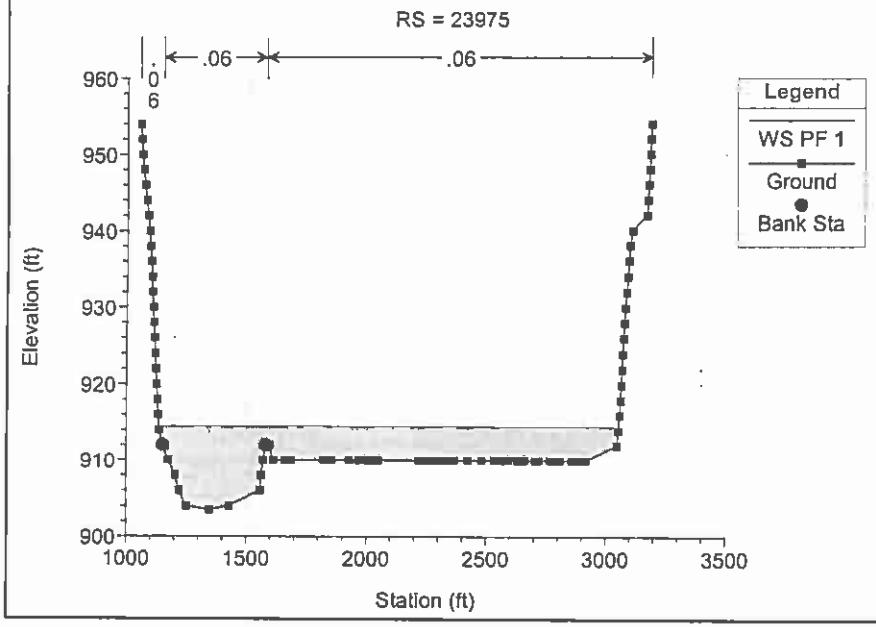
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



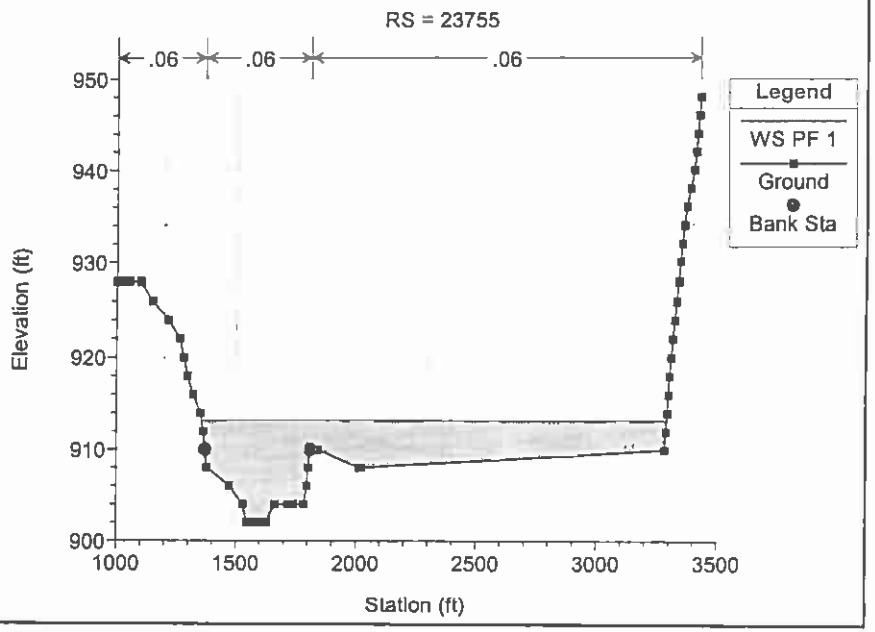
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

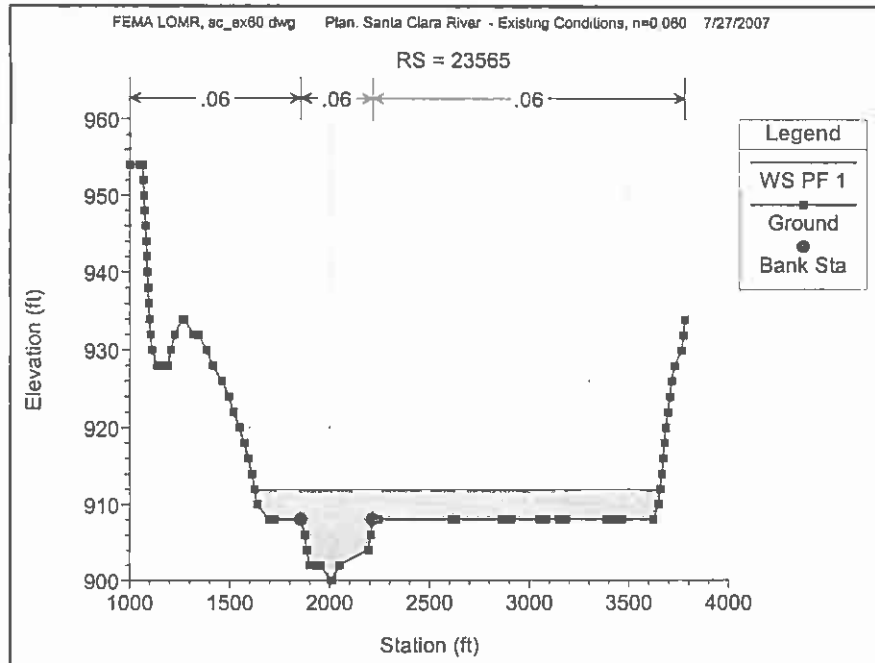


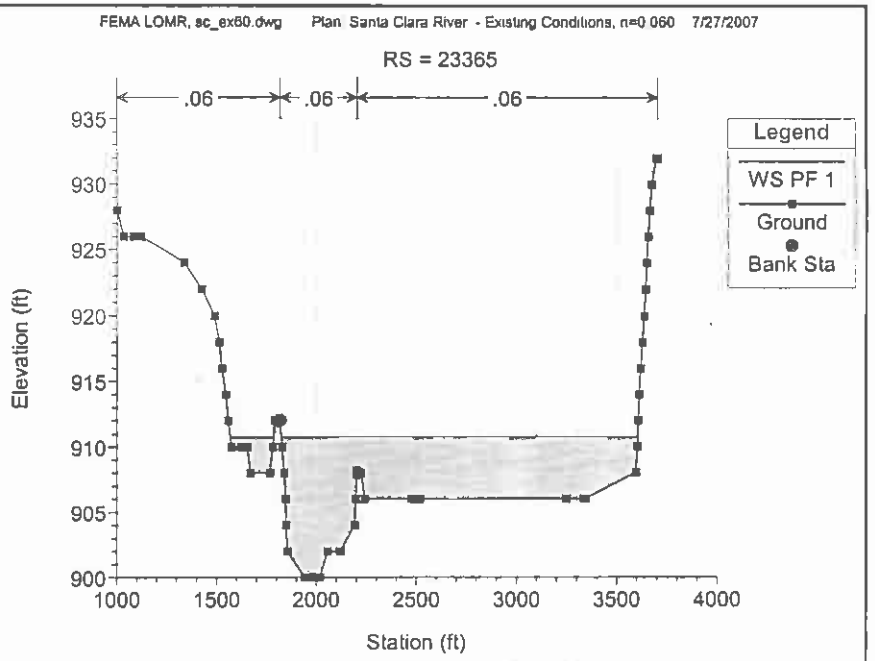
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

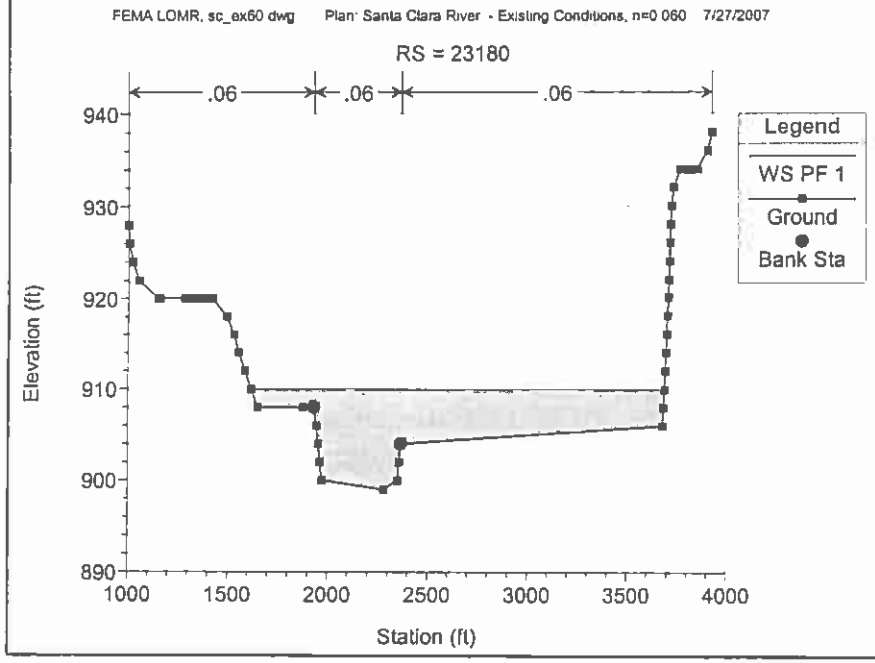


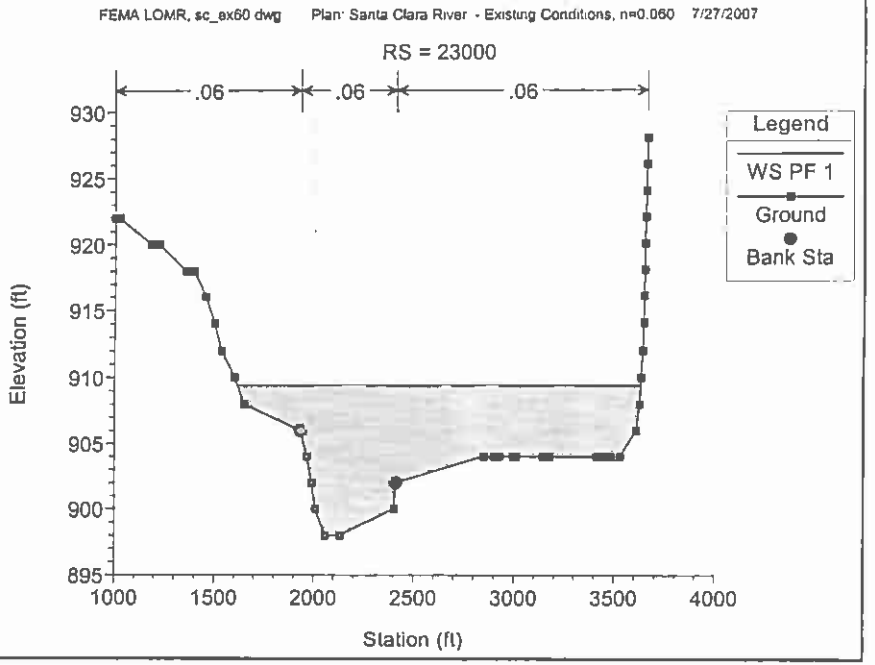
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

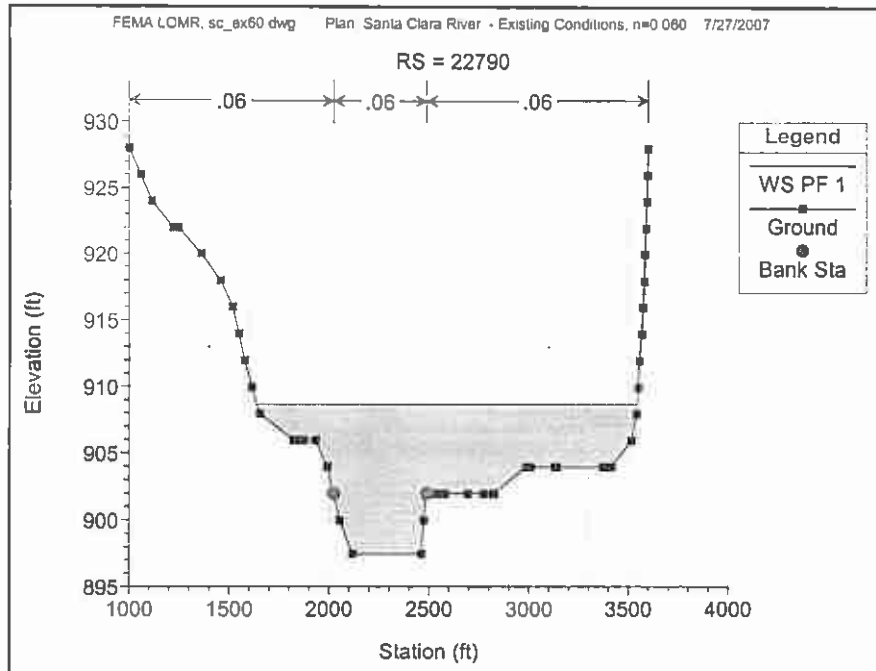


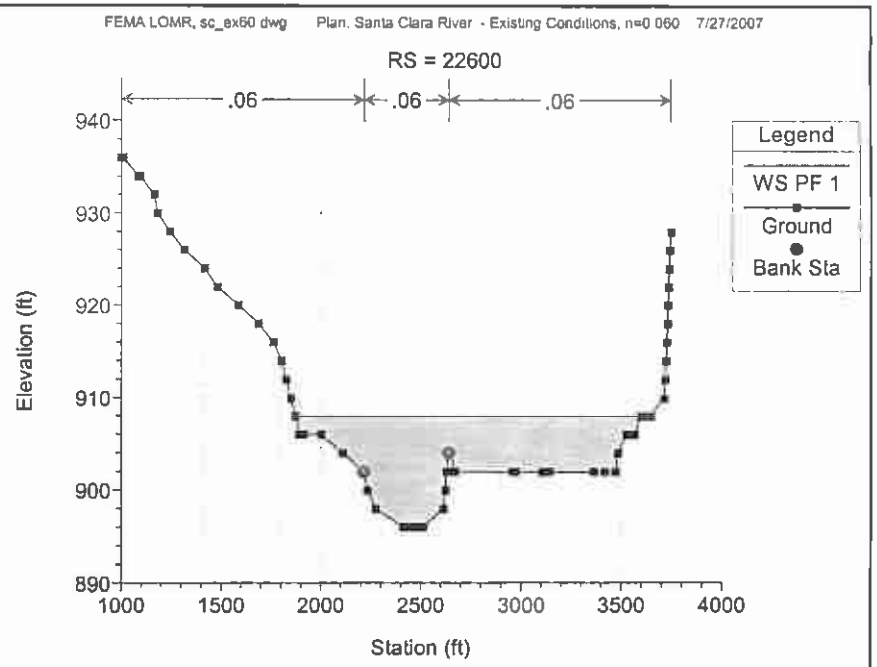

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 23565
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 23365
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 23180
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 23000
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 22790
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 22600
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.06
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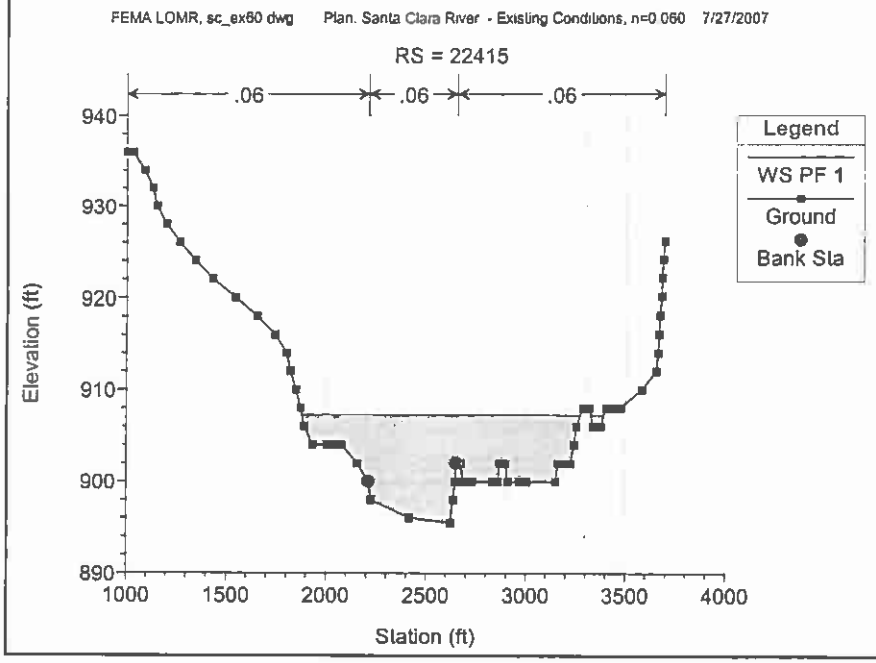
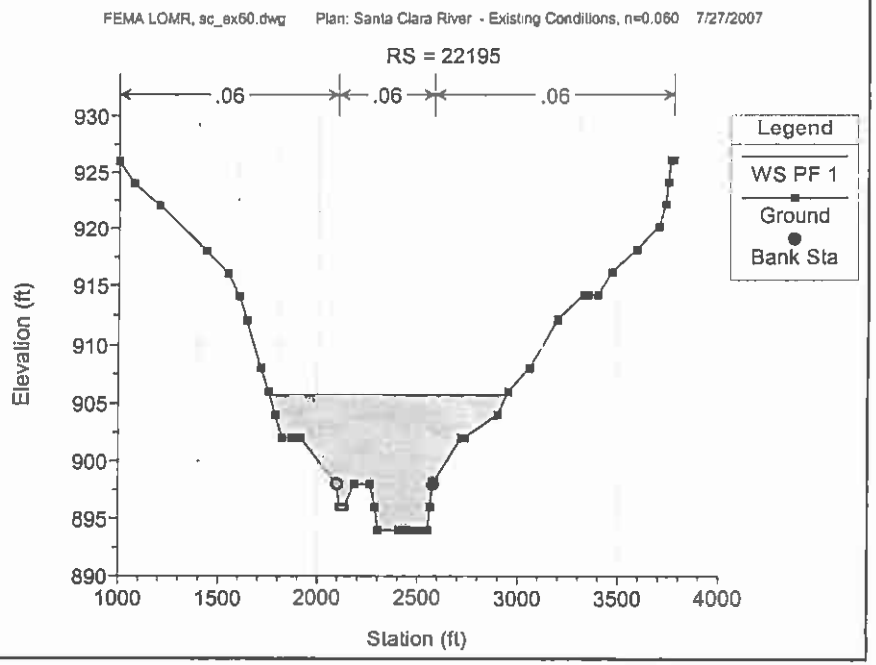
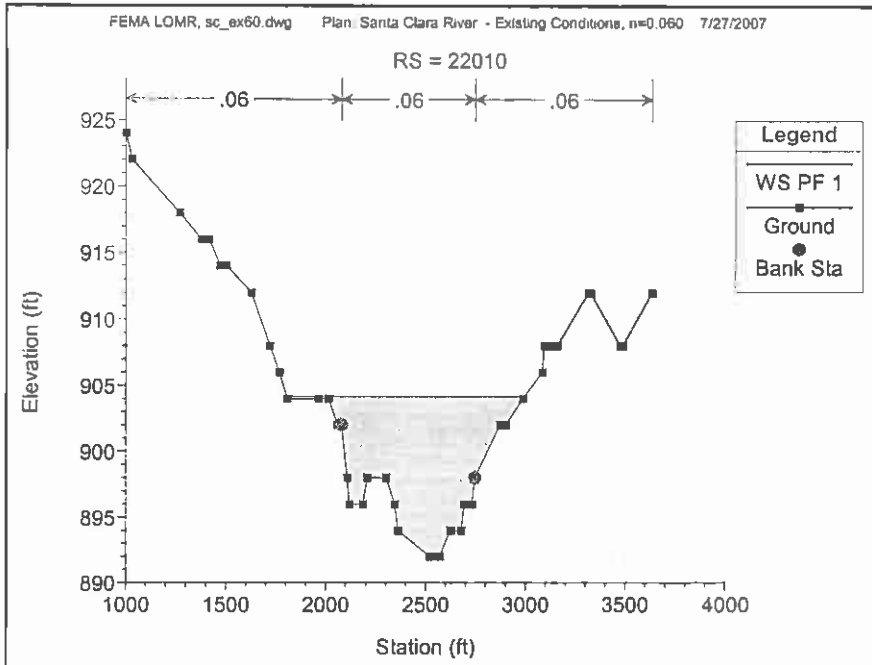
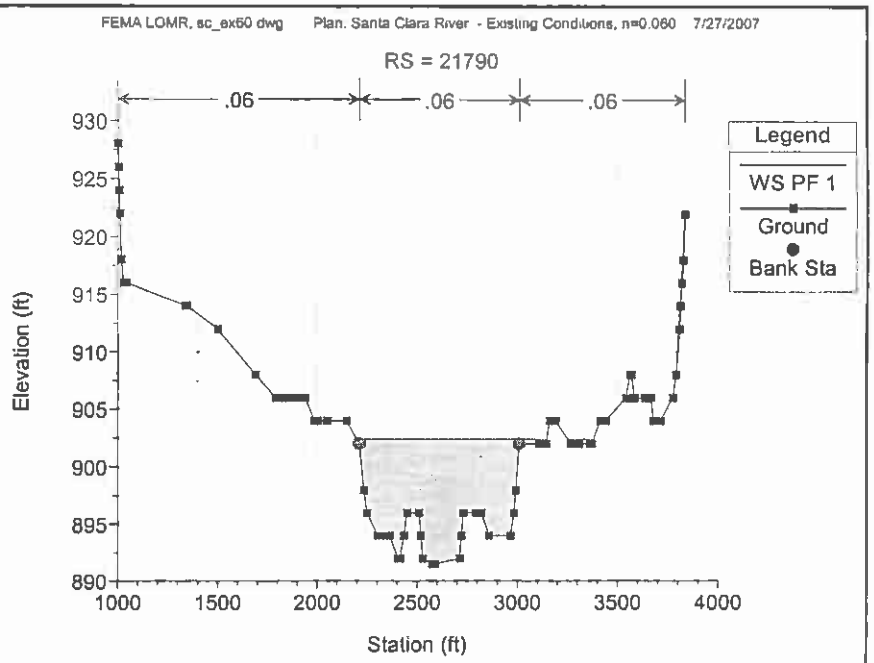
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 22415
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 22195
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 22010
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 21790
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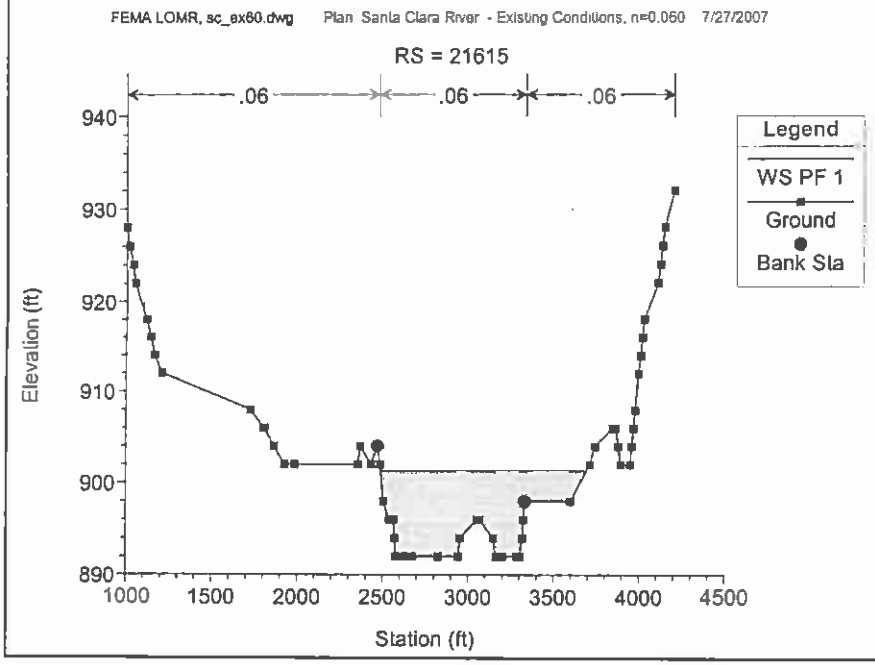
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 21615
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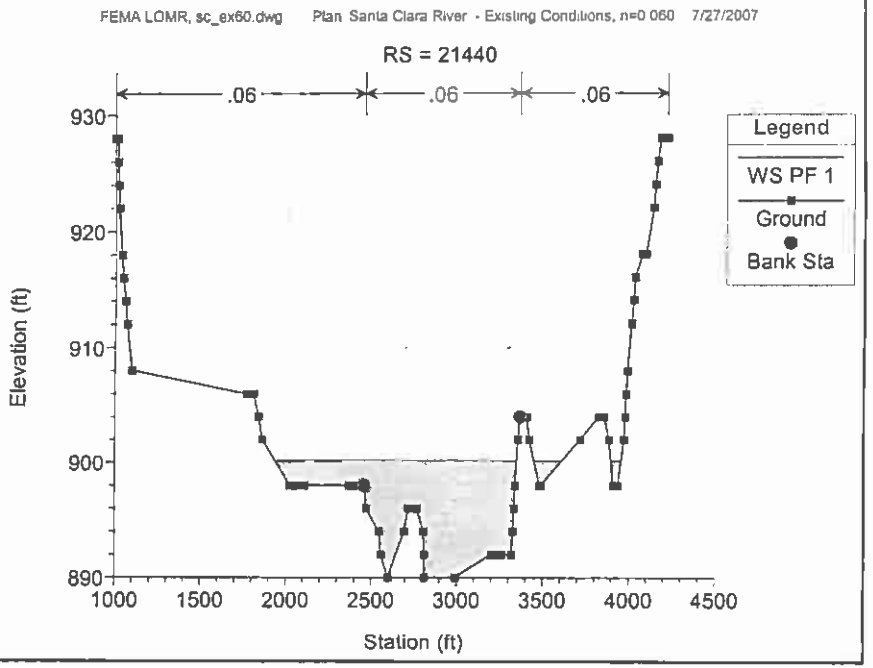
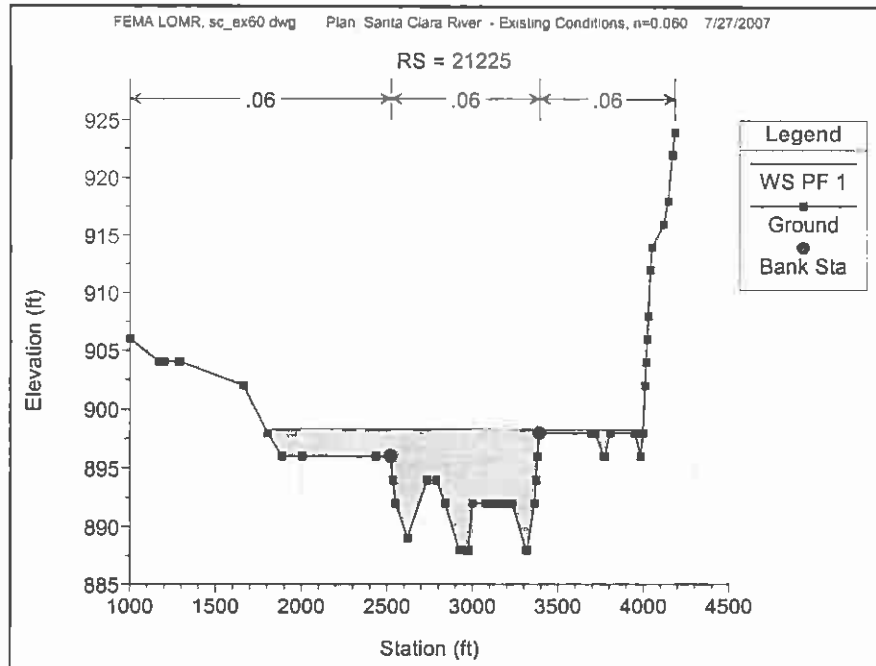
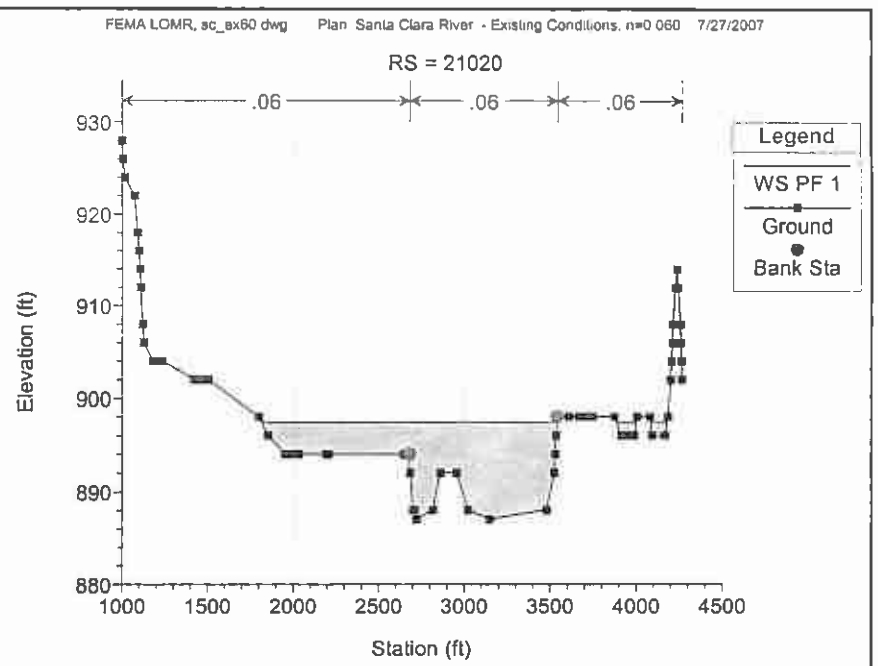
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 21440
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 21225
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 21020
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.06
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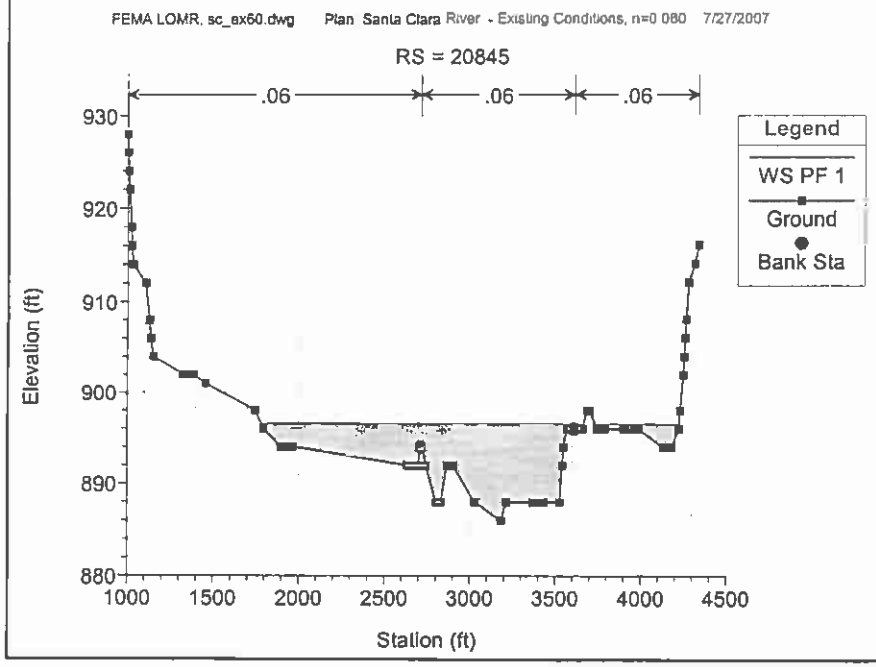
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 080 7/27/2007
RS = 20845
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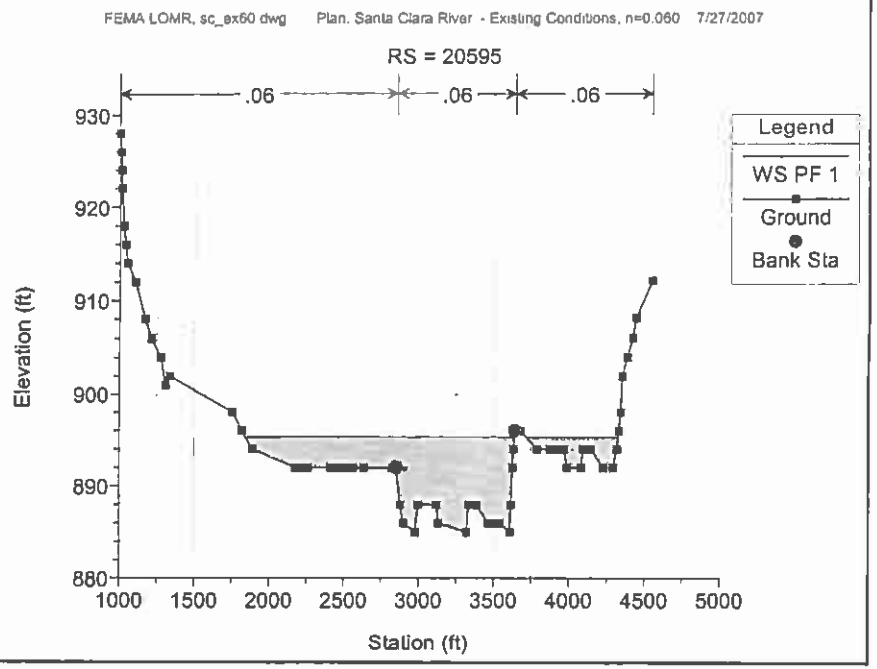
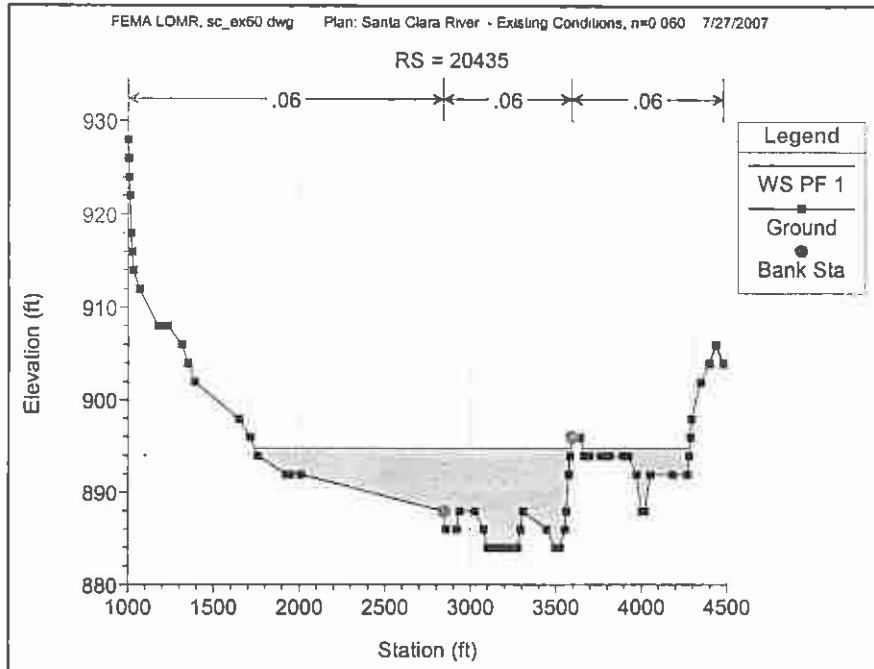
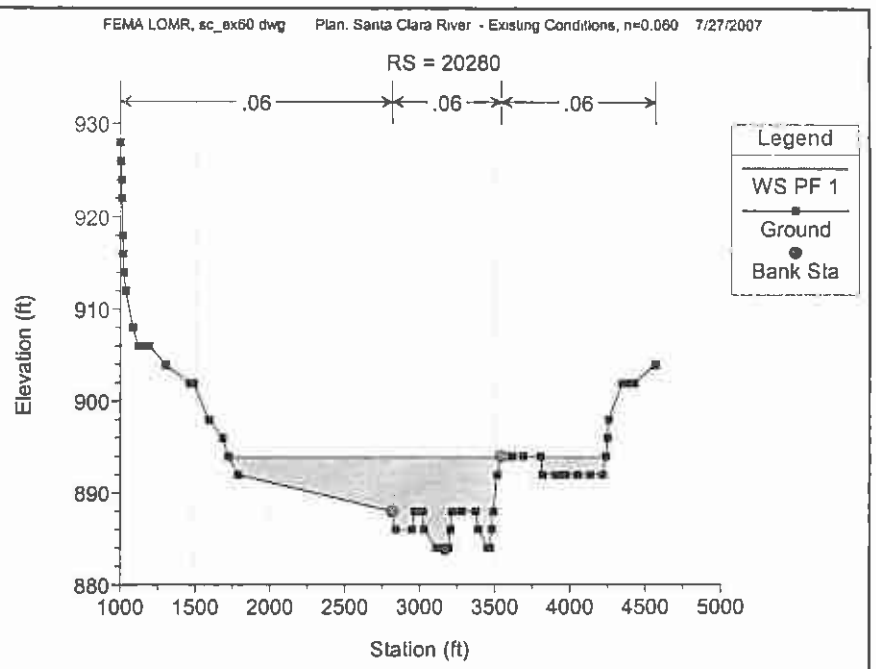
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 20595
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 20435
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 20280
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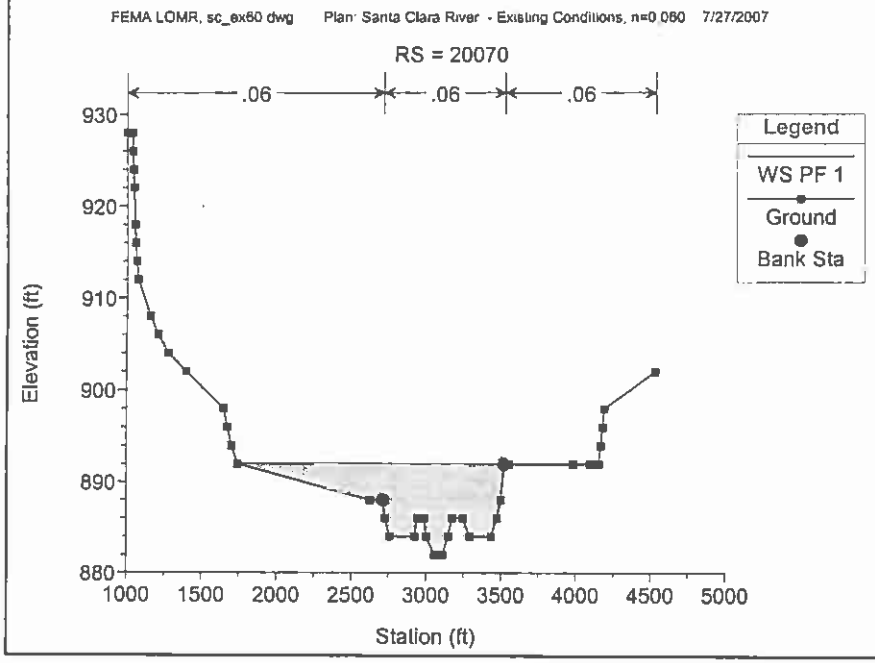
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 20070
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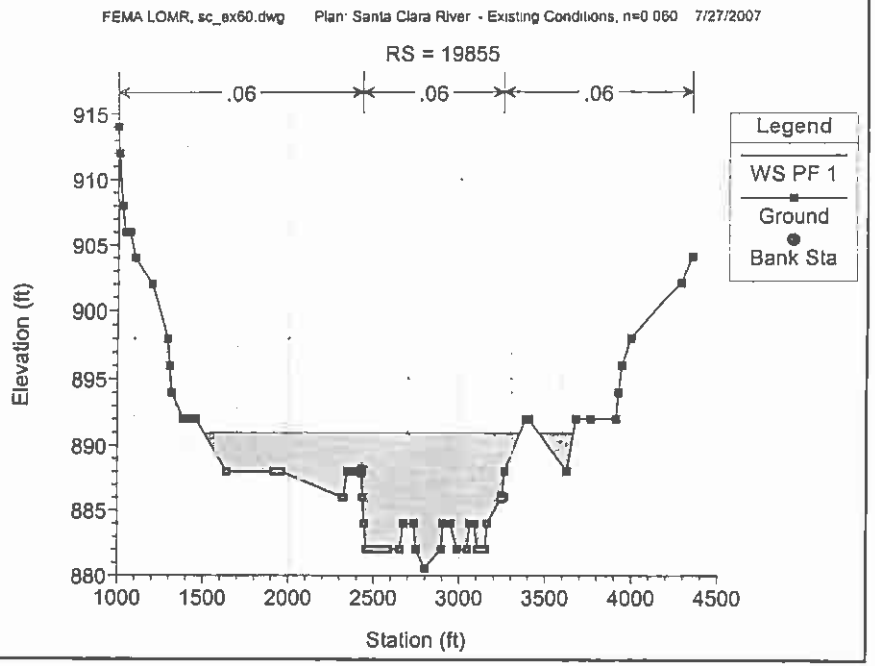
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 19855
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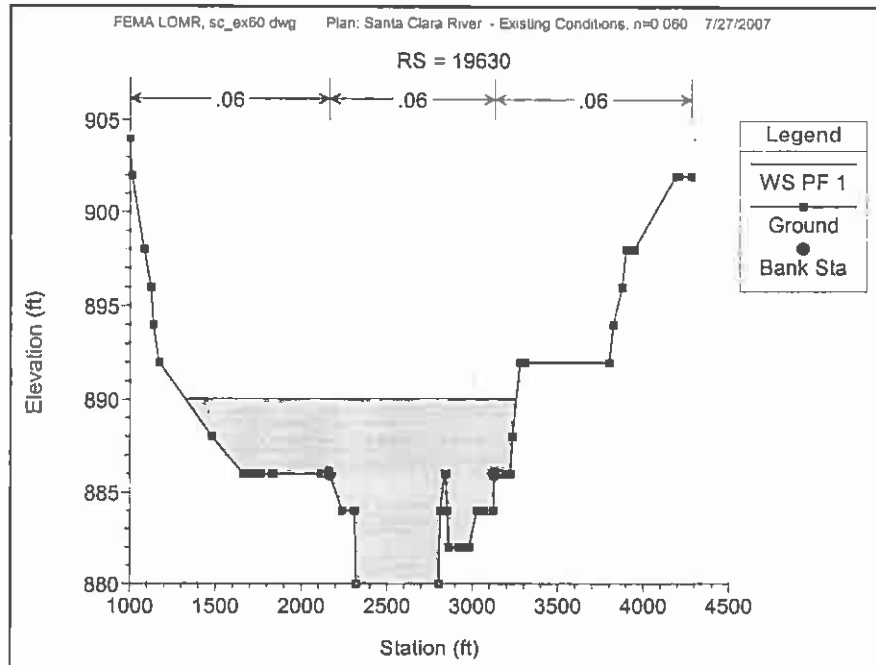
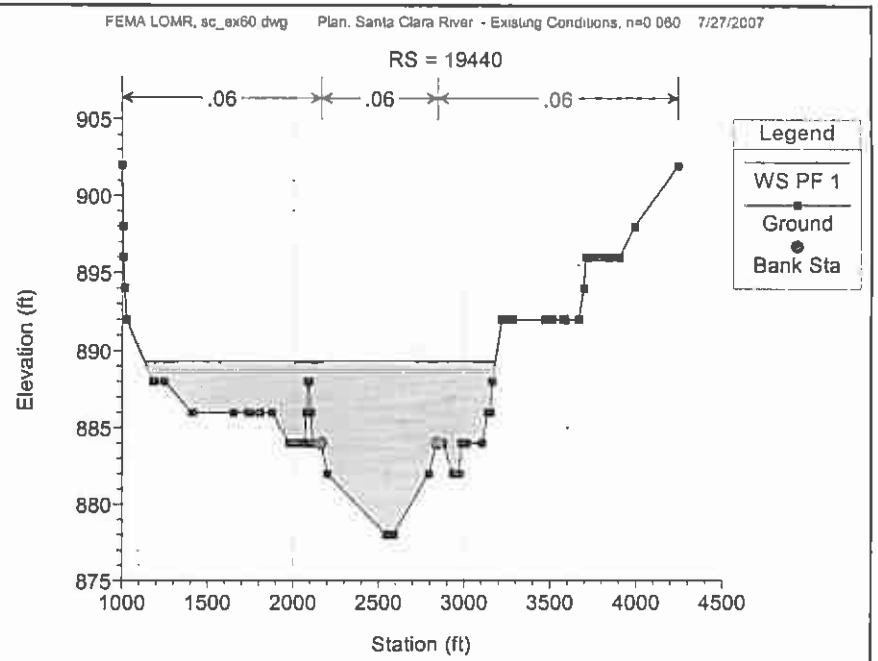
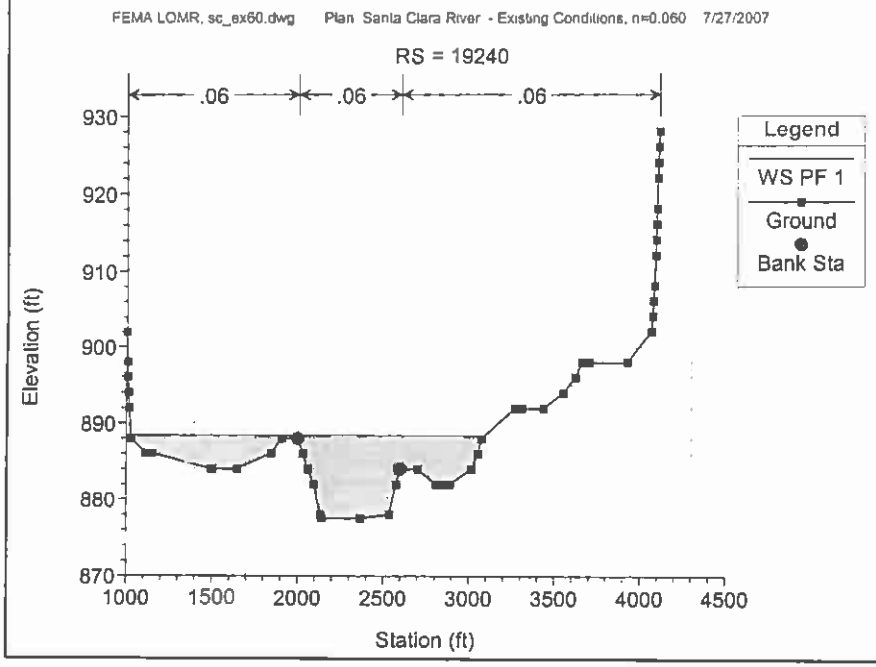
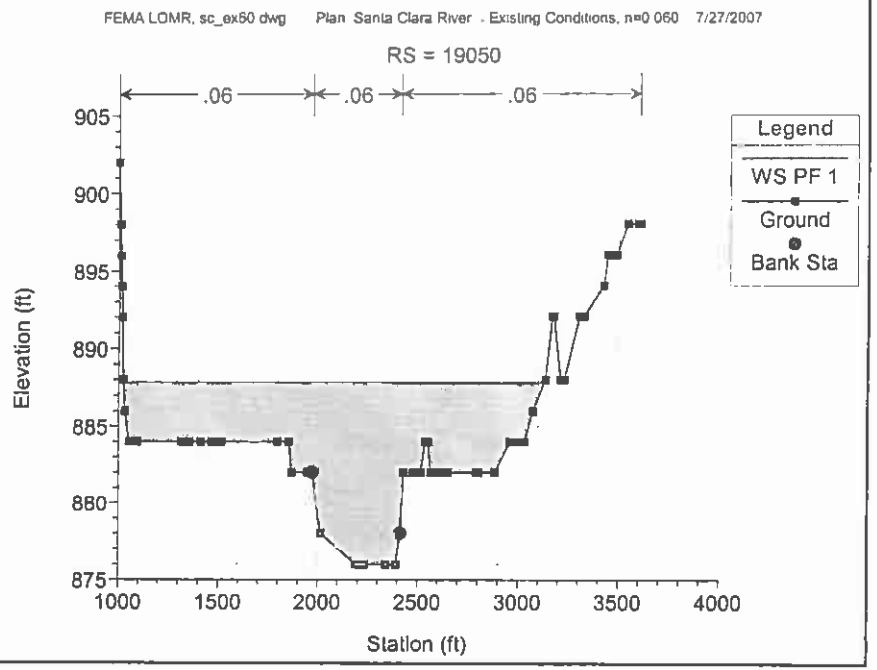
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

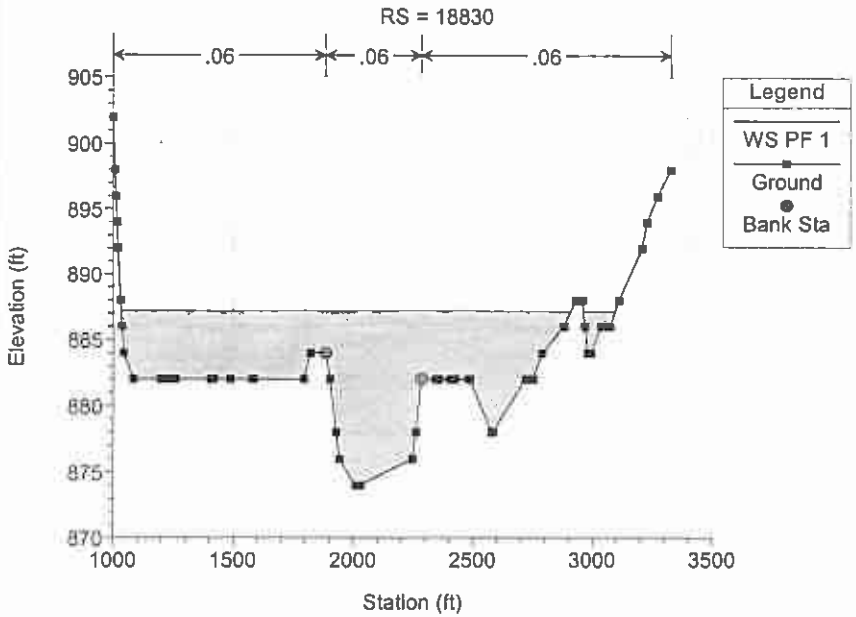

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 19630
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 19440
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

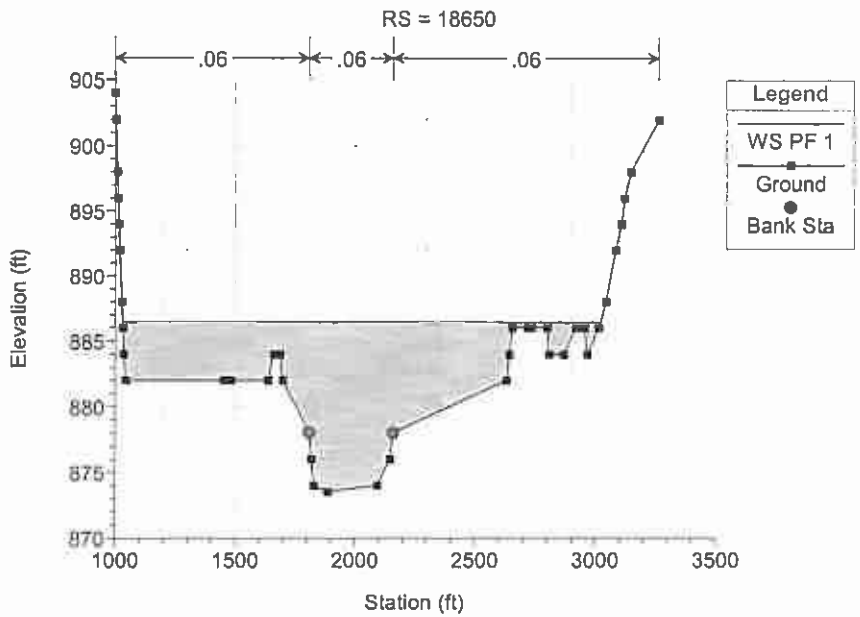

FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 19240
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 19050
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

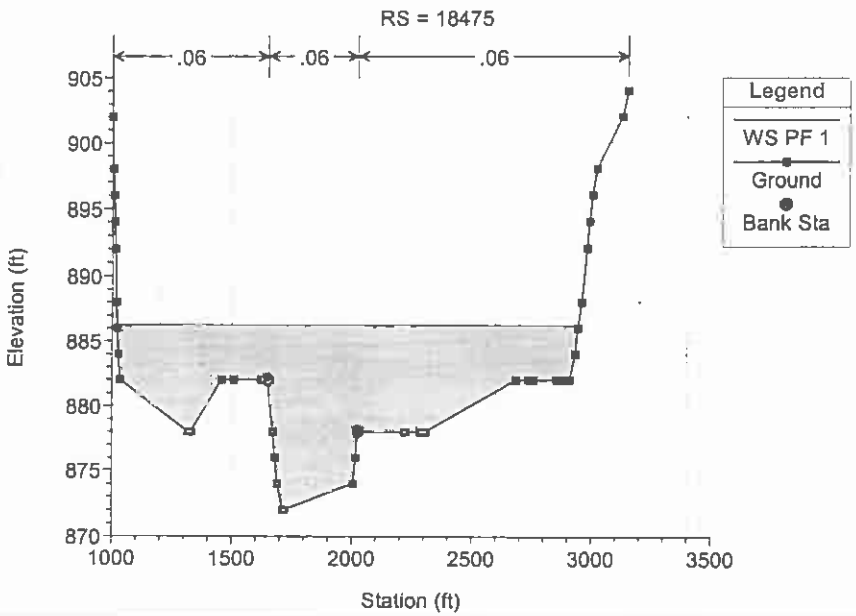
FEMA LOMR, sc_ex60.dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007



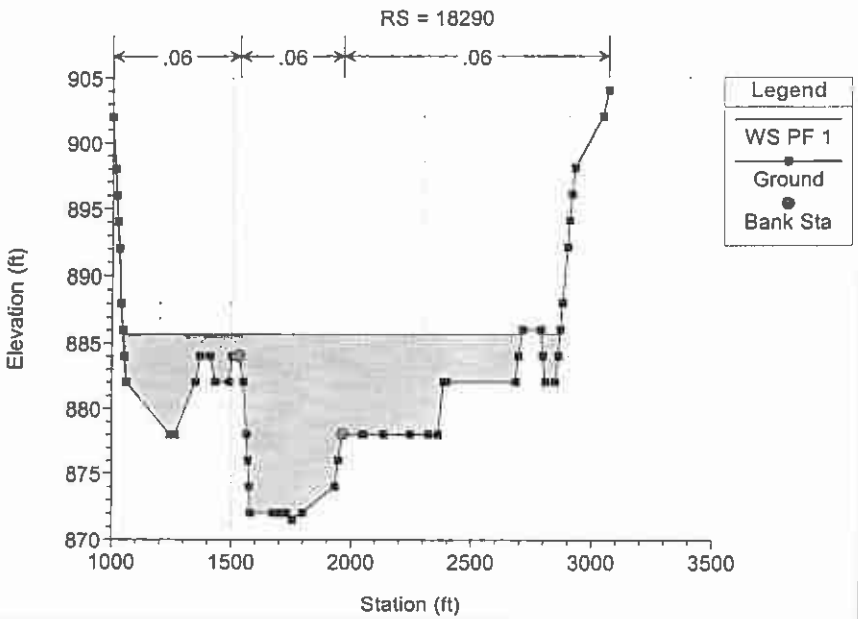
FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007

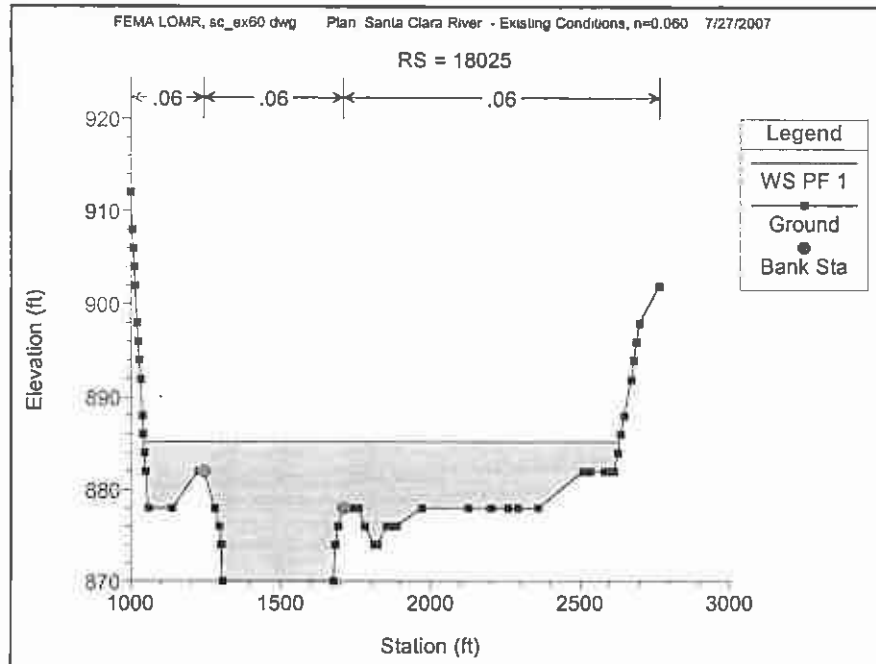


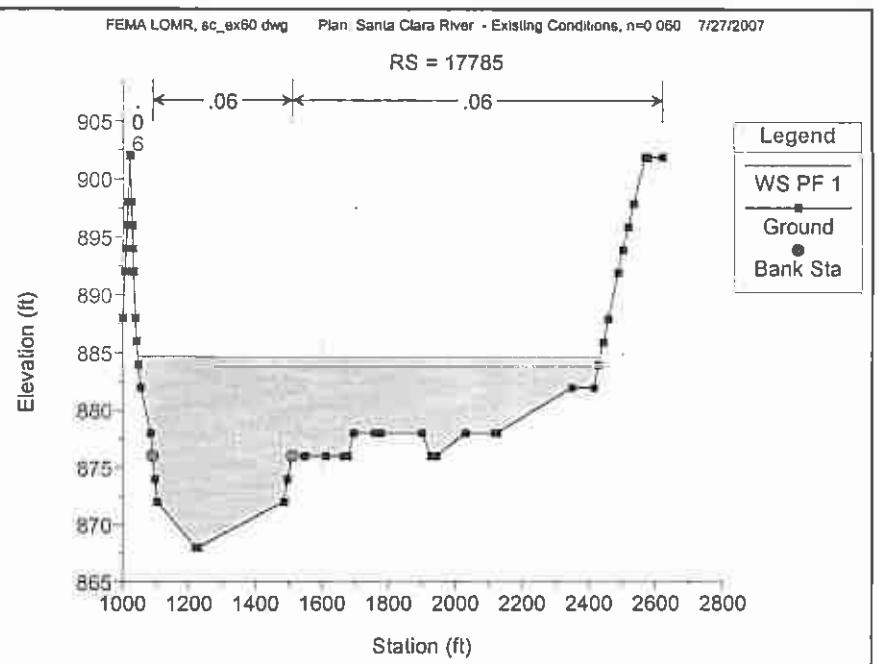
FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007

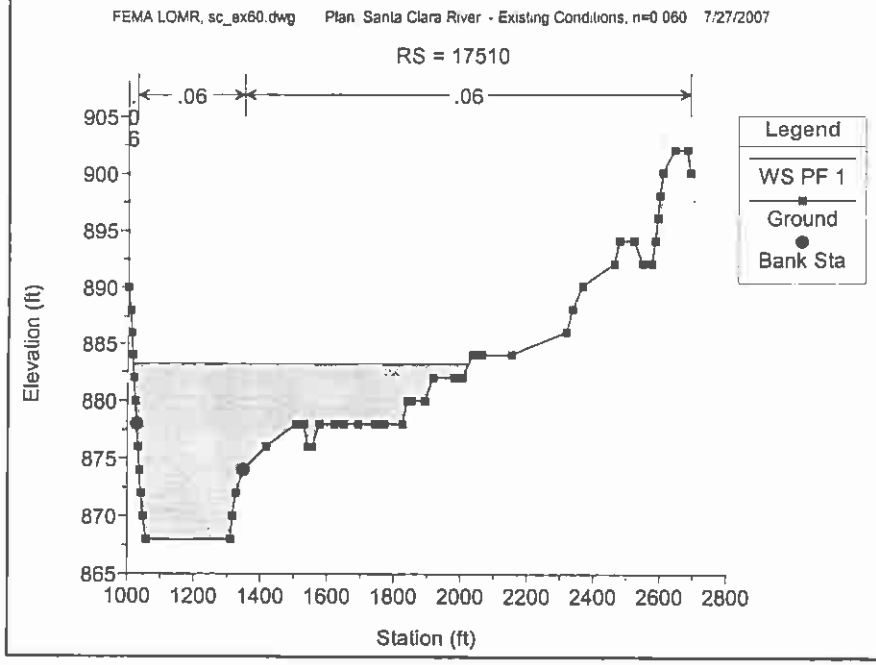


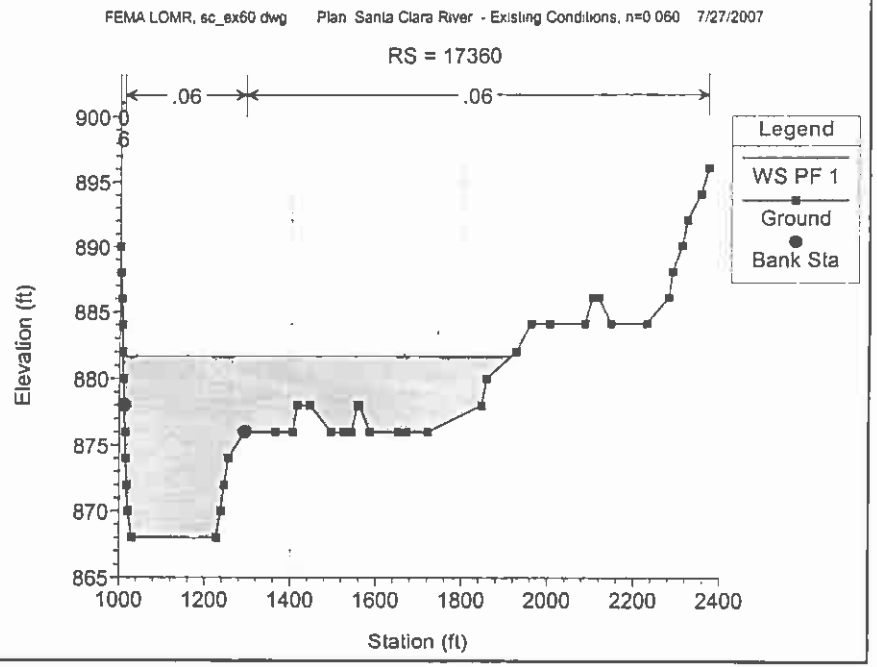
FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007

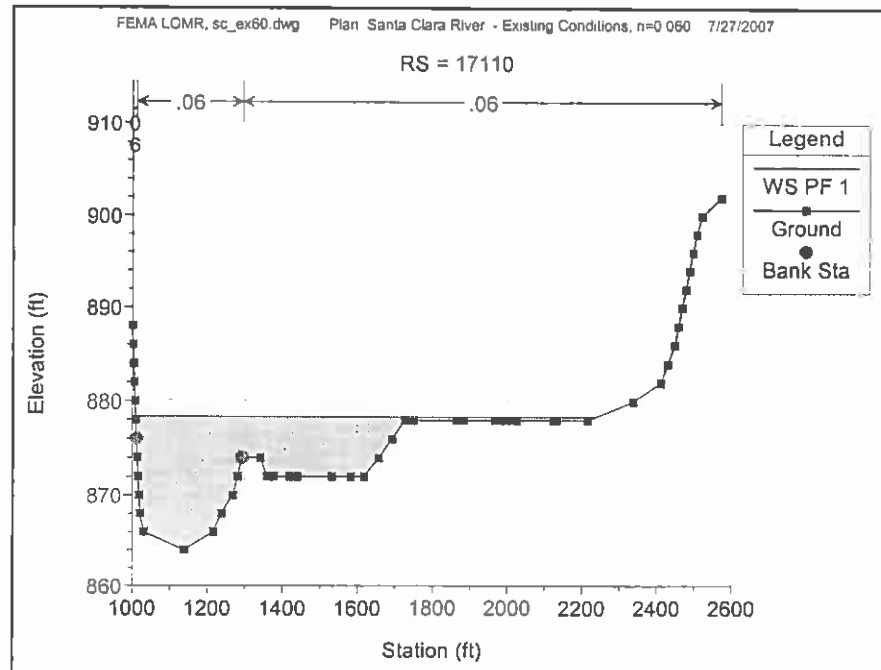



FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 18025
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 17785
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 17510
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 17360
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 17110
.06
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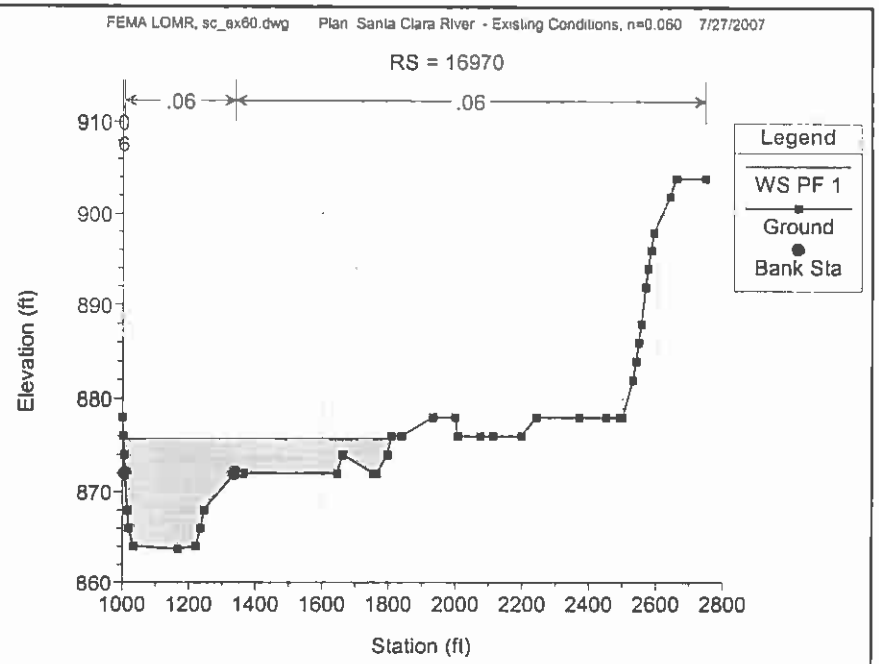
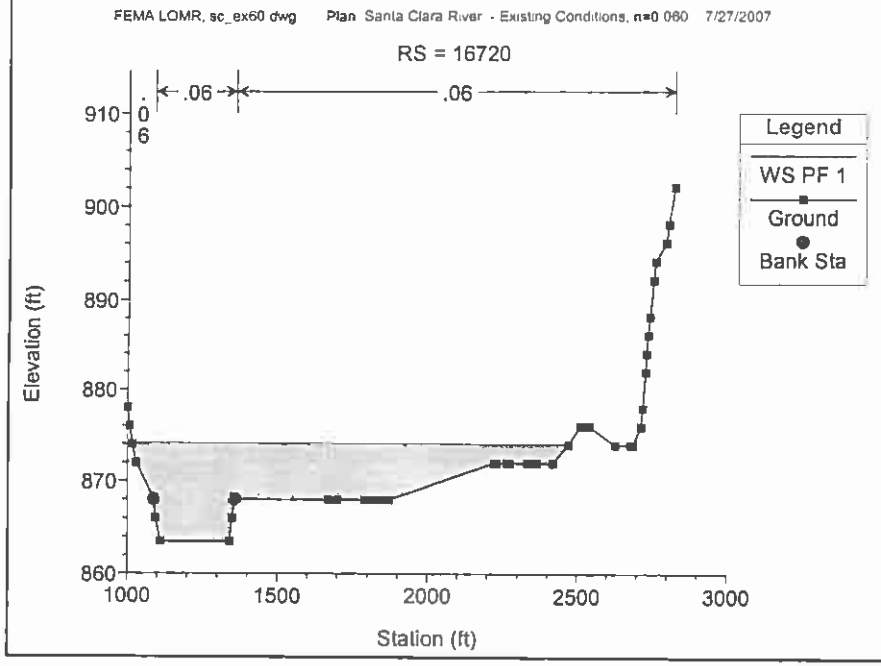
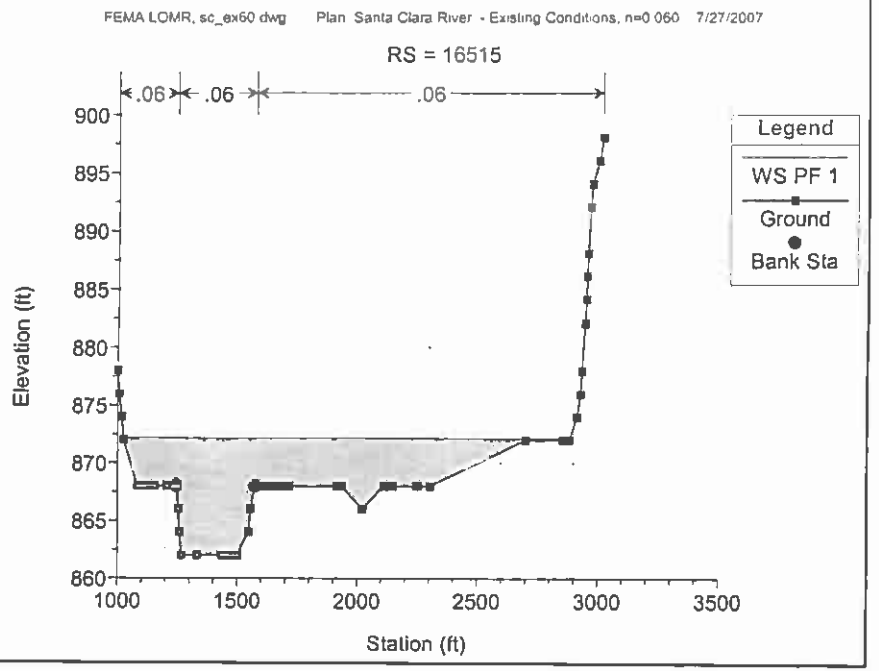
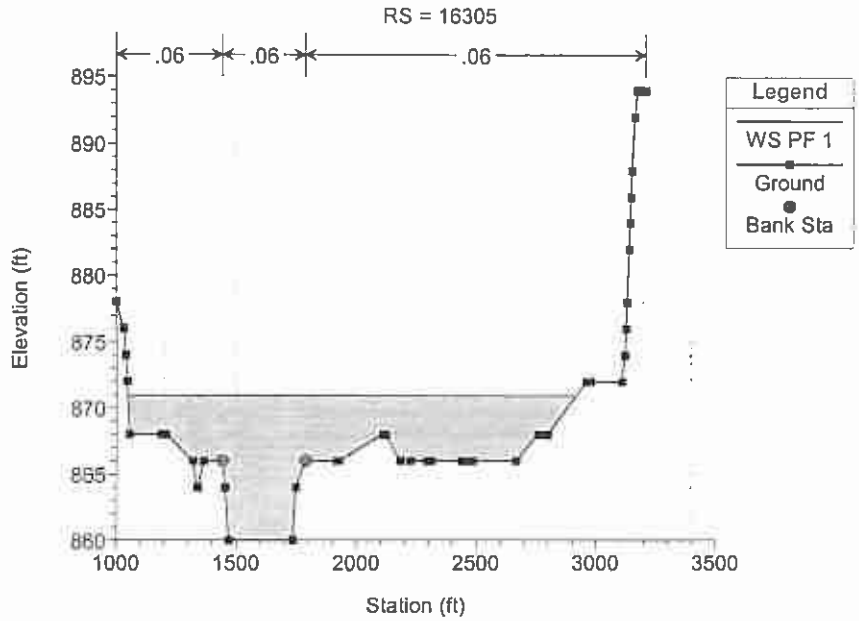
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 16970
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

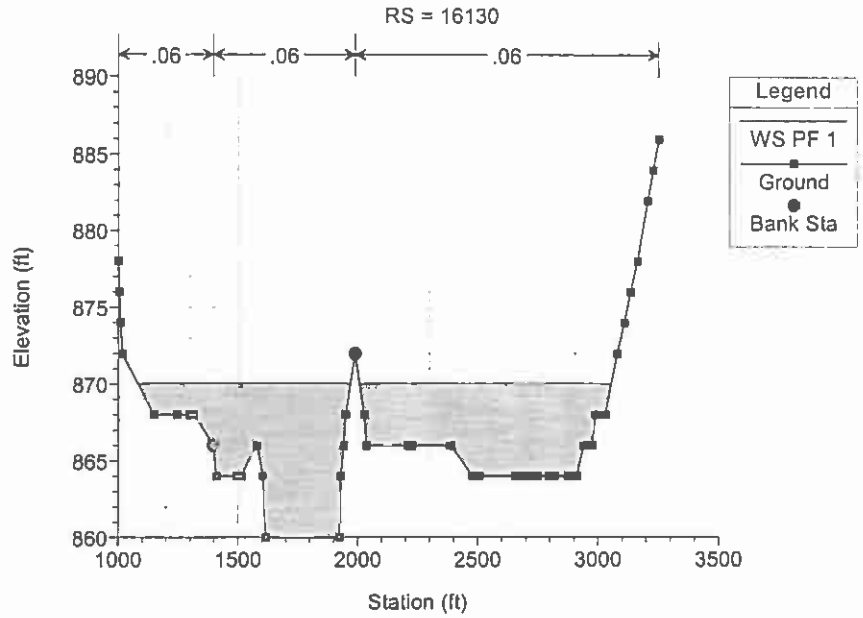

FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 16720
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 16515
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

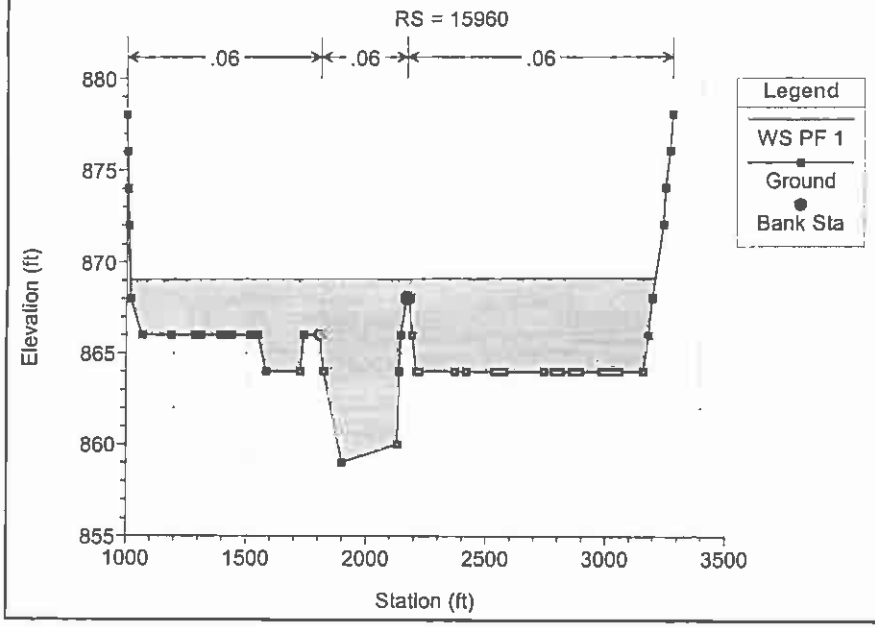
FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



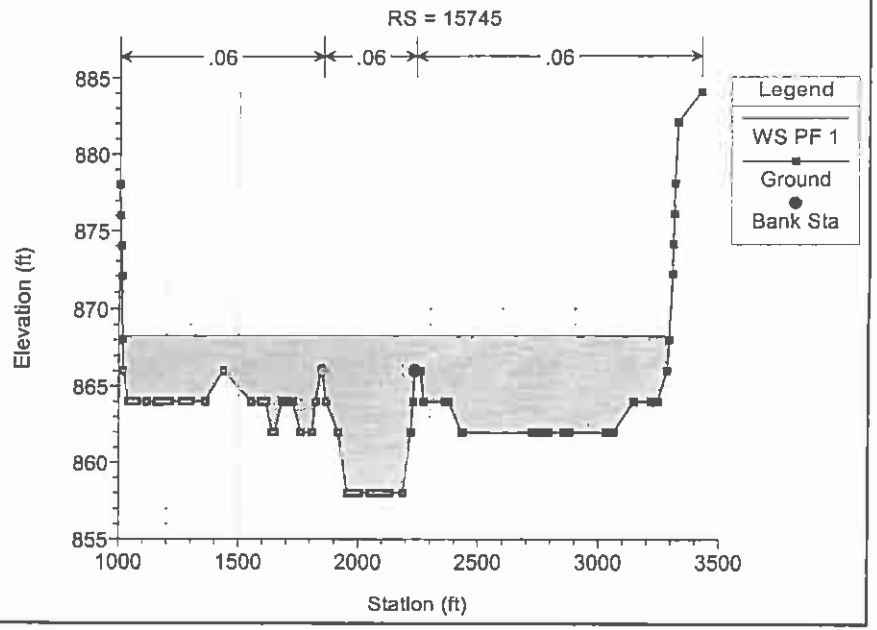
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

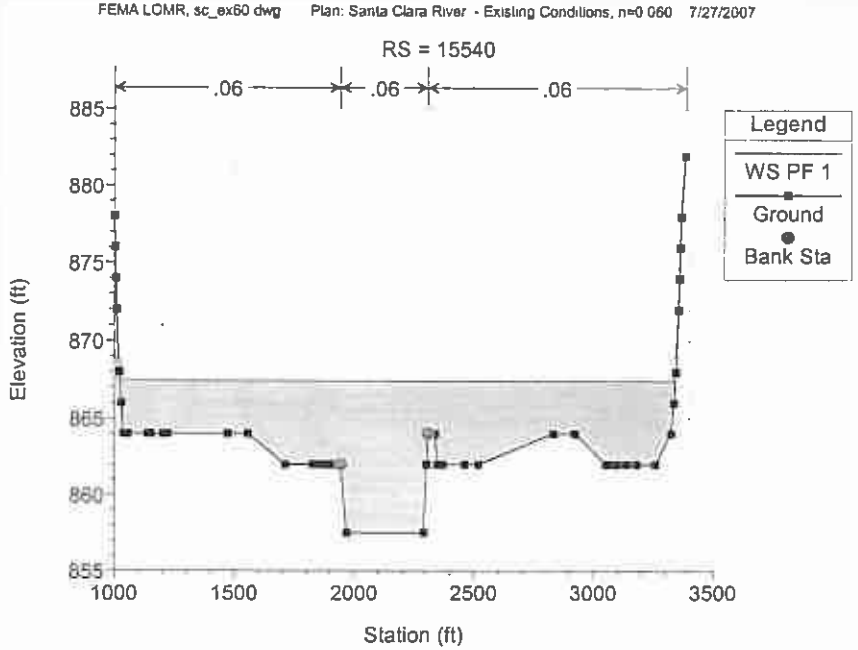


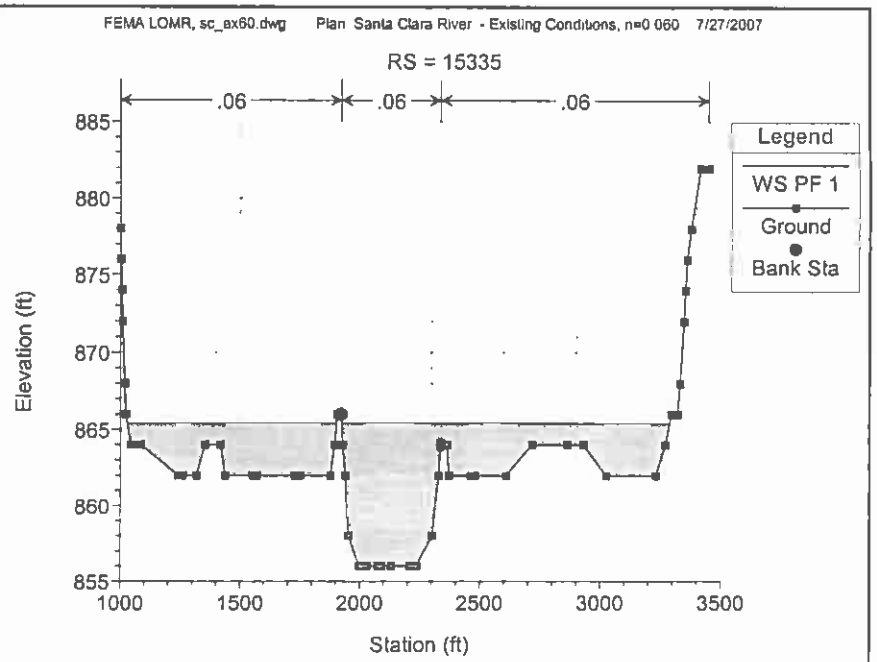
FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

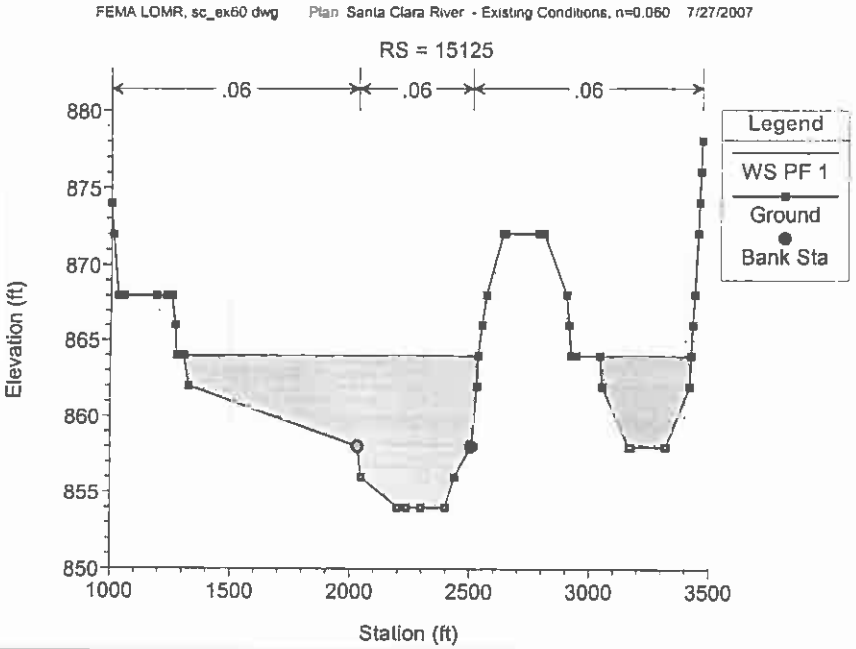


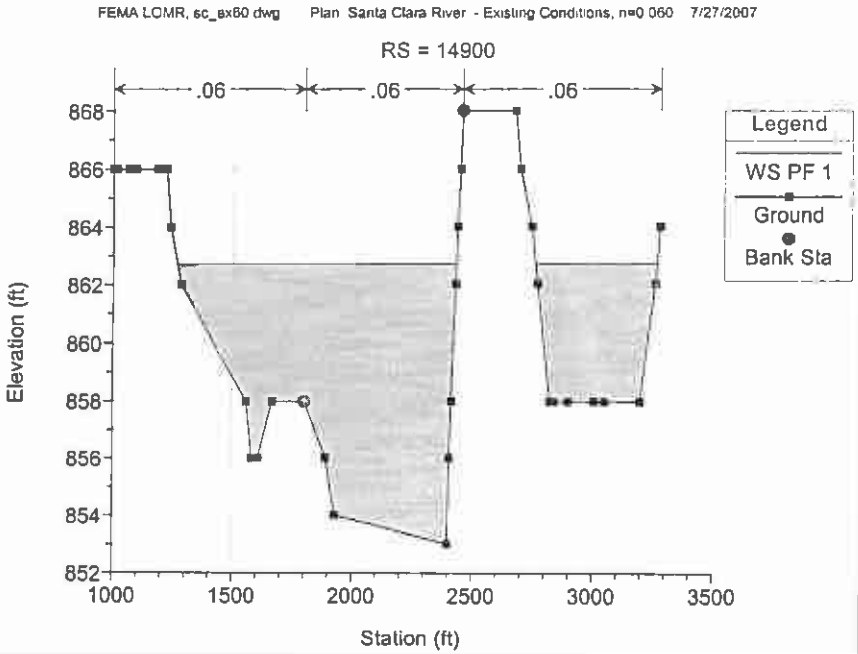
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



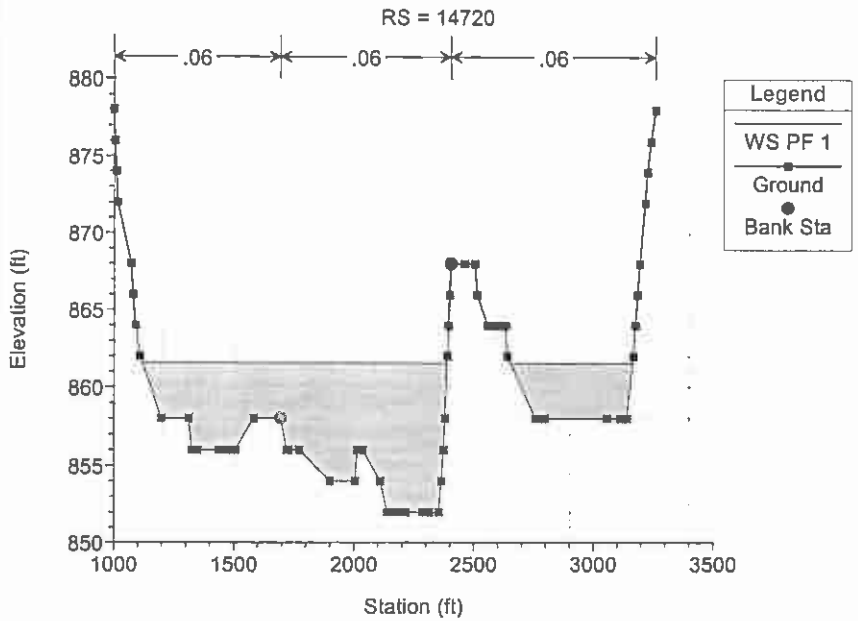

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 15540
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 15335
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

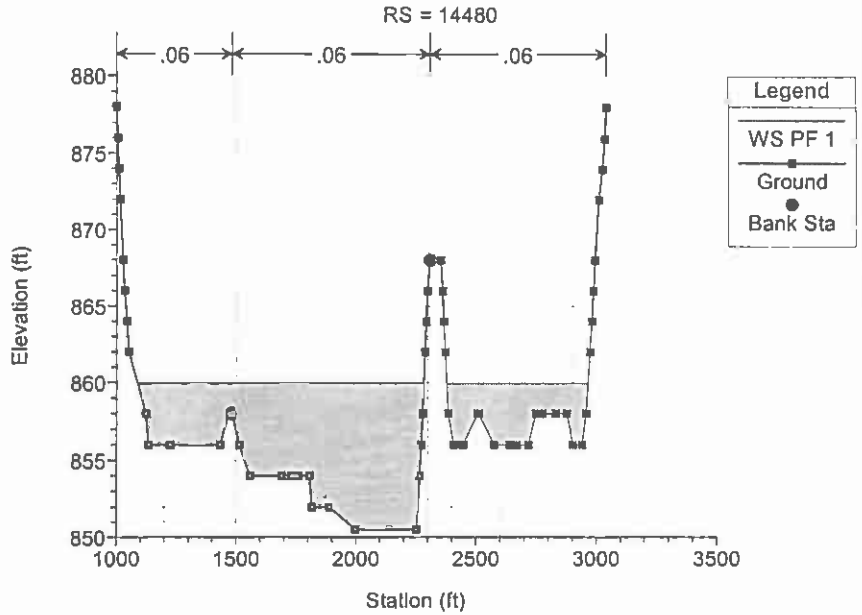

FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 15125
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 14900
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

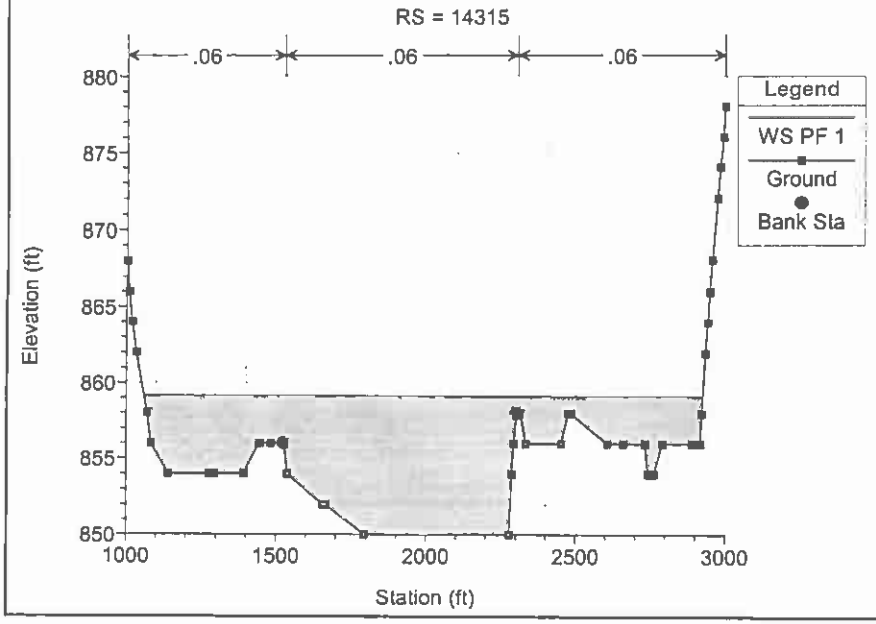
FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007



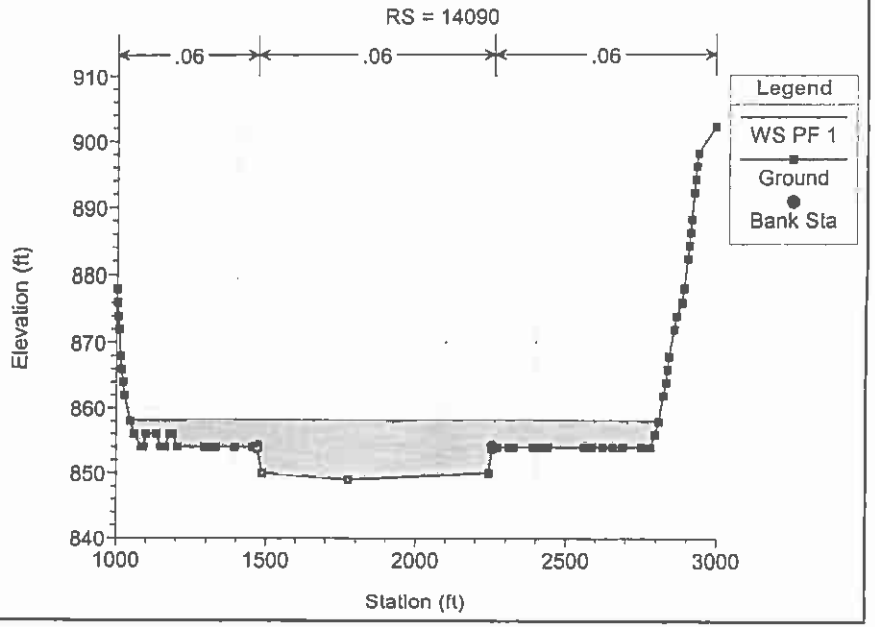
FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007

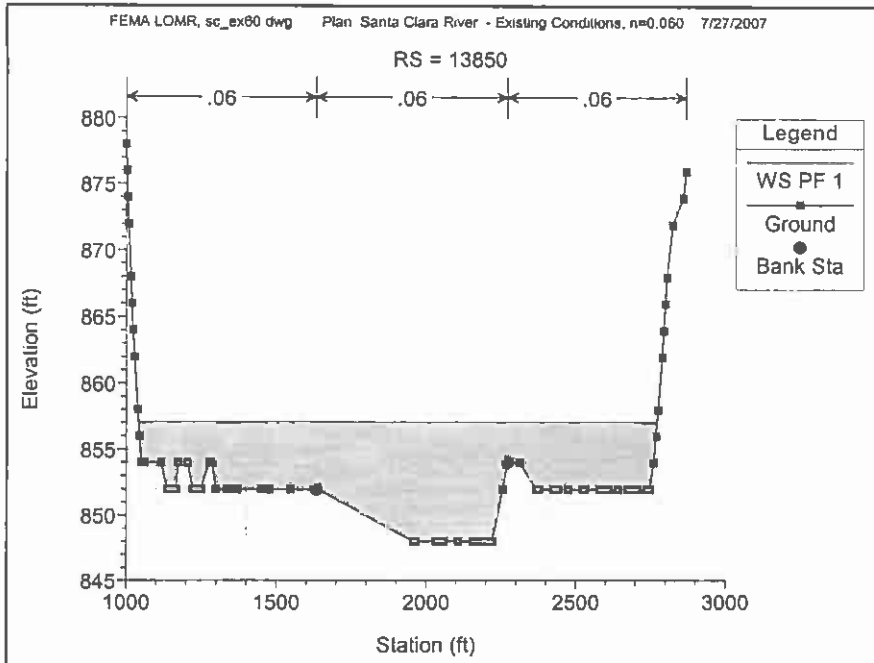


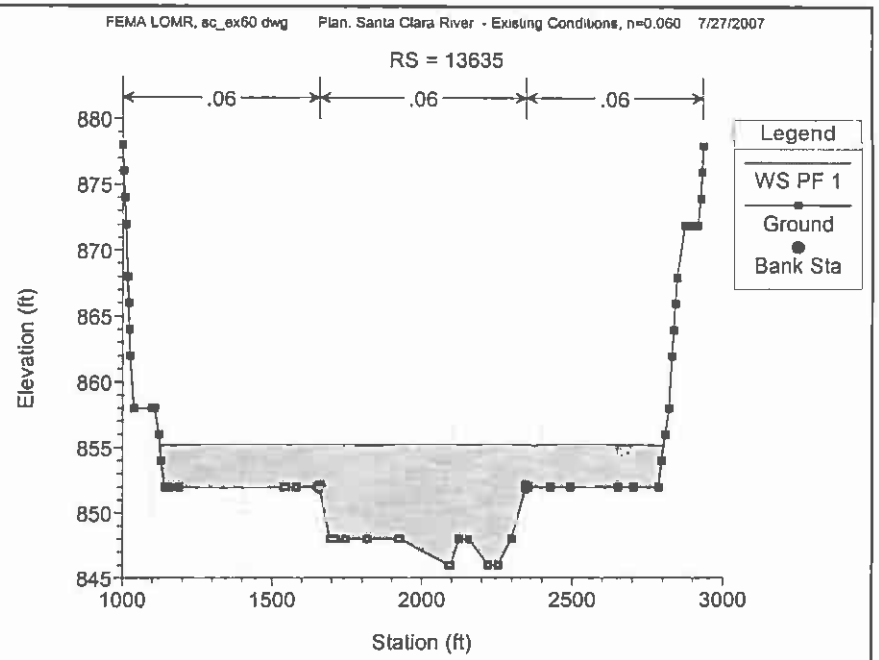
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007

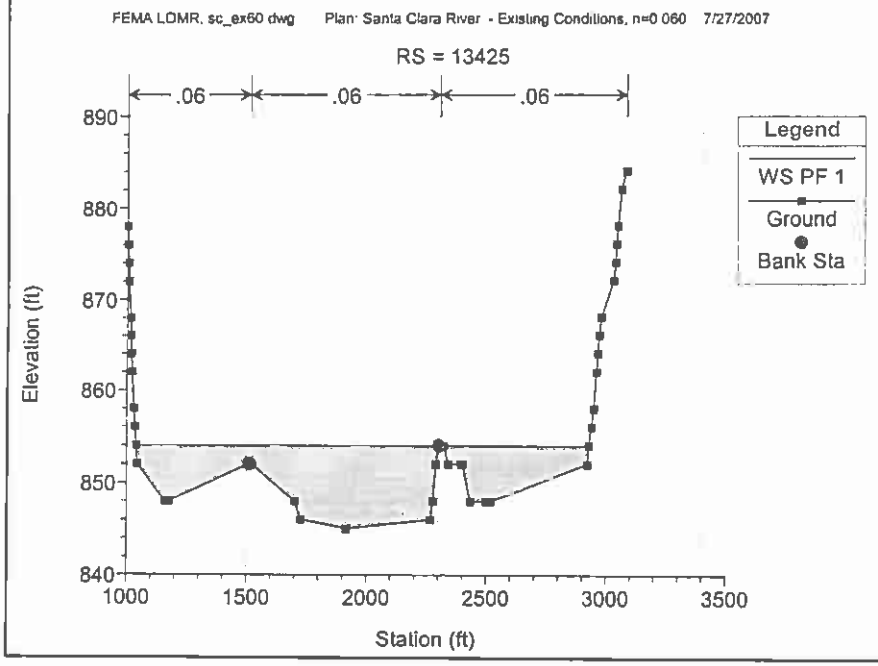


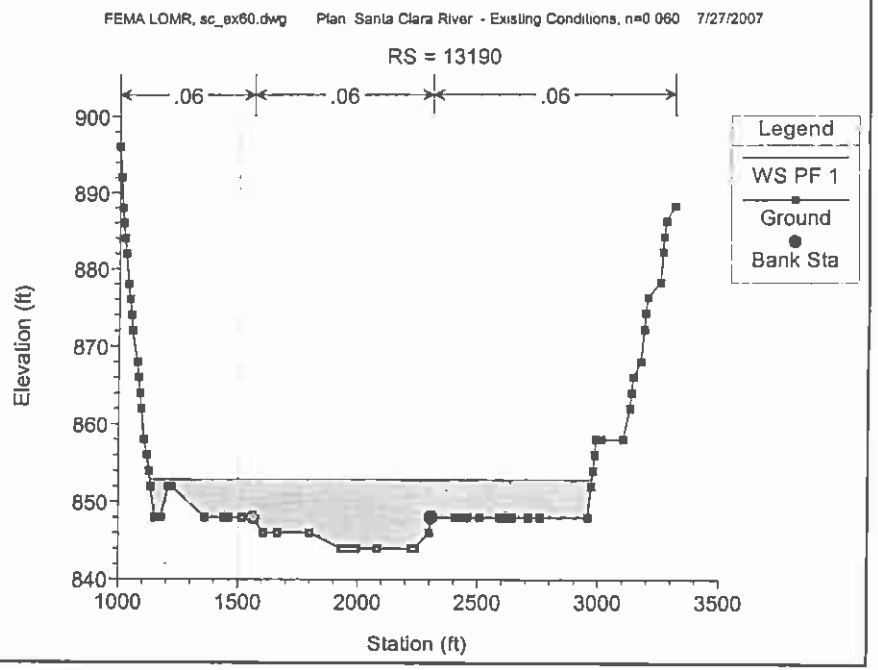
FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007

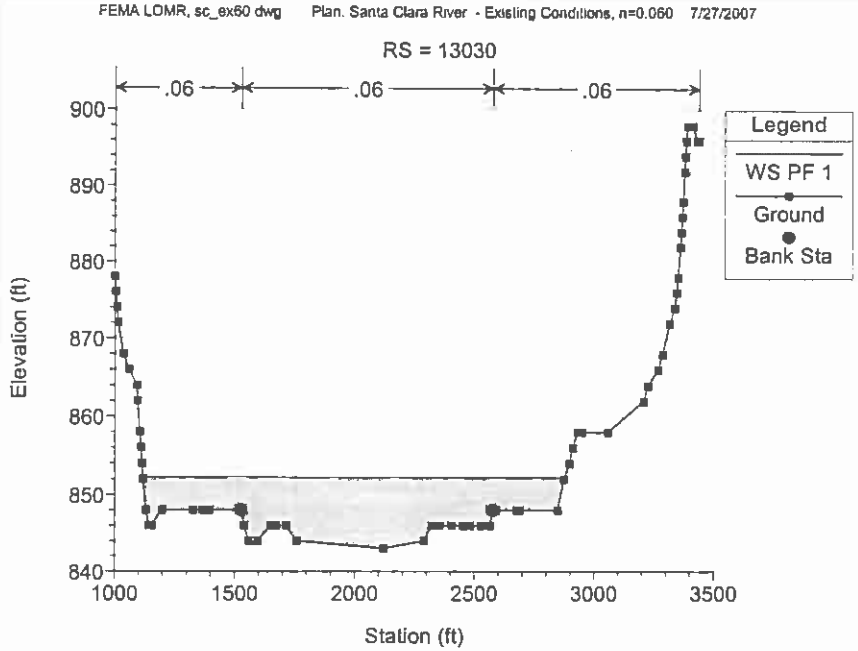


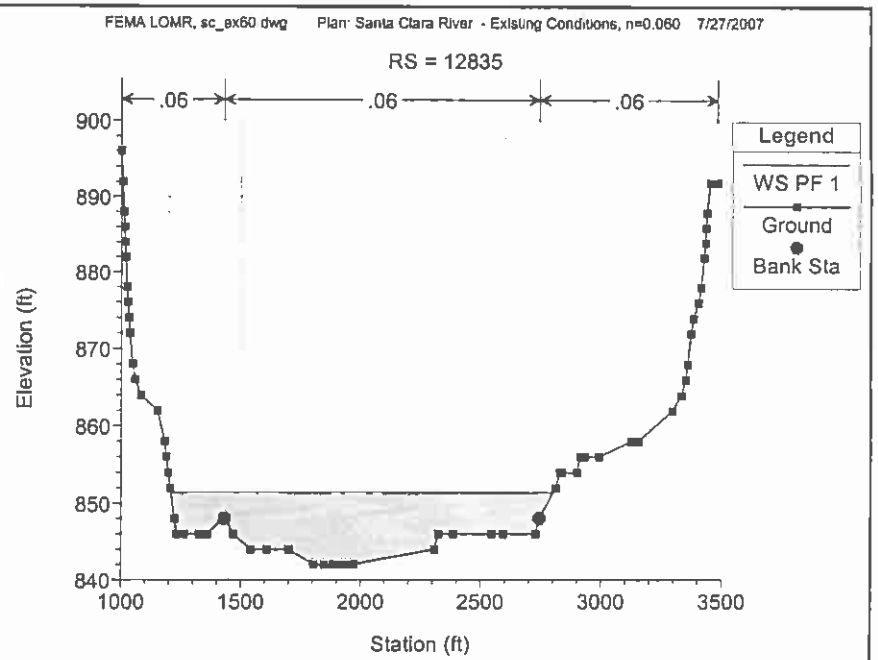

FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 13850
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

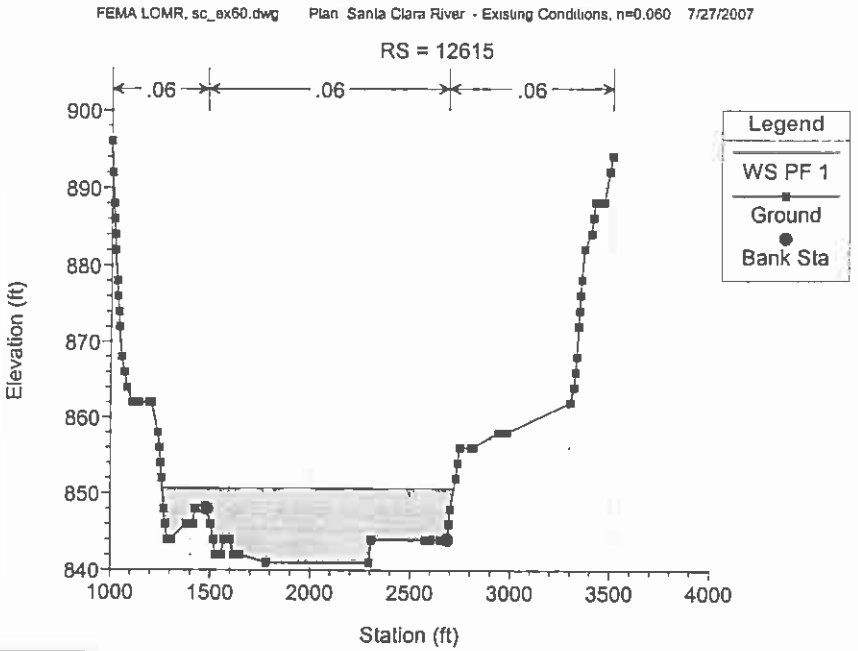

FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 13635
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

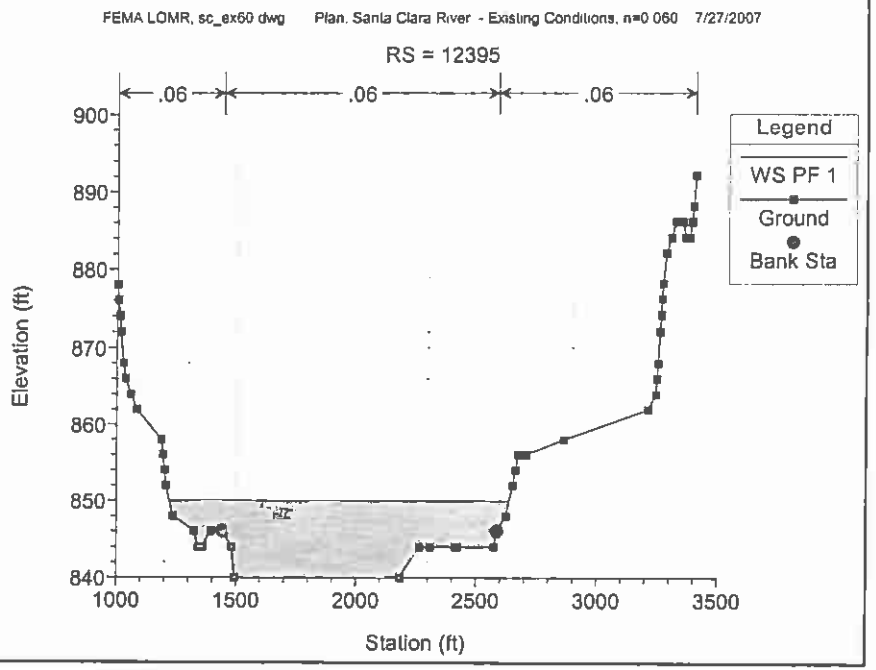

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 13425
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

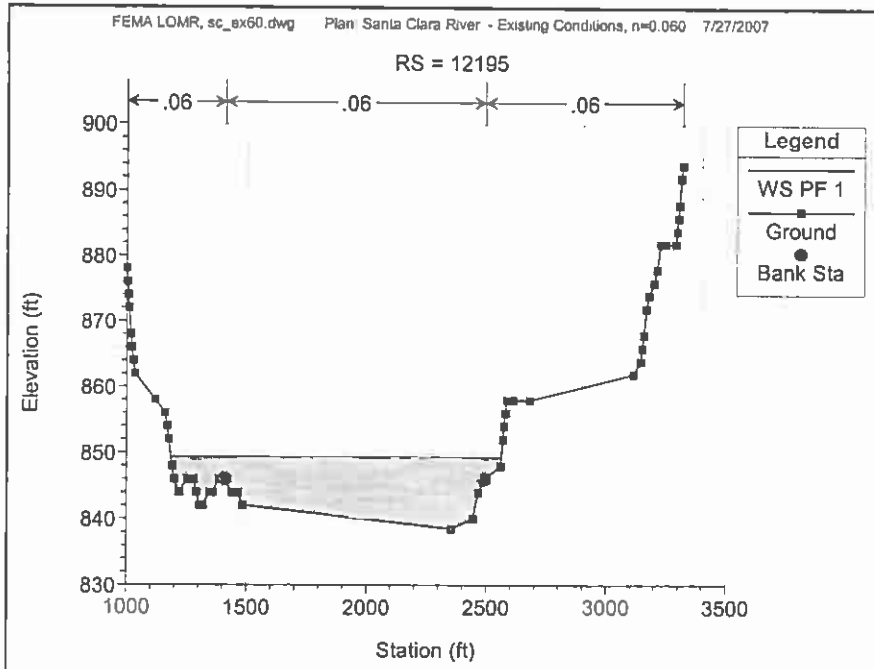

FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 13190
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

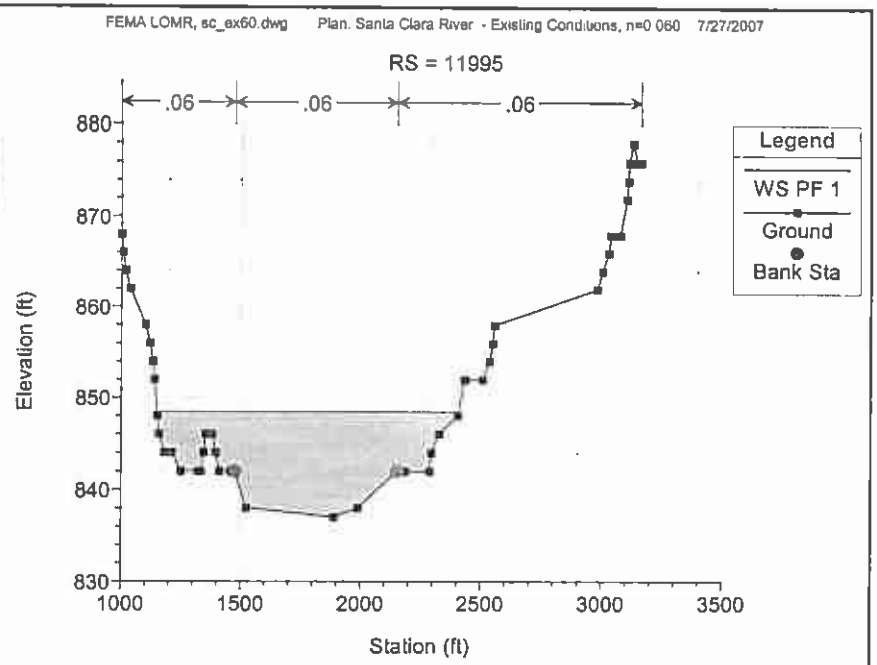

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 13030
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

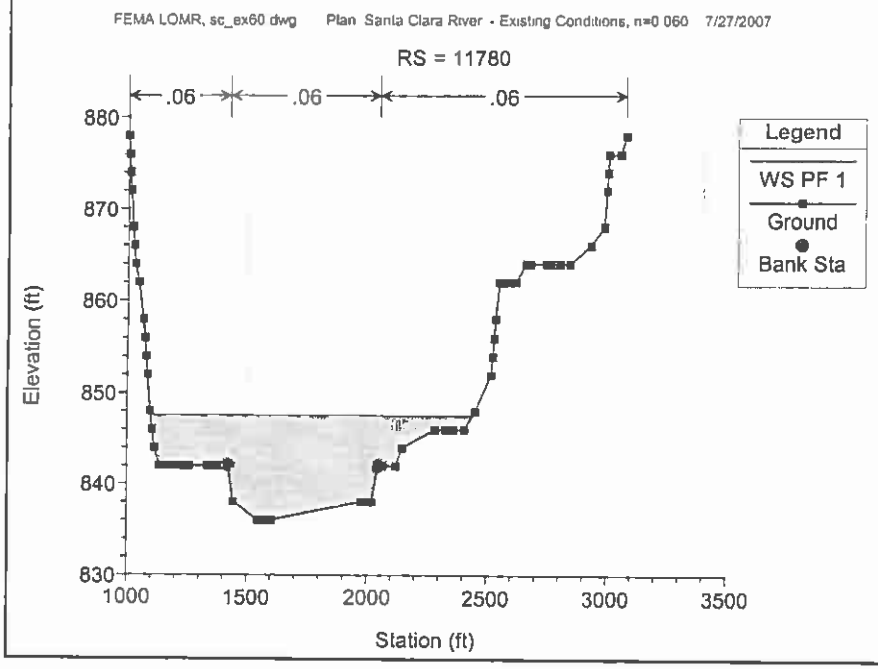

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 12835
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

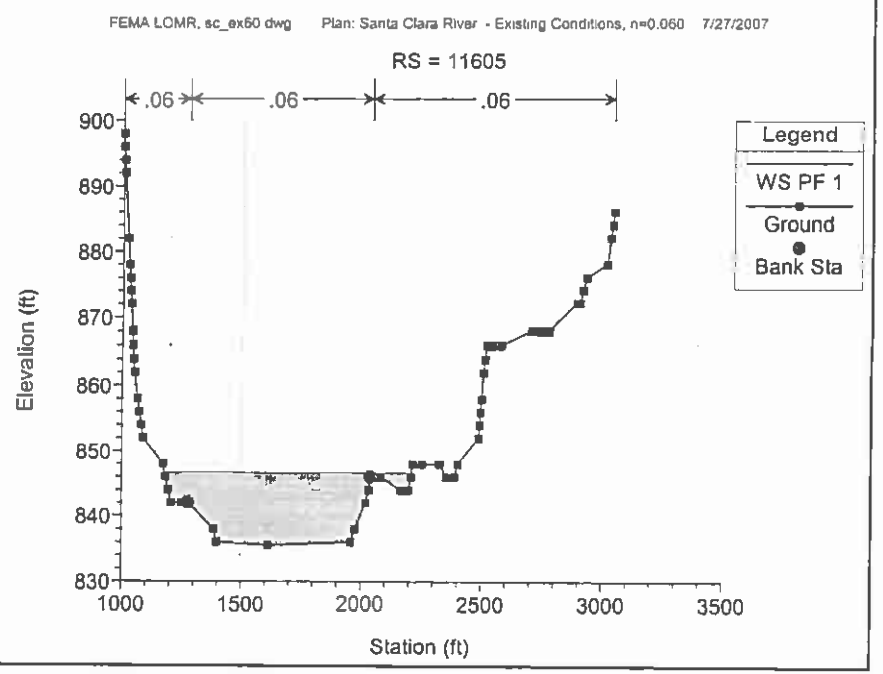

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 12615
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

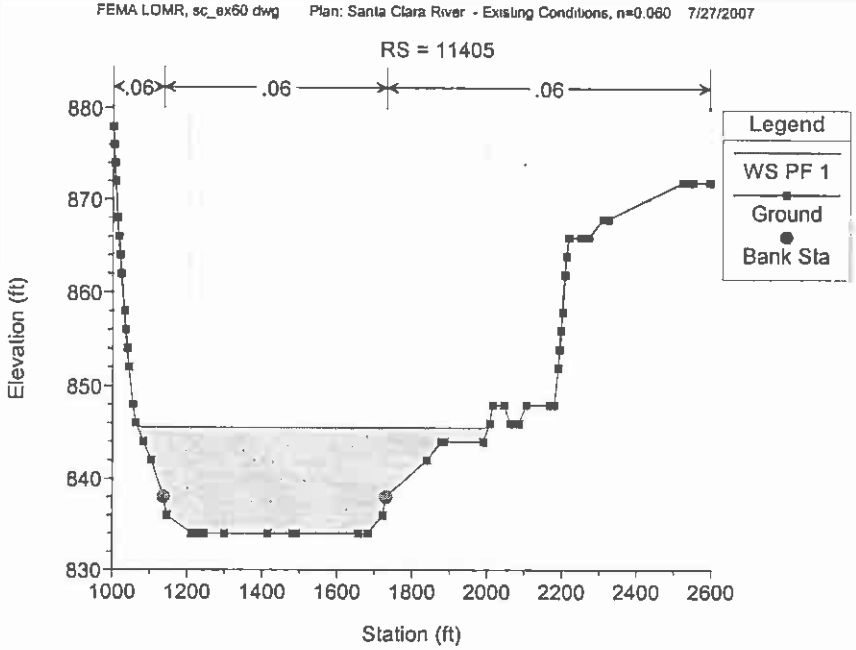

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 12395
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

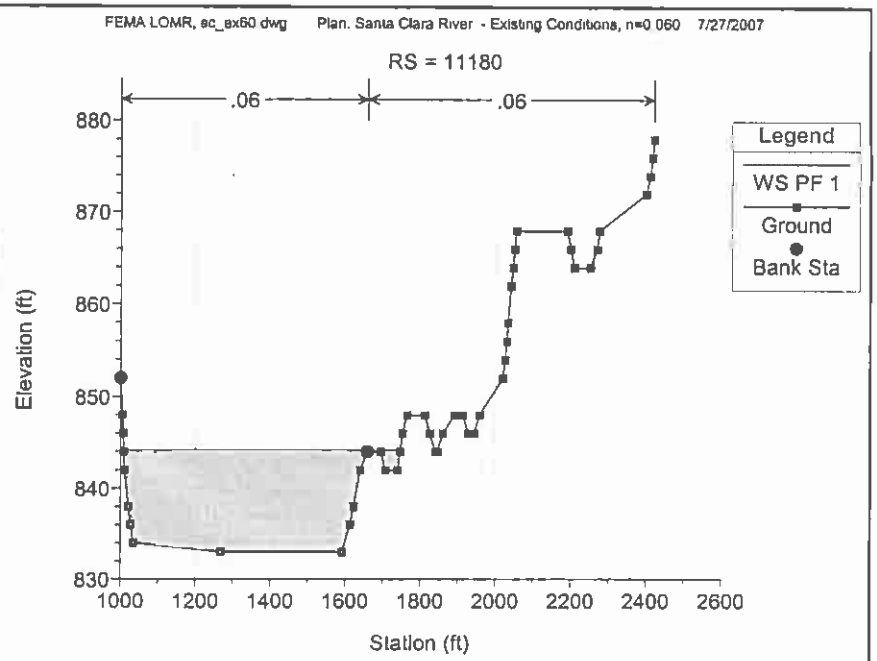

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 12195
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

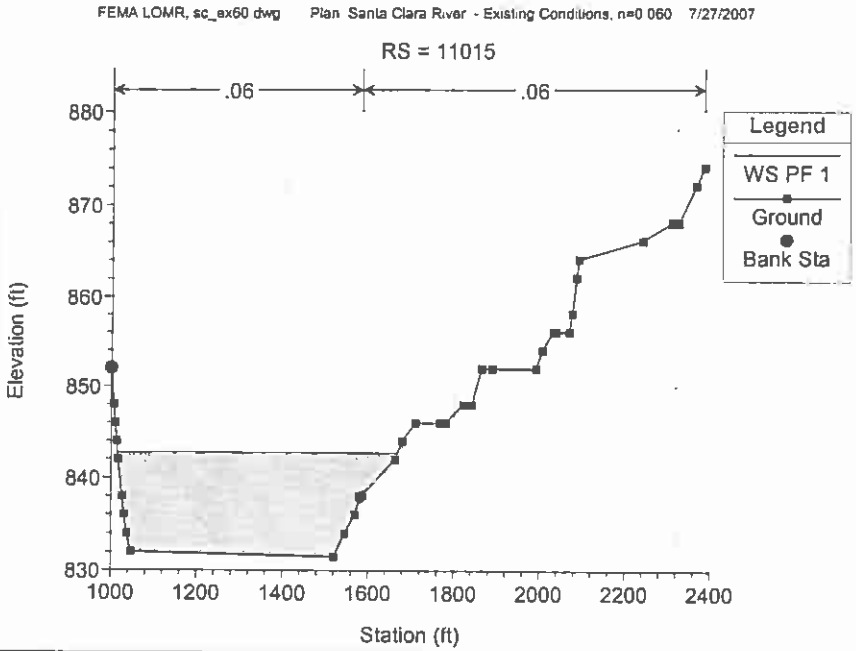

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 11995
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

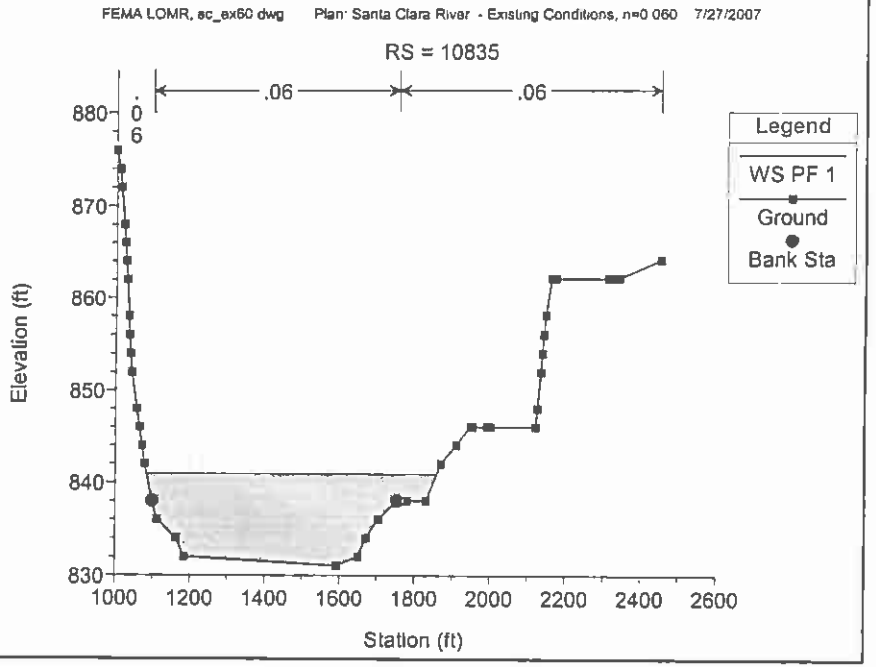

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 11780
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

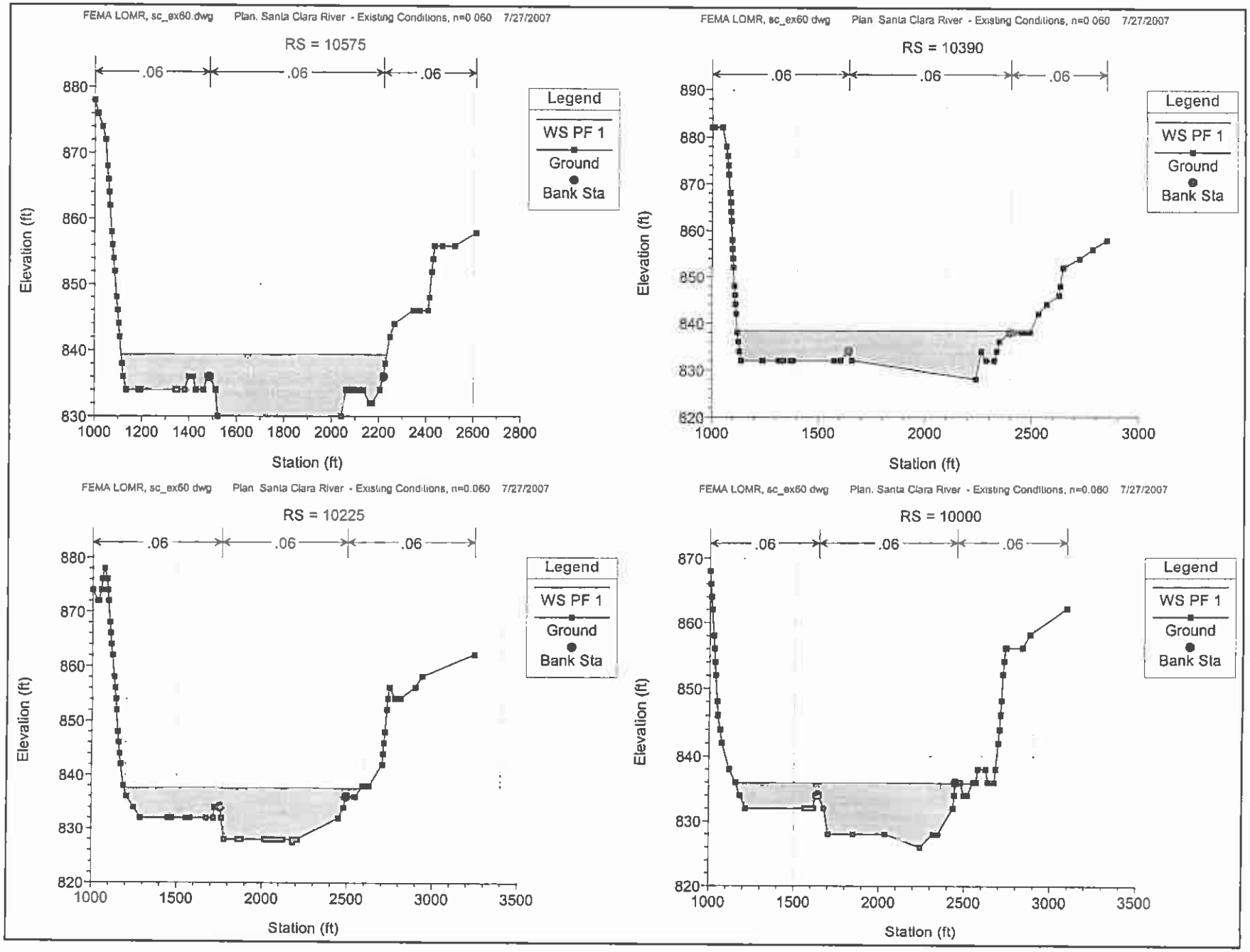

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 11605
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

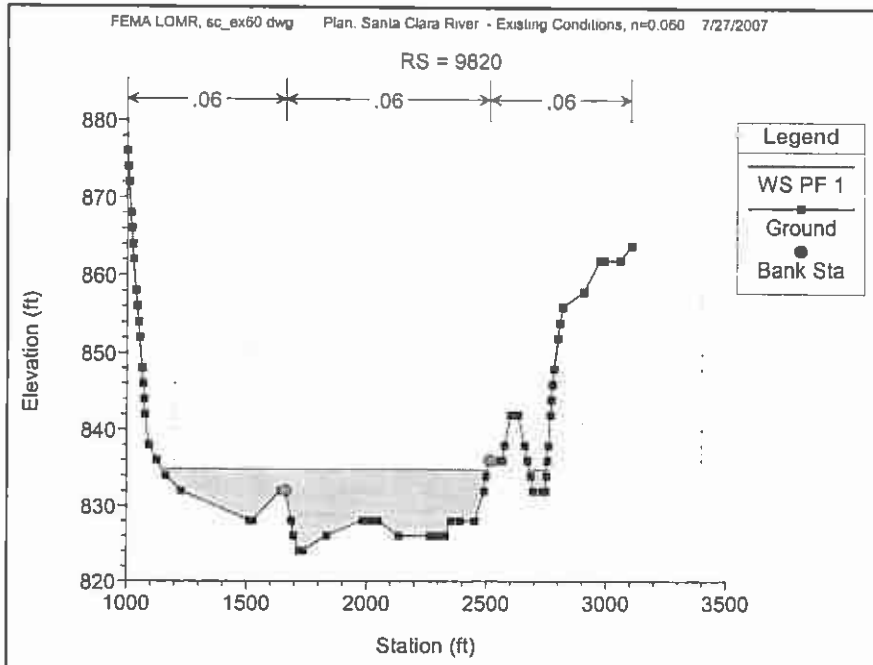

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 11405
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

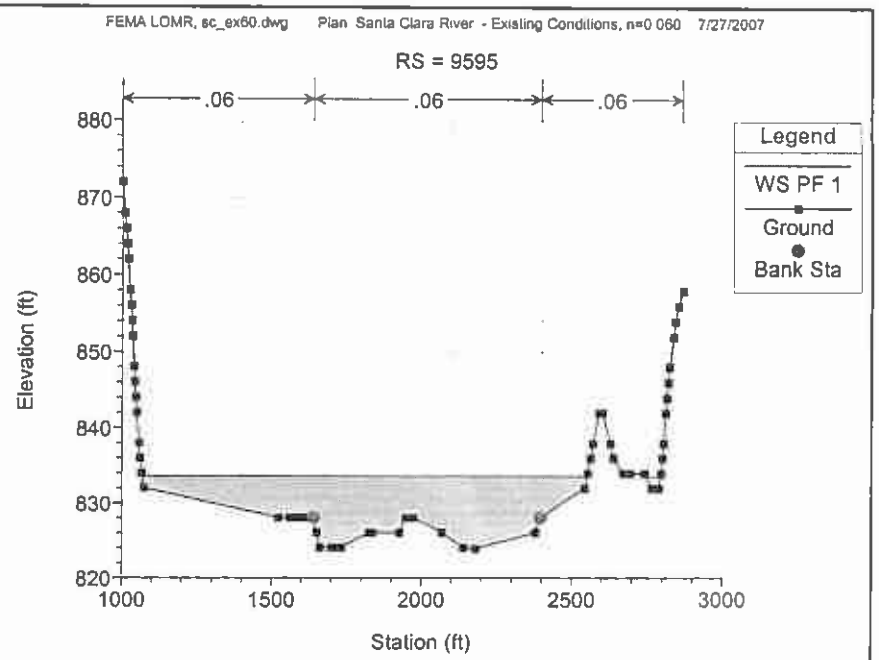

FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 11180
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

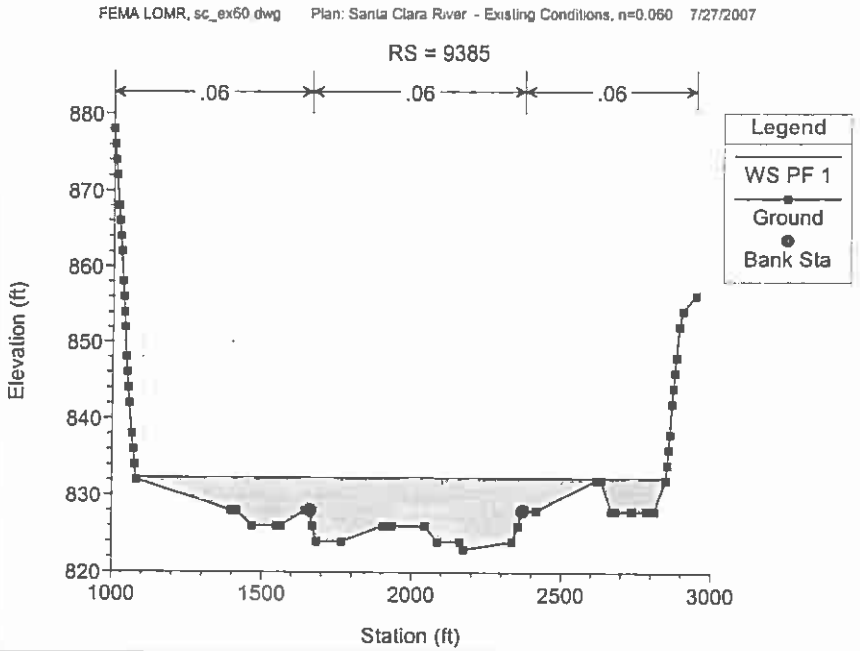

FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 11015
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

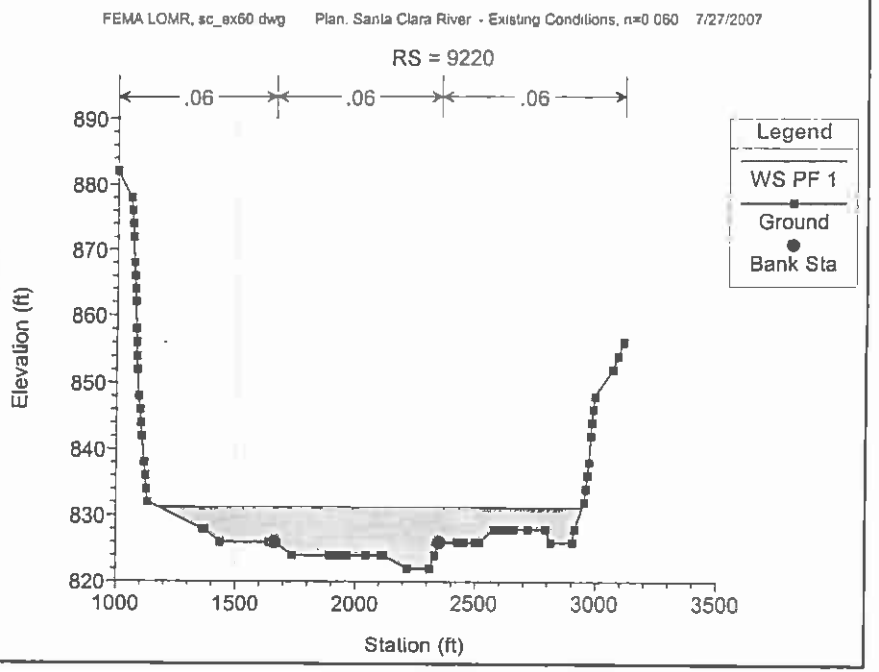

FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 10835
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 10575
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 10390
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
FEMA LOMR, sc_ex60 dwg Plan Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 10225
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 10000
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

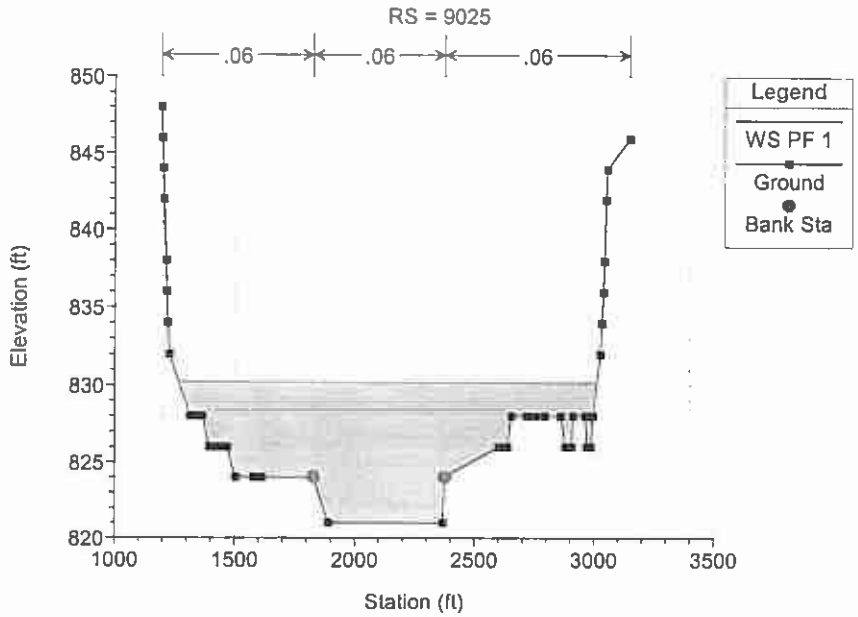

FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 9820
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60.dwg Plan Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 9595
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007
RS = 9385
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


FEMA LOMR, sc_ex60 dwg Plan. Santa Clara River - Existing Conditions, n=0 060 7/27/2007
RS = 9220
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

FEMA LOMR, sc_ex60.dwg Plan: Santa Clara River - Existing Conditions, n=0.060 7/27/2007



HEC-RAS Model

Proposed Model
NGVD 29

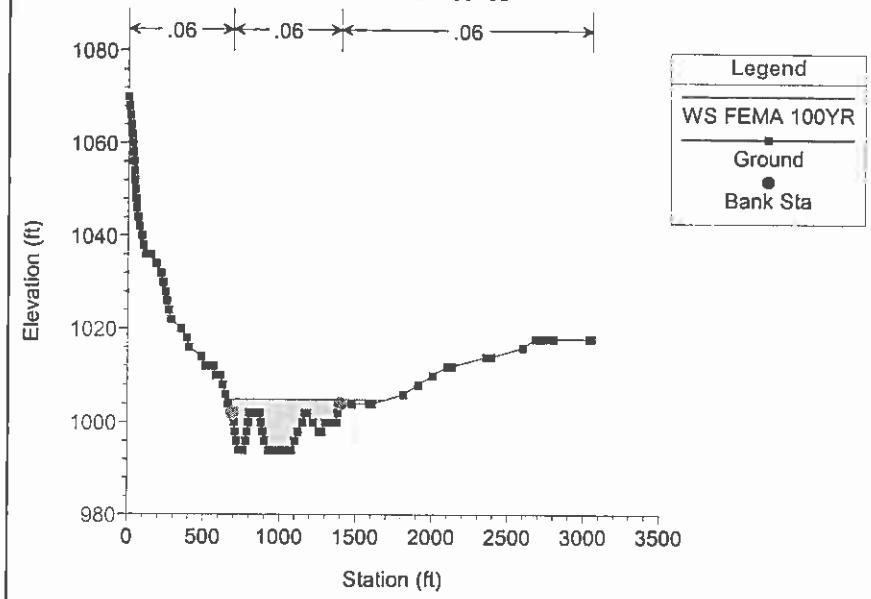
PROP_Mission_Village.prj

HEC-RAS Plan: FEMA 100-YR River: Reach #1 Reach: Santa Clara Rive Profile: FEMA 100YR

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Santa Clara Rive	39755	FEMA 100YR	40300.00	994.00	1004.96	1002.49	1005.92	0.007592	7.91	5315.85	1051.85	0.53
Santa Clara Rive	39605	FEMA 100YR	40300.00	993.00	1004.17	1001.07	1004.92	0.005359	7.04	6121.09	1086.88	0.45
Santa Clara Rive	39310	FEMA 100YR	40300.00	992.00	1001.93	999.47	1002.95	0.007853	8.30	5314.01	1096.48	0.54
Santa Clara Rive	39100	FEMA 100YR	40300.00	990.00	1001.05	997.42	1001.66	0.004232	6.43	6681.76	1057.73	0.40
Santa Clara Rive	38925	FEMA 100YR	40300.00	989.50	1000.16	997.35	1000.82	0.005301	6.68	6397.00	1061.47	0.44
Santa Clara Rive	38710	FEMA 100YR	40300.00	988.00	999.14	995.89	999.76	0.004487	6.48	6542.33	963.68	0.41
Santa Clara Rive	38475	FEMA 100YR	40300.00	986.00	996.78	994.93	998.12	0.011020	9.29	4348.76	672.88	0.63
Santa Clara Rive	38300	FEMA 100YR	40300.00	985.50	995.66	992.63	996.56	0.006237	7.60	5303.89	689.85	0.48
Santa Clara Rive	38065	FEMA 100YR	40300.00	984.00	994.47	990.62	995.25	0.004706	7.12	5660.79	657.58	0.43
Santa Clara Rive	37810	FEMA 100YR	40300.00	983.00	992.51	989.89	993.67	0.008016	8.63	4667.29	603.48	0.55
Santa Clara Rive	37655	FEMA 100YR	40300.00	982.00	990.32	989.28	991.89	0.016575	10.06	4005.80	713.65	0.75
Santa Clara Rive	37390	FEMA 100YR	40300.00	981.00	988.93	985.62	989.53	0.004543	6.21	6546.55	980.26	0.41
Santa Clara Rive	37135	FEMA 100YR	40300.00	980.00	987.73	984.71	988.29	0.005151	5.98	6734.32	1087.61	0.42
Santa Clara Rive	36930	FEMA 100YR	40300.00	978.00	987.05	982.89	987.49	0.002854	5.51	7910.39	1120.65	0.33
Santa Clara Rive	36735	FEMA 100YR	40300.00	977.00	986.51	982.82	986.93	0.002772	5.53	8109.56	1195.25	0.33
Santa Clara Rive	36515	FEMA 100YR	40300.00	975.00	986.09	981.50	986.42	0.001844	5.01	9446.40	1324.32	0.28
Santa Clara Rive	36374	FEMA 100YR	40300.00	974.11	985.44	981.10	985.85	0.002858	5.11	7893.88	1039.19	0.33
Santa Clara Rive	36299		Bridge									
Santa Clara Rive	36240	FEMA 100YR	40300.00	974.11	984.24	981.00	984.83	0.005391	6.16	6537.00	1044.74	0.43
Santa Clara Rive	36080	FEMA 100YR	40300.00	973.00	983.19	980.76	983.87	0.007536	6.63	6074.63	1118.77	0.50
Santa Clara Rive	35845	FEMA 100YR	40300.00	971.00	982.02	979.28	982.53	0.004176	5.72	7049.89	1310.76	0.43
Santa Clara Rive	35725	FEMA 100YR	40300.00	970.00	981.34	978.93	981.96	0.005097	6.35	6436.08	1323.98	0.49
Santa Clara Rive	35515	FEMA 100YR	40300.00	969.00	980.06	977.09	980.82	0.005853	7.17	6253.96	1332.79	0.47
Santa Clara Rive	35245	FEMA 100YR	40300.00	968.00	978.28	975.64	979.07	0.007122	7.26	5961.22	1270.33	0.50
Santa Clara Rive	35040	FEMA 100YR	40300.00	967.00	976.94	975.00	977.64	0.006414	7.07	6454.96	1335.57	0.48
Santa Clara Rive	34860	FEMA 100YR	40300.00	966.00	975.53	973.56	976.36	0.008241	7.58	5839.51	1268.17	0.54
Santa Clara Rive	34720	FEMA 100YR	40300.00	965.50	974.17	972.47	975.13	0.008847	8.06	5546.55	1407.95	0.56
Santa Clara Rive	34495	FEMA 100YR	40300.00	964.00	972.45	970.60	973.26	0.007592	7.46	5920.48	1263.01	0.52
Santa Clara Rive	34310	FEMA 100YR	40300.00	963.00	971.37	968.48	972.05	0.005182	6.81	6478.40	1257.36	0.44
Santa Clara Rive	34090	FEMA 100YR	40300.00	962.00	970.10	967.39	970.83	0.006036	6.92	6162.37	1261.77	0.47
Santa Clara Rive	33880	FEMA 100YR	40300.00	960.00	968.87	966.33	969.58	0.005963	6.93	6331.39	1281.35	0.46
Santa Clara Rive	33710	FEMA 100YR	40300.00	959.00	967.67	965.42	968.46	0.006802	7.36	6091.67	1316.60	0.50
Santa Clara Rive	33500	FEMA 100YR	40300.00	958.00	966.48	963.63	967.16	0.005359	6.94	6651.63	1445.74	0.45
Santa Clara Rive	33310	FEMA 100YR	40300.00	957.00	965.46	962.98	966.13	0.005552	6.96	6727.51	1471.87	0.45
Santa Clara Rive	33115	FEMA 100YR	40300.00	956.00	964.72	961.18	965.20	0.003535	5.88	7797.02	1572.36	0.37
Santa Clara Rive	32795	FEMA 100YR	40300.00	954.00	963.42	960.32	964.00	0.004223	6.38	7069.08	1311.68	0.40
Santa Clara Rive	32605	FEMA 100YR	40300.00	952.00	962.62	959.26	963.19	0.004095	6.36	7328.65	1632.87	0.39

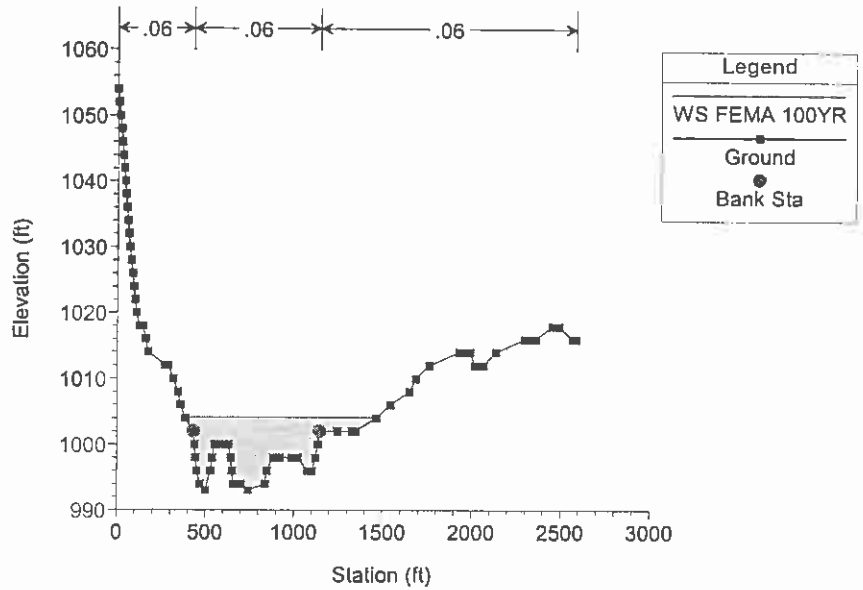
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 39755



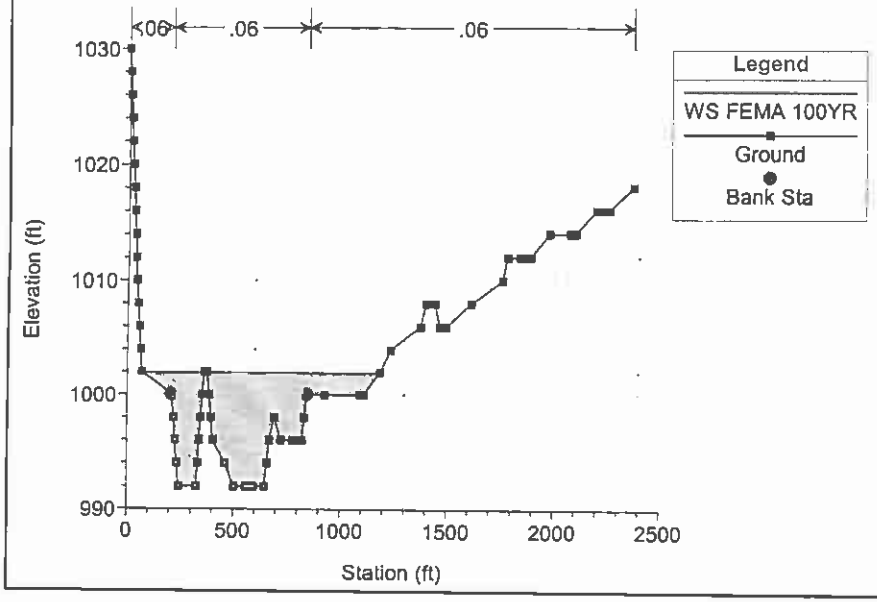
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 39605



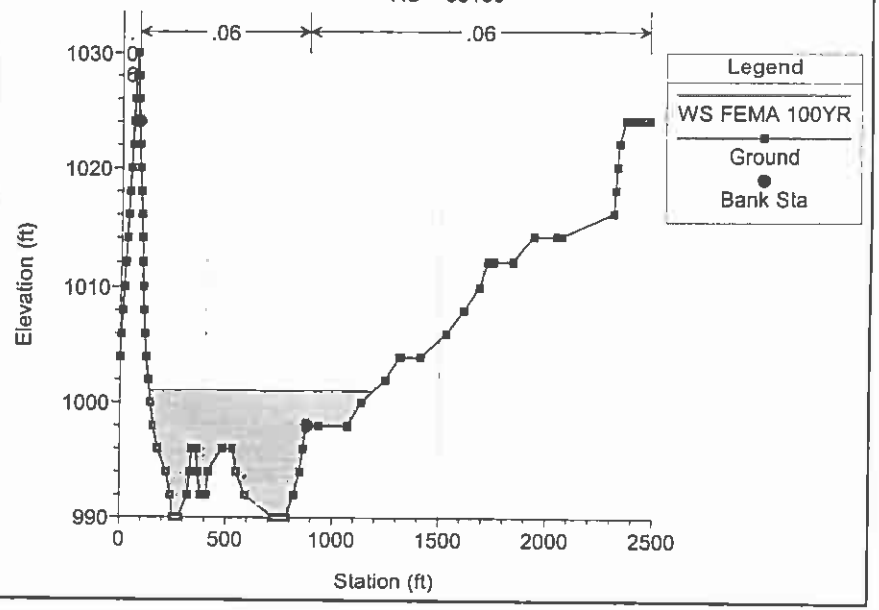
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

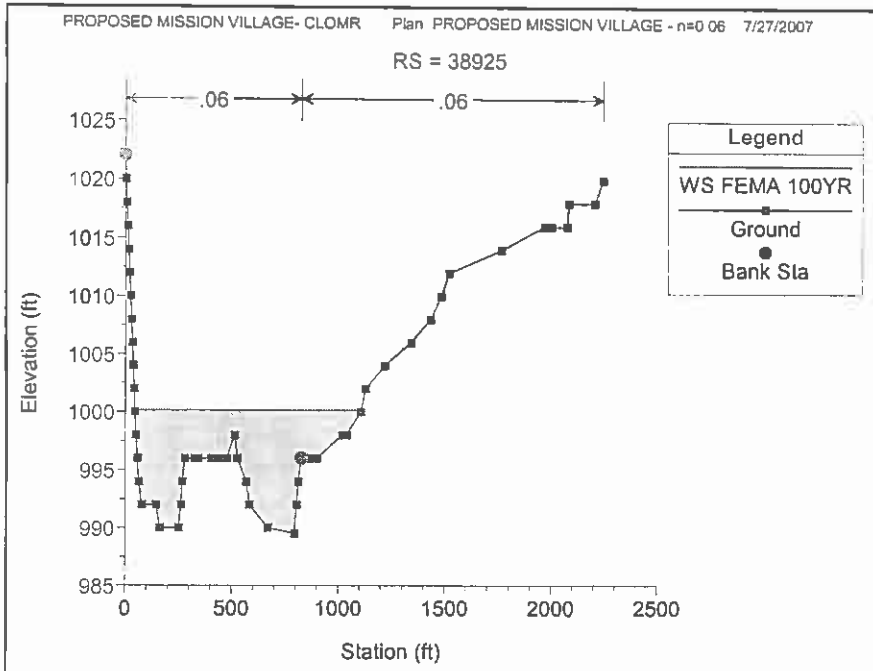
RS = 39310

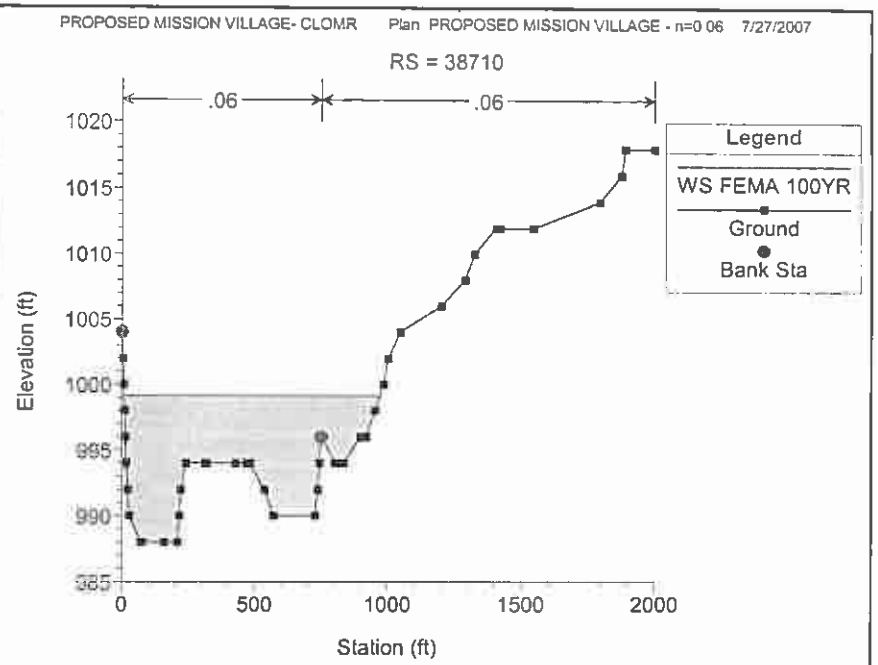


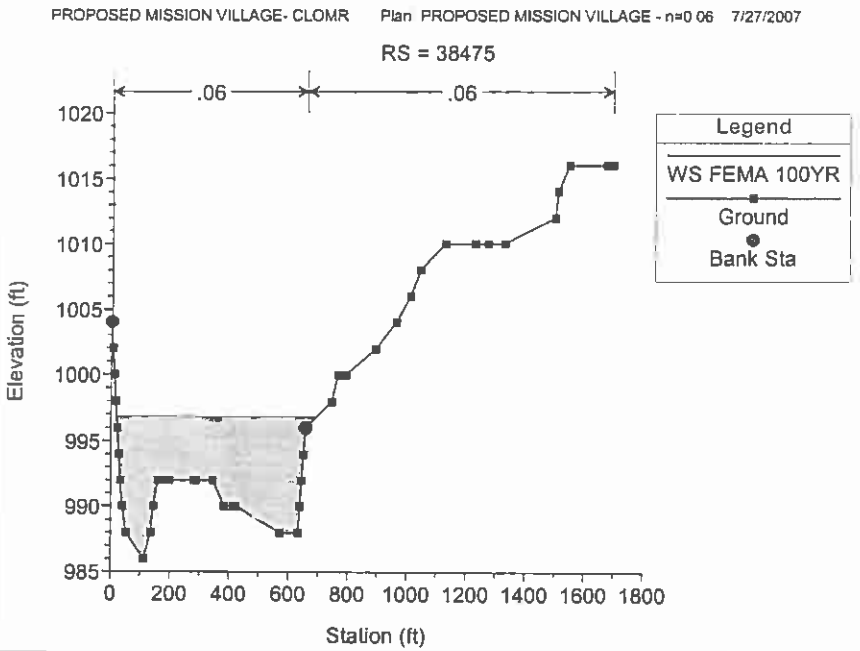
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

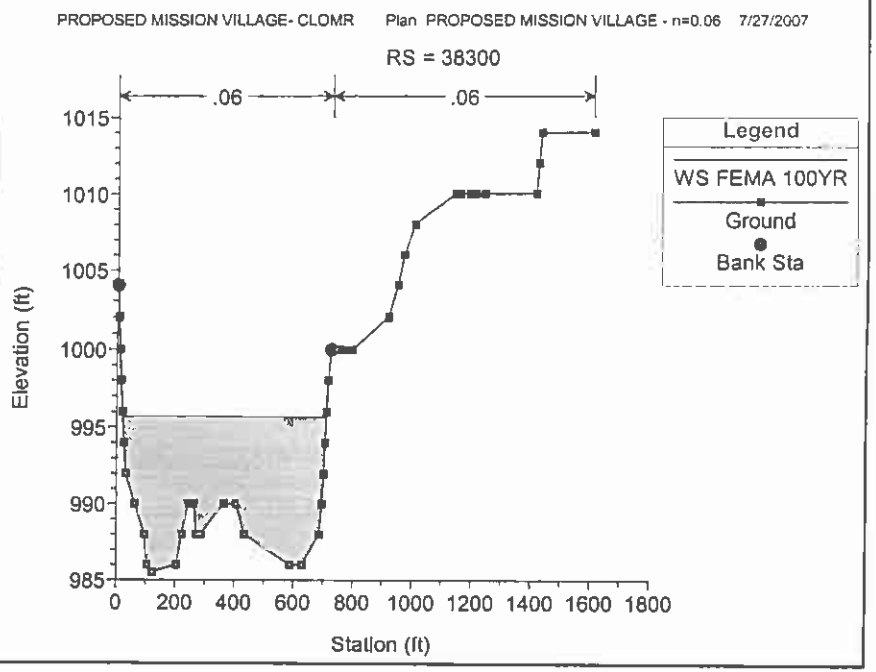
RS = 39100




PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 38925
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

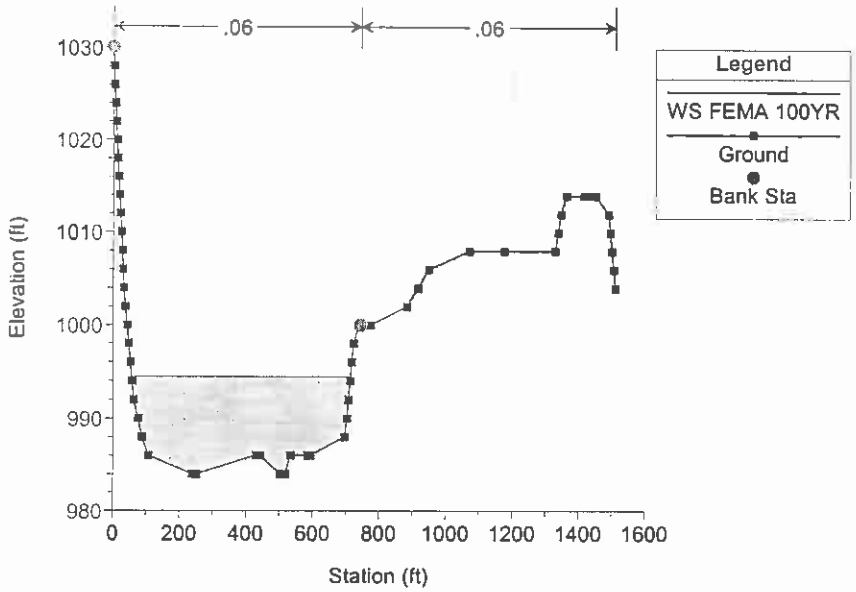

PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 38710
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 38475
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0.06 7/27/2007
RS = 38300
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

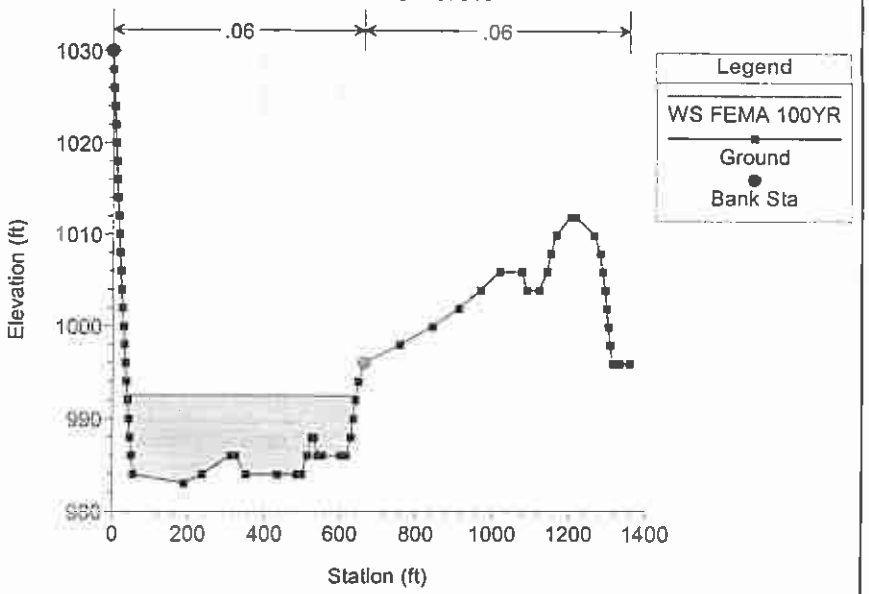
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0.06 7/27/2007

RS = 38065



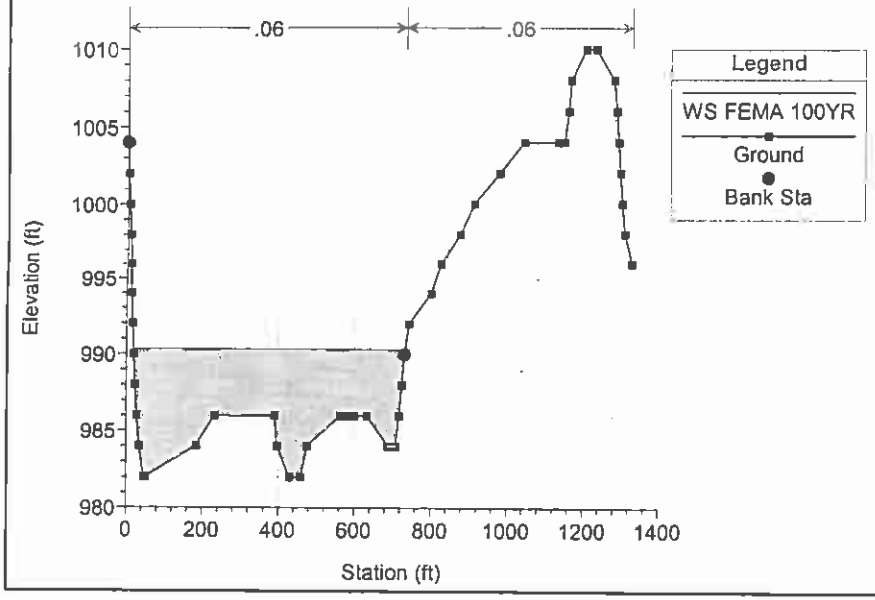
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 37810



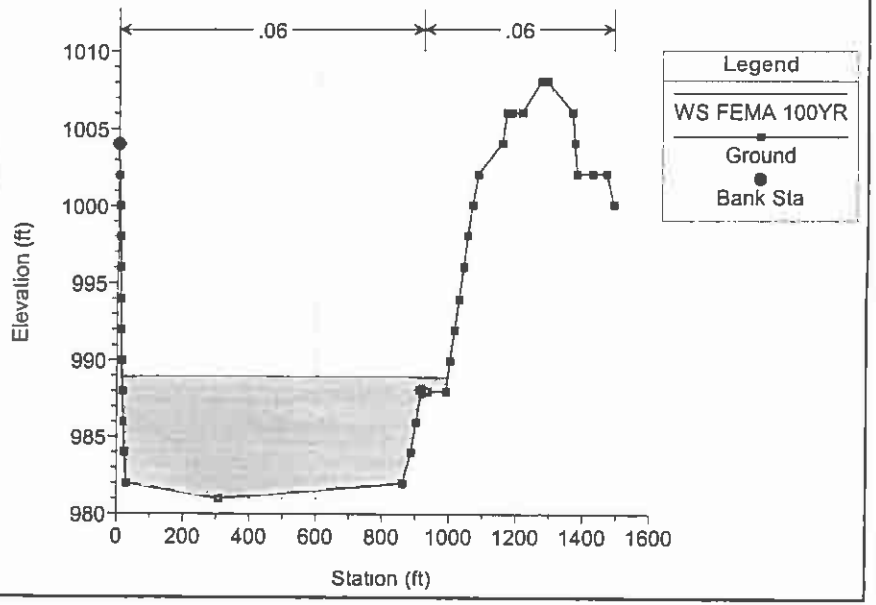
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 37655



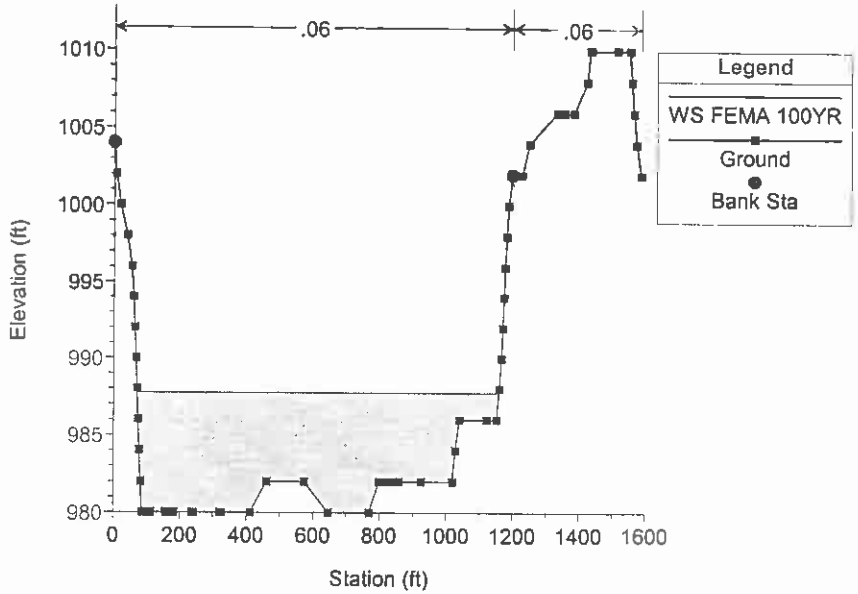
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 37390



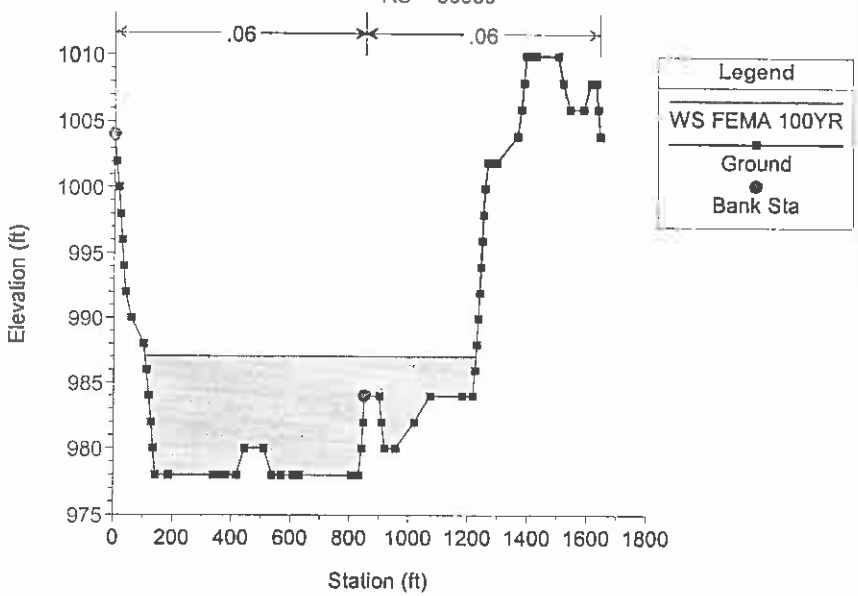
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0.06 7/27/2007

RS = 37135



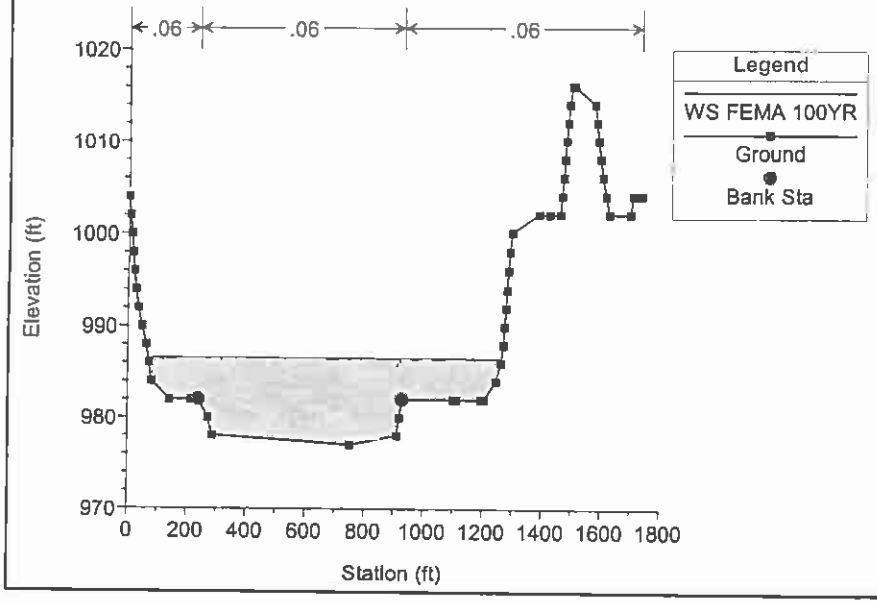
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 36930



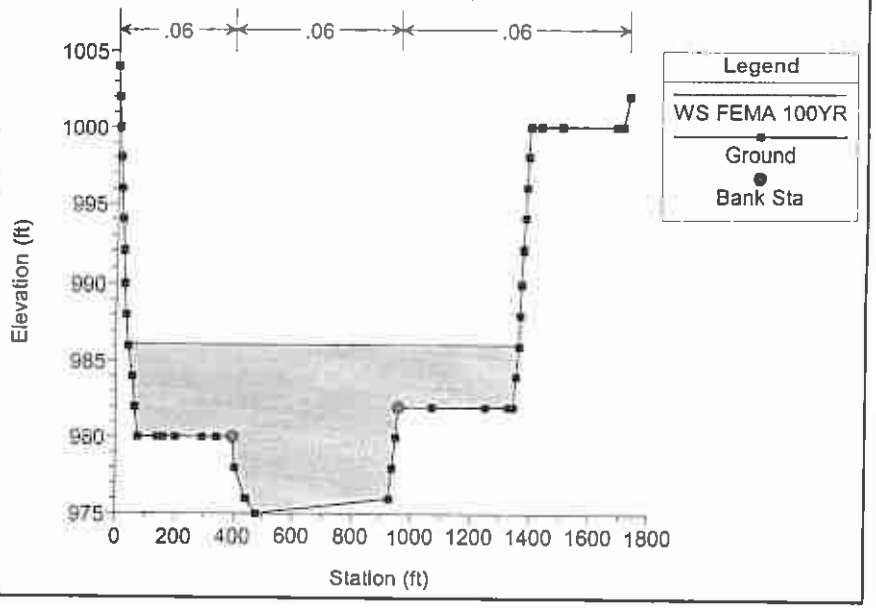
PROPOSED MISSION VILLAGE- CLOMR Plan: PROPOSED MISSION VILLAGE - n=0.06 7/27/2007

RS = 36735



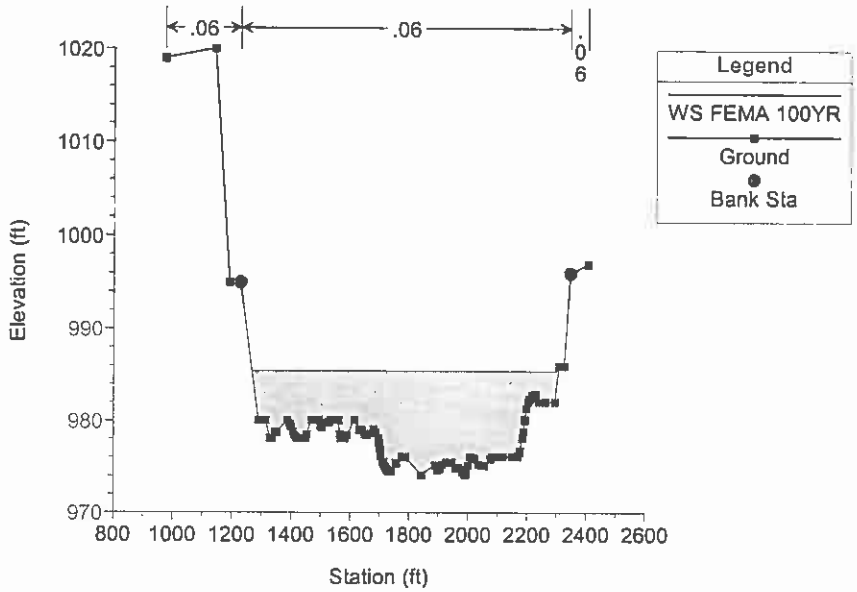
PROPOSED MISSION VILLAGE- CLOMR Plan. PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 36515



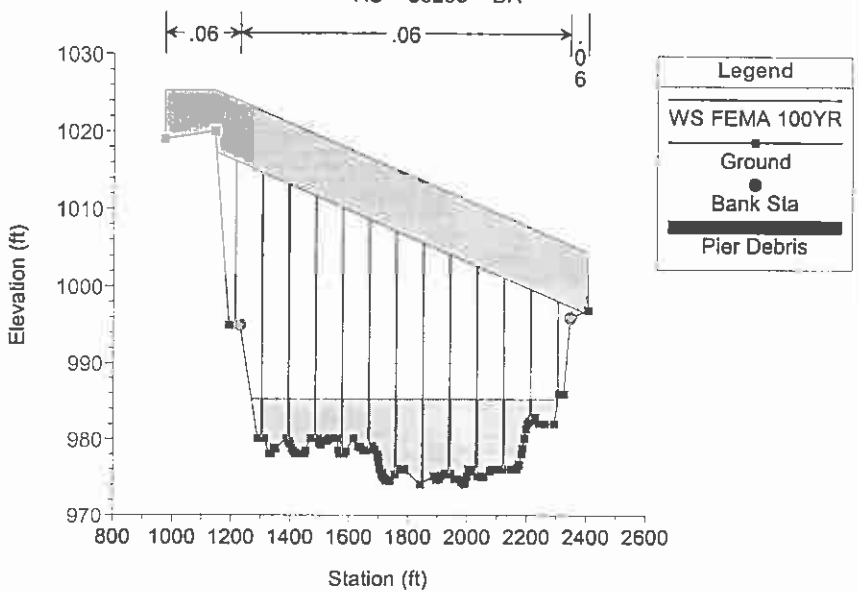
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 36374



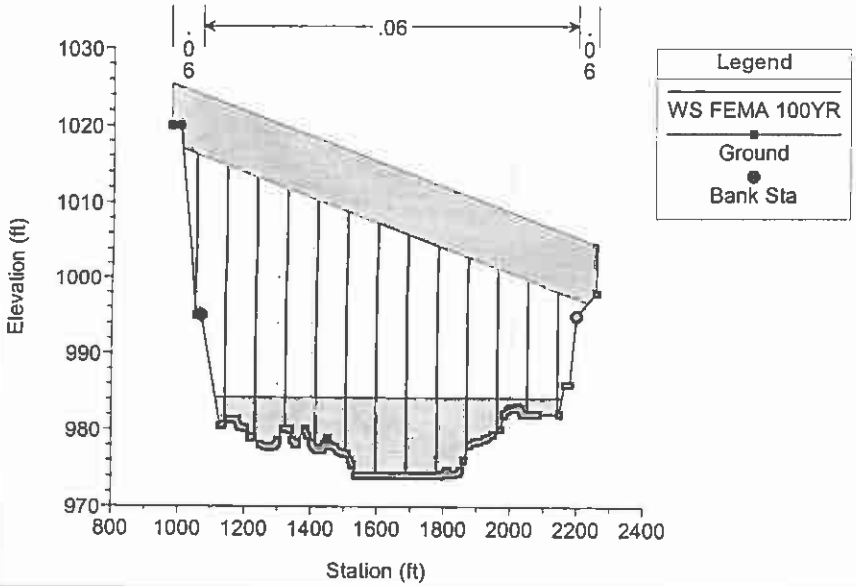
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 36299 BR



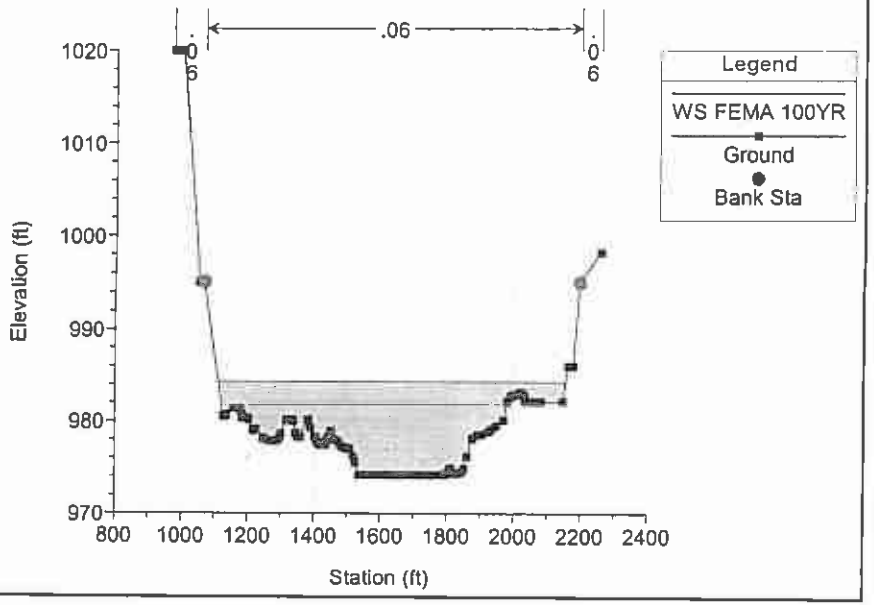
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

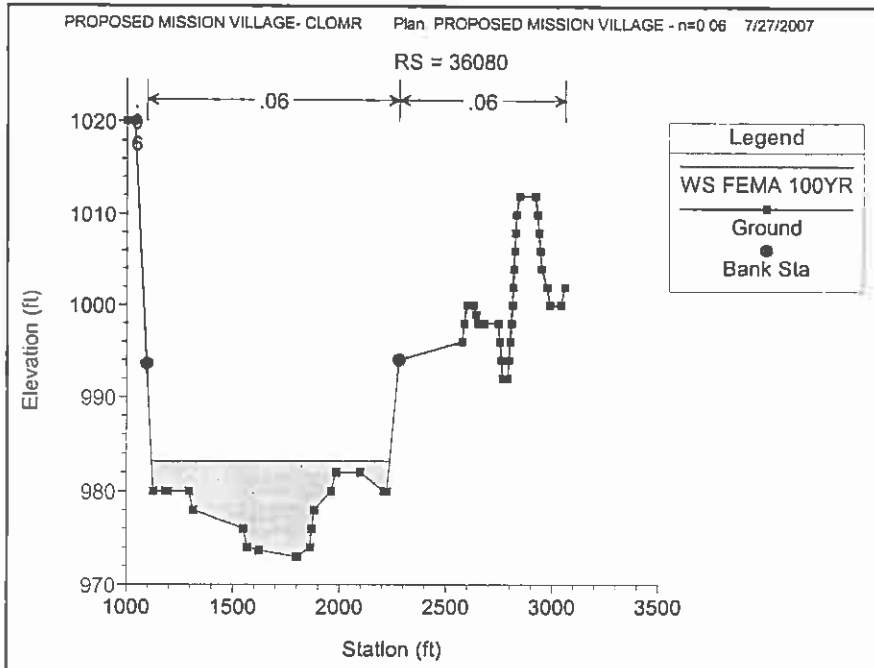
RS = 36299 BR

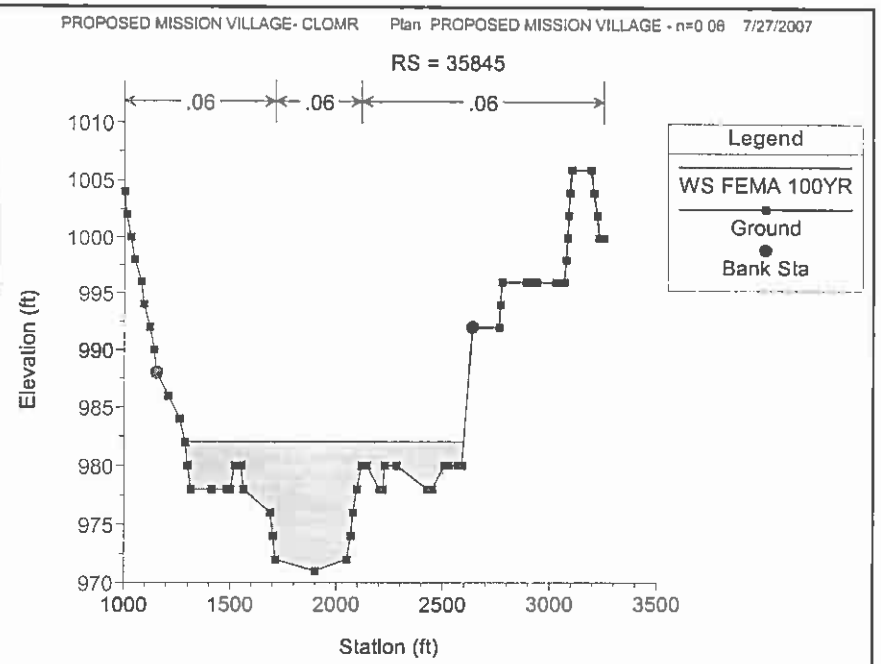


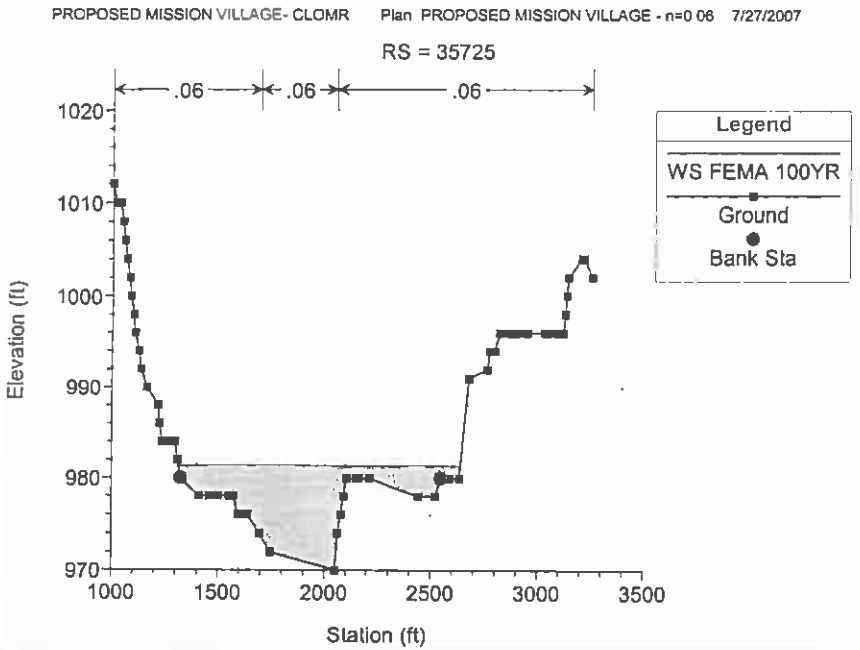
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

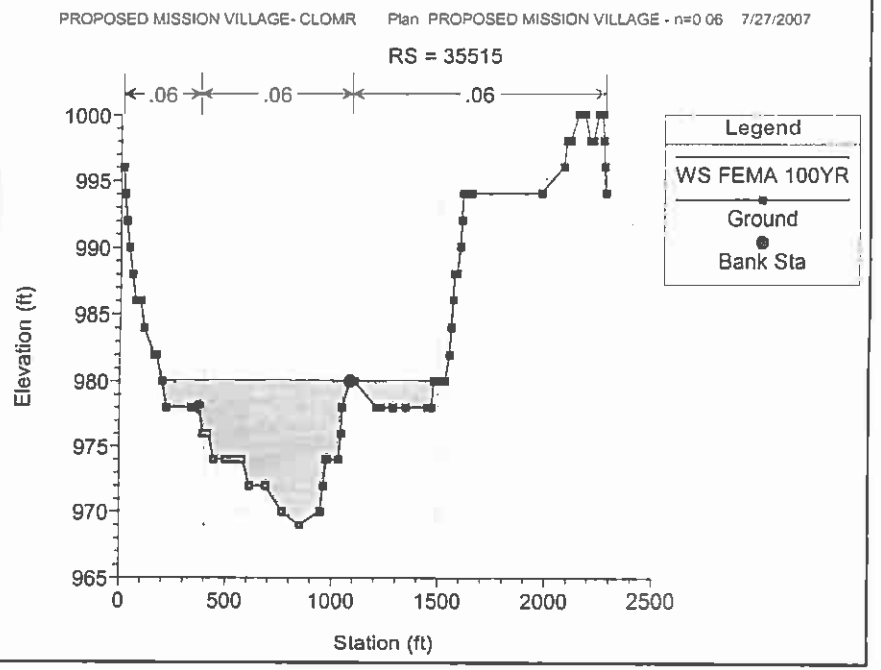
RS = 36240

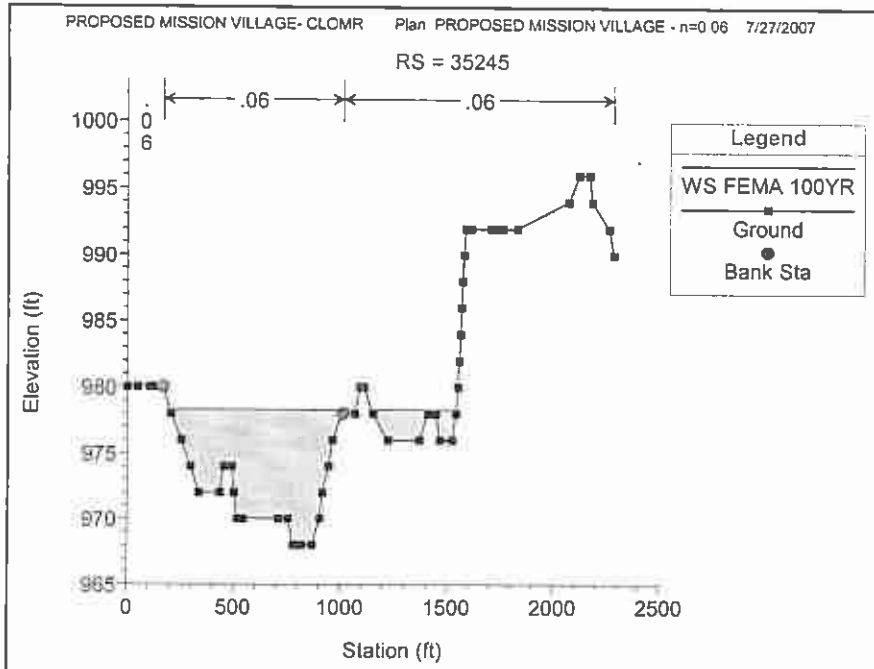


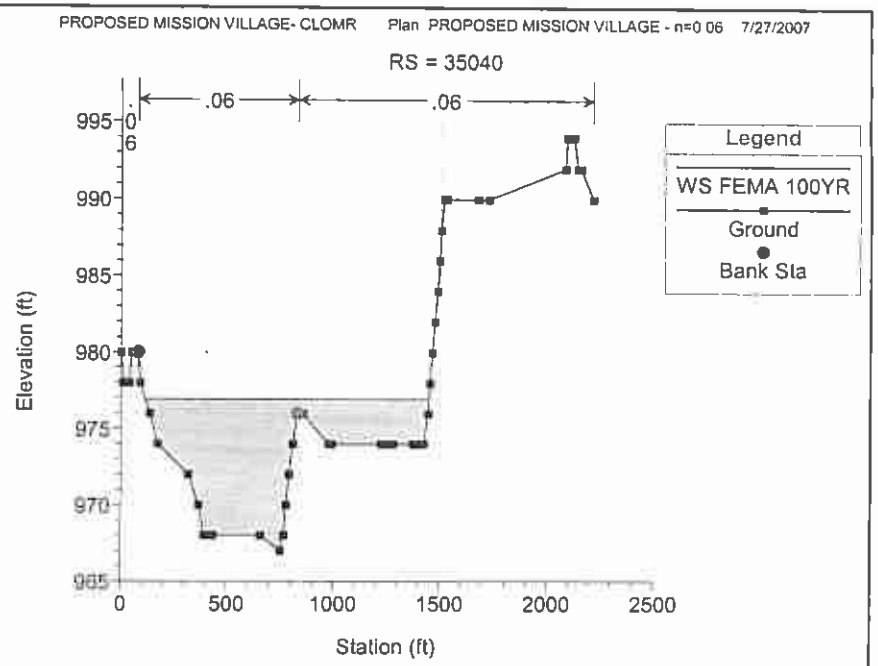

PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 36080
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

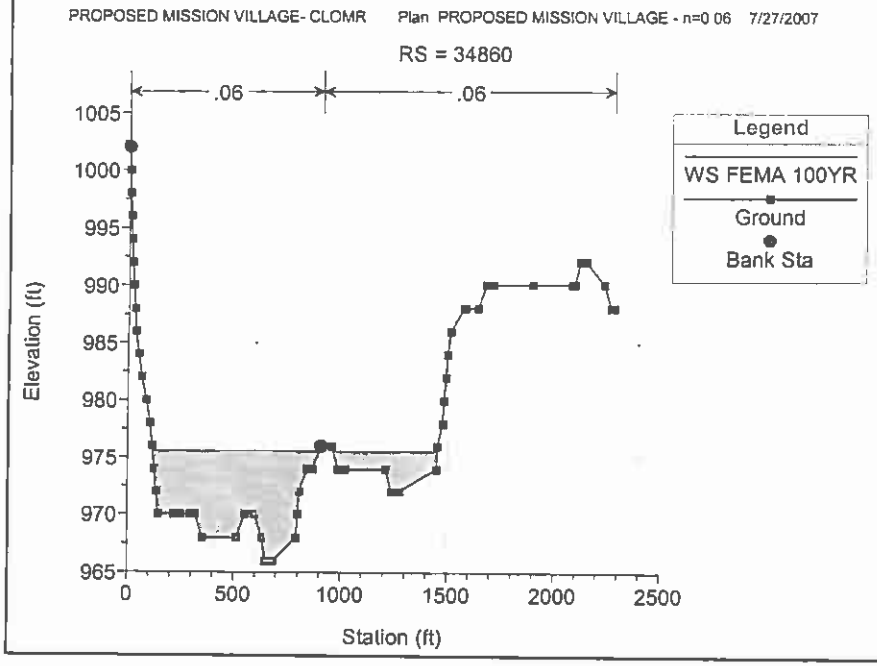

PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 35845
.06
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

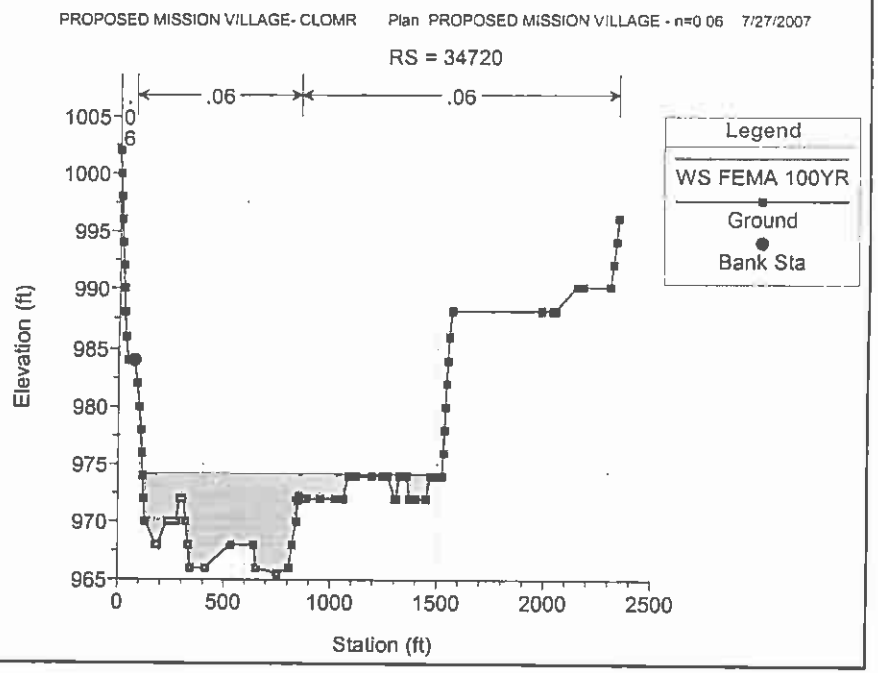

PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 35725
.06
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 35515
.06
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR
Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 35245
.06
.06
0
6
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

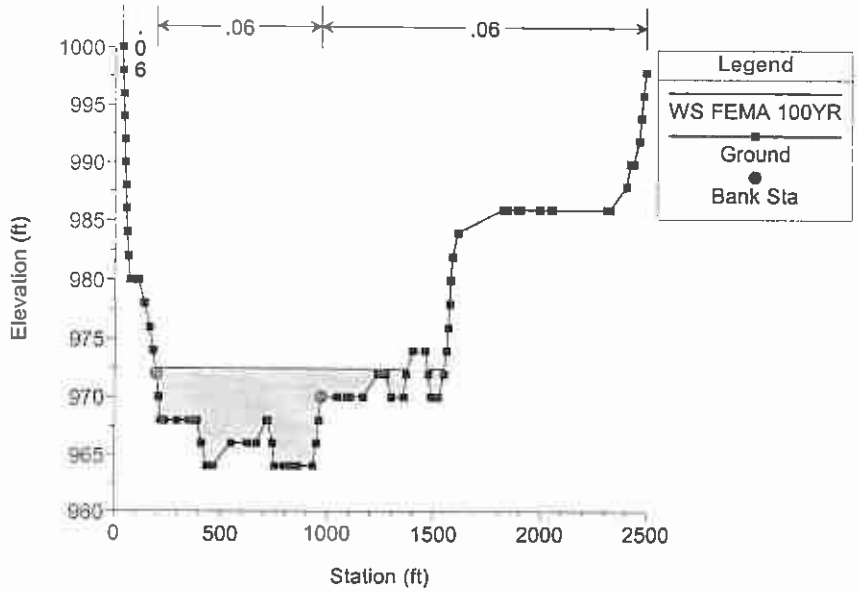

PROPOSED MISSION VILLAGE- CLOMR
Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 35040
.06
.06
0
6
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR
Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 34860
.06
.06
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


PROPOSED MISSION VILLAGE- CLOMR
Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007
RS = 34720
.06
.06
0
6
Legend
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

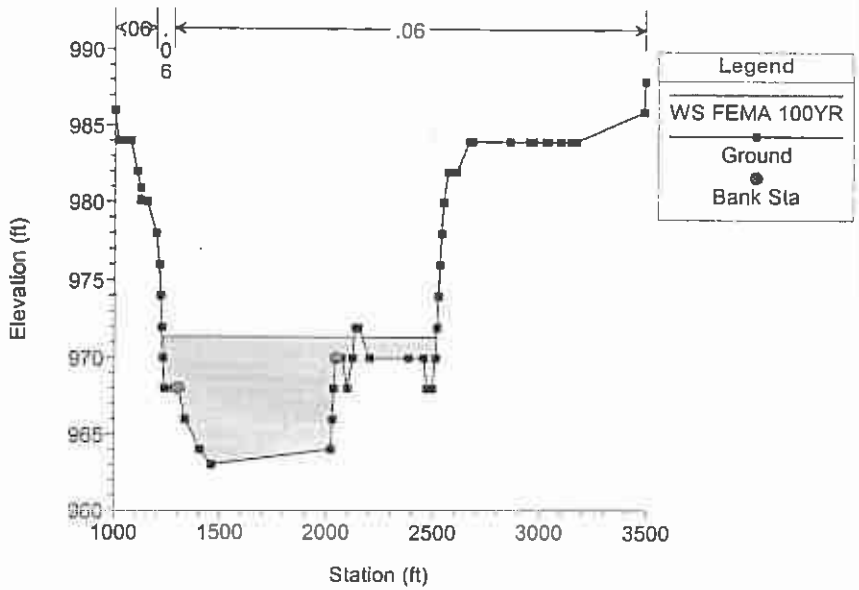
PROPOSED MISSION VILLAGE- CLOMR Plan: PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 34495



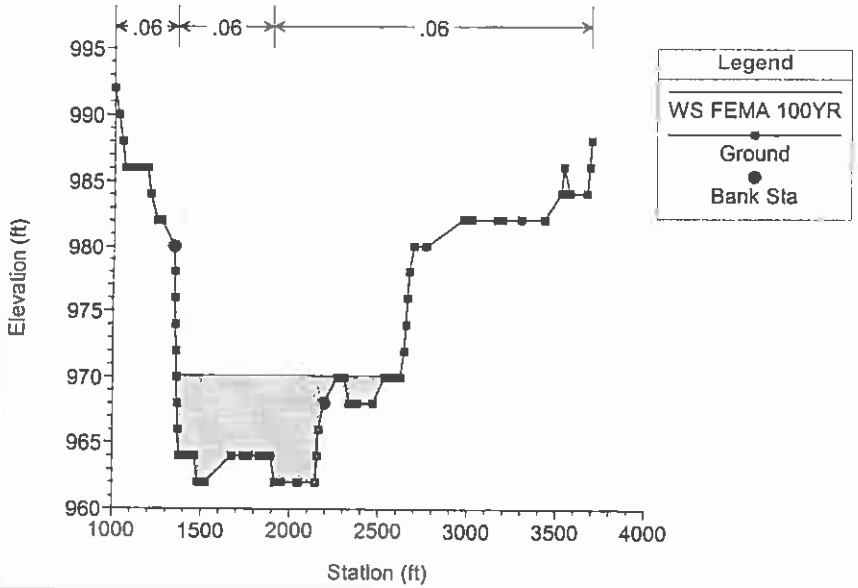
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 34310



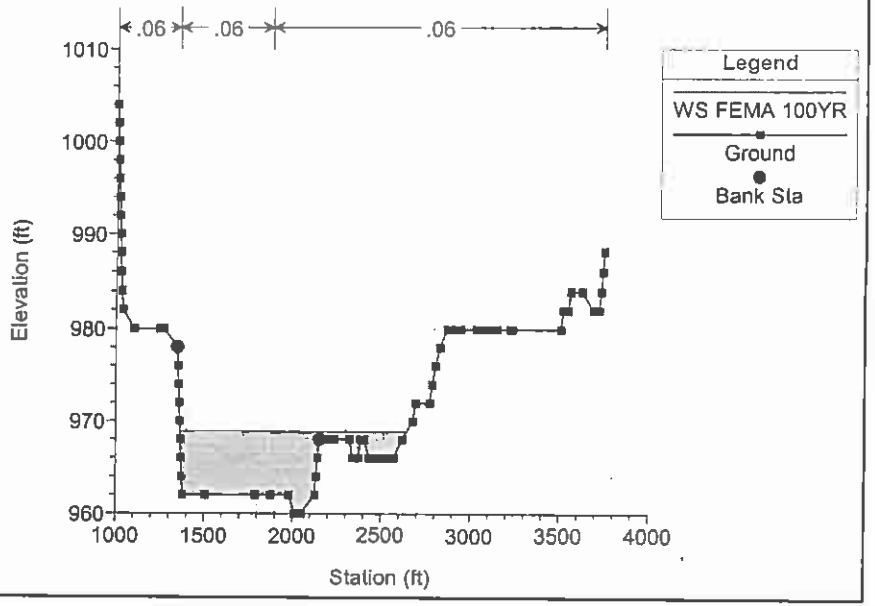
PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0.06 7/27/2007

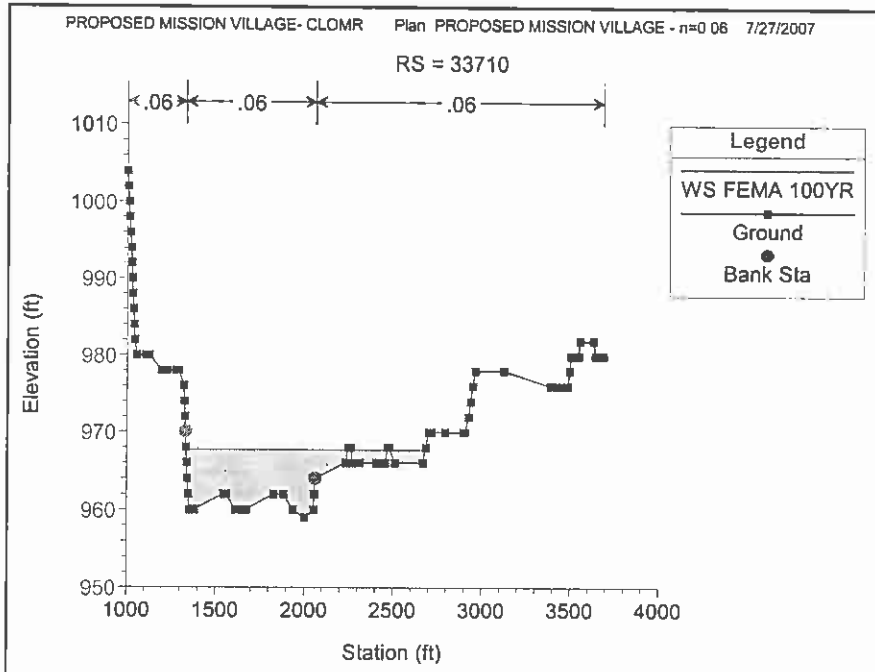
RS = 34090



PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0 06 7/27/2007

RS = 33880

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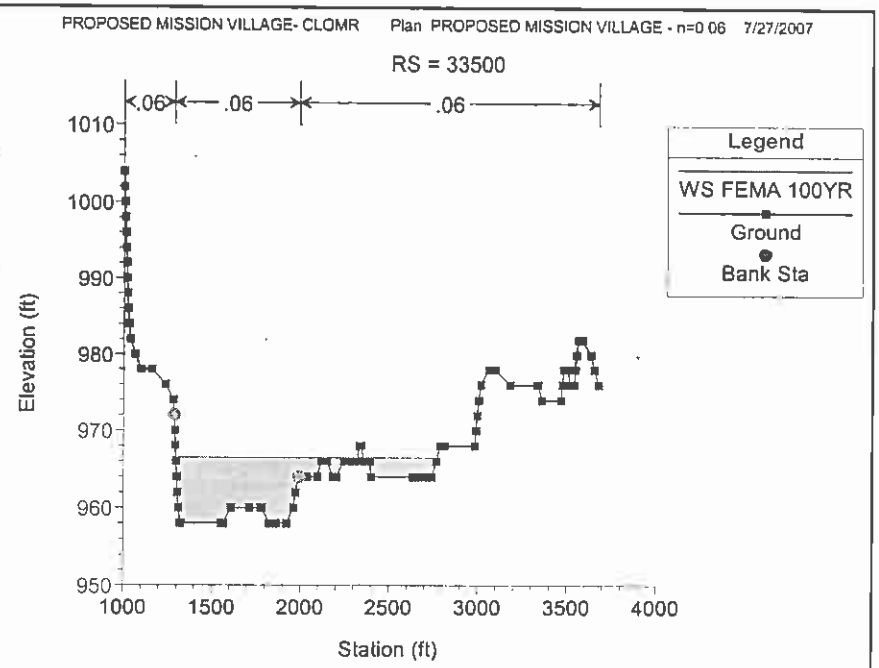
WS FEMA 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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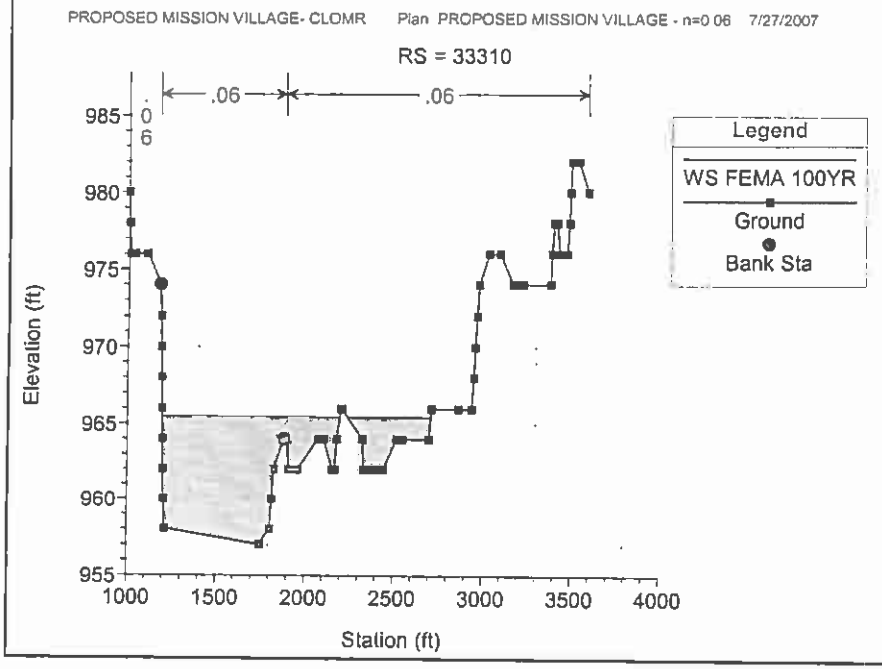
Bank Sta
Elevation (ft)
Station (ft)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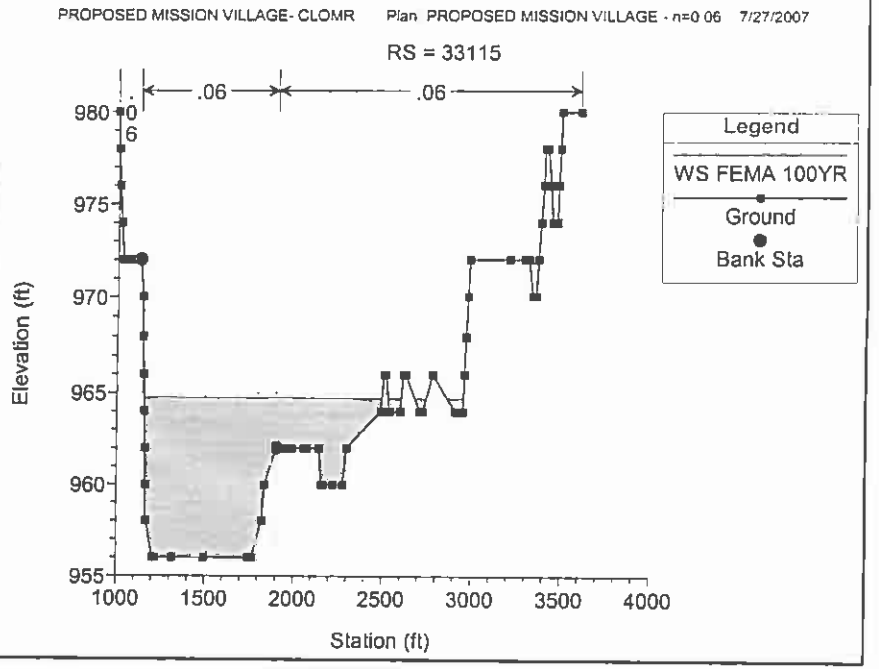
Bank Sta
Elevation (ft)
Station (ft)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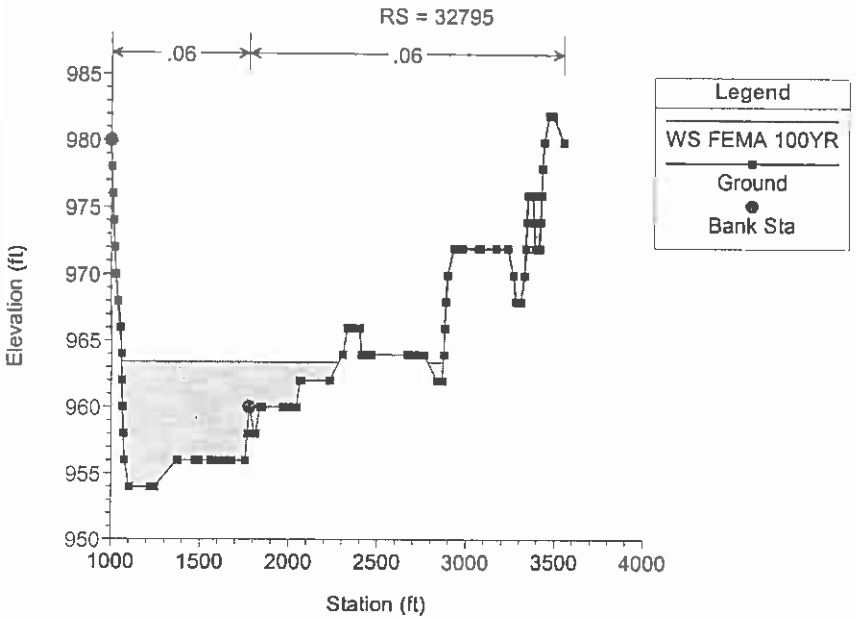
Ground
Bank Sta
Elevation (ft)
Station (ft)

PROPOSED MISSION VILLAGE- CLOMR Plan PROPOSED MISSION VILLAGE - n=0.06 7/27/2007



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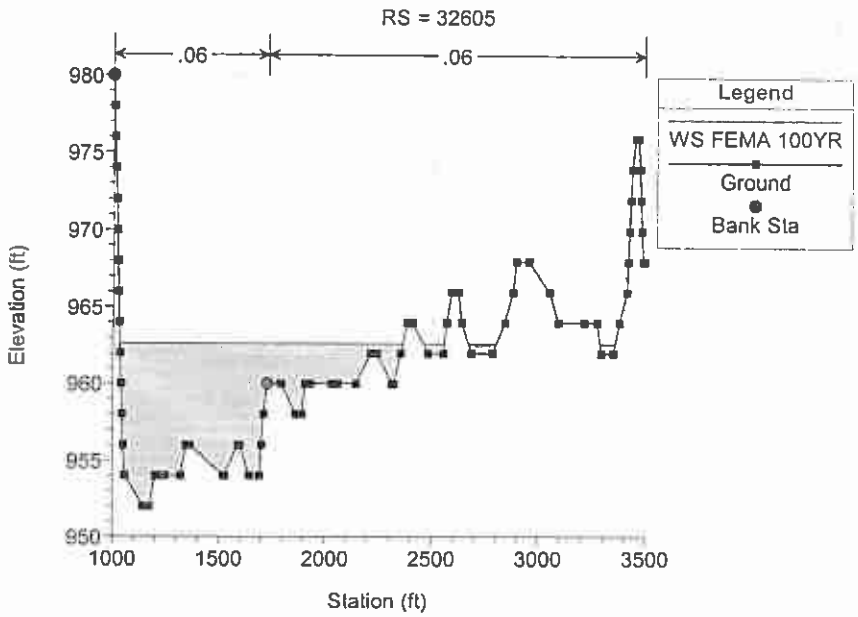

U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B No. 1660-0016
Expires: August 31, 2007

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Santa Clara River
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization ..... complete Section B
Bridge/Culvert ..... complete Section C
Dam..... complete Section D
Levee/Floodwall ..... complete Section E
Sediment Transport..... complete Section F (if required)

Description Of Structure

1. Name of Structure: Commerce Center Drive Bridge

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: RS 36299; Approximately 4,000 feet upstream of Castaic Creek confluence

Downstream Limit/Cross Section: 36240

Upstream Limit/Cross Section: 36374

2. Name of Structure: "South Bank of Commerce Center Drive Bridge" Soil Cement Bank Protection

Type (check one): ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Along the south bank of the Santa Clara River adjacent to Commerce Center Drive Bridge.

Downstream Limit/Cross Section: RS 55845

Upstream Limit/Cross Section: RS 36374

3. Name of Structure: "San Jose Flats" Soil Cement Bank Protection

Type (check one) ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Along the south bank of Santa Clara River, approximately 1600 feet D/S of Commerce Center Drive Bridge

Downstream Limit/Cross Section: RS 33500

Upstream Limit/Cross Section: RS 34495

4. Name of Structure: "SR 126 HWY Widening at North Bank of Commerce Center Bridge" Soil Cement Bank Protection

Type (check one) ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Along north bank of Santa Clara River, adjacent to Commerce Center Drive Bridge.

Downstream Limit/Cross Section: RS 35515

Upstream Limit/Cross Section: RS 37655

*** This portion of bank protection is being included as part of the post-project condition for logistical purposes only and is not under PACE control. It is a stand alone project directed by LACDPW / CALTRANS & Newhall Land and Farming Co. (NLF) that is already underway. Please see attached sheets immediately following this Form.**

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source: Santa Clara River

Name of Structure: "South Bank of Commerce Center Drive Bridge" Soil Cement Bank Protection

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☒ Other (Describe): Soil Cement Bank Protection
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist - "*Figure 01 – South Bank of Commerce Center Drive Bridge Plan and Profile", "Topographic Workmap"*

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.
Please See *Appendix C* for Plan and Profile Drawing

3. Hydraulic Considerations

The channel was designed to carry 116,236 (cfs) and/or the Capital (Q-cap)-year flood.

The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☒ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

Flooding Source: Santa Clara River

Name of Structure: "San Jose Flats" Soil Cement Bank Protection

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☒ Other (Describe): Soil Cement Bank Protection
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist - "*Figure 01 – South Bank of Commerce Center Drive Bridge Plan and Profile", "Topographic Workmap"*

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.
Please See *Appendix C* for Plan and Profile Drawing

3. Hydraulic Considerations

The channel was designed to carry 116,236 (cfs) and/or the Capital (Q-cap)-year flood.

The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☒ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

Flooding Source: Santa Clara River

Name of Structure: "SR 126 HWY Widening at North Bank of Commerce Center Bridge" Soil Cement Bank Protection

1. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)]
☐ Superelevated sections
☐ Debris basin/detention basin
☒ Other (Describe): Soil Cement Bank Protection
☐ Drop structures
☐ Transitions in cross sectional geometry
☐ Energy dissipator

2. Drawing Checklist - "*Figure 02 – North Bank of Commerce Center Drive Bridge Plan and Profile", "Topographic Workmap"*

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.
Please See *Appendix C* for Plan and Profile Drawing

3. Hydraulic Considerations

The channel was designed to carry 116,236 (cfs) and/or the Capital (Q-cap)-year flood.

The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☒ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Santa Clara River

Name of Structure: Commerce Center Drive Bridrge

1. This revision reflects (check one):

☒ New bridge/culvert not modeled in the FIS
☐ Modified bridge/culvert previously modeled in the FIS
☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided): **Please See *Appendix D***

☒ Dimensions (height, width, span, radius, length)
☐ Shape (culverts only)
☐ Material
☐ Beveling or Rounding
☐ Wing Wall Angle
☒ Skew Angle
☒ Distances Between Cross Sections
☐ Erosion Protection
☒ Low Chord Elevations – Upstream and Downstream
☒ Top of Road Elevations – Upstream and Downstream
☒ Structure Invert Elevations – Upstream and Downstream
☒ Stream Invert Elevations – Upstream and Downstream
☒ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☒ Yes ☐ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency ☐ Private organization

   Name of the agency or organization:

3. The Dam was permitted as (check one) ☐ Federal Dam ☐ State Dam ☐ Local Government Dam ☐ None

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number _____ Permitting Agency or Organization _____

4. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

6. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source: Santa Clara River

Name of Structure: Commerce Center Drive Bridge and Soil Cement Bank Portection

Please see *Appendix D* and *Appendix E* for bridge scour calculations and fluvial sediment analysis.

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Regarding Section A.4 of Form 3 :

The SR 126/Commerce Center Drive Interchange Project (EA: 187220) is a stand alone project outside of the Newhall Land Mission Village Land development project (MV Project). The SR 126/ Commerce Center Drive Interchange Project (SR 126 project) is a join project by Los Angeles County and Caltrans. The SR 126 project bank protection has been included with the Mission Village CLOMR submittal because it is assumed that the SR 126 project will be completed prior to or concurrently with the Mission Village project. The Mission Village project can proceed without the SR 126 project completion. However, a maximum of 3500 residential units can be constructed before the SR 126 project (and the Commerce Center Drive Bridge is required). The MV project will therefore include the SR 126 project bank protection in case it is necessary to complete SR 126 project as part of the MV project.

As a stand alone project the SR 126 project has an approved "Finding of No Significant Impact/ Negative Declaration (FONSI/ND) State Clearing House # 2003101127.
With this approval there were numerous alternatives considered but none were found to be feasible. Caltrans approval letter and State Clearing House document are attached.

17C 4 Enviro.

DEPARTMENT OF TRANSPORTATION
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Be energy efficient!

September 1, 2006

File: 07-LA-126 KP R6.8 – R9.2 (PM R4.2 – R5.7)
SR 126/Commerce Center Drive Interchange Project
EA: 187220

Responsible Agencies, Review Agencies,
Trustee Agencies, and individuals
interested in the proposed project

Notice of Final Environmental Document
Notice of Findings of No Significant Impact/Negative Declaration

After considerable deliberation, the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) have approved a Finding of No Significant Impact/Negative Declaration (FONSI/ND) for improvements on SR-126 at the Commerce Center Drive interchange in the County of Los Angeles. The proposed action (Alternative C or the selected alternative) is to construct a grade-separated interchange at the State Route 126 and Commerce Center Drive intersection, with a new overpass structure for Commerce Center drive over SR 126. The new interchange will provide full movements for traffic between Commerce Center Drive and SR 126. The selected alternative will provide diamond ramps on SR 126 at Commerce Center Drive in the westbound direction. In the eastbound direction, a two-lane loop on-ramp will be constructed from southbound Commerce Center Drive to eastbound SR 126. From northbound Commerce Center Drive, a two-lane diagonal on-ramp will be provided near the intersection of Commerce Center Drive and Henry Mayo Drive. A one-lane off-ramp will also be provided from eastbound SR 126 to Henry Mayo Drive, which will be realigned to the south, and extended to the west.

Caltrans and FHWA have determined that project impacts can be mitigated to a level below significance allowing for the approval of this Finding of No Significant Impact/Negative Declaration (FONSI/ND). A Notice of Determination will be filed with the State Clearinghouse pursuant to the California Environmental Quality Act (CEQA) requirements.

A draft of the ND and technical studies was circulated for public and agency review from May 19, 2005 through July 8, 2005. Caltrans also conducted a public hearing on June 23, 2005, in the Board Conference Room at the Castaic Union School District in the City of Valencia. The deadline for submittal of comments to Caltrans was July 8, 2005. All comments received were considered and are addressed in the enclosed Environmental Assessment/Initial Study (EA/IS) in Appendix G.

After an extensive analysis of the comments received from the public, Caltrans and FHWA approved Alternative C of the EA/IS as the Recommended Alternative.

Enclosed please find a copy of the FONSI/ND and accompanying EA/IS for your records. Copies of the referenced technical studies are also available Monday through Friday, from 8:00 a.m. through 4:00 p.m. at Caltrans District 7, Division of Environmental Planning, 100 S. Main Street, Los Angeles, CA 90012. These studies can also be reviewed during normal business hours at the Los Angeles County Public Library, 23743 W. Valencia Blvd. Santa Clarita, CA 91355.

For additional information on this project, please call Chris Benz-Blumberg at (213) 897-0674. Thank you for your insightful contributions to this decision-making process.

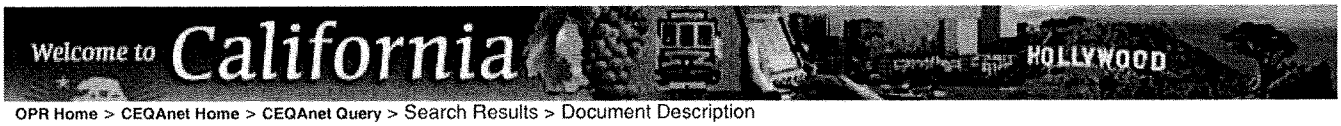
Sincerely,

Ronald Kosinski

RONALD KOSINSKI
Deputy District Director, District 7
California Department of Transportation

California Home

Friday, July 27, 2007



SR 126/Commerce Center Drive Interchange Project

SCH Number: 2003101127

Type: NOD

Project Description

The California Department of Transportation (Caltrans) District 7, in coordination with the Federal Highway Administration, Los Angeles County, the Newhall Land and Farming Company, proposes to construct a grade-separated interchange at the existing, signalized intersection of State Route 126 (SR-126) and Commerce Center Drive. The Commerce Center intersection with Henryo Mayo would also be reconfigured. The proposed project is located northwest of the City of Santa Clarita in Los Angeles County.

Project Lead Agency

Caltrans #7

Contact Information

Primary Contact:
Chris Benz-Blumberg
Department of Transportation, District 7
(213) 897-0674
100 South Main Street
Los Angeles
CA, 90012

Project Location

County: Los Angeles
City: Santa Clarita
Region:
Cross Streets: Commerce Center Drive and State Route 126
Parcel No:
Township:
Range:
Section:
Base:
Other Location Info:

Determinations

This is to advise that the ☒ Lead Agency ☐ Responsible Agency California Department of Transportation has approved the project described above on 6/22/2006 and has made the following determinations regarding the project described above.

1. The project ☐ will ☒ will not have a significant effect on the environment.

2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.

   ☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.

3. Mitigation measures ☒ were ☐ were not made a condition of the approval of the project.

4. A Statement of Overriding Considerations ☐ was ☒ was not adopted for this project.

5. Findings ☒ were ☐ were not made pursuant to the provisions of CEQA.

Final EIR Available at: California Department of Transportation

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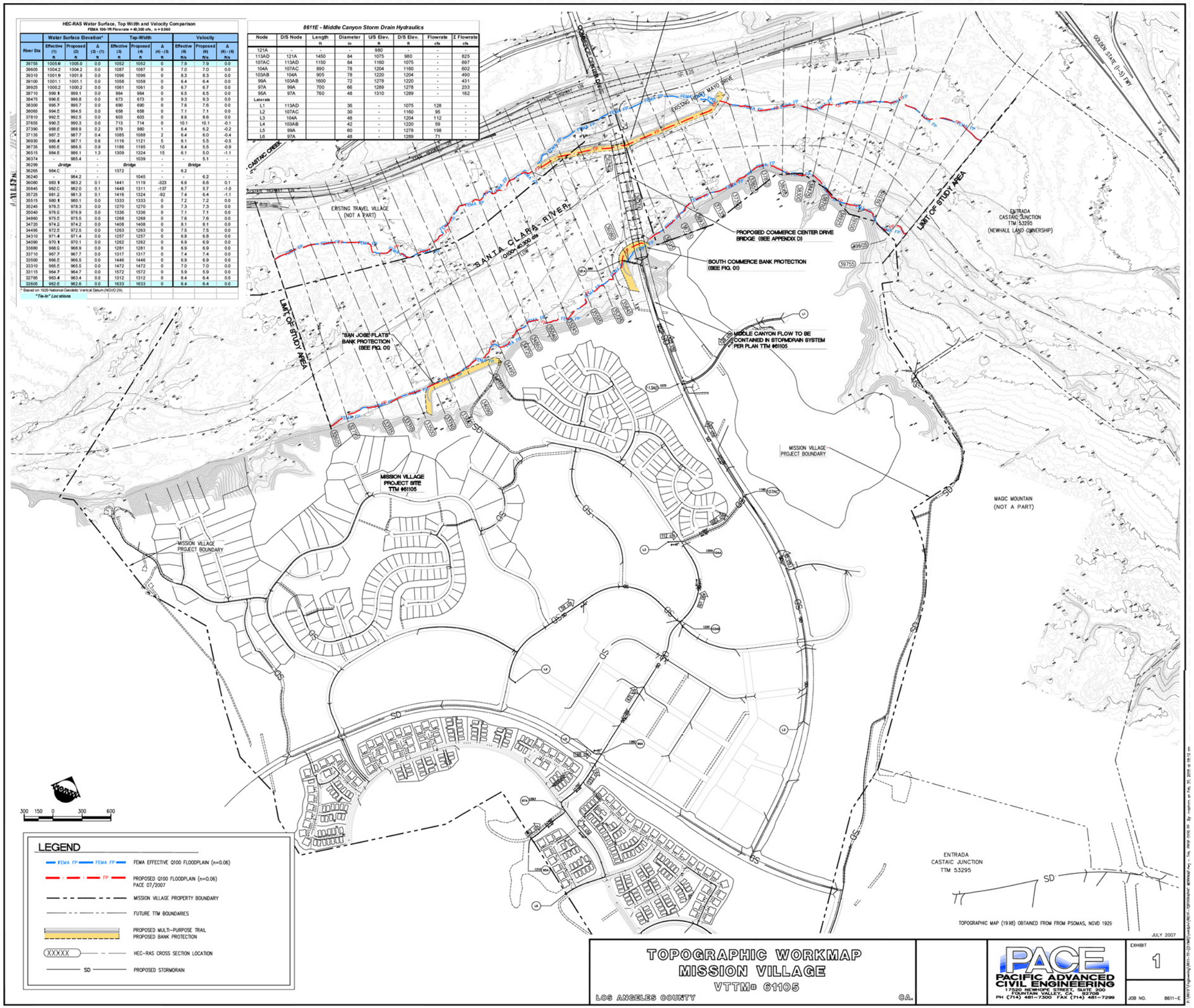
Date Received: 9/14/2006

A full-size reproduction of this figure can be found at Impact Sciences.



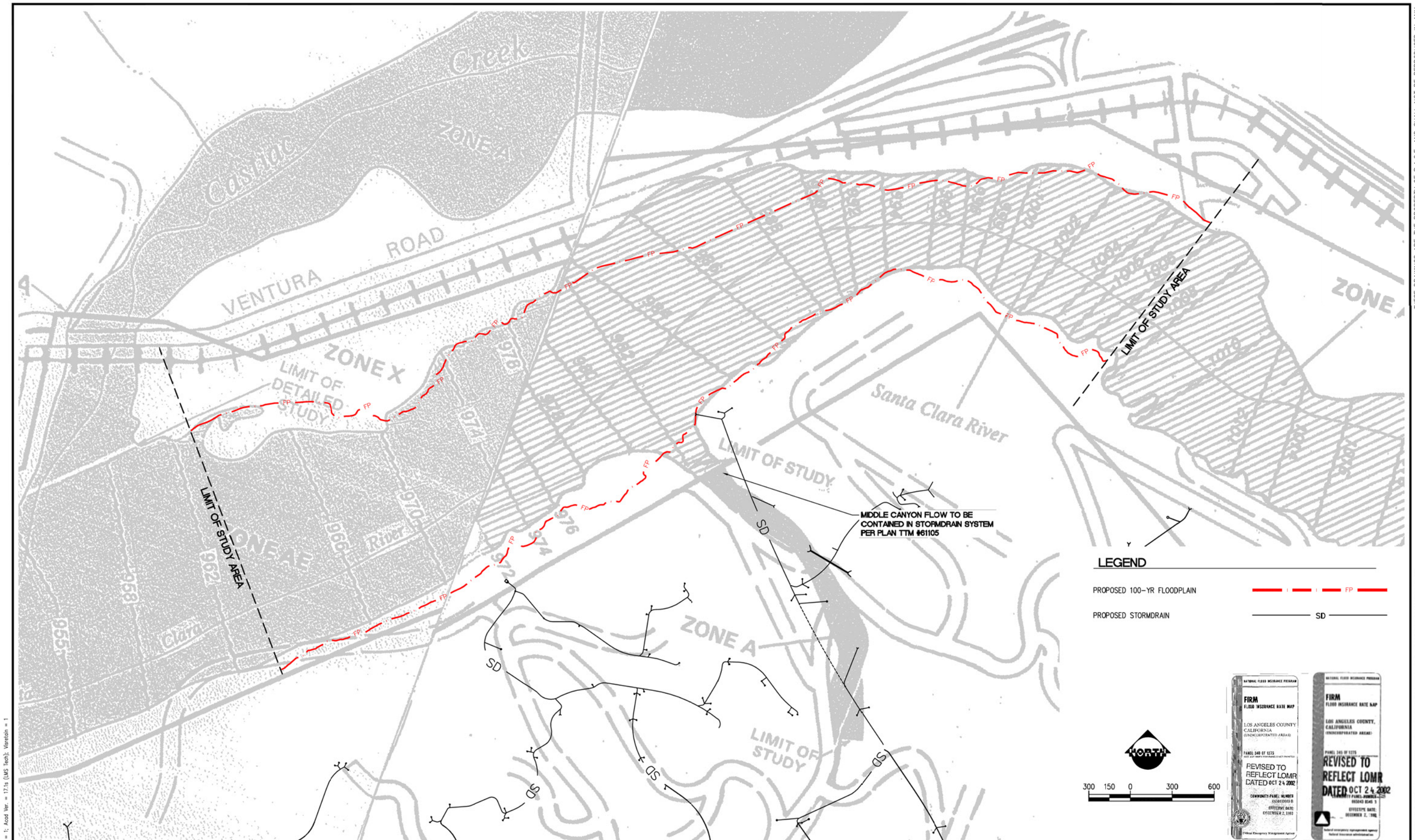
HEC-RAS Water Surface, Top Width and Velocity Comparison
FEMA 100-YR Flowrate = 40,300 cfs, n = 0.060

River Sta	Water Surface Elevation*			Top-Width			Velocity		
	Effective (1) ft	Proposed (2) ft	Δ (2) - (1) ft	Effective (3) ft	Proposed (4) ft	Δ (4) - (3) ft	Effective (5) ft/s	Proposed (6) ft/s	Δ (6) - (5) ft/s
39755	1005.6	1005.0	0.0	1052	1052	0	7.9	7.9	0.0
39605	1004.2	1004.2	0.0	1087	1087	0	7.0	7.0	0.0
39310	1001.9	1001.9	0.0	1096	1096	0	8.3	8.3	0.0
39100	1001.1	1001.1	0.0	1058	1058	0	6.4	6.4	0.0
38925	1000.2	1000.2	0.0	1061	1061	0	6.7	6.7	0.0
38710	999.1	999.1	0.0	964	964	0	6.5	6.5	0.0
38475	996.6	996.8	0.0	673	673	0	9.3	9.3	0.0
38300	995.7	995.7	0.0	690	690	0	7.6	7.6	0.0
38065	994.5	994.5	0.0	658	658	0	7.1	7.1	0.0
37810	992.5	992.5	0.0	603	603	0	8.6	8.6	0.0
37655	990.3	990.3	0.0	713	714	0	10.1	10.1	-0.1
37390	988.8	988.9	0.2	979	980	1	6.4	6.2	-0.2
37135	987.3	987.7	0.4	1085	1088	2	6.4	6.0	-0.4
36930	986.4	987.1	0.6	1116	1121	5	6.1	5.5	-0.5
36735	985.6	986.5	0.9	1186	1195	10	6.4	5.5	-0.9
36515	984.6	986.1	1.3	1309	1324	15	6.1	5.0	-1.1
36374	-	985.4	-	-	1039	-	-	5.1	-
36299	*Bridge*		-	*Bridge*		-	*Bridge*		-
36265	984.C	-	-	1372		-	6.2		-
36240	-	984.2	-	-	1045	-	-	6.2	-
36080	983.1	983.2	0.1	1441	1119	-323	6.6	6.6	0.1
35845	982.C	982.0	0.1	1448	1311	-137	6.7	5.7	-1.0
35725	981.2	981.3	0.1	1416	1324	-92	7.4	6.4	-1.1
35515	980.1	980.1	0.0	1333	1333	0	7.2	7.2	0.0
35245	978.3	978.3	0.0	1270	1270	0	7.3	7.3	0.0
35040	976.5	976.9	0.0	1336	1336	0	7.1	7.1	0.0
34860	975.5	975.5	0.0	1268	1268	0	7.6	7.6	0.0
34720	974.2	974.2	0.0	1408	1408	0	8.1	8.1	0.0
34495	972.5	972.5	0.0	1263	1263	0	7.5	7.5	0.0
34310	971.4	971.4	0.0	1257	1257	0	6.8	6.8	0.0
34090	970.1	970.1	0.0	1262	1262	0	6.9	6.9	0.0
33880	968.6	968.9	0.0	1281	1281	0	6.9	6.9	0.0
33710	967.3	967.7	0.0	1317	1317	0	7.4	7.4	0.0
33500	966.5	966.5	0.0	1446	1446	0	6.9	6.9	0.0
33310	965.5	965.5	0.0	1472	1472	0	7.0	7.0	0.0
33115	964.3	964.7	0.0	1572	1572	0	5.9	5.9	0.0
32795	963.4	963.4	0.0	1312	1312	0	6.4	6.4	0.0
32605	962.6	962.6	0.0	1633	1633	0	6.4	6.4	0.0

* Based on 1929 National Geodetic Vertical Datum (NGVD 29).
"Tie-In" Locations

8611E - Middle Canyon Storm Drain Hydraulics

Node	D/S Node	Length ft	Diameter in	U/S Elev. ft	D/S Elev. ft	Flowrate cfs	Σ Flowrate cfs
121A	-	-	-	980	-	-	-
113AD	121A	1450	84	1075	980	-	825
107AC	113AD	1150	84	1160	1075	-	697
104A	107AC	890	78	1204	1160	-	602
103AB	104A	905	78	1220	1204	-	490
99A	103AB	1600	72	1278	1220	-	431
97A	99A	700	66	1289	1278	-	233
95A	97A	760	48	1310	1289	-	162
Laterals							
L1	113AD		36	-	1075	128	-
L2	107AC		30	-	1160	95	-
L3	104A		48	-	1204	112	-
L4	103AB		42	-	1220	59	-
L5	99A		60	-	1278	198	-
L6	97A		48	-	1289	71	-



NO	BY	DATE		DATE	APP.
△					
△					
△					
△					
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JOB

MISSION VILLAGE
VTTM# 61105

LOS ANGELES COUNTY CA

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1" : 300'
DESIGNED	CVH
DRAWN	CVH
CHECKED	MEK
DATE	AUGUST 2007
JOB NO.	8611E

TITLE

ANNOTATED FIRM

EXHIBIT 2

JOB NO. 8611-E

THESE DRAWINGS ARE THE PROPERTY OF P.A.C.E. AND SHALL NOT BE REPRODUCED IN ANY MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

Dimscale = 300; Ltscale = 0.5; PSltscale = 1; Acad Ver. = 17.1s (LMS Tech); Viewtoin = 1

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A full-size reproduction of this figure can be found at Impact Sciences.

Mission Village TTM # 61105

CLOMR - Supplemental Report

Abbreviated Version of Mission Village Drainage Concept Report

July 2007

Prepared For:

NEWHALL LAND
A LENNAR/LNR COMPANY

Submitted To:

Los Angeles County Department of Public Works (LACDPW)
Federal Emergency Management Agency (FEMA)

Prepared by:

Pacific Advanced Civil Engineering, Inc.
17520 Newhope Street, Suite 200
Fountain Valley, CA 92708
(714) 481-7300

Contact Person:
Mark Krebs, P.E.
Chet Van Horn, E.I.T.

PACE JN 8611E

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Figure A: Mission Village Project Location Map
Figure A1: Santa Clara River Watershed Aerial Map

1 Introduction

Newhall Land and Farming Co. (NLF) has retained Pacific Advanced Civil Engineering, Inc. (PACE) to provide river hydraulic analysis and flood protection system analysis along the north and south banks of the Santa Clara River (River) associated with the proposed Mission Village TTM # 61105 (see Figure A). NLF has also retained PACE to pursue a federally approved Conditional Letter Of Map Revision (CLOMR) which may in all hopes lead to a final Letter of Map Revision (LOMR) upon the final construction of this project. The main purpose of this report is to request a CLOMR from FEMA as construction is yet to begin.

The project area extends roughly from upstream of the Castaic Creek confluence, and ends approximately 1,200 feet upstream from the proposed Commerce Center Drive Bridge (see *Topographic Workmap* in *Appendix A*).

The proposed Mission Village (TTM # 61105) land development project site consists primarily of an elevated alluvial surface historically utilized for agricultural grazing and oil production activities.
Although the land development portion of Mission Village is confined to the south of the river, there are infrastructure elements necessary for the project development that includes the north bank of the river as well. The horizontal alignment of the proposed bank protection roughly coincides with the pre-project bank of the River. The bank protection horizontal alignments follow the proposed project alignment that was evaluated and approved in the Newhall Ranch Specific Plan. The alignment also follows the Newhall Ranch Santa Clara River HEC-RAS Modeling and Newhall Ranch River Fluvial Study - Phase 1 Final Draft prepared by PACE, both recently approved by Los Angeles County Department of Public Works (LACDPW).

In summary, the proposed Mission Village project bank protection and River infrastructure (Specific Plan) analysis includes the following elements:

Proposed Project:

- Commerce Center Drive Bridge at Santa Clara River (Sikand submitted Bridge Location, Span and Clearance) – 1,200 LF with 11 piers
- Partially exposed soil cement bank protection – *Mission Village "Commerce Center Bridge South Bank"* - 600 LF
- Partially exposed soil cement bank protection – *Mission Village "SR 126 HWY Widening* at Commerce Center Bridge" on the north bank – 2,000 LF.

  Note: This portion of the bank protection is being included as part of the Mission Village development. It is a stand alone project already underway by LACDPW/ CALTRANS & NLF and for modeling purposes, will be analyzed in the proposed condition.
- Buried soil cement bank protection – *Mission Village "San Jose Flats"* on the south bank – 1,100 LF

Proposed *"Commerce Center Drive"* Bridge over the River would include abutments and bank stabilization on the northern and southern sides of the bridge, which would protect against the erosive forces of the River. The Bridge Location, Span and Clearance Final Submittal have been proposed by Sikand and their HEC-RAS modeling is included herein. The preliminary bridge information is included in this report as *Appendix D*. The bank protections; *SR 126 HWY Widening at Commerce Center Bridge* and *Commerce Center Bridge South Bank* will be designed and constructed to LACDPW standards and will ultimately be accepted by LACDPW for maintenance.

Mission Village "Commerce Center Bridge South Bank" is partially exposed soil cement bank protection located along the south bank of the River and on the northern portion of the proposed Mission

Project Site TTM # 61105. The bank protection is approximately 600 linear feet. The horizontal alignment starts approximately 450 feet west from the central line of the proposed "Commerce Center Drive Bridge," runs under the Bridge and ends approximately 150 feet east (upstream) adjacent to the pre-project slope. Riprap will be utilized for the transition structure at the terminus on the west end east end of bank protection and will tie into the high ground of pre-project riverbank. (See *Figure 01* in *Appendix C* for bank location plan and profile.) PSOMAS is Newhall Land civil engineering consultant for Mission Village Tentative Tract Map and associated infrastructure plan production. PACE and PSOMAS have coordinated efforts related to detailed bank protection layout at South Bank.

Mission Village "SR 126 HWY Widening at Commerce Center Bridge" is partially exposed soil cement bank protection located south of State Route 126, along the north bank of the river at the north end of Commerce Center Drive Bridge. This soil cement is considered as part of the proposed condition for HEC-RAS modeling purposes for the Mission Village project yet is actually a part of the CALTRANS/LA County Department of Public Works Project (State Route 126 widening and Commerce Center Drive interchange project; Sate Clearing house #2003101127). This bank protection is approximately 2,000 linear feet with a horizontal alignment that starts approximately 850 feet west from the central line of proposed "Commerce Center Drive" Bridge, runs under the Bridge and ends approximately 1,150 feet east (upstream) adjacent to the slope of the proposed road. Riprap will be utilized for the transition structure at the terminus and will tie into the high ground on the west end of bank protection and into the slope of pre-project road on the east end of bank protection. See *Figure 02* in *Appendix C* for bank location, plan and profile. CH_2MHill is the NLF consultant preparing the design of the SR 126 widening (for the joint LACDPW/Caltrans project) and to date they have utilized the buried soil cement bank protection alignment as provided by PACE and approved by LACDPW (Newhall Ranch River Fluvial Study - Phase 1 Final Draft).

Mission Village "San Jose Flats" is buried soil cement bank protection located along the south bank of the River and on the northern portion of the proposed Mission Project Site TTM # 61105. The bank protection is approximately 1,100 linear feet and protects the proposed Mission Village stormwater quality basin. The horizontal alignment starts approximately 1,700 feet west from the central line of the proposed "Commerce Center Drive" Bridge. Riprap will be utilized for the transition structure at the terminus on the west end east end of bank protection and will tie into the high ground of pre-project riverbank. (See *Figure 01* in *Appendix C* for bank location plan and profile.) The bank protection in this area has been reduced and realigned since the Newhall Ranch River Fluvial Study - Phase 1 Final Draft analysis; however, there are no fluvial impacts as some of the bank protection has been eliminated or moved further back from the river.

The proposed soil cement bank protections are primarily necessary to protect the proposed development of the proposed Mission Village Project and associated local and regional infrastructure (bridge and utilities) from potential erosion due to the river.

WSE, velocity and floodplain changes will be noted by comparing the FEMA 100-YR HEC-RAS n=0.060 runs of the proposed project and effective conditions. Soil cement bank protection top and toe have been established via the more conservative values provided from the respective Q_{cap} HEC-RAS n=0.085 and n=0.025 runs of the "Newhall Ranch River Fluvial Study - Phase 1 Final Draft" and "Santa Clara River HEC-RAS Modeling" reports completed by PACE. Calculations of soil cement bank protection design parameters are presented in *Appendix F, Tables 8.0-8.4* of this report.

Proposed bank protection will consist of an 8-foot wide soil cement section with varied height (top and toe as required) and a 1.5:1 slope (verified in the geotechnical analyses). Upon completion of the installation, the soil cement will be backfilled (buried) with native soils on a 4:1 slope. The excavation required to construct the bank protection will be backfilled and returned to pre-project grade, except as overlayed by the 4:1 fill slope.

Topographic mapping data as shown on all drawings, figures, etc is from 1998 PSOMAS mapping of Newhall Ranch and is based upon the National Geodetic Vertical Datum of 1929 (NGVD 29). All water

surface elevations and soil cement top and toe elevations shown in this report and in the construction drawings are also based upon the NGVD 29 datum.

Geotechnical firm Alan E. Seward Engineering Geology has prepared geotechnical reports for Mission Village TTM #61105. The soil cement bank protection construction documents will incorporate the geotechnical investigation of the site to determine both the specific locations of the on-site soils suitable for use with soil cement and potentially high groundwater levels (See *Appendix E*).

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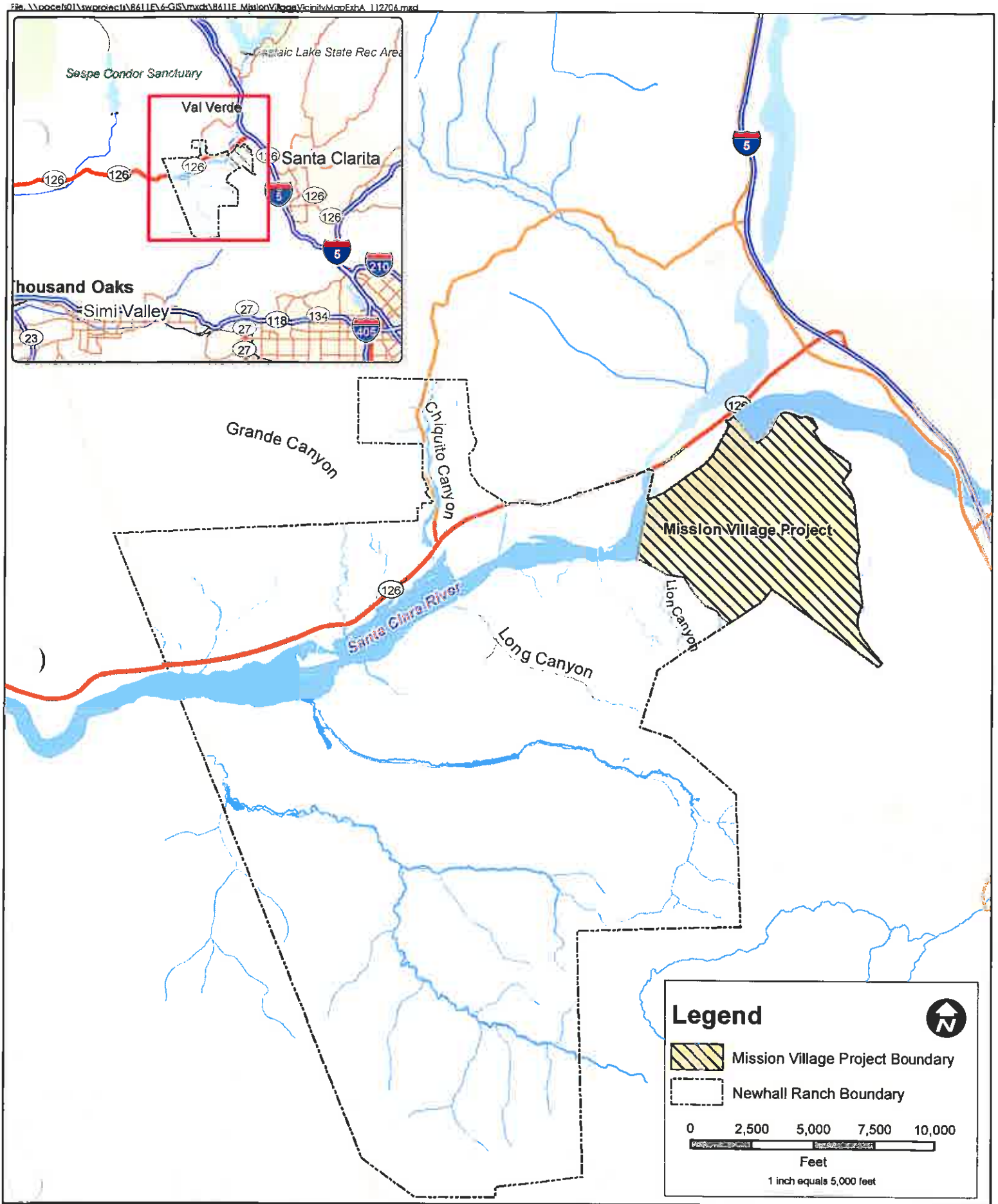

FIGURE

PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

SCALE	1"= 5000'
DESIGNED	PC
DRAWING	PC
CHECKED	MW
DATE	11/15/06
JOB NO	8613-E

JOB: MISSION VILLAGE

LOS ANGELES CO CA

TITLE: VICINITY MAP

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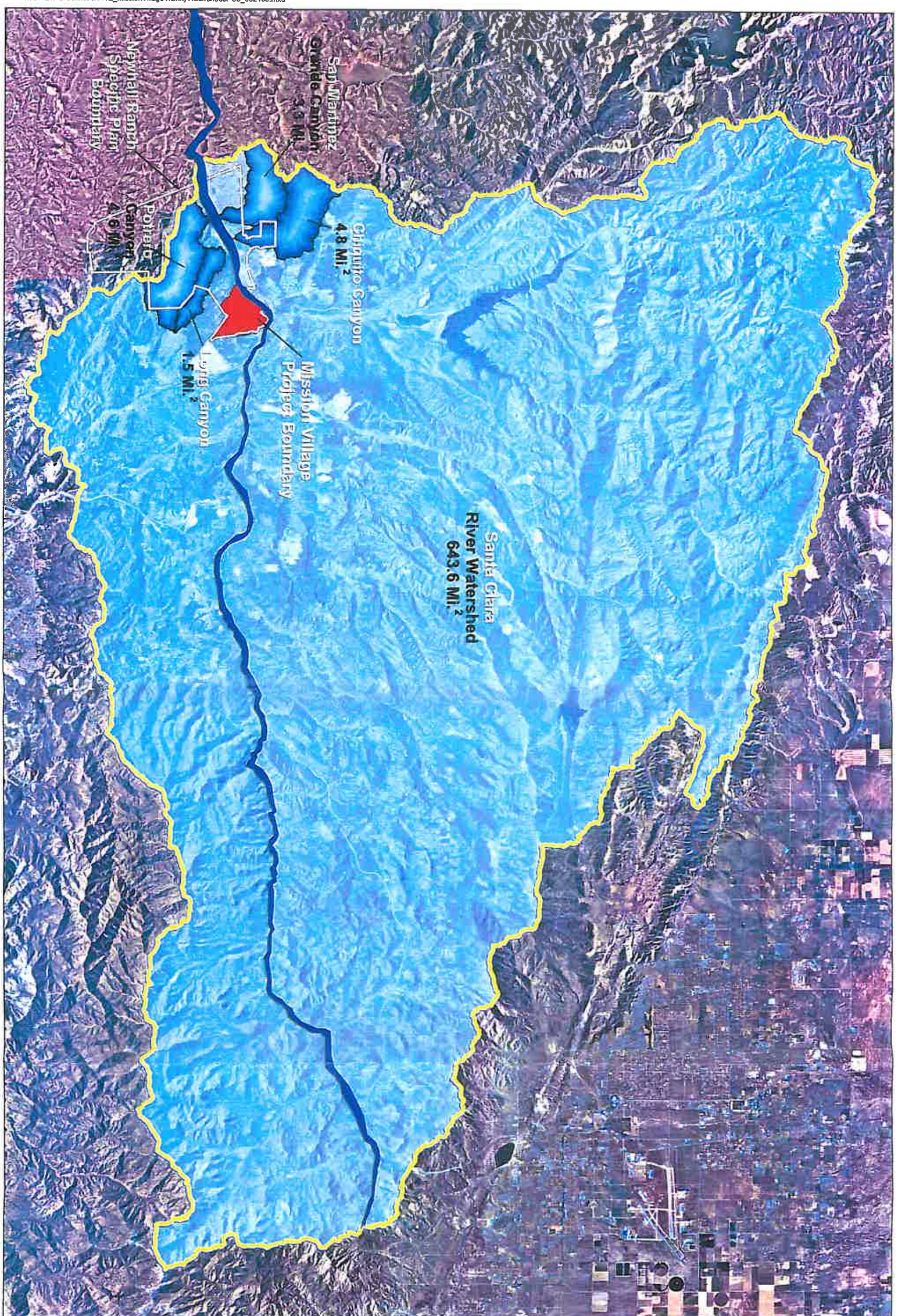

FIGURE A1

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 15,000'
DESIGNED	TH
DRAWING	TH
CHECKED	MK
DATE	06/20/06
JOB NO	8137E

JOB

MISSION VILLAGE
DRAINAGE CONCEPT
REPORT

LOS ANGELES CO. CA

TITLE

SANTA CLARA RIVER
NEWHALL RANCH WATERSHED
MISSION VILLAGE

2 Hydrology

The total Santa Clara River Watershed encompasses 1,621 square miles (within 644 square miles at the Los Angeles County Line) with 17-inch average annual rainfall in the region The River lies within the jurisdiction of the LACDPW, which has completed an extensive hydrologic analysis of the watershed and provided updated capital flood flow rates for this reach of the river.

All of the proposed developed area of the 1,252 acres Mission Village TTM 61105 is currently above or will be filled to be above the capital floodplain and therefore none of the improvements proposed on the site would be subject to flood hazard from the River or other nearby drainages.

FEMA has published maps to designate flood hazard zones that are accepted as the floodplain boundaries for insurance purposes. The Los Angeles County Flood Control District (LACFCD) analyzes conditions based on the capital flood (Q_{cap}) storm event. The Q_{cap} event assumes a burned watershed and the resulting bulked peak flows. The Q_{cap} is in excess of the flow anticipated by the base flood or 100-year FEMA storm event and thus was taken to design the soil cement top and toe.
(See *Table 1.0* for Q_{cap} and FEMA Q_{100} flowrates.)

Although the FEMA 100-year storm is used for flood insurance purposes, the design storm established by LACDPW is the Q_{cap}, which is defined as follows:

1. The design storm is assumed to occur on already saturated soils over a period of four days, with the maximum rainfall falling on the fourth day. During the 24-hour period of maximum rainfall, the rainfall intensity typically increases during the first 70-90% of the period and decreases in the remaining time. Furthermore, approximately 80% of the amount of the 24-hour rainfall falls within the same 70-90% of the period.

2. When converting rainfall to runoff, rainfall that is not lost due to hydrologic processes of interception, evaporation, transpiration, depression storage, infiltration or percolation is assumed to be surface runoff.

3. The natural portions of the watershed are assumed to have been burned by fire, which decreases soil infiltration.

4. A bulking factor is assumed. In the area where a watershed is burned, the runoff would carry with it a large layer of eroded topsoil, burned trees and brush. To account for the quantity of debris, the design flow rate is artificially increased by a percentage increase in flow rate, or bulking factor.

PACE has utilized the Q_{100} flowrates from FEMA for all floodplain mapping purposes and Q_{cap} flowrates for all soil cement design purposes. (*Table 1.0*)

Table 1.0 : Design Hydrology for Mission Village

HEC-RAS Reach Cross-Section	FEMA 100-YR Flowrate (cfs)	Q-cap Flowrate (cfs)	Reach Location Description
39755	40,300	116,236	D/S from Proposed Commerce Center Drive Bridge to Castaic Creek Confluence

3 HEC-RAS Modeling

An extensive analysis was done to determine hydraulic design data to determine the top and toe elevations for future proposed bank protection as well as to determine floodplain impacts the proposed project may cause. Bank protection analysis was performed in the previously approved "Newhall Ranch River Fluvial Study - Phase 1 Final Draft" and "Santa Clara River HEC-RAS Modeling" reports by PACE while the floodplain analysis is demonstrated herein.

Analyses and calculations for Q_{cap} with a Manning's values of 0.085, 0.025 were utilized in the previously approved "Newhall Ranch Santa Clara River HEC-RAS Model" and "Newhall Ranch River Fluvial Study - Phase 1 Final Draft" to ensure the most conservative design values for the bank protection top and toe. See *Appendix F, Tables 8.0-8.4* for top and toe calculation results. Analyses and calculations for FEMA's Q_{100} of 40,300 cfs with a Manning's value of 0.060 are presented to identify the changes in the effective floodplain as it pertains to water surface elevation, velocity and top-width. *Table 2.0* below identifies manning's values associated with each respective model.

Table 2.0 : HEC-RAS model boundary flow conditions for Mission Village

Utility	Manning's
Top of Bank Protection	n =0.085
Floodplain Mapping	n =0.060
Toe of Bank Protection	n =0.025

3.1 Summary from the approved "Newhall Ranch Santa Clara River HEC-RAS Modeling" report

This HEC-RAS modeling analysis has been completed and approved for the pre-project and proposed project conditions for all of the Newhall Ranch Proposed Soil Cement Bank Protection Projects along the River between the I-5 Freeway and the Los Angeles/Ventura County Line for the Q_{cap} Storm Event. The Newhall Ranch Proposed Soil Cement Bank Protection Projects (full build out of Newhall Ranch project) along the River include:

1. Newhall Ranch Water Reclamation Plant (WRP) Soil Cement Bank Protection – 4,385 LF.
2. Soil Cement Bank Protection between the Grande and Potrero confluences (along north bank) (Homestead West) – 3,300 LF.
3. Homestead Proposed Bank Protection (along south bank) – 2,450 LF.
4. Landmark Village Soil Cement Bank Protection (both north and south banks of the River) – 10,500 LF, 6,300 LF.
5. Bank Protection for proposed Commerce Center Drive Bridge/Hwy 126 Widening Bank Protection – 2,500 LF.
6. Proposed Utility Corridor grading and slope erosion protection – 7,080 LF. (Chiquito confluence to WRP bank protection)

The proposed bridges over the River included in the proposed Newhall Ranch condition HEC-RAS models include:

1. Commerce Center Drive Bridge
2. Long Canyon Bridge
3. Potrero Canyon Bridge

3.2 HEC-RAS Models Developed for the Mission Village CLOMR request

Prior to the Mission Village project bank protection construction the *Mission Village "SR 126 HWY Widening* at Commerce Center Bridge" north bank protection will be constructed. Therefore for proposed modeling purposes, PACE has incorporated this section of revetment into the proposed-river condition and revised the model by including it with the other improvements that are directly associated with the Mission Village development. These improvements include the previously mentioned "*Commerce Center Drive Bridge*" south bank protection, the "*San Jose Flats"* south bank protection and the Commerce Center Drive Bridge itself. The revised model is submitted here as the *Mission Village proposed condition* HEC-RAS Model.

Boundary conditions for the flow were established as known water surfaces reflecting the effective boundary water surfaces from the FEMA effective HEC-RAS model. Boundary conditions for the effective conditions and proposed conditions are differ only because the proposed condition model is truncated to fit within reasonable study limits for the Mission Village development. The proposed condition model has identical cross sections as the effective model except immediately upstream and downstream of the Commerce Center Drive Bridge which provide two additional sections and at bank protection affected sections where the cross section geometry has been adapted to reflect the soil cement revetment
The Mission Village proposed project condition HEC-RAS Model <u>includes</u> the following proposed river related improvements:

1. Mission Village Soil Cement Bank Protections; *Mission Village "Commerce Center Bridge South Bank"* and *Mission Village "San Jose Flats"* – 600 LF and – 1,100 LF respectively
2. *"Commerce Center Drive"* Bridge

and <u>does not</u> include:

3. Newhall Ranch Water Reclamation Plant (WRP) Soil Cement Bank Protection – 4,385 LF.
4. Soil Cement Bank Protection between the Grande and Potrero confluences (along north bank) (Homestead West) – 3,300 LF.
5. Homestead Proposed Bank Protection (along south bank) – 2,450 LF.
6. Long Canyon Bridge and Potrero Canyon Bridge.
7. Landmark Village Soil Cement Bank Protection (both north and south banks of the River) – 10,500 LF, 6,300 LF.

"Commerce Center Drive" Bridge is the proposed bridges over the River and has been included in the proposed condition HEC-RAS model. For the purposes of the bridge modeling in this project, the two new HEC-RAS sections upstream and downstream from the bridge have been created within the proposed HEC-RAS model.

4 Summary of HEC-RAS Results

4.1 Effective vs. Proposed Condition (n=0.06)

PACE utilized HEC-RAS analyses for FEMA's Q_{100} with a Manning's value of 0.060 to identify the changes in floodplain acreage, water surface elevation and top-width for the Mission Village effective condition and proposed project condition (See *Table 3.0* below).

The water surface at both the upstream and downstream ends of the study reach show no appreciable changes due to the implementation of the proposed soil cement revetment or Commerce Center Drive Bridge. For this reason, PACE feels no impact would be felt within the Santa Clara River or along it's banks as a result of the Mission Village proposed project moving forward with it's current design in place.

Near Commerce Center Drive bridge, its adjacent sections of bank protection, and the "San Jose Flats" section of bank protection however, there are slight increases in Base Flood Elevations (BFE's) and expected changes in top-width due to the encroaching alignment of the revetment when compared to the effective floodplain. A maximum increase in water surface elevation of 0.95 feet occurs at river station 36515 which is just upstream of the Commerce Center Drive Bridge. Though notable, this increase is less than 1.0 foot. A maximum reduction in top-width of 364 feet occurs at river station 36515 which is directly upstream and adjacent to Commerce Center Drive Bridge. A maximum increase in top-width of 4.7 feet occurs at station 37655 which is just upstream of the SR-126 widening portion of bank protection.

A thorough analysis for Q_{100} with Manning values of 0.060 are presented in *Table 3.0* to show the changes in the water surface elevation, top-width and velocity between effective and proposed conditions.

Table 3.0 : HEC-RAS Water Surface, Top Width and Velocity Comparison

FEMA 100-YR Flowrate = 40,300 cfs, n = 0.060

	Water Surface Elevation*			Top-Width			Velocity		
River Sta	Effective (1) ft	Proposed (2) ft	Δ (2) - (1) ft	Effective (3) ft	Proposed (4) ft	Δ (4) - (3) ft	Effective (5) ft/s	Proposed (6) ft/s	Δ (6) - (5) ft/s
39755	1005.0	1005.0	0.0	1052	1052	0	7.9	7.9	0.0
39605	1004.2	1004.2	0.0	1087	1087	0	7.0	7.0	0.0
39310	1001.9	1001.9	0.0	1096	1096	0	8.3	8.3	0.0
39100	1001.1	1001.1	0.0	1058	1058	0	6.4	6.4	0.0
38925	1000.2	1000.2	0.0	1061	1061	0	6.7	6.7	0.0
38710	999.1	999.1	0.0	964	964	0	6.5	6.5	0.0
38475	996.8	996.8	0.0	673	673	0	9.3	9.3	0.0
38300	995.7	995.7	0.0	690	690	0	7.6	7.6	0.0
38065	994.5	994.5	0.0	658	658	0	7.1	7.1	0.0
37810	992.5	992.5	0.0	603	603	0	8.6	8.6	0.0
37655	990.3	990.3	0.0	713	714	0	10.1	10.1	-0.1
37390	988.8	988.9	0.2	979	980	1	6.4	6.2	-0.2
37135	987.3	987.7	0.4	1085	1088	2	6.4	6.0	-0.4
36930	986.4	987.1	0.6	1116	1121	5	6.1	5.5	-0.5
36735	985.6	986.5	0.9	1186	1195	10	6.4	5.5	-0.9
36515	984.8	986.1	1.3	1309	1324	15	6.1	5.0	-1.1
36374	-	985.4	-		1039	-	-	5.1	-
36299	*Bridge*		-	*Bridge*		-	*Bridge*		-
36265	984.0	-	-	1371.6	-	-	6.2	-	-
36240	-	984.2	-		1045	-	-	6.2	-
36080	983.1	983.2	0.1	1441	1119	-323	6.6	6.6	0.1
35845	982.0	982.0	0.1	1448	1311	-137	6.7	5.7	-1.0
35725	981.2	981.3	0.1	1416	1324	-92	7.4	6.4	-1.1
35515	980.1	980.1	0.0	1333	1333	0	7.2	7.2	0.0
35245	978.3	978.3	0.0	1270	1270	0	7.3	7.3	0.0
35040	976.9	976.9	0.0	1336	1336	0	7.1	7.1	0.0
34860	975.5	975.5	0.0	1268	1268	0	7.6	7.6	0.0
34720	974.2	974.2	0.0	1408	1408	0	8.1	8.1	0.0
34495	972.5	972.5	0.0	1263	1263	0	7.5	7.5	0.0
34310	971.4	971.4	0.0	1257	1257	0	6.8	6.8	0.0
34090	970.1	970.1	0.0	1262	1262	0	6.9	6.9	0.0
33880	968.9	968.9	0.0	1281	1281	0	6.9	6.9	0.0
33710	967.7	967.7	0.0	1317	1317	0	7.4	7.4	0.0
33500	966.5	966.5	0.0	1446	1446	0	6.9	6.9	0.0
33310	965.5	965.5	0.0	1472	1472	0	7.0	7.0	0.0
33115	964.7	964.7	0.0	1572	1572	0	5.9	5.9	0.0
32795	963.4	963.4	0.0	1312	1312	0	6.4	6.4	0.0
32605	962.6	962.6	0.0	1633	1633	0	6.4	6.4	0.0

* Based on 1929 National Geodetic Vertcal Datum (NGVD 29).

"Tie-In" Locations

4.2 Proposed Condition (n=0.085) and Top of Bank Protection Determination

As stated above, PACE utilized HEC-RAS analyses of Q_{cap} with a Manning's value of 0.085 to determine the proposed condition maximum water surface and resulting top of bank protection.

The proposed project condition maximum water surface are presented and compared with the proposed Newhall Ranch build-out condition maximum water surface elevations from the Newhall Ranch River Fluvial Study - Phase 1 Final Draft.

Minor increases in water surface elevation do not result in increased top. Therefore, design values for the bank protection top and the top elevations from Newhall Ranch River Fluvial Study - Phase 1 Final Draft are to be used as proposed minimum top elevations for some of the soil cement bank protection in this report. See "Santa Clara River Summary of Maximum Proposed Tow-down and Freeboard", *Tables 8.0-8.4* from Newhall Ranch River Fluvial Study - Phase 1 Final Draft in *Appendix F*.

The freeboard values are used to calculate the new minimum top elevation to compare with the top elevations from Newhall Ranch River Fluvial Study - Phase 1 Final Draft. The higher value of top elevations is going to be the minimum designed top elevation for soil cement bank protection for this report.

Final design elevations for all sections of bank protection are shown in *Tables 4.0, 5.0*, and *6.0* while the calculated elevations are respectively shown in *Tables 4.1, 5.1* and *6.1*. The detailed water surface elevation of the n=0.085 model results are shown in and the detailed model results are shown in *Tables 8.0-8.4* of *Appendix F*. The purpose of providing the n=0.85 water surface comparison is to demonstrate proper soil cement bank protection design technique.

4.3 Proposed Condition (n=0.025) and Toe of Bank Protection Determination

As stated above as per LACDPW standard, PACE utilized HEC-RAS analyses for Q_{cap} and Manning value of 0.025 to determine the proposed condition maximum flow velocities for determination of bank protection toe-down.

The proposed project condition maximum flow velocities are presented and compared with the proposed Newhall Ranch build-out condition maximum flow velocities from the Newhall Ranch River Fluvial Study - Phase 1 Final Draft as well.

Minor increases in velocity do not result in increased toe-down. Therefore, design values for the bank protection toe elevations from the Newhall Ranch River Fluvial Study - Phase 1 Final Draft are going to be used as proposed design toe elevations for some portions of soil cement bank protection in this report.

The design and calculated toe-down values of the n=0.025 model are shown in *Tables 4.0, 4.1, 5.0, 5.1, 6.0* and *6.1* and the detailed model results are shown in *Tables 8.0-8.4* of *Appendix F*. The purpose of providing these tables is to demonstrate proper soil cement bank protection design technique.

Table 4.0 : Designed Top and Toe Elevations for Mission Village "Commerce Center Bridge South Bank" soil cement bank protection							
HEC-RAS River Section No.	Straight-Inside Curved Reach				Bank Stations (ft)	Designed Top El. (ft)	Designed Toe El. (ft)
	Top of Bank[2] (Newhall Ranch) (ft)	Top of Bank[2] (Mission Village) (ft)	Toe of Bank[2] (Newhall Ranch) (ft)	Toe of Bank[2] (Mission Village) (ft)			
36515	996.12	996.38	965.00	965.00			
					1578.09	**996.00**	**949.14**
36374		**995.87**		**953.27**	**1531.94**	**995.90**	**949.14***
Bridge - Commerce Center Drive - Proposed							
36240		**993.97**		**950.16**	**1397.94**		**948.50***
36080	993.14	**992.82**	963.00	**963.00**	**1376.29**		
					1347.94		**948.50**
					1297.94		**959.00**
					1000.00	**992.50**	**959.00**
35845	991.64	991.46	961.00	957.00			

(2) Top and Toe Bank Elevations are minimum top and toe elevations.
(3) Top and Toe Bank Elevations are from Fluvial Study for Santa Clara River and are not considered.
Bank Protection Sections and Minimum Designed Top and Toe Elevations in bold
Designed Top and Toe Elevations, Grade Break (GB) elevations in bold

Table 4.1 : Calculated Top and Toe Elevations for Mission Village "Commerce Center Bridge South Bank" soil cement bank protection							
HEC-RAS River Section No.	Prop. Cond. WSE [2] (ft)	Straight-Inside Curved Reach Freeboard [2] (Table 4.2) (ft)	Straight-Inside Curved Reach Top of Bank[2] (ft)	River Invert Elevations (ft)	Bank Stations (ft)	Straight-Inside Curved Reach Toe-Down [2] (Table 5.2) (ft)	Straight-Inside Curved Reach Toe of Bank[2] (ft)
36515	**993.88**	2.50	996.38	975.00		10.00	965.00
36374	993.37	2.50	**995.87**	974.64	**1531.94**	21.37	**953.27**
Bridge - Commerce Center Drive - Proposed							
36240	991.47	2.50	**993.97**	974.00	**1397.94**	23.84	**950.16**
36080	990.32	2.50	**992.82**	973.00	**1376.29**	10.00	**963.00**
35845	988.96	2.50	991.46	971.00		14.00	957.00

Table 5.0 : Designed Top and Toe Elevations for Mission Village "San Jose Flats" soil cement bank protection

HEC-RAS River Section No.	Outside Curved Reach				Bank Stations (ft)	Designed Top El. (ft)	Designed Toe El. (ft)
	Top of Bank(3) (Newhall Ranch) (ft)	Top of Bank(2) (Mission Village) (ft)	Toe of Bank(3) (Newhall Ranch) (ft)	Toe of Bank(2) (Mission Village) (ft)			
34495	982.24	982.12	946.00	943.00	2120.00		
					2033.32	981.70	942.50
34310	980.94	**980.96**	945.00	**942.00**	1915.24	981.00	942.00
34090	979.54	**979.62**	944.00	**944.00**	1688.29		
33880	978.16	**978.23**	**942.00**	945.00	1466.18		942.00
33710	977.05	**977.14**	941.00	**941.00**	1297.30	977.15	941.00
					1053.74		940.52
					1000.00	976.40	
33500	975.81	975.90	940.00	940.00	783.00		

(2) Top and Toe Bank Elevations are minimum top and toe elevations.
(2) Top and Toe Bank Elevations are minimum top and toe elevations except for Section 33880.
(3) Top and Toe Bank Elevations are from Fluvial Study for Santa Clara River.
Bank Protection Sections and Minimum Designed Top and Toe Elevations in bold
Designed Top and Toe Elevations, Grade Break (GB) elevations in bold

Table 5.1 : Calculated Top and Toe Elevations for Mission Village "San Jose Flats" soil cement bank protection

HEC-RAS River Section No.	Prop. Cond. WSE (2) (ft)	Outside Curved Reach Freeboard (2) (Table 4.1) (ft)	Outside Curved Reach Top of Bank(2) (ft)	River Invert Elevations (ft)	Bank Stations (ft)	Outside Curved Reach Toe-Down (2) (Table 5.1) (ft)	Outside Curved Reach Toe of Bank(2) (ft)
34495	979.62	2.50	982.12	964.00		21.00	943.00
34310	978.46	2.50	**980.96**	963.00	**1915.24**	21.00	**942.00**
34090	977.12	2.50	**979.62**	962.00	**1688.29**	18.00	**944.00**
33880	975.73	2.50	**978.23**	960.00	**1466.18**	15.00	**945.00**
33710	974.64	2.50	**977.14**	959.00	**1297.30**	18.00	**941.00**
33500	973.40	2.50	975.90	958.00		18.00	940.00

Table 6.0 : Designed Top and Toe Elevations for Mission Village "SR 126 HWY Widening at Commerce Center Bridge" soil cement bank protection							
HEC-RAS River Section No.	Outside Curved Reach				Bank Stations (ft)	Designed Top El. (ft)	Designed Toe El. (ft)
	Top of Bank[3] (Newhall Ranch) (ft)	Top of Bank[2] (Mission Village) (ft)	Toe of Bank[3] (Newhall Ranch) (ft)	Toe of Bank[2] (Mission Village) (ft)			
37655	1002.51	1002.88	968.00	968.00	3273.42		
					3091.05*		**967.48**
					3040.00*	**1002.22**	
37390	1000.95	**1001.35**	967.00	**967.00**	**2919.56**	**1001.35**	**967.00**
37135	999.29	**999.62**	967.50	**967.50**	**2655.75**		
36930	998.17	**998.50**	964.00	**964.00**	**2461.06**		**964.00**
36735	997.11	**997.39**	964.50	**964.50**	**2268.79**		
					2136.62*		**959.65**
					2086.62*		**949.14***
36515	996.12	**996.38**	960.00	**960.00**	**2060.91**	**996.40**	
36374		**995.87**		**952.62**	**2036.62**		**949.14***
Bridge - Commerce Center Drive - Proposed							
36240		**993.97**		**949.69**	**1902.62**		**948.50***
					1852.62*		**948.50***
				956.01	**1802.62***		**956.01**
36080	993.14	**992.82**	958.00	**958.00**	**1626.95**		**958.00**
35845	991.64	**991.46**	956.00	**950.00**	**1370.17**		**950.00**
35725	990.79	**990.62**	955.00	**955.00**	**1241.66**	**990.80**	**955.00**
					1100.00*	**990.00**	**952.97**
35515	989.35	989.26	951.00	951.00	962.98		

(2) Top and Toe Bank Elevations are minimum top and toe elevations.
(3) Top and Toe Bank Elevations are from Fluvial Study for Santa Clara River and they are not considered.
Bank Protection Sections and Minimum Designed Top and Toe Elevations in bold
Designed Top and Toe Elevations, Grade Break (GB) elevations in bold
(*) Bank stations added for Top and Toe design purpose.

Table 6.1 : Calculated Top and Toe Elevations for Mission Village "SR 126 HWY Widening" soil cement bank protection							
HEC-RAS River Section No.	Prop. Cond. WSE [2] (ft)	Outside Curved Reach Freeboard [2] (Table 4.1) (ft)	Outside Curved Reach Top of Bank[2] (ft)	River Invert Elevations (ft)	Bank Stations (ft)	Outside Curved Reach Toe-Down [2] (Table 5.1) (ft)	Outside Curved Reach Toe of Bank[2] (ft)
37655	1000.38	2.50	1002.88	982.00		14.00	968.00
37390	998.85	2.50	**1001.35**	981.00	**2919.56**	14.00	**967.00**
37135	997.12	2.50	**999.62**	980.00	**2655.75**	12.50	**967.50**
36930	996.00	2.50	**998.50**	978.00	**2461.06**	14.00	**964.00**
36735	994.89	2.50	**997.39**	977.00	**2268.79**	12.50	**964.50**
36515	993.88	2.50	**996.38**	975.00	**2060.91**	15.00	**960.00**
36374	993.37	2.50	**995.87**	974.64	**2036.62**	22.02	**952.62**
Bridge - Commerce Center Drive - Proposed							
36240	991.47	2.50	**993.97**	974.00	**1902.62**	24.31	**949.69**
36080	990.32	2.50	**992.82**	973.00	**1626.95**	15.00	**958.00**
35845	988.96	2.50	**991.46**	971.00	**1370.17**	21.00	**950.00**
35725	988.12	2.50	**990.62**	970.00	**1241.66**	15.00	**955.00**
35515	986.76	2.50	989.26	969.00		18.00	951.00

5 HEC RAS Model Bridge Scour Calculation

The Commerce Center Drive Bridge modeling is based on the preliminary location, span and clearance information available (refer to *Appendix D*).

Pier scouring is calculated using two methods; HEC-18 calculations from the HEC-RAS program and the pier scouring equation from the LADPW County Hydrology Manual:

1. The HEC-18 calculation was used to calculate the contraction and pier scour at the proposed Commerce Center Drive Bridge. The result of the model (Qcap and n=0.025) is 14.1 feet of combined contraction and pier maximum scour potential at the Commerce Center Drive bridge. Total scour depth inside the bridge (16.8 feet) is a combination of long-term bed elevation changes of 2.7 feet contraction scour, and local scour at each individual pier and abutment. The top width of the local scour hole around a pier is computed as 2.0 Ys (2x12.3'=24.6') to each side of the pier.

2. The equation from LADPW County Hydrology Manual was used to calculate the pier scour at the proposed Commerce Center Drive Bridge. The result of the model (Qcap and n=0.025) is 14.8 feet of pier maximum scour potential at the Commerce Center Drive bridge. Calculations for the revised bank protection toe-down based on hydraulic output from the proposed project HEC-RAS model are shown above in *Appendix F*.

The first and last piers of the bridge structure, recognized as a "bridge abutment", are located behind to the soil cement bank protection. The next piers are located 95 feet from the North abutment and 68 feet from the South abutment. The width of pier scour hole is 24.6' to each side of the pier and the bank protection with trail (16' minimum to 30' maximum wide) is located next to the abutment.

The recently approved (LACDPW) report "Hydraulic Calculations for Location, Span and Clearance for Commerce Center Drive Bridge" prepared by Sikand dated April 18, 2006 provides toe and top based on the PACE report "Newhall Ranch Santa Clara River HEC-RAS Modeling". The Sikand report offers both a minimum calculated total pier scouring of 22.5 ft and an approved total pier scouring of 25.5 ft. Both values are compared to the values PACE has generated for the same study area (see *Tables 7, 7.1* and *7.2)*. The resulting toe-down values are similar in both reports and therefore we are using the LACDPW approved values from the Sikand report. Final design of the bridge will include detailed scour evaluations for final bridge abutment and pier design layout. Our recommendation is to move forward with the project planning and the bridge design based upon the LACDPW approved values from the Sikand report.

Table 7.0 : Minimum Scour Elevation for Commerce Center Drive Bridge		
Pier next to North Bank	**Pier next to South Bank**	**All other Piers**
948.50 (refer to Table 10.1)	948.50 (refer to Table 10.2)	948.50 (974.00-25.5)
North Bank U/S at Bridge Abutment	**South Bank U/S at Bridge Abutment**	
949.14 (refer to Table 10.1)	949.14 (refer to Table 10.2)	
North Bank D/S at Bridge Abutment	**South Bank D/S at Bridge Abutment**	
948.50 (refer to Table 10.1)	948.50 (refer to Table 10.2)	

The Approved 25.5 ft of total pier scour from the "Hydraulic Calculations for Location, Span and Clearance for Commerce Center Drive Bridge over Santa Clara River" is used in these scour elevations.

Table 7.1 : Summary of Toe-Down for and Toe Elevations for Commerce Center Drive Bridge and the Mission Village "SR 125 HWY Widening" soil cement bank protection

HEC-RAS River Section No.	Bank Stations (ft)	River Invert Elevations (ft)	Outside Curved Reach Toe-Down (Table 5.1) (ft)	Min. Calculated Total Pier Scouring per Approved Report * (ft)	Approved Total Pier Scouring per Approved Report * (ft)	Designed Toe El. (Toe-Down is 25.50') (ft)
36374	1531.94	974.64	22.02	22.50	25.50	949.14
Bridge - Commerce Center Drive - Proposed						
36240	1397.94	974.00	24.31	22.50	25.50	948.50

(*) Approved Report "Hydraulic Calculations for Location, Span and Clearance for Commerce Center Drive Bridge over Santa Clara River" (prepared by Sikand Engineering Associates, 04/18/06)
Min. Calc. Total Pier scouring per Approved Report is also considered as Toe-Down for Bank Protection per this report analysis.

Table 7.2: Summary of Toe-Down for and Toe Elevations for Commerce Center Drive Bridge and the Mission Village "Commerce Center Bridge South Bank" soil cement bank protection

HEC-RAS River Section No.	Bank Stations (ft)	River Invert Elevations (ft)	Straight-Inside Curved Reach Toe-Down (Table 5.2) (ft)	Min. Calculated Total Pier Scouring per Approved Report * (ft)	Approved Total Pier Scouring per Approved Report * (ft)	Designed Toe El. (Toe-Down is 25.50') (ft)
36374	1531.94	974.64	21.37	22.50	25.50	949.14
Bridge - Commerce Center Drive - Proposed						
36240	1397.94	974.00	23.84	22.50	25.50	948.50

(*) Approved Report "Hydraulic Calculations for Location, Span and Clearance for Commerce Center Drive Bridge over Santa Clara River" (prepared by Sikand Engineering Associates, 04/18/06)
Min. Calc. Total Pier scouring per Approved Report is also considered as Toe-Down for Bank Protection per this report analysis.

6 Proposed Floodplain Mapping

The proposed floodplain mapping was established based on proposed river improvements on both north and south sides of the River as well as the Commerce Center Drive Bridge via HEC-RAS modeling. HEC-RAS output was analyzed for impacts in water surface elevation and top-width. Floodplain lines were then appropriately drawn onto digital topography via an AutoCAD application so to reflect the water surface limits. The FEMA Q_{100} flowrate of 40,300 cfs for this reach of the Santa Clara River and a Manning's roughness coefficient of .060 were utilized for the hydraulic analysis. Please refer to the *Topographic Workmap* and *Annotated FIRM* exhibits in *Appendix A* for all floodplain lines.

The effective and proposed HEC-RAS models are based upon the NGVD 1929 datum. All topographic maps and design elevations are also based upon the NGVD 29 datum.

The goal of this mapping is to revise FEMA's Flood Insurance Rate Maps (FIRM's) through the CLOMR and LOMR process so to reflect the implementation of the proposed bank protection and Commerce Center Drive bridge.

7 Fluvial Analysis

The technical study in the recently approved report Newhall Ranch River Fluvial Study - Phase 1 Final Draft provides an evaluation of the existing and proposed fluvial characteristics and long-term stability of the River between Interstate 5 and an area generally west of the Los Angeles/Ventura County line as described in the Newhall Ranch Specific Plan. Development along the River within the study area has the potential to modify the fluvial mechanics of the River. The proposed soil cement bank protection on both the north and south banks of the River is intended to provide long-term erosion protection from lateral migration of the bank and flood protection for the adjacent proposed development areas. The completed analysis evaluates impacts of the Newhall Ranch build-out of from (1) fluvial modifications of the river bed from single hypothetical storm events, and (2) changes in the floodplain fluvial mechanics over the long-term.

Sediment data collection for the River along the study reach was conducted by Allan E. Seward Engineering Geology Inc. Eighteen samples were collected at six different locations positioned along River subreaches. All sampling was conducted using grab samples of the upper foot of the active or recently active portion of the bed. No fine material is included in the sediment analysis because fine material is generally transported as wash load. A review of the raw gradation curves indicates that most samples are comprised of poorly graded sands with gravels and silts. The D_{50} values for all samples ranged from 0.25 to 4.67 mm with an average of 0.8 mm. Additionally, previous studies noted above also found similar sandy characteristics. No cobbles are present in the Seward study and sampling was not conducted for cobble grain sizes. Cobbles are not present in any of the grain size distribution curves in the heretofore discussed SLA study (particularly in the Landmark study reach), and a careful review of the boring logs down to approximately 10 feet (approximately five times the SAM single event depth) notes only sporadic cobble observances, generally less than 5% and rarely as much as 10%. Because of the paucity of cobble occurrence in both the boring logs and their depth below the SAM single event depth, taken here as the active depth, PACE believes that the sampling data collected by Seward is representative of the active bed.

General adjustment was estimated in this study using the US Army Corps of Engineers (ACOE) SAM steady-state zero-dimensional numerical model. SAM is utilized to provide a first approximation of sediment transport potential for subreaches within the River. The SAM numerical model is built upon hydraulic and fluvial representations of the study bed. The hydraulic component includes representations of bed characteristics and discharge. The fluvial component includes representation of bed gradation and sediment transport functions. SAM's hydraulic component utilized average cross-section data imported from HEC-2 numerical models of the river converted from HEC-RAS numerical models. The conversion process modifies the original numerical model, as discussed in Chapter 4 of the Newhall Ranch River Fluvial Study - Phase 1 Final Draft, so some differences in numerical models are created. Both the existing and proposed conditions HEC-RAS models were originally developed by Sikand Engineering in the *Newhall Ranch Santa Clara River HEC-RAS Study* (June 2000) and submitted as part of the Newhall Ranch Specific Plan. The HEC-RAS model that is the basis of the SAM modeling, and that is the basis of the earlier Landmark DCR report, has been refined by PACE in the *Newhall Ranch Santa Clara River HEC-RAS Modeling* report. The current model resembles the Sikand model but has been refined to address current LACDPW modeling standards and updated proposed project conditions. River subreaches that make up the SAM model are determined by examining the hydraulic parameters of the individual HEC-RAS cross-sections and identifying correlations between those hydraulic parameters and the longitudinal position in the channel.

SAM was run for all River reaches and bed stability was estimated based on the change in potential transport between adjacent channel subreaches for the Q_{CAP} discharge. General adjustment was also calculated using the equation specified in the Los Angeles County Hydrology and Sedimentation Manual (LACH&SM). The LACH&SM general adjustment calculation is based only on flow mean velocity. In most circumstances, adjustment predicted by the LACH&SM is greater (more scour) than that predicted by SAM for both the existing and proposed conditions. SAM results predict general adjustment from -2.9 to +2.3 feet for the existing condition, and -1.6 and +2.1 feet for the proposed condition. LACH&SM

methodology predicts general adjustment from -2.1 to -8.1 feet for the existing and -1.8 to -7.6 feet for the proposed condition, both outside of curves (*Tables 8.1-8.4*). In this report the outside of the curve values and inside of curve values are considered separately, as per LACDPW criteria, since outsides of curves tend to degrade while insides of curves tend to aggrade. It is not presently clear if the changes in general adjustment result from the alteration of the hydrology caused by full build-out, or from changes in the velocity in the River associated with specific individual project improvements. It is expected that various Newhall related impacts will be localized, and, with respect to implementation of the proposed improvements, that the River will continue to behave fluvially as it did prior to construction of these proposed improvements. Long-term changes to hydrology and sediment production are not addressed in the first phase report, but may be addressed in the second phase Fluvial Analysis. Finally, the general trend in general adjustment for the study reach as indicated by SAM modeling is not apparent for either the existing or proposed condition.

Long-term adjustment was calculated based on historical topographic data records. Topographic data dating from 1930, 1947, 1963, 1999, 2004 and 2005, was digitized. Cross-sections were cut at the locations of select HEC-RAS sections for each historical topography. At least one cross-section was chosen for each subreach. Areas of the 1947, 1963, 1999, 2004 and 2005 sections are calculated and the areas of the 1947, 2004 and 2005 bed are used to calculate the average change in bed elevation over time. The 1930 topography is not used to calculate average change in bed because the trends in bed change that occurred during this year occurred immediately following the failure of the St. Francis Dam upstream of the project site. Several events within the available historical record (1930 to present) have had an impact on the River bed and fluvial mechanics. These events include failure of the upstream dam, construction of bridges spanning the River, agricultural infill along the River banks, and periodic burning of surrounding vegetation during forest fires. The most significant historical event in the formation of the present bed condition was the failure of the Dam. Within the project reach, the failure of the Dam appears to have resulted in the abrupt scour of the bed. The sectional analysis finds that some historical sections (SRD2, SRD3, SRE1, SRE2) show little change between 1947 and 2005 suggesting an approximate equilibrium state for these subreaches. Between 1947 and 2005, 0.5, 0.7, 1.0, and 0.8 feet, respectively, of cumulative degradation appears to have occurred on these sections. Upstream sections SRA1 to SRC3 show continuous degradation over the period of record from 1947 to the present. Three sections, SRC4, SRD1 and SRE3 aggraded cumulatively between 1947 and 2005 by 1.9, 1.4, and 3.1 feet on average, respectively. While it is unclear why the observed aggradation occurred, it is presently believed to be the result of the fires of the summer of 2004 and the heavy rains of the 2004/2005 rainy season. This combination had the potential to produce high sediment runoff loading into the River. Degradation seems to be more prevalent on the upper half of the study reach while mild fluctuations about a mean are more apparent on the lower half. This appears to result from the relatively steep, narrow, winding upper portion of the study reach versus the relatively flat, wide, braided channel in the lower portion of the study reach of the River. Agricultural activities occurred, primarily in downstream sections but in upstream sections as well, so some of the observed channelization may have resulted from these activities.

Other scour considered in this study is comprised of four sub-categories: local scour, bend scour, low-flow incisement, and bedform height. Local scour occurs in the vicinity of flow obstructions including piers and abutments. Bend scour occurs because of velocity gradients around curves in fluvial systems. Three distinct bends are located in the study reach. Low flow incisement is included to represent thalweg or low flow channel depth. On-site inspection and review of historic data of this feature suggest a thalweg depth of approximately two feet. Finally, bedform height represents the dunes and anti-dunes that develop in active soft-bottomed channels during flow events. In this study, bedform height has been limited after Kennedy (1963). Local scour ranges from 0.0 to 17.4 feet in the proposed conditions at the various river crossings. Results of calculations of bend scour vary from 0.0 to 11.3 feet for the pre-project condition and 0.0 to 8.9 feet for the proposed condition. For both the pre-project condition and the proposed condition, the bedform height ranges from 0.5 to 8.3 feet. Changes between the existing and proposed conditions are a reflection primarily of the change in velocity brought about by the proposed condition.

General adjustment, long-term adjustment, and other scour are summed to determine total potential bed adjustment following LACH&SM methodology. For cross-sections where SAM modeling predicts

aggradation, the general adjustment contribution to total bed adjustment is not included for degradation calculations. The pre-project condition is predicted to have a combined bed adjustment of approximately -6.9 to -19.7 feet for the outside of curved reaches and -6.2 to -15.4 feet for the inside of curved and straight reaches. Calculations in the proposed condition predict that the combined bed adjustment ranges from approximately -6.7 to -26.2 feet for both the outside of curved reaches and for the inside of curved and straight reaches.

A comparison of total bed adjustment estimated by both the summed methodology and the LACFCDDM methodology shows that the more intensive LACH&SM methodology using SAM for general adjustment and historical analysis for long-term adjustment predicts a shallower toe-down for both the pre-project and proposed conditions than does the LACFCDDM methodology except for sections in the vicinity of subreach SRA2, SRB1, SRC2, and SRE1. In subreach SRA2 section 43820, very high long-term adjustment causes LACH&SM calculations of this section to exceed LACFCDDM calculations by 1.4 feet for both outside of curved reaches and straight or inside of curved reaches in the pre-project and proposed conditions. In SRC2 section 29140, higher general adjustment and higher bedform height cause LACH&SM calculations of this section to exceed LACFCDDM calculations by 0.6 feet in outside curved reaches and 1.2 feet in straight and inside of curved reaches for the pre-project condition. In SRB1 section 36080 and SRE1 section 15125, the presence of proposed bridges causes LACH&SM calculations of this section to greatly exceed LACFCDDM calculations, by more than 10 feet. LACH&SM methodology utilizing SAM calculations predicts a deeper toe-down than does the LACFCDDM at these locations methodology because the LACFCDDM does not account for the effects of local degradation as effectively.

Freeboard is considered for the purposes of this report to be the additional height required above the top of a levee or other bank protection to prevent overtopping. Freeboard elevation is calculated in this study based on LACH&SM Chapter 5A-3, and includes LACFCDDM calculations. The freeboard for the River ranges from approximately 2.5 to 5.2 feet for both outside of curved and straight or inside of curved reaches in the proposed condition. Maximum total toe-down, total freeboard, toe-down elevation and freeboard elevation are presented in *Appendix F, Tables 8.0-8.4* .

8 Proposed Soil Cement Bank Protection

Mission Village "SR 126 HWY Widening at Commerce Drive Bridge" – The partially exposed soil cement bank protection is located south of State Route 126, along the north bank of the river at the north end of Commerce Center Drive Bridge. This soil cement is part of the proposed condition which ia actually a part of the CALTRANS/LA County Department of Public Works Project (State Route 126 widening and Commerce Center Drive interchange project; Sate Clearing house #2003101127). The bank protection is approximately 2,000 linear feet. The horizontal alignment starts approximately 850 feet west from the central line of proposed "Commerce Center Drive" bridge, runs under the bridge and ends approximately 1150 feet east (upstream) adjacent to the slope of the existing road. Riprap will be utilized for the transition structure at the terminus and will tie into the high ground on the west end of bank protection and into the slope of existing road on the east end of bank protection. (See *Figure 02* in *Appendix C* for bank protection location, plan and profile.)

Mission Village "Commerce Center Bridge South Bank" – The partially exposed soil cement bank protection soil cement bank protection is located along the south bank of the River and on the northern portion of the proposed Mission Project Site TTM # 61105. The bank protection is approximately 600 linear feet. The horizontal alignment starts approximately 450 feet west from the central line of the proposed "Commerce Center Drive" bridge, runs under the bridge and ends approximately 150 feet east (upstream) adjacent to the pre-project slope. Riprap will be utilized for the transition structure at the terminus on the west end east end of bank protection and will tie into the high ground of existing riverbank. (See *Figure 01* in *Appendix C* for bank protection location, plan and profile.)

Mission Village "San Jose Flats" – The buried soil cement bank protection is located along the south bank of the River and on the northern portion of the proposed Mission Project Site TTM # 61105. The bank protection is approximately 1,100 linear feet. The horizontal alignment starts approximately 1700 feet west from the central line of the proposed "Commerce Center Drive" bridge. Riprap will be utilized for the transition structure at the terminus on the west end east end of bank protection and will tie into the high ground of existing riverbank. (See *Figure 01* in *Appendix C* for bank protection, location, plan and profile.)

The soil cement bank protection at *"SR 126 HWY Widening"* and *"Commerce Center South Bank"* are primarily necessary to protect the proposed residential and commercial development on the proposed Mission Village Project Site and the *"Commerce Center Drive"* Bridge from potential erosion due to project implementation.

The proposed bank protections will consist of standard soil cement to provide scour and freeboard flood control protection for all storm events up to the Q_{cap}. The critical factors in determining the design of the bank protection were based on the following criteria:

1. Flood control stability and durability of bank protection.
2. Safety concerns regarding access to and from the channel in dry and wet conditions.
3. Bank protection maintenance considerations.
4. Environmental compatibility with the native area and resource enhancement concepts, and aesthetic considerations.
5. Constructability and cost of construction.

Soil cement bank protection is constructed as a monolithic and homogenous structure consisting of approximately 90% native soils and 10% cement. The typical section consists of 8-foot wide and 6- to 12-inch thick layers of soil cement. Each layer of soil cement is set back from the edge of the previous layer, at a 1.5:1 slope. The entire section varies in total height, from 32 to 42 feet, based on varying freeboard, flow depth and toe-down requirements along the length of the river.

The proposed soil cement bank protection addresses the above design criteria as follows:

1. Soil cement provides a stable riverbank protection material, in terms of both surface erosion and structural stability. Preliminary geotechnical analysis indicates that locally available native soils are considered acceptable for use as soil cement.

2. Exposed areas of the soil cement will be aesthetically compatible with the native earth re-vegetated resource area since it offers a natural soil cement material color. Exposed areas include the top portions of the soil cement at storm drain outlets, access ramps and regions of the *Commerce Center Bridge South Bank* soil cement which will be exposed at the bridge area.

The bank protection incorporates a 16-foot wide access road that follows the alignment of the bank protection and is located directly above the top layer of soil cement (Refer to Typical Sections on *Figures 01* and *02* in *Appendix C*).

This report implements the analysis and values of the minimum top bank protection and toe-down elevations from the recently approved Newhall Ranch River Fluvial Study - Phase 1 Final Draft (see *Appendix F*).

8.1 Material Suitability of Soil Cement

The following excerpts were taken from various ACI and PCA publications referenced in the bibliography.

The erosion and overtopping of river banks by floodwaters is a significant flood control concern in the southwest. In order to protect valuable land, bridges, and buildings from such erosion, many communities have found that stabilized soil, in the form of soil cement, meets the criteria of cost-effectiveness, performance, functional life, and aesthetics.

The American Concrete Institute (ACI 116R) defines soil cement as "a mixture of soil and measured amounts of cement and water compacted to a high density." Soil cement can be further defined as a material produced by blending, compacting, and curing a mixture of soil/aggregate, Portland cement, possibly admixtures including pozzolans, and water, to form a hardened material with specific engineering properties. The soil/aggregate particles are bonded by cement paste, but unlike concrete, the individual particle is not completely coated with cement paste.

A wide variety of soils can be used to make durable soil cement. In fact, most soils in Southern California are suitable for use in soil cement. Ideally, sand to silty sand with the highest dry unit weight possible should be used to make soil cement, as that material is more likely to be well graded. For maximum economy and most efficient construction, the Portland Cement Association (PCA) recommends that:

1. The soil contains no material retained on a 3-inch (75 mm) sieve.
2. Between 60 percent and 90 percent passes the No. 4 (4.75 mm) sieve.
3. Between 5 percent and 25 percent passes the No. 200 (0.074 mm) sieve.
4. The Plasticity Index (PI) of the fines should not exceed eight.

An analysis of the soil classification, cement content, borrows area/earthwork and groundwater levels follows:

<u>Soil Classification</u>

Preliminary borings for the Mission Village Project site indicate that some of the soil along the proposed limits of excavation is generally suitable for use with soil cement. However, other sources of material, whether found on-site or imported, may need to be blended in to optimize the soil cement mix design. Additional geotechnical investigation will be required to determine the suitability of soils for use with soil cement for the final design. For ideal base material gradation for soil cement: 100-80% passing through ¾" sieve, 90-60% passing through No. 4 sieve, 50-30 percent passing through No. 40 sieve, and 25-5% passing through No. 200 sieve. A well graded material with some fine sands, and no or minimal clays are

required. The gradation test data of various borings, provided in the geotechnical report, were used to determine the location of the soils that contain suitable material for use in soil cement.

Cement Content

An efficient mix utilizes the minimum cement content necessary to reach the specified design strengths. For this mix, base cement content of 7% to 10%, by weight will be used. Per the project specifications, the final cement content will be based on testing of the actual soil cement base material stockpile. Based on strength and durability relationships developed by the PCA, the cement content will be determined based on achieving a 7-day unconfined compressive strength of approximately 750 psi.

Aggregate Location and Volumes

It is estimated that approximately 51,000CY of soil cement will be required for the 4,900 LF of bank protection for "*SR 126 HWY Widening at Commerce Drive Bridge*", "*Commerce Center Bridge South Bank*" and "*San Jose Flats*".

Groundwater Levels

All information on groundwater levels will be based on geotechnical investigations for this project site. It is assumed that dewatering will be required for construction of the proposed soil cement bank protection and construction of the proposed soil cement toe erosion protection and it will be determined based on geotechnical report and groundwater levels at the time of construction.

9 Planning and Environmental Issues

The major environmental and planning issues impacting the proposed bank protection project are the jurisdictional limits of the ACOE and California Department of Fish and Game (CDFG). No construction may occur within the jurisdictional limits without prior approval from both the ACOE and CDFG. At several locations, the limit of construction disturbance lies within the jurisdiction limits. These impacts will require mitigation in the form of in-kind re-vegetation. The excavation required to construct the bank protection will be backfilled and returned to pre-project grade or lower in order to facilitate re-vegetation. The top portion of the bank protection above the river invert will be left exposed.

Newhall Land is in the process of developing a Natural River Management Plan "Phase Two" EIR and technical support documents for public review. This document will be referred to as, "Newhall Ranch Resource Management Development Plan." This document will address the proposed Newhall Ranch project impacts to the Santa Cara River and the tributaries.

The Newhall Ranch Resource Management Development Plan EIR and ensuing 404/1603 Permits will identify environmental impacts of the project and provide necessary mitigation measures. These documents will also establish limits of temporary and permanent encroachment within the ACOE and CDF jurisdictional limits for construction and long-term maintenance.

10 Conclusion

The proposed design for soil cement bank protections along the River is based on the LACDPW approved *Newhall Ranch River Fluvial Study - Phase 1 Final Draft* by PACE which provides the hydraulic and fluvial analysis and compares design recommendations for the full build-out of the Newhall Ranch river bank protection. The purpose of this report is to present the proposed river improvements for Mission Village TTM # 61105, among others, and evaluate the hydraulic impacts upon the effective condition in comparison with the proposed project condition bank protection which has aided in the application for appointment of a Conditional Letter of Map Revision (CLOMR) by FEMA. Although, proposed project bank protection causes impacts within the study reach, the impacts are all contained within the overall Mission Village project boundary and it's subsequent proposed improvements along the Santa Clara River. Therefore, it is not impacting any non-Newhall Land properties upstream or downstream of the Mission Village project area.

Currently, the project site is located under Zone A on the FEMA Flood Insurance Rate Maps (FIRMs) of Community No. 065043-0340B and 065043-0345B. This CLOMR application for the Mission Village project will first be submitted to LACDPW for review and finally to FEMA. Upon completion of the project and pending a CLOMR approval, a Letter of Map Revision (LOMR) application will be submitted to FEMA, requesting that the FIRM be revised to reflect the proposed condition after project build out.

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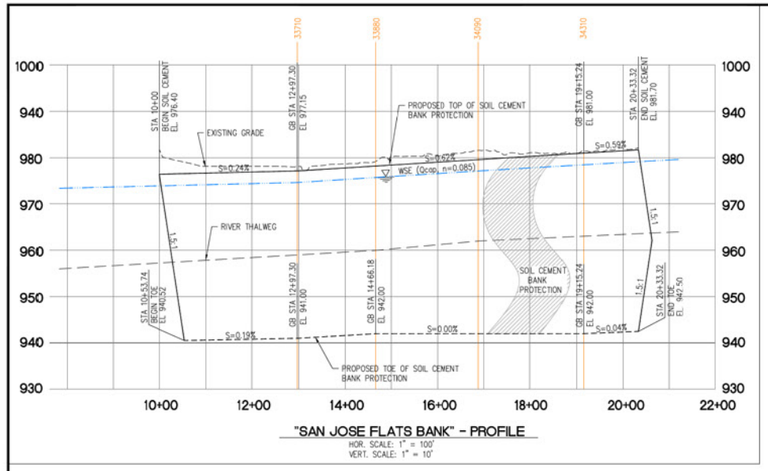
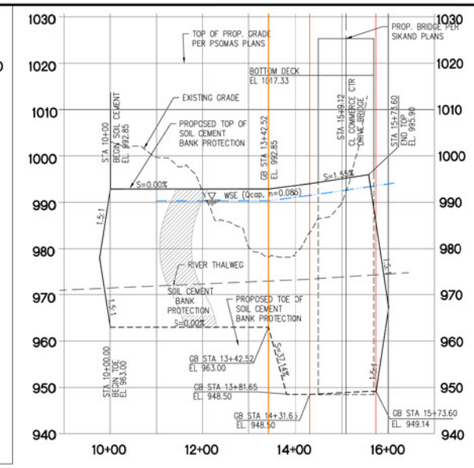
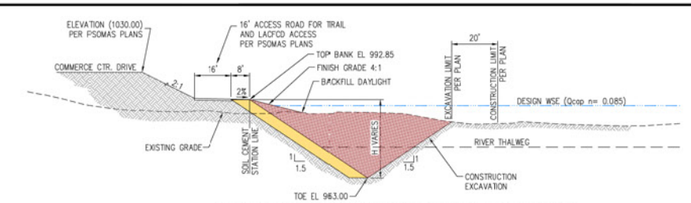
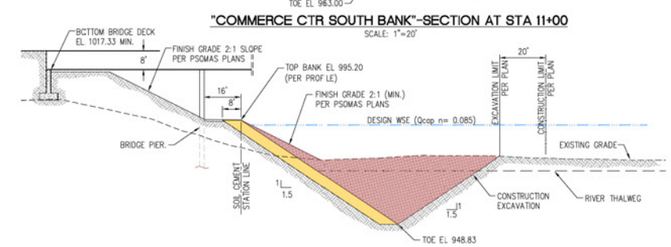
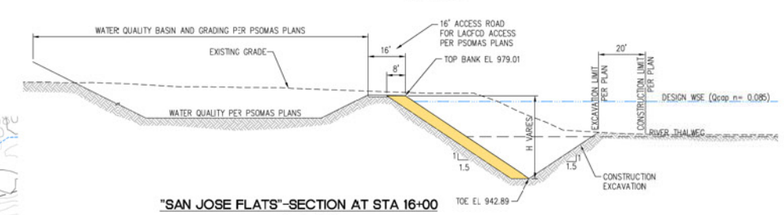
A full-size reproduction of this figure can be found at Impact Sciences.

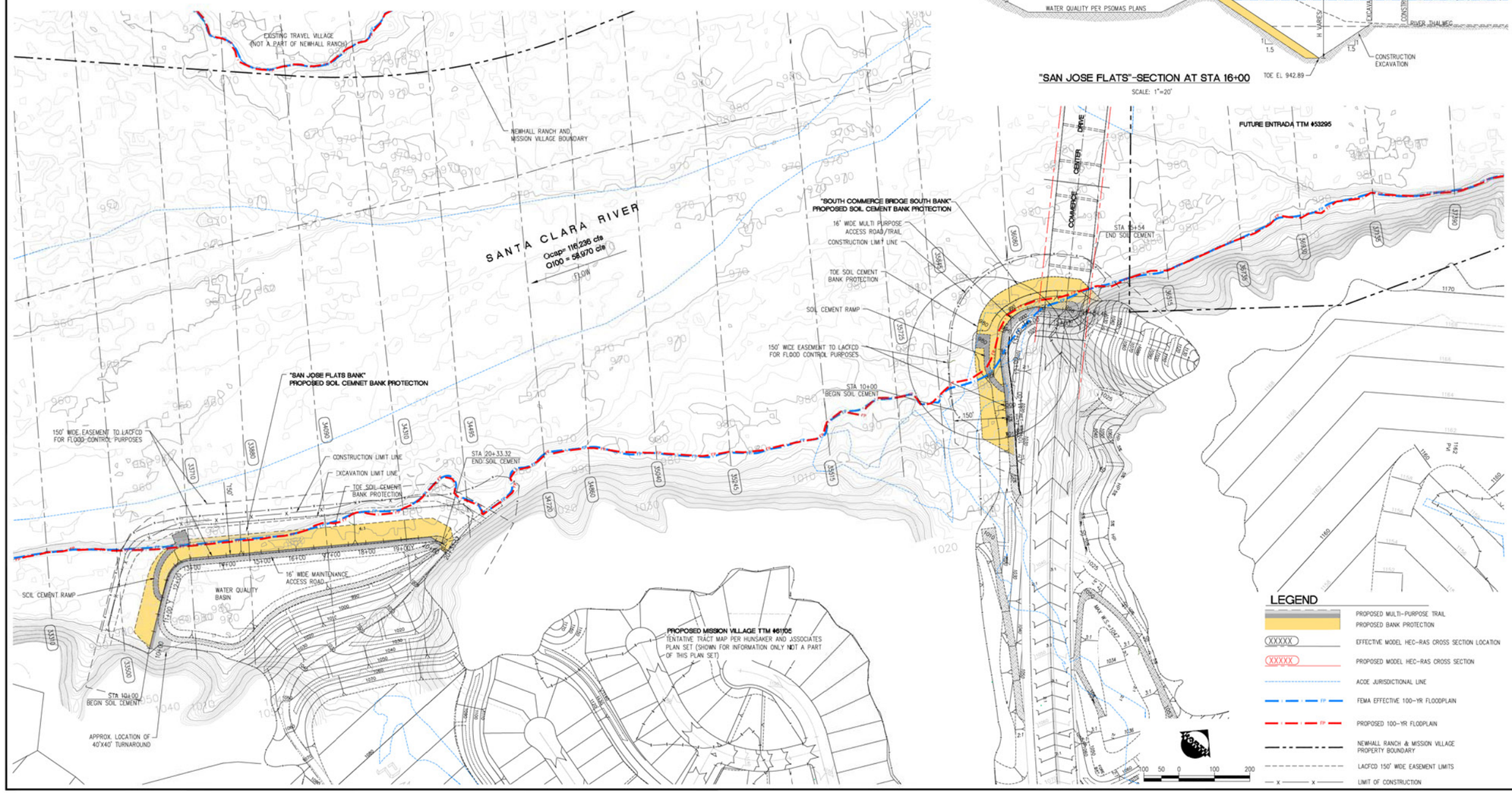












NO	BY	DATE	REVISIONS	DATE	APP

THESE DRAWINGS ARE THE PROPERTY OF P.A.C.E. AND SHALL NOT BE REPRODUCED IN ANY MANNER NOR BE USED FOR CONSTRUCTION UNLESS STAMPED "ISSUED FOR CONSTRUCTION".

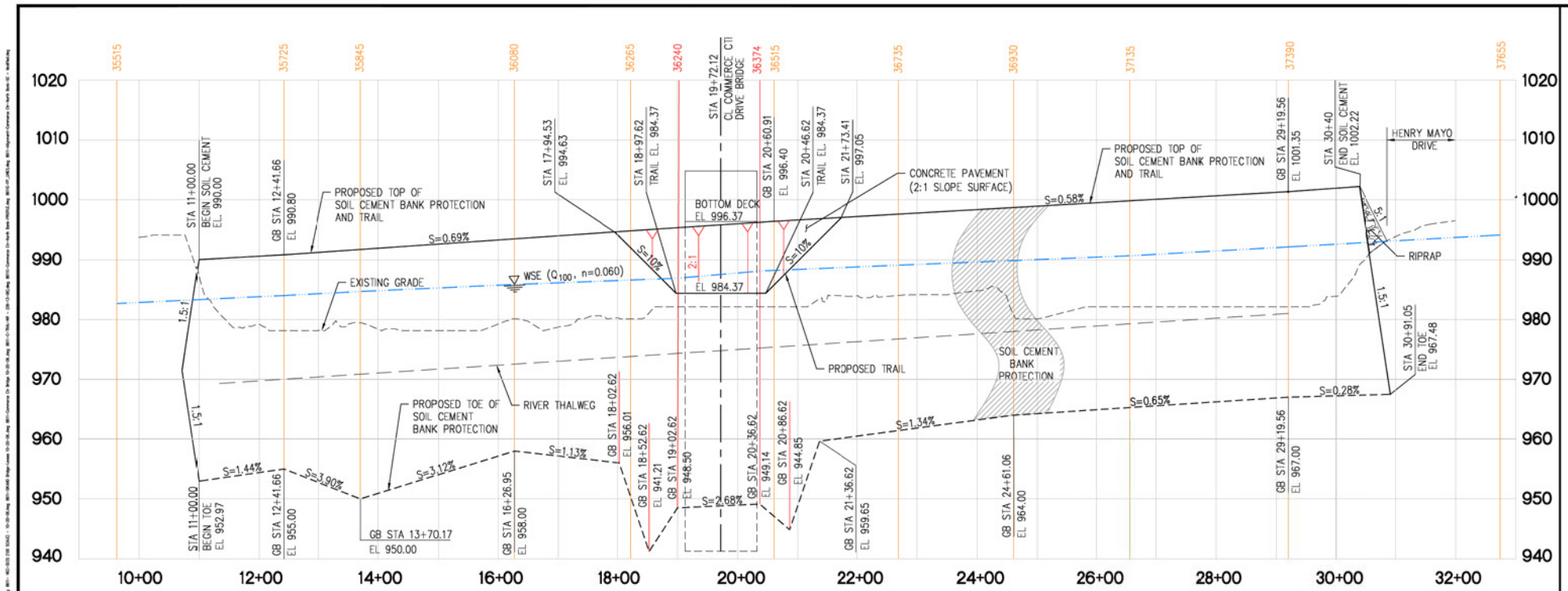
SCALE 1"=100'
DESIGNED VB
DRAWN JEP
CHECKED MEK
DATE JULY 2007
JOB NO. 8611E

FILE: "SAN JOSE FLATS BANK" & "COMMERCE CTR. SOUTH BANK" PROPOSED SOIL CEMENT BANK PROTECTION, PLAN PROFILE & TYP. SECTIONS

SANTA CLARA RIVER
BANK PROTECTION FOR
MISSION VILLAGE
VTTM#61105
LOS ANGELES COUNTY

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHALL STREET, SUITE 200
SANTA CLARITA, CA 91387
PH (714) 481-7300 FAX (714) 481-7299

FIGURE 01
JOB NO. 8611E



PROFILE

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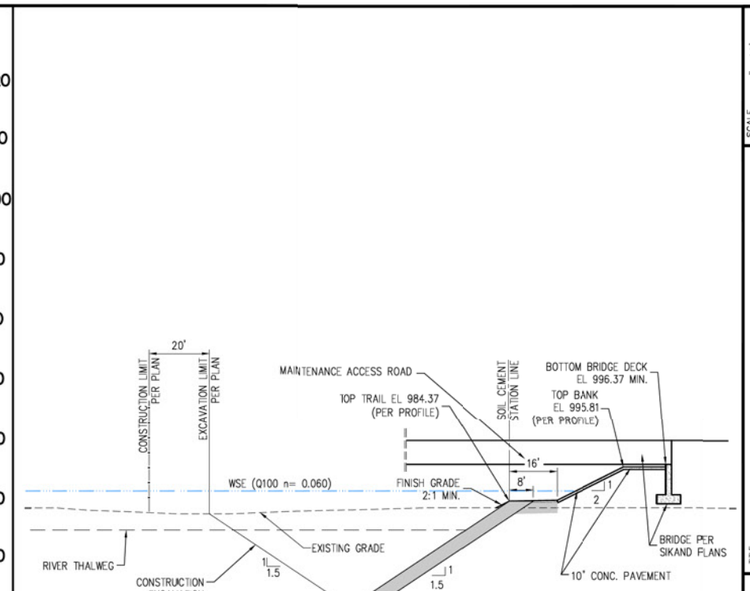

SECTION AT STA 19+72.12

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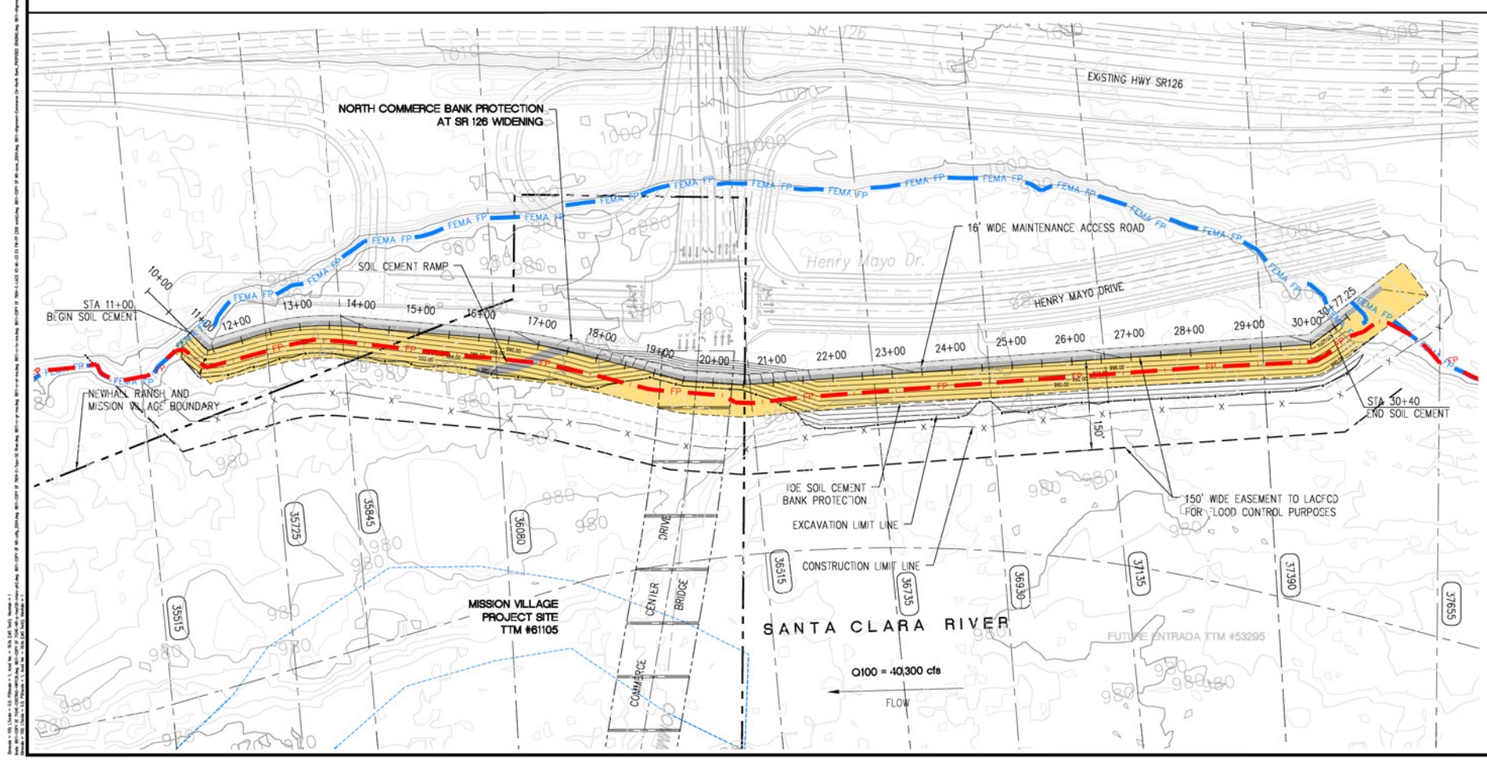

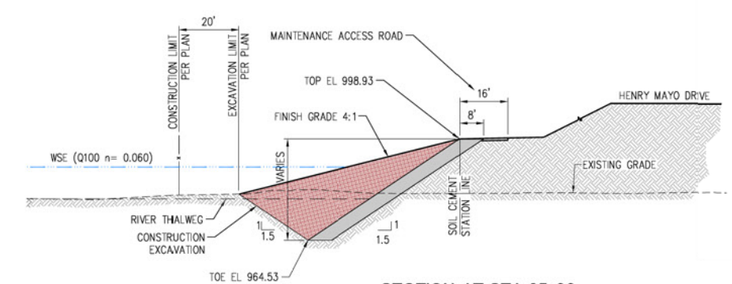

SECTION AT STA 25+00

SCALE: 1"=20'

LEGEND

- PROPOSED MULTI-PURPOSETRAIL
- BANK PROTECTION PRE-PROJECT
- XXXXX — HEC-RAS CROSS SECTION LOCATION
- XXXXX — HEC-RAS CROSS SECTION (PROPOSED CONDITION)
- ACOE JURISDICTIONAL LINE
- FEMA EFFECTIVE 100-YR FLOODPLAIN
- PROPOSED 100-YR FLOODPLAIN
- NEWHALL RANCH & MISSION VILLAGE PROPERTY BOUNDARY
- LACFCD 150' WIDE EASEMENT LIMITS
- LIMIT OF CONSTRUCTION

NORTH

100 50 0 100 200

SCALE	1"=100'
DESIGNED	VB
DRAWN	JEP
CHECKED	MEK
DATE	JULY 2007
JOB NO.	8611E

TITLE: PROPOSED SOIL CEMENT BANK PROTECTION, PALN PROFILE & TYP. SECTIONS SR 126 HWY WIDENING

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JOB: NEWHALL RANCH
SANTA CLARA RIVER
NORTH COMMERCE
PRE-PROJECT BANK PROTECTION
LOS ANGELES COUNTY

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

FIGURE 02

JOB NO. 8611-E

P:\8611E\Engineering\Global Artists\8611E-CLOMR-MY SC PLAN & PROFILE (Vg 2).dwg - Tab: layout By: jpression on May 12, 2010 at 04:48 pm

A full-size reproduction of this figure can be found at Impact Sciences.

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

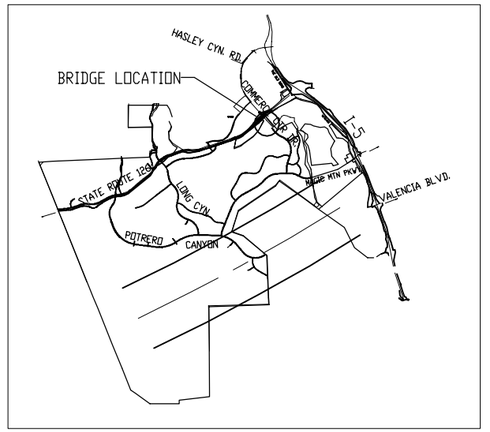
LOCATION, SPAN & CLEARANCE

FOR

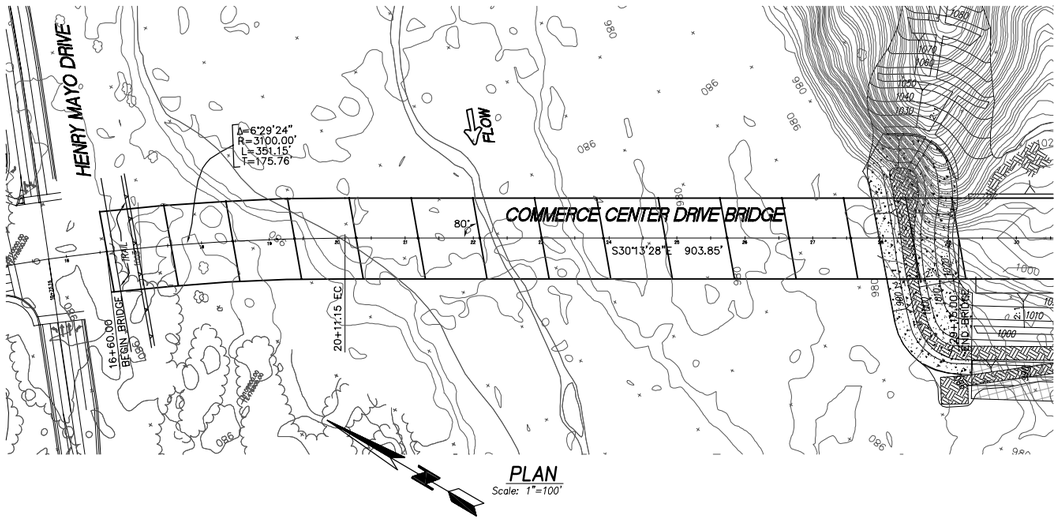
COMMERCE CENTER DRIVE BRIDGE

OVER

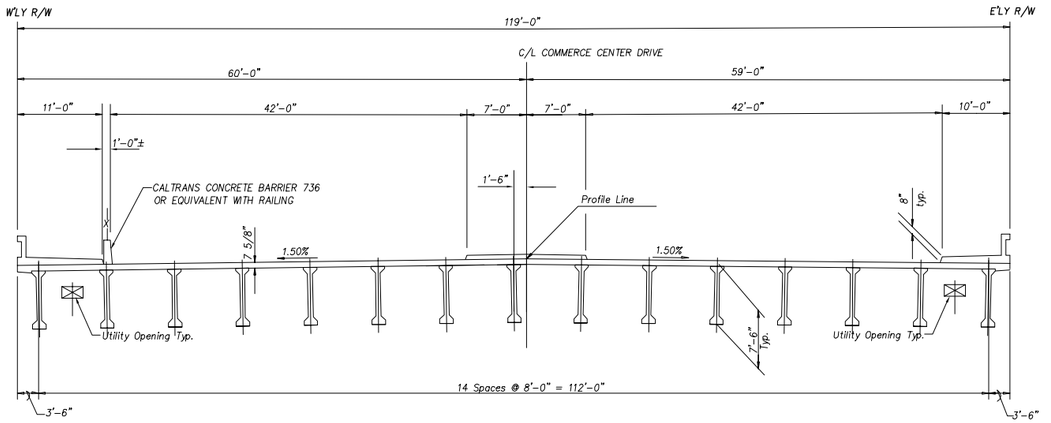
SANTA CLARA RIVER



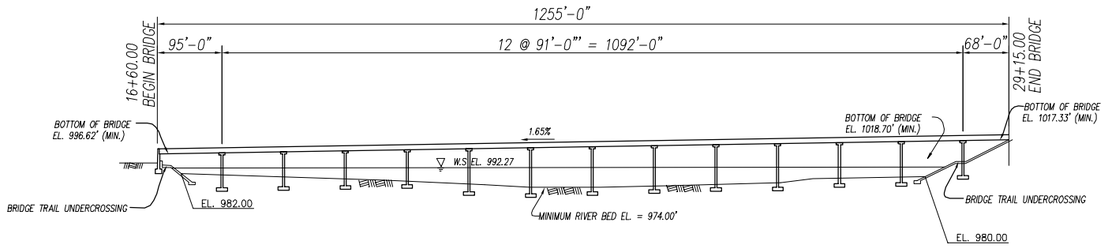
PROJECT LOCATION
No Scale



PLAN
Scale: 1"=100'



SECTION B–B
Scale: 1"=8'



SECTION A–A
Scale: 1"=100'

SIKAND ENGINEERING ASSOCIATES CONSULTING ENGINEERS 15230 BURBANK BLVD., VAN NUYS, CALIFORNIA 91411 (818)787-6550	LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS DESIGN DIVISION STRUCTURES SECTION
DESIGNED BY:	COMMERCE CENTER DRIVE BRIDGE OVER SANTA CLARA RIVER LOCATION, SPAN & CLEARANCE
DRAWN BY:	SUBMITTED: DIVISION ENGINEER DATE BRIDGE NO.:
PROJECT ENGINEER:	APPROVED: H. W. STONE DIRECTOR OF PUBLIC WORKS BY: DEPUTY DIRECTOR DATE PROJECT NO.: SHT.: 1 OF: 1 DWG. NO.:

DRAWN | CHECKED | REVISIONS

K:\Sikand\Drainage Concept\BRIDGE-RIVER\Commerce Bridge 08_15_06\Commerce Bridge Span and Clearance_rev1.dwg, Plan Sheet, 10/02/06 13:31:26 by

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

October 13, 2003 Job No: 03-1702R-4

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Keith Herren

Subject: **GEOTECHNICAL LETTER REPORT**
Evaluation of Soil Cement Liner Slope Gradient

Project: Tentative Tract 53108
River Village
Castaic Area, California

Dear Mr. Herren:

1.0 BACKGROUND

We previously addressed the proposed tentative map design (dated June 11, 2000) for the above-referenced site in our report dated September 27, 2000 and Addendum Report dated February 10, 2001. This Tentative Map shows a buried soil cement liner that is proposed at a gradient of 2:1 (H:V).

It is our understanding that Newhall would like to redesign the soil cement liner at a steeper gradient (preferably 1:1) in order to minimize costs and impacts to the river. The purpose of this letter report is to present the results of our Preliminary Geotechnical Evaluation of the steeper slope gradient and associated recommendations for the soil cement liner.

2.0 GEOTECHNICAL ANALYSIS

In order to evaluate potential slope gradients for the soil cement liner, we constructed four draft Geologic Cross Sections at various locations along the proposed bank stabilization where we have subsurface data from our Tentative Map Investigation. We then reviewed the soil types that are anticipated to be exposed in the channel liner backcut, the shear strength

and cohesion of these soils, and existing and historic high ground water levels. This data was then used to determine what slope gradients and heights will be temporarily stable.

Based on our current data, we used the following criteria in our analysis:

1. The native material anticipated to be exposed in the temporary cut-slopes for the channel liner will consist primarily of alluvial deposits of sand and gravely sand.

2. The existing ground water level is above the bottom of the channel liner. For purposes of stability analyses, it was assumed that the ground water will be removed prior to grading by dewatering techniques. If seepage occurs during construction, the recommended backcut slope gradients may need to be modified.

3. Based on laboratory test data from our Tentative Map Investigation, we used a peak shear strength of 200 psf cohesion and 30° phi for the alluvium in our stability analyses.

4. A composite section A-A' was used as the representative section for stability analysis (see attached copy). This section illustrates a typical existing profile and removal depths for construction in relation to the proposed channel liner grades.

3.0 RESULTS OF ANALYSIS

Based on our analyses we conclude the following:

1. Following the maximum anticipated remedial removals for construction, the channel liner backcut will range from approximately 10 to 18 feet in height.

2. 1:1 cut slopes calculate temporarily stable up to a height of only 5 ft. unless seepage can be completely eliminated.

3. Based on our analyses, we recommended the following three (3) preliminary options to steepen the liner gradient:

    a. The backcut for the channel liner can be steepened to a 1.5:1 gradient up to a maximum height of 45 ft. with a factor of safety of >1.25 for temporary stability.

b. A 1:1 slope gradient can be used for the channel liner if the backcut is first constructed at a 1.5:1 gradient down from the remedial removal bottom to an elevation 5 ft. above the bottom of the liner, leaving an equipment width space between the backcut and the proposed liner. The bottom 5 ft of the backcut and the liner can then be constructed at grade at a 1:1 gradient. The channel liner could then be constructed at a 1:1 gradient above the bench either concurrently with fill placement or after fill slope construction at a 1:1 gradient (see attached Cross Section A-A'). The Contractor will need to avoid contamination of the soil cement during fill placement and compaction.

c. As a third alternative, the liner may be constructed at a 1:1 gradient if the native soil is first removed as a 1.5:1 gradient from the remedial removal bottom down to the bottom elevation, leaving a minimum equipment width space behind the proposed liner. A temporary 1:1 fill slope may then be constructed with cohesive soils ($C \geq 300$) up to the proposed grade. The liner can then be constructed against this slope.

4. The temporary cut on the river side of the liner may be cut at a 1.5:1 gradient. The bottom 5 ft. may be steepened to a 1:1 gradient or the bottom 3 ft. maybe cut as a vertical.

The above recommendations are preliminary and may require refinement based on the results of a channel liner-specific investigation.

This opportunity to be of service is greatly appreciated. If you have any questions regarding this report please give us a call.

Respectfully submitted,

Dharmesh Amin

Dharmesh P. Amin, M.S., P.E., GE 2553
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
DHARMESH P. AMIN
No. 2553
Exp: 12-31-06
GEOTECHNICAL
STATE OF CALIFORNIA

The following attachments complete this report.

Cross Section A-A' (1" = 40')

Distribution: (2) Newhall Land
Attn: Addressee

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

October 13, 2003 Job No: 03-1702R-4

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Distribution: (2) Newhall Land
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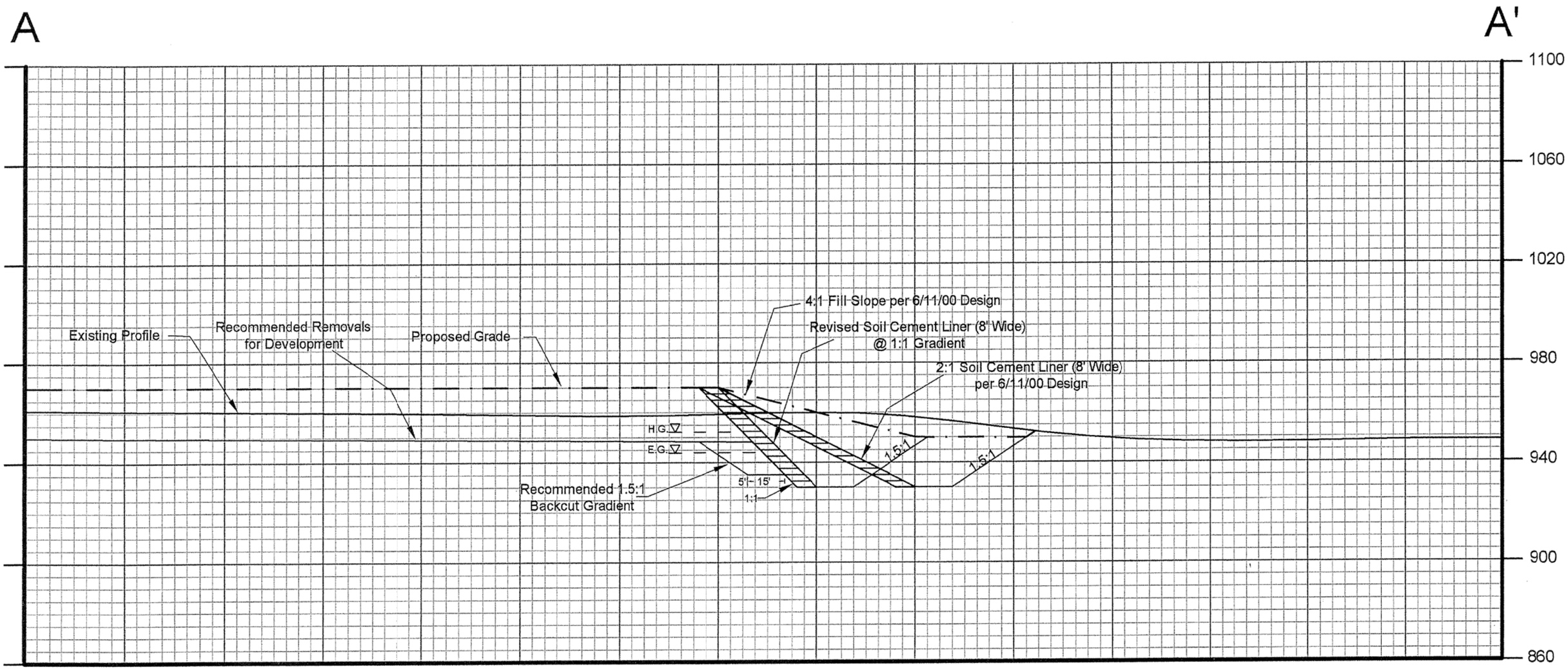

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

CROSS SECTION A-A'

Date: 10/13/03		*Job No.:* 03-1702R-4
Scale: 1" = 40' (H=V)		*CAD File:* CROSS SECTION A-A'
PLATE I	*Geology by:* N/A	*Revised:*
	Drawn by: DGG	

Table 8.0 : Santa Clara River Summary of Maximum Proposed Toe-down & Freeboard (ft)

Subreach	HEC-RAS Section	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]	Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]		Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]	Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]
SRA1	46195	1035.0	14.0	1021.0	14.0	1021.0	1063.1	3.1	1066.3	3.1	1066.3
	46020	1032.0	14.0	1018.0	14.0	1018.0	1062.0	3.0	1065.0	3.0	1065.0
	45545	1030.0	14.0	1016.0	14.0	1016.0	1057.9	3.4	1061.3	3.4	1061.3
	45030	1025.0	14.0	1011.0	14.0	1011.0	1054.2	3.0	1057.3	3.0	1057.3
	44585	1022.0	14.0	1008.0	14.0	1008.0	1050.6	3.2	1053.8	3.2	1053.8
	44210	1020.0	14.0	1006.0	14.0	1006.0	1047.8	2.9	1050.8	2.9	1050.8
SRA2	43820	1018.0	15.4	1002.6	15.4	1002.6	1042.1	3.9	1046.0	3.9	1046.0
	43610	1017.0	17.0	1000.0	17.0	1000.0	1038.3	4.0	1042.2	4.0	1042.2
	43410	1016.0	15.8	1000.2	15.8	1000.2	1035.8	3.6	1039.4	3.6	1039.4
	43200	1014.0	16.3	997.7	16.3	997.7	1033.2	3.5	1036.7	3.5	1036.7
	42975	1012.0	15.5	996.5	15.5	996.5	1031.0	2.9	1033.8	2.7	1033.7
	42815	1011.0	15.5	995.5	15.5	995.5	1029.7	2.5	1032.2	2.5	1032.2
	42590	1010.0	21.0	989.0	14.7	995.3	1028.4	2.5	1030.9	2.5	1030.9
	42430	1008.0	21.0	987.0	15.3	992.7	1027.5	2.5	1030.0	2.5	1030.0
	42215	1006.0	21.0	985.0	14.7	991.3	1026.7	2.5	1029.2	2.5	1029.2
	41940	1005.0	15.0	990.0	11.9	993.1	1025.6	2.5	1028.1	2.5	1028.1
	41730	1004.0	15.0	989.0	12.0	992.0	1024.6	2.5	1027.1	2.5	1027.1
	41460	1002.0	15.0	987.0	11.9	990.1	1023.2	2.5	1025.7	2.5	1025.7
SRA3	41280	1001.0	12.5	988.5	12.5	988.5	1021.8	2.5	1024.3	2.5	1024.3
	41080	1000.0	14.0	986.0	14.0	986.0	1020.5	2.5	1023.0	2.5	1023.0
	40825	999.5	21.0	978.5	14.0	985.5	1019.3	2.5	1021.8	2.5	1021.8
	40585	998.0	18.0	980.0	12.5	985.5	1018.3	2.5	1020.8	2.5	1020.8
	40335	996.0	15.0	981.0	10.0	986.0	1017.4	2.5	1019.9	2.5	1019.9
	40130	995.0	15.0	980.0	10.0	985.0	1016.6	2.5	1019.1	2.5	1019.1
	39945	994.0	15.0	979.0	10.0	984.0	1015.9	2.5	1018.4	2.5	1018.4
	39755	994.0	12.5	981.5	12.5	981.5	1014.6	2.5	1017.1	2.5	1017.1
	39605	993.0	14.0	979.0	14.0	979.0	1013.7	2.5	1016.2	2.5	1016.2
	39310	992.0	18.0	974.0	12.5	979.5	1012.2	2.5	1014.7	2.5	1014.7
	39100	990.0	14.0	976.0	14.0	976.0	1011.1	2.5	1013.6	2.5	1013.6
	38925	989.5	10.0	979.5	10.0	979.5	1010.3	2.5	1012.8	2.5	1012.8
SRA4	38710	988.0	10.0	978.0	10.0	978.0	1009.2	2.5	1011.7	2.5	1011.7
	38475	986.0	12.5	973.5	12.5	973.5	1007.0	2.6	1009.5	2.6	1009.5
	38300	985.5	14.0	971.5	14.0	971.5	1005.8	2.5	1008.3	2.5	1008.3
	38065	984.0	10.0	974.0	10.0	974.0	1004.1	2.5	1006.6	2.5	1006.6
	37810	983.0	14.0	969.0	14.0	969.0	1001.4	2.8	1004.2	2.8	1004.2
	37655	982.0	14.0	968.0	14.0	968.0	999.9	2.6	1002.5	2.6	1002.5
	37390	981.0	14.0	967.0	14.0	967.0	998.5	2.5	1001.0	2.5	1001.0
	37135	980.0	12.5	967.5	12.5	967.5	996.8	2.5	999.3	2.5	999.3
	36930	978.0	14.0	964.0	14.0	964.0	995.7	2.5	998.2	2.5	998.2
	36735	977.0	12.5	964.5	12.5	964.5	994.6	2.5	997.1	2.5	997.1
	36515	975.0	15.0	960.0	10.0	965.0	993.6	2.5	996.1	2.5	996.1
	36265	974.0	15.0	959.0	10.0	964.0	992.3	2.5	994.8	2.5	994.8
SRB1	36080	973.0	22.9	950.1	22.0	951.0	990.6	2.5	993.1	2.5	993.1
	35845	971.0	15.0	956.0	10.0	961.0	989.1	2.5	991.6	2.5	991.6
	35725	970.0	15.0	955.0	10.0	960.0	988.3	2.5	990.8	2.5	990.8
	35515	969.0	18.0	951.0	12.5	956.5	986.9	2.5	989.4	2.5	989.4
	35245	968.0	18.0	950.0	12.5	955.5	985.0	2.5	987.5	2.5	987.5
	35040	967.0	21.0	946.0	14.0	953.0	983.6	2.5	986.1	2.5	986.1
	34860	966.0	21.0	945.0	14.0	952.0	982.3	2.5	984.8	2.5	984.8
	34720	965.5	21.0	944.5	14.0	951.5	981.3	2.5	983.8	2.5	983.8
	34495	964.0	18.0	946.0	12.5	951.5	979.7	2.5	982.2	2.5	982.2
	34310	963.0	18.0	945.0	12.5	950.5	978.4	2.5	980.9	2.5	980.9
	34090	962.0	18.0	944.0	12.5	949.5	977.0	2.5	979.5	2.5	979.5
SRB2	33880	960.0	18.0	942.0	12.5	947.5	975.7	2.5	978.2	2.5	978.2
	33710	959.0	18.0	941.0	12.5	946.5	974.6	2.5	977.1	2.5	977.1
	33500	958.0	18.0	940.0	12.5	945.5	973.3	2.5	975.8	2.5	975.8
	33310	957.0	18.0	939.0	12.5	944.5	972.3	2.5	974.8	2.5	974.8
	33115	956.0	15.0	941.0	10.0	946.0	971.4	2.5	973.9	2.5	973.9
	32795	954.0	15.0	939.0	10.0	944.0	969.7	2.5	972.2	2.5	972.2
	32605	952.0	15.0	937.0	10.0	942.0	968.7	2.5	971.2	2.5	971.2
SRC1	32265	950.0	18.0	932.0	12.5	937.5	967.2	2.5	969.7	2.5	969.7
	31875	949.0	15.0	934.0	10.0	939.0	965.6	2.5	968.1	2.5	968.1
	31585	946.0	15.0	931.0	10.0	936.0	964.7	2.5	967.2	2.5	967.2
	31360	944.0	15.0	929.0	10.0	934.0	963.9	2.5	966.4	2.5	966.4
	31060	942.0	12.0	930.0	8.0	934.0	963.2	2.5	965.7	2.5	965.7
	30720	940.0	12.0	928.0	8.0	932.0	962.5	2.5	965.0	2.5	965.0
	30445	938.0	12.0	926.0	8.0	930.0	962.1	2.5	964.6	2.5	964.6
	30095	936.0	12.0	924.0	8.0	928.0	961.5	2.5	964.0	2.5	964.0
	29815	935.0	12.0	923.0	8.0	927.0	960.8	2.5	963.3	2.5	963.3
	29565	934.0	12.0	922.0	8.0	926.0	960.3	2.5	962.8	2.5	962.8
	29385	933.0	12.0	921.0	8.0	925.0	959.6	2.5	962.1	2.5	962.1
SRC2	29140	932.0	12.0	920.0	9.1	922.9	958.4	2.5	960.9	2.5	960.9
	28895	930.0	21.0	909.0	14.0	916.0	953.8	4.8	958.6	4.7	958.5
	28695	928.0	15.0	913.0	15.0	913.0	952.9	2.5	955.4	2.5	955.4
	28500	927.5	14.7	912.8	14.7	912.8	950.5	3.1	953.5	2.9	953.4
	28280	926.0	21.0	905.0	14.0	912.0	949.8	2.5	952.3	2.5	952.3
	28080	925.0	15.0	910.0	10.0	915.0	949.1	2.5	951.6	2.5	951.6
	27925	924.0	10.3	913.7	10.3	913.7	948.1	2.5	950.6	2.5	950.6
	27725	923.0	14.0	909.0	14.0	909.0	946.1	2.9	949.0	2.9	949.0
	27545	922.0	15.0	907.0	15.0	907.0	944.3	3.1	947.4	3.1	947.4
	27335	921.0	14.1	906.9	14.1	906.9	943.0	2.7	945.7	2.6	945.6
	27155	920.5	14.0	906.5	14.0	906.5	941.5	2.9	944.4	2.8	944.2
SRC3	26990	920.0	21.0	899.0	14.0	906.0	940.4	2.5	942.9	2.5	942.9
	26780	918.0	21.0	897.0	14.0	904.0	939.3	2.5	941.8	2.5	941.8
	26575	917.0	21.0	896.0	14.0	903.0	938.5	2.5	941.0	2.5	941.0
	26355	916.0	18.0	898.0	12.5	903.5	937.6	2.5	940.1	2.5	940.1
	26170	915.0	18.0	897.0	12.5	902.5	936.9	2.5	939.4	2.5	939.4
	25965	914.0	21.0	893.0	14.0	900.0	936.2	2.6	938.8	2.5	938.7
	25785	913.5	21.0	892.5	14.0	899.5	935.5	2.7	938.2	2.5	938.0
	25600	912.5	21.0	891.5	14.0	898.5	934.8	2.5	937.3	2.5	937.3
	25425	911.0	21.0	890.0	14.0	897.0	934.1	2.5	936.7	2.5	936.6
	25215	910.0	15.0	895.0	10.0	900.0	933.3	2.5	935.8	2.5	935.8
	25000	909.0	15.0	894.0	10.0	899.0	932.5	2.5	935.0	2.5	935.0
SRC4	24795	908.0	15.0	893.0	10.0	898.0	931.5	3.7	935.2	3.4	934.9
	24550	906.0	18.0	888.0	12.5	893.5	930.1	3.6	933.6	3.3	933.4
	24335	905.0	21.0	884.0	14.0	891.0	928.5	3.9	932.4	3.6	932.1
	24115	904.0	21.0	883.0	14.0	890.0	927.0	3.8	930.8	3.5	930.5
	23975	903.5	21.0	882.5	14.0	889.5	926.1	3.5	929.7	3.3	929.4
	23755	902.0	21.0	881.0	14.0	888.0	924.7	3.2	927.9	3.1	927.8
	23565	900.0	21.0	879.0	14.0	886.0	923.6	3.7	927.3	3.4	927.0
	23365	900.0	21.0	879.0	14.0	886.0	922.4	3.5	925.9	3.2	925.6
	23180	899.0	21.0	878.0	14.0	885.0	921.5	3.2	924.6	3.0	924.4
	23000	898.0	21.0	877.0	14.0	884.0	920.0	3.3	923.3	3.0	923.0
	22790	897.5	26.8	870.7	23.0	874.5	917.5	3.1	920.6	3.0	920.5
	22600	896.0	21.0	875.0	14.0	882.0	915.8	3.2	919.0	2.9	918.7
	22415	895.5	21.0	874.5	14.0	881.5	914.4	3.2	917.6	2.9	917.4

1 - Phase 1 Analysis, see end note

2 - Minimum 1999 Bed Elevation

3 - Toe-down and Freeboard based on max of LA County Hydrology & Sedimentation Manual (with SAM general aggradation) and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Values at bridges are approxmiate. Final design of levee at bridge locations will include detailed bridge analysis

PACE
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Table 8: Santa Clara River Summary of Proposed Toe-down & Freeboard (ft) continued

Subreach	HEC-RAS Section	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]	Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]		Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]	Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]
SRD1	22195	894.0	15.0	879.0	10.0	884.0	913.1	2.5	915.6	2.5	915.6
	22010	892.0	18.0	874.0	12.5	879.5	911.4	2.5	913.9	2.5	913.9
	21790	891.5	21.0	870.5	14.0	877.5	909.9	2.6	912.6	2.5	912.4
	21615	892.0	21.0	871.0	14.0	878.0	908.9	2.6	911.5	2.5	911.4
	21440	890.0	18.0	872.0	12.5	877.5	907.8	2.5	910.3	2.5	910.3
	21225	888.0	21.0	867.0	14.0	874.0	906.7	2.5	909.2	2.5	909.2
	21020	887.0	21.0	866.0	14.0	873.0	905.6	2.5	908.1	2.5	908.1
	20845	886.0	18.0	868.0	12.5	873.5	904.7	2.5	907.2	2.5	907.2
	20595	885.0	15.0	870.0	10.0	875.0	903.6	2.5	906.1	2.5	906.1
	20435	884.0	15.0	869.0	10.0	874.0	902.8	2.5	905.3	2.5	905.3
	20280	883.7	18.0	865.7	12.5	871.2	901.8	2.5	904.3	2.5	904.3
	20070	882.0	21.0	861.0	14.0	868.0	900.6	2.5	903.1	2.5	903.1
SRD2	19855	880.5	21.0	859.5	14.0	866.5	899.6	3.0	902.6	2.9	902.5
	19630	880.0	21.0	859.0	14.0	866.0	898.6	2.9	901.5	2.9	901.5
	19440	878.0	15.0	863.0	10.0	868.0	897.9	3.0	900.8	3.0	900.8
	19240	877.5	18.0	859.5	12.5	865.0	896.9	3.4	900.3	3.4	900.2
	19050	876.0	21.0	855.0	14.0	862.0	896.2	4.1	900.3	4.1	900.3
	18830	874.0	15.0	859.0	10.0	864.0	895.4	4.1	899.4	4.0	899.4
	18650	873.5	15.0	858.5	10.0	863.5	894.7	4.0	898.7	4.0	898.7
	18475	872.0	13.6	858.4	8.0	864.0	894.3	3.4	897.6	3.4	897.6
	18290	871.5	14.1	857.4	8.0	863.5	893.6	3.2	896.8	3.2	896.8
	18025	870.0	8.0	862.0	8.0	862.0	892.9	3.1	895.9	3.1	895.9
	17785	868.0	8.0	860.0	8.0	860.0	892.0	3.2	895.2	3.2	895.2
SRD3	17510	868.0	10.0	858.0	10.0	858.0	890.4	2.5	892.9	2.5	892.9
	17360	868.0	12.5	855.5	12.5	855.5	888.3	2.5	890.8	2.5	890.8
	17110	864.0	14.0	850.0	14.0	850.0	885.5	2.5	888.0	2.5	888.0
	16970	863.7	14.0	849.7	14.0	849.7	884.0	2.5	886.5	2.5	886.5
	16720	863.5	14.0	849.5	14.0	849.5	882.3	2.5	884.8	2.5	884.8
	16515	862.0	14.0	848.0	14.0	848.0	881.2	2.5	883.7	2.5	883.7
	16305	860.0	10.0	850.0	10.0	850.0	880.4	2.5	882.9	2.5	882.9
	16130	860.0	12.5	847.5	12.5	847.5	879.4	2.5	881.9	2.5	881.9
	15960	859.0	12.5	846.5	12.5	846.5	878.6	2.5	881.1	2.5	881.1
	15745	858.0	10.0	848.0	10.0	848.0	877.6	2.5	880.1	2.5	880.1
	15540	857.5	10.0	847.5	10.0	847.5	876.7	2.5	879.2	2.5	879.2
	15335	856.0	12.5	843.5	12.5	843.5	874.8	2.5	877.3	2.5	877.3
SRE1	15125	854.0	26.1	827.9	26.1	827.9	872.0	2.5	874.5	2.5	874.5
	14900	853.0	14.0	839.0	14.0	839.0	869.7	2.5	872.2	2.5	872.2
	14720	852.0	21.0	831.0	14.0	838.0	868.4	2.5	870.9	2.5	870.9
	14480	850.5	21.0	829.5	14.0	836.5	866.9	2.5	869.4	2.5	869.4
	14315	850.0	15.0	835.0	10.0	840.0	866.0	2.5	868.5	2.5	868.5
	14090	850.0	15.0	835.0	10.0	840.0	864.8	2.5	867.3	2.5	867.3
	13850	848.0	15.0	833.0	10.0	838.0	863.6	2.5	866.1	2.5	866.1
	13635	846.0	18.0	828.0	12.5	833.5	862.5	2.5	865.0	2.5	865.0
	13425	845.0	21.0	824.0	14.0	831.0	861.8	2.5	864.3	2.5	864.3
	13190	844.0	15.0	829.0	10.0	834.0	861.1	2.5	863.6	2.5	863.6
SRE2	13030	843.0	15.0	828.0	10.0	833.0	860.6	4.2	864.8	4.1	864.8
	12835	842.0	10.0	832.0	10.0	832.0	860.0	4.7	864.7	4.6	864.7
	12615	841.0	10.0	831.0	10.0	831.0	859.3	5.2	864.6	5.2	864.6
	12395	840.0	10.0	830.0	10.0	830.0	858.7	5.1	863.8	5.1	863.8
	12195	839.0	10.0	829.0	10.0	829.0	858.1	4.2	862.3	4.2	862.3
	11995	837.0	10.0	827.0	10.0	827.0	857.3	4.1	861.4	4.1	861.4
	11780	836.0	10.0	826.0	10.0	826.0	856.6	4.0	860.5	4.0	860.5
	11605	835.5	10.0	825.5	10.0	825.5	855.8	4.0	859.8	4.0	859.8
	11405	834.0	10.0	824.0	10.0	824.0	854.6	3.9	858.6	3.9	858.6
	11180	833.0	12.5	820.5	12.5	820.5	852.7	3.9	856.6	3.9	856.6
SRE3	11015	831.5	14.0	817.5	14.0	817.5	850.2	3.8	854.0	3.8	854.0
	10835	831.0	14.0	817.0	14.0	817.0	848.1	3.7	851.8	3.7	851.8
	10575	830.0	14.0	816.0	14.0	816.0	846.1	3.8	849.9	3.8	849.9
	10390	828.0	14.0	814.0	14.0	814.0	845.1	3.1	848.2	3.1	848.2
	10225	827.5	12.5	815.0	12.5	815.0	844.1	3.1	847.2	3.1	847.2
	10000	826.0	10.0	816.0	10.0	816.0	842.6	3.1	845.7	3.1	845.7
	9820	824.0	14.0	810.0	14.0	810.0	841.4	3.1	844.5	3.1	844.5
	9595	823.8	10.0	813.8	10.0	813.8	839.9	3.1	843.0	3.1	843.0
	9385	823.0	18.0	805.0	12.5	810.5	838.6	3.1	841.7	3.1	841.7
	9220	822.0	18.0	804.0	12.5	809.5	837.6	3.1	840.7	3.1	840.7
	9025	821.0	18.0	803.0	12.5	808.5	836.6	3.1	839.7	3.1	839.7

1 - Phase 1 Analysis, see end note

2 - Minimum 1999 Bed Elevation

3 - Toe-down and Freeboard based on max of LA County Hydrology & Sedimentation Manual (with SAM general aggradation) and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Values at bridges are approxmiate. Final design of levee at bridge locations will include detailed bridge analysis

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

TABLE 8.1: CALCULATIONS FOR TOTAL FREEBOARD BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM - SANTA CLARA RIVER PROPOSED CONDITIONS OUTSIDE CURVED REACH Q_{CAP} n=0.085

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
37655	2.5	2.5	9.8	18.4	1.0	0.1	2	348.9	946.7	0.1	1	1.5	9000	1.3	2.5
37390	2.5	2.1	8.4	17.9	1.0	0.1	2	803.3	832.1	0.0	1	1.5	9000	1.0	2.5
37135	2.5	2.2	9.0	17.1	1.0	0.1	2	564.0	831.1	0.0	1	1.5	9000	1.1	2.5
36930	2.5	2.0	8.3	18.0	1.0	0.1	2	708.3	886.2	0.0	1	1.5	9000	0.9	2.5
36735	2.5	2.1	8.2	17.9	1.0	0.1	2	633.8	929.7	0.1	1	1.5	9000	0.9	2.5
36515	2.5	1.9	7.4	18.9	1.0	0.1	2	532.1	1001.1	0.1	1	1.5	9000	0.7	2.5
36374	2.5	1.8	7.0	19.3	1.0	0.1	2	400.0	1104.2	0.0	1	1.5	9000	0.7	2.5
36240	2.5	2.0	8.0	17.4	1.0	0.1	2	359.0	1107.8	0.1	1	1.5	9000	0.9	2.5
36080	2.5	2.0	8.2	17.3	1.0	0.0	2	326.3	1162.8	0.1	1	1.5	9000	0.9	2.5
35845	2.5	1.7	7.0	18.0	1.0	0.0	2	376.2	1477.6	0.0	1	1.5	9000	0.7	2.5
35725	2.5	1.8	7.6	18.1	1.0	0.0	2	378.2	1451.1	0.0	1	1.5	9000	0.8	2.5
35515	2.5	2.0	8.3	17.8	1.0	0.0	2	379.3	1500.0	0.1	1	1.5	9000	0.9	2.5
35245															
35040															
34860															
34720															
34495	2.5	1.8	7.3	15.6	1.0	0.0	2	504.6	1459.7	0.1	1	1.5	9000	0.7	2.5
34310	2.5	1.9	7.8	15.5	1.0	0.0	2	684.5	1408.6	0.1	1	1.5	9000	0.8	2.5
34090	2.5	1.8	7.4	15.1	1.0	0.0	2	787.5	1369.8	0.1	1	1.5	9000	0.7	2.5
33880	2.5	2.0	7.4	15.7	1.0	0.2	2	761.0	1475.7	0.1	1	1.5	9000	0.7	2.5
33710	2.5	1.9	6.9	15.6	1.0	0.2	2	719.2	1642.0	0.1	1	1.5	9000	0.6	2.5
33500	2.5	1.9	7.1	15.4	1.0	0.2	2	666.4	1720.2	0.1	1	1.5	9000	0.7	2.5

DEFINITIONS
Y_{MAX} = GREATER OF THE DM AND S&H HEIGHTS
Y_{TOT}=TOTAL EMBANKMENT PROTECTION IN FEET BASED ON THE H&S
V(FPS) =VELOCITY IN FEET PER SECOND
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
Y_{AGG}=LONG TERM AGGRADATION IN FEET
Y_{GA}=GENERAL AGGRADATION IN FEET FROM SAM
CHANNEL TYPE=CHANNEL SHAPE/FLOW FACTOR:
IF Fr<1, RECTANGULAR = 0; IF Fr>1, RECTANGULAR = 1;
IF Fr<1, TRAPEZOIDAL = 2; IF Fr>1, TRAPEZOIDAL = 3.
Y_{SE}=SUPER ELEVATION IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
SIDE SLOPE=CHANNEL SIDE SLOPE (H:V), UNITLESS
BOTTOM WIDTH=CHANNEL BOTTOM WIDTH IN FEET, $Q_{2\text{-}YEAR}$ TOP WIDTH
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
H/2=HALF BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH,
AFTER KENNEDY (1963)
Y_{DM} = EMBANKMENT PROTECTION REQUIRED BY THE LACFCDDM IN FEET

GENERAL
THIS SPREADSHEET IS DESIGNED TO CALCULATE TOP PROTECTION (FREE BOARD) BASED ON LACDWP COUNTY HYDROLOGY MANUAL (1991) PAGES 5.8-5.9 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH NO MAXIMUM VALUE. THE USER SHOULD CONSIDER A PRACTICAL MAXIMUM OF APPROXIMATELY 20-30 FPS. THE PRESENT VERSION (8/05) WILL CALCULATE UP TO 100 VELOCITIES AT ONE TIME. LONG TERM AGGRADATION IS USER SUPPLIED. GENERAL AGGRADATION IS ALSO USER SUPPLIED. SUPER ELEVATION AT BENDS IS BASED ON LACFCDDM EQUATIONS FOUND IN C-3.1. BEDFORM HEIGHT, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963), IS BASED ON EQUATIONS IN APPENDIX Q13. IF FLOW IS SUPERCRITICAL SPREADSHEET REPORTS LACFCDDM TOTAL WALL HEIGHT INSTEAD OF FREEBOARD. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL (LACFCDDM) VALUES ARE PRESENTED AS A PART OF LACH&SM CALCULATIONS. THE SPREADSHEET CALCULATES THE GREATER OF THE TWO METHODOLOGIES. BOTTOM WIDTH IS BASED ON THE 2-YEAR WATER SURFACE AFTER ACOE PROCEDURES.

COLOR CODES
OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
AUGUST, 2005

TABLE 8.2: CALCULATIONS FOR TOTAL FREEBOARD BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM - SANTA CLARA RIVER PROPOSED CONDITIONS STRAIGHT-INSIDE CURVED REACH Q_{CAP} n=0.085

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
36515	2.5	1.8	7.4	18.9	1.0	0.1	2	532.1	1001.1	0.0	0	1.5	9000	0.7	2.5
36374	2.5	1.8	7.0	19.3	1.0	0.1	2	400.0	1104.2	0.0	0	1.5	9000	0.7	2.5
36240	2.5	2.0	8.0	17.4	1.0	0.1	2	359.0	1107.8	0.0	0	1.5	9000	0.9	2.5
36080	2.5	1.9	8.2	17.3	1.0	0.0	2	326.3	1162.8	0.0	0	1.5	9000	0.9	2.5
35845	2.5	1.7	7.0	18.0	1.0	0.0	2	376.2	1477.6	0.0	0	1.5	9000	0.7	2.5

DEFINITIONS
Y_{MAX} = GREATER OF THE DM AND S&H HEIGHTS
Y_{TOT}=TOTAL EMBANKMENT PROTECTION IN FEET BASED ON THE H&S
V(FPS) =VELOCITY IN FEET PER SECOND
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
Y_{AGG}=LONG TERM AGGRADATION IN FEET
Y_{GA}=GENERAL AGGRADATION IN FEET FROM SAM
CHANNEL TYPE=CHANNEL SHAPE/FLOW FACTOR:
IF Fr<1, RECTANGULAR = 0; IF Fr>1, RECTANGULAR = 1;
IF Fr<1, TRAPEZOIDAL = 2; IF Fr>1, TRAPEZOIDAL = 3.
Y_{SE}=SUPER ELEVATION IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
SIDE SLOPE=CHANNEL SIDE SLOPE (H:V), UNITLESS
BOTTOM WIDTH=CHANNEL BOTTOM WIDTH IN FEET, $Q_{2\text{-}YEAR}$ TOP WIDTH
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
H/2=HALF BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH,
AFTER KENNEDY (1963)
Y_{DM} = EMBANKMENT PROTECTION REQUIRED BY THE LACFCDDM IN FEET

GENERAL
THIS SPREADSHEET IS DESIGNED TO CALCULATE TOP PROTECTION (FREE BOARD) BASED ON LACDWP COUNTY HYDROLOGY MANUAL (1991) PAGES 5.8-5.9 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH NO MAXIMUM VALUE. THE USER SHOULD CONSIDER A PRACTICAL MAXIMUM OF APPROXIMATELY 20-30 FPS. THE PRESENT VERSION (8/05) WILL CALCULATE UP TO 100 VELOCITIES AT ONE TIME. LONG TERM AGGRADATION IS USER SUPPLIED. GENERAL AGGRADATION IS ALSO USER SUPPLIED. SUPER ELEVATION AT BENDS IS BASED ON LACFCDDM EQUATIONS FOUND IN C-3.1. BEDFORM HEIGHT, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963), IS BASED ON EQUATIONS IN APPENDIX Q13. IF FLOW IS SUPERCRITICAL SPREADSHEET REPORTS LACFCDDM TOTAL WALL HEIGHT INSTEAD OF FREEBOARD. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL (LACFCDDM) VALUES ARE PRESENTED AS A PART OF LACH&SM CALCULATIONS. THE SPREADSHEET CALCULATES THE GREATER OF THE TWO METHODOLOGIES. BOTTOM WIDTH IS BASED ON THE 2-YEAR WATER SURFACE AFTER ACOE PROCEDURES.

COLOR CODES
OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
AUGUST, 2005

TABLE 8.3: CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER PROPOSED CONDITIONS OUTSIDE CURVED REACH Q_{CAP} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_I+	H/2	Z_{DM}=
37655	14.0	9.8	21.2	10.3	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.009	735.9	9000	0.0	2.0	5.1	14.0
37390	14.0	8.2	23.3	7.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	6.4	0.013	776.2	9000	0.0	2.0	3.5	14.0
37135	12.5	8.5	16.9	9.6	2.7	0.0	0	0.0	1	0.0	0	0.0	1	8.8	0.004	779.2	9000	0.0	2.0	3.8	12.5
36930	14.0	8.7	20.6	8.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.3	0.008	761.8	9000	0.0	2.0	4.0	14.0
36735	12.5	8.3	16.3	10.1	2.7	0.0	0	0.0	1	0.0	0	0.0	1	8.2	0.005	856.0	9000	0.0	2.0	3.6	12.5
36515	15.0	7.2	12.8	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	1	9.4	0.002	957.4	9000	0.3	2.0	2.2	15.0
36374	22.0	22.0	11.8	13.1	2.7	0.0	0.9	4.0	1	0.0	0	14.8	1	9.1	0.002	1067.0	9000	0.6	2.0	1.9	15.0
36240	24.3	24.3	17.9	10.0	2.7	0.0	0.9	4.0	1	0.0	0	14.8	1	6.2	0.008	1043.8	9000	0.5	2.0	4.3	18.0
36080	15.0	9.7	15.0	11.7	3.2	0.7	0	0.0	1	0.0	0	0.0	1	6.9	0.005	1128.0	9000	0.8	2.0	3.0	15.0
35845	21.0	11.6	18.0	10.6	3.2	0.7	0	0.0	1	0.0	0	0.0	1	4.9	0.008	1306.5	9000	1.3	2.0	4.4	21.0
35725	15.0	10.3	14.3	12.7	3.2	0.7	0	0.0	1	0.0	0	0.0	1	6.2	0.004	1337.7	9000	1.6	2.0	2.8	15.0
35515	18.0	11.4	16.7	12.1	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.9	0.004	1356.7	9000	1.8	2.0	3.8	18.0
35040																					
34860																					
34720																					
34495	21.0	11.3	18.1	8.9	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.0	0.009	1277.3	9000	1.0	2.0	4.4	21.0
34310	21.0	11.4	18.4	8.6	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.3	0.006	1332.0	9000	1.2	2.0	4.3	21.0
34090	18.0	10.7	16.9	8.5	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1305.3	9000	1.0	2.0	3.8	18.0
33880	15.0	9.4	14.3	10.4	3.4	0.0	0	0.0	1	0.0	0	0.0	1	6.1	0.004	1331.5	9000	1.3	2.0	2.8	15.0
33710	18.0	10.2	16.3	9.5	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1366.5	9000	1.3	2.0	3.6	18.0
33500	18.0	10.3	15.9	9.5	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.3	0.006	1472.9	9000	1.5	2.0	3.4	18.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET FROM SAM
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_I=LOW-FLOW INCISEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06
THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

TABLE 8.4: CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER PROPOSED CONDITIONS STRAIGHT-INSIDE CURVED REACH Q_{CAP} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_I+	H/2	Z_{DM}=
36515	10.0	6.9	12.8	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	0	9.4	0.002	957.4	9000	0.0	2.0	2.2	10.0
36374	21.4	21.4	11.8	13.1	2.7	0.0	0.9	4.0	1	0.0	0	14.8	0	9.1	0.002	1067.0	9000	0.0	2.0	1.9	10.0
36240	23.8	23.8	17.9	10.0	2.7	0.0	0.9	4.0	1	0.0	0	14.8	0	6.2	0.008	1043.8	9000	0.0	2.0	4.3	12.5
36080	10.0	8.9	15.0	11.7	3.2	0.7	0	0.0	1	0.0	0	0.0	0	6.9	0.005	1128.0	9000	0.0	2.0	3.0	10.0
35845	14.0	10.2	18.0	10.6	3.2	0.7	0	0.0	1	0.0	0	0.0	0	4.9	0.008	1306.5	9000	0.0	2.0	4.4	14.0

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THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

Balance Hydrologics, Inc., "Assessment of Potential Impacts Resulting From Cumulative Hydromodification Effects, Selected Reaches of the Santa ClaraRiver, Los Angeles County, California" (October 2005)

Assessment of potential impacts resulting from cumulative hydromodification effects, selected reaches of the Santa Clara River, Los Angeles County, California

Report prepared for:

GeoSyntec Consultants

Prepared by:

Scott Brown

Barry Hecht

Balance Hydrologics, Inc.

October 2005

A report prepared for:

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Portland, OR 97204
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Attn: Lisa Austin

Assessment of potential impacts resulting from cumulative hydromodification effects, selected reaches of the Santa Clara River, Los Angeles County, California

Balance Project Assignment 205018

by

Scott Brown
Hydrologist, Geomorphologist

Barry Hecht, CEG 1245, CHg 50
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October 27, 2005

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APPENDICES

Appendix A. List of aerial photographs analyzed

1. INTRODUCTION

1.1 Background and purpose

The Newhall Ranch Specific Plan projects will urbanize a portion of the Santa Clarita Valley in Los Angeles County during the coming decades. The project is an extension of prior community growth, which commenced in earnest during the 1960s, in accordance with the adopted General Plan and adopted growth projections. Concern has been expressed that future urbanization may result in changes in the Santa Clara River, a stream of regional scale draining westward from northern Los Angeles County through Ventura County, flowing into the Pacific Ocean near Oxnard. Prior analysis by Geosyntec Consultants (2005) indicates that cumulative future urbanization in the upper watershed of the Santa Clara River, of which Newhall ranch will contribute a portion, will reach approximately 9 percent at "built-out" conditions. A survey of the literature (reviewed in GeoSyntec, 2002) shows that many western-state streams begin to exhibit effects when impervious areas exceed a threshold of about 10 percent, with some considerable site-by-site variability. Additional studies by GeoSyntec in the San Francisco Bay area (2004) and a recent Southern California regional study (Coleman and others, 2005) indicate that, for watersheds smaller than about 25 square miles, channels in granular, non-cohesive sediments may become unstable downstream from urbanizing areas when impervious coverage reaches as little as 2 to 3 percent.

This report uses an empirical approach to assess the potential effects of urbanization on channel morphology associated with the implementation of the Newhall Ranch Specific Plan, combined with other existing and future development in the upper watershed of the Santa Clara River as described in the adopted General Plan. We use historical changes in the Santa Clara River channel pattern to help bracket potential morphological effects on the river of hydromodification due to accumulated urban development. We note that historical changes (both natural and human-induced) in the three factors most likely to affect the Santa Clara River stability (magnitude and frequency of stormflow events, sediment supply and caliber, and channel vegetation) are very large relative to the effects, if any, of the Newhall Ranch project and other planned future urban development. We hypothesize that it will prove useful to learn from history, and to assess the nature and general degree of change that may result from future urbanization by applying these insights.

Much of what is learned from this analysis may be applicable in other aspects of planning and managing the Santa Clara River in the Newhall Ranch reach and reaches downstream. It is not, however, an immediate objective of this report to develop management plans, to assess

potential changes in tributary channels, or to explore how habitat conditions might be changed by potential hydromodification, beyond that which is related to the physical channel form and dynamics.

1.2 Technical approach

The history of the Santa Clara River in the Santa Clarita Valley and eastern Ventura County allows us to explore the three factors most likely to affect the stability and morphology of the river downstream from existing and future development in the Santa Clarita Valley (including Newhall Ranch):

- High streamflows, including increased peak flows, volumes, and/or durations of stormflows,
- Coarse-sediment supply, including sharp curtailment of sediment entering the river following completion of Castaic (1974) and Santa Felicia-Piru (1958) Dams.
- Mature riparian vegetation, with interpenetrating roots, which can stabilize the banks and maintain the channel pattern.

We consider the 'pre-urban' condition to be the form and functions of the river during the 1950s and 1960s, prior to significant urban growth and modification of the flow and sediment regimes due to the construction of the Castaic and Santa Felicia-Piru Dams. Historic deviations from the pre-urban condition can be evaluated using the geomorphic evidence left by a period of floods and high flows from 1938 to about 1945. The effects of sediment supply can be evaluated by quantifying effects of eliminating coarse-sediment delivery from Castaic Creek (with a drainage area of 155 square miles, approximately 25 percent of the Santa Clara watershed at the L.A./Ventura County line. Supporting evidence can also be obtained similarly at Piru Creek (approximately 40 percent of the watershed at its confluence with the Santa Clara River at Piru).

1.3 Report organization

The analysis begins with an overview of the factors affecting the form and geomorphic history of the Santa Clara River (Chapter 2). The larger events and fluctuations, and manner in which they may have affected the river, are considered in Chapter 3. The fourth chapter explains the source materials and methods used to quantify the river's response to these perturbations, which are summarized in Chapter 5. Chapter 6 is a discussion of what we have learned from this study, and Chapter 7 draws conclusions as to how these findings relate to potential hydromodification effects in response to anticipated future watershed urbanization.

2. GEOMORPHIC SETTING

2.1 Channel pattern influences

Several previous reports have described the overall and geomorphic histories of the Santa Clara River (c.f., Schwarzberg and Moore, 1995; SCREMP 2005). In each case, authors have noted that the forms and functions of the river have varied with climatic cycles and with episodes such as floods and fires. It is this variability that is characteristic of the river. In the this report, we utilize the study of historic influences of some of the more pronounced events and cycles to better understand the impacts of drainage changes, if any, that can be expected to result from the anticipated future development in the Santa Clarita Valley, including Newhall Ranch.

2.1.1 Physiography

The Santa Clara River flows through a complex, tectonically-active trough generally bounded by reverse faults on the San Cayetano Mountain and South Mountain fronts. Some of the most rapid rates of geologically-current uplift in the world are reported from the Ventura anticline and San Gabriel Mountains, just to the northwest and southeast, respectively, of the river. Slopes are very steep, with local relief of 3000 to 4000 feet being common. These faults bring harder, more resistant sedimentary rocks over softer and younger sedimentary formations, but all formations are fundamentally soft and erodible. On either side of the faults, sandstone (generally multi-cyclic and fine-grained) and mudstones prevail. The northeastern and southeastern corners of the watershed are underlain by deeply-weathered granitic and schistose rocks, which produce sands that are coarser than those of other rock units when they weather and erode. The San Gabriel fault crosses the valley near the county line, bringing slightly more resistant rock to the surface and creating a local base level reflected as a slight rise or 'bump' on the river's longitudinal profile.

Most geologic materials in the watershed decompose mainly to silts and clays and to sand, with some coarser materials. Rhea Williams and his colleagues at the U. S. Geological Survey found that most sediment moved by the Santa Clara River and its main tributaries are quite fine, with less than 5 percent bedload-sized material (>0.25 mm, or about 0.01 inches in diameter). Some gravels and cobbles do occur within the beds of the streams and in their alluvium. Nonetheless, both the bed and the sediment transported by the river tend to be finer than in most Southern California watersheds (c.f., Knudsen and others, 1992).

The Santa Clara River watershed drains a watershed of 1,600 square miles, of which 625 square miles are within Los Angeles County, upstream of the "county-line gage" (USGS No. 11108500), near the western edge of the Newhall Ranch Specific Plan area.

2.1.2 Climate

Much of the watershed upstream of the Newhall Ranch Specific Plan area receives rainfall averaging about 18 to 25 inches per year (NOAA). As throughout Southern California, rainfall in the Santa Clara watershed alternates between wet and dry periods, a variation that is central to understanding the cultural and geomorphic histories of the upper watershed (Schwarzberg and Moore, 1995; Lynch, 1931; Reichard, 1981). Wet cycles tend to persist for several years, sometimes for periods of 6 or 8 years, during which rainfall, although variable, may average about 140 to 150 percent of the long-term average. For the woody riparian vegetation along the banks and on islands in the braided channels, these are crucial periods for establishment and growth. During dry cycles, the roots of the riparian vegetation must grow downward to the water table or perched zones, and where it cannot do so, this band of vegetation will die back.

2.1.3 Flows

Flows in the Santa Clara River, as in most southern California streams, are highly episodic. For the gaged period between 1953 and 1996 annual flow at the Los Angeles/Ventura County line gage ranged between 253,000 acre-feet (1969) and 561 acre-feet (1961). In general, however, streamflow, and especially dry-season streamflow, has increased over the past few decades primarily due to discharges from two wastewater treatment plants. Mean annual flow at the County Line increased from 25,700 acre-feet in 1972 (averaged over a 20-year record) to 35,360 acre-feet in 1988 (36-year record), with a significant decrease in the number of very low years over that period (UWCD and CLWA, 1996). Downstream of the County line, however, the Santa Clara River flows through the Piru groundwater basin, which represents a "Dry Gap" where dry-season streamflow is lost to groundwater.

Annual peak flows at the County line between 1953 and 1996 ranged from 68,800 cfs (1969) to 109 cfs (1960). Of note is that the second highest annual peak, 32,000 cfs in 1966, was less than half of the highest peak (68,800 in 1969). Both of these events occurred in the late pre-urban to early-urbanization stages within the Santa Clarita Basin and no consistent increase in peak flow is evidence since this time. Flow data for the 2005 flood event are not yet available, however the peak flow at the County line may have approached the flow observed in 1969. As discussed below these large episodic events have a significant impact on the geomorphic characteristics of the Santa Clara River mainstem.

2.1.4 Ground-water supported riparian vegetation

The Santa Clara River is underlain by several distinct alluvial ground-water basins—the Piru, Fillmore, and Santa Paula Basins (Reichard and others, 1999; SCREMP 2005). These basins are divided longitudinally by sills or ridges of bedrock that support areas of locally-high ground water, including the area upstream from the County line (above the Piru Basin), and upstream from the mouth Sespe Creek (the transition between the Piru and Fillmore Basins). This locally-high ground water sustains summer baseflow and riparian vegetation within the Santa Clara River corridor even through relatively dry climatic cycles.

3. PERTURBATIONS

This section describes several major perturbations (those with the potential to affect channel- and floodplain-form) that occurred in the Santa Clara River watershed since the early 1900s (summarized in Figure 1). Aerial photographs were selected to bracket these events and analyzed, both qualitatively and quantitatively, to try to discern and quantify responses of the Santa Clara River channel to:

(1) changes in flow regime during wet and dry multi-year cycles,

(2) sediment supply, notably describing the channel's adjustments to construction of large dams, and

(3) development of mature riparian vegetation with interpenetrating roots.

3.1 Streamflow cycles and events

As described above, streamflow within the Santa Clara watershed is highly episodic, and can vary drastically from year to year. However, decade-scale patterns of wet and dry periods have been identified in the historic record—as early as the 1700s. Previous wet periods (with associated high flows) are reported from 1810 to 1817, 1831 to 1840, 1883 and 1893, and 1903 to 1916, during each of which periods the area received a total of an additional 60 to 80 inches above the mean annual rainfall over the duration of the wet cycle. Prolonged static or drying periods similar to that observed between 1945 and 1977 also occurred from 1780 to 1810, 1842 to 1882, and 1919 to 1935 (with associated reductions in streamflow). The river is likely to have remained most stable during the latter periods, with the notable exceptions of a few major storms of record, such as 1862 (c.f., Lynch, 1931; Reichard, 1981; Schwartzberg and Moore, 1995). The primary wet periods in this study occurred between 1938 and 1946, and 1978 to 1983 (Figures 1 and 2). Other large storm events occurred in 1966, 1969, 1972, 1983, 1998, and 2005. Notable dry periods occurred between 1946 and the late 1960s, and 1983 and 1991.

3.2 Dam construction

Castaic Dam was completed on Castaic Creek (a tributary of the Santa Clara River just upstream of the Newhall project) in 1974. The watershed area above the dam is approximately one-quarter of the watershed area of the Santa Clara River at the L.A./Ventura County line, downstream of the Castaic confluence, and therefore the dam effectively reduced the sediment contributing area by about 25 percent. For comparison purposes, we also considered the effects

of the construction of the Santa Felicia Dam (Lake Piru), which resulted in an approximate 38 percent decrease in sediment contribution area below the confluence of Piru Creek and the Santa Clara River[1].

3.3 Urbanization

Settlement of the Los Angeles County portion of the watershed transitioned from rural to mixed-use suburban during the mid- to late-1960s. This change initiated a period of ongoing urban expansion, with associated increases in the area of impervious or compacted surfaces as homes, commercial and industrial centers, highways and diverse infrastructure have developed throughout the Santa Clarita Valley. Future General Plan urbanization within the upper watershed, inclusive of Newhall Ranch, will bring the percent of urban area west of the County line to about nine percent (GeoSyntec, 2005).

3.4 Treated effluent discharge

Since the 1960's, treated effluent from two water reclamation plants (Saugas and Valencia) has been released directly to the Santa Clara River. This, combined with an increase in applied, imported agricultural water, has led to increased summer baseflows in the Santa Clara River at the County line, which had only rarely occurred under pre-urban conditions. This led to an increase in available water to support woody riparian vegetation. The increase in baseflow is evident in the USGS gaging record at the county line (Figure 2). In some stream corridors, vegetation growth in response to increased baseflow can provide additional bank cohesiveness and reduce erosion; though in others heavy in-channel vegetation growth (riparian encroachment) can serve to destabilize the stream and induce lateral erosion by directing flows toward the banks.

Newhall Ranch has proposed an additional plant that would ultimately treat approximately 5.8 million gallons per day at project build-out. However discharge from the plant in the summer is not expected, as this water will be re-used for irrigation purposes, and we therefore do not expect further change in riparian vegetation growth as a result.

3.5 Saint Francis Dam Breach

On March 12, 1928 the Saint Francis Dam, located in San Francisquito Canyon upstream of the Newhall project, failed and released approximately 30,000 acre-feet of water over the course of a few hours, with an estimated peak discharge of up to 800,000 cubic feet per second (Newhall,

[1] Drainage area calculations were based on USGS gaging station watershed data at Piru and Castaic Dams, and gages on the Santa Clara River at the L.A./Ventura County line and near Piru.

1928; and SCREMP, 2005). This event had drastic effects on the stream reaches downstream, as the resulting flows were much higher than anticipated from any natural event. Aerial photograph coverage during this time period is limited, however, and therefore an assessment of this event was not feasible. In addition, because of the extreme size of the event, it is unlikely that an assessment would be beneficial for assessing hydromodification impacts.

4. METHODS

We analyzed aerial photographs from 1927, 1947, 1957, 1966/67, 1989, 2002, and 2005 to describe channel change in response to the major episodes described above. The main criteria described were the width of the active braiding area (or meander belt width if there was no braiding), bank vegetation, number of channels, and width of the active channel. Also described, where they could be identified, were the width and length of "islands" (vegetated mid-channel bars) within the stream. Islands were typically easier to identify where vegetation was heavy, as the color of the vegetation highlighted the differences between channel and meta-stable islands.

The aerial photographs were analyzed in two different ways. First, a qualitative comparison of the alluvial corridor shown in the different years' photos was made, describing general differences in channel pattern and vegetation on a reach-wide scale. Second, specific cross sections were defined and the above parameters measured for each year with photo coverage in that area to provide a quantitative comparison of channel change at these standard locations along the Santa Clara River (Figure 3).

4.1 Descriptions of analysis criteria

4.1.1 Width of active braiding corridor

For braided reaches, the active channel width was identified primarily by noting the extent of active channels or recent sediment deposition. In many cases the active corridor was bounded by a significant change in vegetation or sediment deposition characteristics.

4.1.2 Relict channel corridor

The relict channel corridor is the portion of the flood plain that does not appear to have been active in the recent past (within the last 5 years or so). Typically the relict corridor is identified by areas of heavy or scattered vegetation containing no or few distinct channels, or areas that do not appear to have experienced recent sediment deposition. Alternatively, identification was based on the width between farmed fields[2]. Measurements of this feature were made from outside bank to outside bank, and include the active corridor.

[2] The total width of the former channel migration corridor is difficult to identify in aerial photographs due to past and present agricultural field reclamation following major perturbations. Where necessary, we used the width between agricultural fields as a estimate of the relict corridor.

4.1.3 Channel width

Where a distinct channel or channels could be identified, the widths of the individual channels were measured. The number of individual channel threads was also recorded, where threads could be distinguished. In some cases, measurement of these features was complicated by poor photo resolution or contrast, and difficulty in distinguishing major channels from minor ones (where a full spectrum was present).

4.1.4 Vegetation

Vegetation was described qualitatively as bare, scattered, moderate, and heavy. The location of specific areas of vegetation, such as vegetated islands, vegetation within the relict corridor, or vegetation along banks, was also described. Where the resolution was adequate, the growth form of vegetation, or state of maturity, was also described (trees or shrubs).

4.1.5 Number of vegetated islands

The number of distinct vegetated islands (mid-channel bars) was also recorded at each cross-section, where the resolution of the photographs was adequate. Where islands could be identified, measurements of width and length were recorded.

5. RESULTS

5.1 Qualitative descriptions

Initial inspection of the series of aerial photographs showed that significant changes in channel planform have occurred throughout the 1900s, as would be expected in a large, braided stream in southern California. Vegetation within the relict corridor (see definition above) near the Newhall Ranch planning area appears to become progressively heavier through time, likely due to the increase in agricultural water and discharge of treated effluent to the channel through the summer months.

The photos show many areas of net deposition, and corresponding channel shifts in major depositional areas. Single-thread, dominant channel segments are rarely present, especially in years following large events. Even when there is one main channel, secondary channels are often present within the active channel corridor.

Portions of the stream have been altered for flood control purposes, including stabilization of banks bounded by orchards and fields, or construction of levees within the active corridor. These levees are most prominent in the 1989 photographs (upstream of the L.A./Ventura County line), where the substantial segments of the main channel are confined in a flood control channel approximately 225 feet wide. By 2002, however, little evidence can be discerned in the aerial photographs of these levees.

The 2005 flood events caused significant changes within the Santa Clara River. Vegetation within the channel was almost all completely washed out (compared to 2002 conditions), and many areas of significant bank-widening were identified, even in areas of heavy bank vegetation (Figure 4).

There appears to be little change in agricultural constriction of the Santa Clara River over the span of photographs reviewed. Through the Newhall reach, the agricultural areas appear to be well buffered by the relict channel and the vegetation supported there. There were only a few places identified where the active channel cut into agricultural areas rather than staying within the relict corridor. In contrast, within the Piru Basin (downstream of the Newhall reach), significant agricultural constriction and subsequent channel widening occurred over the time span of the photos reviewed.

Areas of shallow ground water between Piru and Sespe Canyon[3], which support denser riparian vegetation than typical for the river between Valencia and Fillmore, show little if any significant change for all years in the studied photo-sets. Both the density and extent of vegetation in these areas does not appear to change over time (despite significant differences in climate and other watershed factors) nor does the amount of vegetation appear to significantly affect channel planform, compared to upstream and downstream reaches (the braided channel does not shift to a single-threaded channel through the wetted reach).

5.2 Quantitative results

For the quantitative portion of the aerial photograph analysis we looked at four different types of criteria to identify physical changes to the Santa Clara River channel (Table 1; see also section 4.1.1 for descriptions of criteria). Because of difficulties in identifying and measuring the width/number of channels and number/dimensions of vegetated islands, because of the varying resolutions and contrasts of the photographs, we concluded that analysis of these two criteria were less meaningful for this study. In other words, there was more variation due to the ability to identify the features for the varying quality of the photos than there was actual variation in the system. While we believe that these criteria may be a valid indicator of channel change, more study would be needed to adequately quantify these features so they were used a supplementary qualitative metric.

For this study we found that measurement of the "active corridor" (see section 4.1.1) was the most useful and easiest to work with to identify channel changes. In most cases there is enough vegetation along the banks that the active braiding corridor is easily identified, and changes in the width of the corridor can be tracked from year-to-year.

Figure 5 summarizes the changes in active corridor width over the time span of the reviewed photos. Within the Newhall reach, the width of the "active corridor" at the four measured cross-sections varies from year-to-year by as much as 500 feet, though most of the variation is considerably less. One station, in the narrows above the Piru Basin, has a very consistent channel width, varying by less than about 50 feet from year to year.

To provide additional analysis, we looked at a series of recent photos (1994, 2000, and 2002-2005) at one cross section downstream of the Castaic confluence. For this photo set, the channel widened significantly between 1994 and 2000 (probably in response to the 1995 or 1998 large

[3] See Reichard and others (1999) for a discussion of the hydrogeology of these shallow ground water areas; although downstream from the Los Angeles County line, results are applicable to the upstream as well, as discussed later in this report.

storms), but showed almost no change between 2000 and 2004 (Figure 6). The channel then widened considerably again in response to the high-flow events in 2005.

As a secondary check of the numbers derived for the measured standardized cross sections, we also measured active channel widths at approximately twenty different locations through the Newhall Reach on three different photo sets—1967, 2004, and 2005. From these measurements an average active braiding corridor width was calculated and compared with the other years. In 1967, the average channel width was approximately 580 feet, which was significantly wider than the average width in 2002 (392 feet). However, after the 2005 storms, the active width was approximately 560 feet, similar to the 1967 conditions.

The "relict corridor" (see section 4.1.2 for definition) also proved useful as a secondary criterion, providing a measurement of potential changes due to agricultural encroachment or constriction of the flood corridor. Measurement of the "relict corridor" at the standard cross sections showed that while there was some variation between photos, there is no consistent trend of agricultural constriction to the Santa Clara River flood corridor. These measurements, along with qualitative observations that within the Newhall reach agricultural activities were generally restricted to outside the active corridor, suggest that agricultural encroachment has not historically affected the geomorphology of the Santa Clara River within the Newhall Reach.

6. DISCUSSION

The Santa Clara River is a dynamic, episodic system. The above analyses highlight the magnitude of geomorphic change over the course of recent history, in response to natural and human disturbances in the watershed. Understanding the magnitude of past response is a key factor in assessing the potential response to future urbanization within the watershed.

The construction of Castaic Dam in 1974, regulating approximately 25 percent of the watershed at the L.A./Ventura County line, cut off a significant supply of sediment to the Santa Clara River. This change, however, does not appear to have had an effect on the channel dimensions of the Santa Clara River mainstem. The width of the active corridor, as well as the general form of the channel, are generally consistent both before and after construction of the dam. It appears that the Santa Clara River adjusted without morphological expression to absorb this change. One factor contributing to the lack of change is the seemingly large volume of sediment stored in the tectonic basin above the county line—a result of bedrock control associated with movement along the San Gabriel fault, which supports the large extent of semi-consolidated and alluvial deposits adjoining the drainage net.

The amount of vegetation within the Santa Clara River corridor appears to have increased since the 1960s, likely due to the increased summer return flows from agricultural water and to year-round augmentation of baseflows due to treated effluent discharge to the river. However, this vegetation does not seem to provide enough erosion resistance to maintain a "stable" channel capable of withstanding regular 're-sets', which occur at intervals averaging about a decade – or much less than the expected lifetime of the riparian woodlands which do get established. Despite heavy vegetation on the active channel banks near Newhall ranch and in areas of shallow ground-water, the stream still responds to large events by a general widening and/or shift of the channel. The role of vegetation in large-channel stability and morphology in Southern and Central California does fundamentally differ from that of smaller streams and streams elsewhere in the country. The geomorophic and historical record shows that resets have been occurring throughout the recent geologic past in basins exceeding a certain size. One partial explanation may be that 're-set' flood events in these larger channels exert stresses beneath or around the riparian vegetation exceeding the vegetation's threshold of stability[4].

[4] Sedimentologists note that crossbeds in the alluvium of the Santa Clara River are often 8 to 12 feet high, equal or greater than the depth to which roots can interpenetrate in most riparian settings in the region.

As stated above, the Santa Clara River, as with many streams in semi-arid southern California, is highly episodic. Concepts of "normal" or "average" sediment-supply and flow conditions have limited value in this "flashy" environment where episodic storm and wildfire events have enormous influence on sediment and stormflow conditions. Many of these channels are actively adjusting to lower flows than the last major event, which may have occurred some years before[5] (Hecht, 1993). In these streams, a large portion of the sediment movement events can occur in a matter of hours or days. In many of these channels most sediment is moved—and most bed changes occur—during the large flow events resulting from storms that may be expected approximately every 5 to 15 years (c.f., Capelli and Keller, 1993; Hecht,1993; Inman and Jenkins, 1999; Knudsen and others, 1992; Kroll and Porterfield, 1969).

Evidence of episodic channel changes can be seen in the Newhall reach of the Santa Clara River. Based on aerial-photograph interpretation of a near-yearly sequence of aerial photographs from within the last decade, the channel appears to maintain a consistent planform during average or dry rainfall years (such as between 2000 and 2004). Large events, however, (such as that which occurred in February 1998 and January 2005) can significantly modify this channel form. This widened and/or shifted channel (like that which was present after the 1998 or 2005 stormflow events) then sets the geomorphic template for subsequent normal to dry years. This model, similar to that described for the Ventura River by Capelli and Keller (1993), suggests that the geomorphology of the Santa Clara River is primarily driven by these large events.

Other perturbations which potentially affect channel geometry appear to have transitory or minor manifestations. For example, effects on the channel width due to 1980s levee construction are barely discernible by the first few years of the 21st century, probably mostly due to morphologic compensation associated with the mid- to late-1990s storm events.

[5] Actively adjusting channels may be aggrading, incising, expanding or otherwise changing channel dimensions, depending on the magnitude, type, and various effects of the episodic event.

7. CONCLUSIONS

Based on the study of historic aerial photographs described above we conclude that:

- Major perturbations within the Santa Clara River watershed (dam construction, levee construction, changes in flows in response to decadal-scale climatic patterns, and increases in woody vegetation) do not appear to have had a significant impact on the geomorphic expression of the Santa Clara River, as quantified from measurements made from a series of historical aerial photographs flown during the years 1927 through 2005.

- Large events (those which are typically not as affected by increases in impervious area and associated increases in stormwater peaks and runoff volume) can completely alter the form of the Santa Clara River channel. We call these events "re-set" events. These events, perhaps occurring on average once every ten years, are a dominant force in defining channel characteristics.

- The geomorphic dominance of "re-set" events overwhelms geomorphic effects of hydromodification on smaller events. Due to these episodic "re-sets" we do not expect hydromodification feedback "unraveling" of the Santa Clara River mainstem, as is seen in many smaller southern California watersheds[6]. The "re-set" events appear to adequately buffer changes that may occur in short-term sediment transport.

- While there is no expected increase in summer flows due to additional treated effluent discharge to the Santa Clara River, even if summer baseflow do increase we would not expect a significant change within the channel. Additional growth in the extent or density of vegetation is not anticipated, as the reach near Newhall already appears to have enough flow to support summer vegetation, and the existing vegetation does not appear to affect channel form for durations longer than the "re-set" interval. Further, re-sets occur at intervals significantly shorter than the period required for maturation of riparian vegetation, such that full development of bank-holding properties is frequently interrupted.

- Given that the channel morphology of the Santa Clara River mainstem has not adjusted significantly to much larger perturbations in flow, sediment yield, and riparian

[6] In many smaller streams, hydromodification of moderate events can induce incision of the stream bed, which reduces the connection of the stream to the floodplain. This disconnect, in turn, increases the erosive forces of the flows (concentrating more flow in the channel) and causing further erosion, and thus a positive feedback response.

vegetation growth factors, within the Newhall reach, we do not expect a significant geomorphic impact to the Santa Clara River mainstem due to the anticipated increase in 'urban area' from four to nine percent.

8. LIMITATIONS

The analyses in this report were designed to help bracket the range of likely effects on the geomorphology of the Santa Clara River due to proposed urban expansion under the General Plan, inclusive of the Newhall Ranch Specific Plan projects. It does not consider specific elements of the project or of evolving mitigation measures; rather, it focuses upon the susceptibility to perturbation of the Santa Clara River corridor as a whole. We believe that it conforms with the standard of care applicable to reconnaissance studies of this nature; no other warranty, expressed or implied, is made.

The above analyses and discussion were intended to assess the potential cumulative impacts to the Santa Clara River *mainstem* (not tributaries) due to the anticipated urban expansion in the watershed. While we conclude that urban expansion from approximately four- to nine-percent urbanized (not 'impervious') will not significantly affect the channel geomorphology of the Santa Clara River, we do expect that there might be a response to urbanization on a larger scale. However, further study would be required to define what the likely threshold and magnitude of response might be.

We ask readers to note that this is a reconnaissance report. It is intended to bracket likely future conditions, to identify factors which must be better known, and to help guide initial planning. This report should *not* be used to site or design individual facilities without further site-specific investigations. Similarly, it is *not* intended to serve as basis for flood management or detailed floodplain planning, both of which should be conducted by well-defined and site-specific procedures, and which frequently require multiple lines of evidence.

The application of geomorphic history to inferring future channel and corridor change has a long and respected record in the earth sciences. As with all history or archival analysis, the better the record is known and understood, the more relevant and predictive the analysis can be. We do encourage readers who have knowledge of other events or processes which may have affected the river to let the authors know at the first available opportunity. The authors and their contacts via several different media are given on the signature page of this report.

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TABLES

Table 1. Aerial photograph cross section data at selected locations near Newhall Ranch, Los Angeles County, CA. See text for explanation and interpretation of data. Locations of cross section are labeled on Figure 2. Photo sources are listed in Appendix A.

Cross section	location description	photo date	width of active braiding corridor (feet)	width of relict braiding corridor (feet)	is there one primary channel visible?	width of main channel (feet)	number of identifiable channels	total width of channels (including main) (feet)	number of islands	length of islands encountered (feet)	width of islands (feet)	vegetation	other descriptions
X1	downstream of Castaic	8/16/1947	570	1247	yes?	71	3?	107	can't define	n/a	n/a	moderately vegetated with some portions of relict corridor heavily vegetated	Just downstream a heavily vegetated bar is cut by a very distinct secondary channel
		7/20/1966	729	1173	yes	27	1	27	1	497	86	almost no vegetation within primary corridor except two areas near the primary channel and scattered small patches, only scattered vegetation on relict corridor	while there is only one main channel the rest of the primary corridor is section is almost deltaic in planform, spreading out from constriction upstream (possibly high sediment load coming in from Castaic)
		5/26/1989	173	1171	yes, but small	43	1	43	0	n/a	n/a	banks of meander corridor have scattered vegetation (less than 2000) with very little within braiding corridor	meander corridor is very distinct and straight, could be from flood control dredging;
		6/1/1994	337	1167	yes	72	2	97	1	551	171	light to moderate vegetation on braiding corridor banks	very little vegetation within braiding corridor
		2/1/2002	505	984	yes	42	2	50	poorly defined	n/a	n/a	relict braiding corridor is well-vegetated; meander belt/bar is lightly to moderately vegetated; at least one main channel bank is well-vegetated (alternates w/ meanders)	secondary channel essentially cuts off meander
		4/1/2004	505	978	no	n/a	3	87	2	929, 251	248, 56	heavy vegetation along former primary channel; relict corridor also heavily vegetated	there are two distinct channels, approximately the same size
		3/1/2003	510	965	yes	75	1	45	0	n/a	n/a	heavy vegetation on northern bank; some scattered vegetation within active corridor and surrounding low-flow channel	channel branches just downstream of cross section; very similar to 2002 and 2004 photos
		2/1/2005	601	999	no	n/a	3	106	poorly defined	n/a	n/a	no vegetation in main portion of channel; right bank has heavy tree cover, left bank has few trees	the main channel is about 340 feet wide with an obvious overbank deposition area (with very little vegetation)
X2	Upstream of County line	8/16/1947	532	1197	yes	89	2	133	1	355	133	vegetation is heavy (probably trees) on relict corridor; moderate (probably scrub) within active corridor (difficult to distinguish)	very distinguishable difference between active and relict corridor within this reach
		3/6/1963	491	1352	no	n/a	difficult to define	n/a	6	252, 283, 82, 441, 94, 410	44, 57, 52, 76, 38,63	several well-defined islands behind established vegetation (individual shrubs or small trees); relict corridor has moderate to heavy tree cover	very braided planform; switches to predominately single-thread channel just downstream
		5/26/1989	651	651	yes	43	3	108	1	2385	477	relict corridor has scattered trees with moderate to heavy shrub or grass cover; central island (along levee) has similar vegetation	well-defined flood control channel, but has been breached and there is a significant secondary channel to the north of the levees; included a portion of the island between the flood control channel and the secondary channel in the relict channel (no sign of recent deposition)

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Cross section	location description	photo date	width of active braiding corridor (feet)	width of relict braiding corridor (feet)	is there one primary channel visible?	width of main channel (feet)	number of identifiable channels	total width of channels (including main) (feet)	number of islands	length of islands encountered (feet)	width of islands (feet)	vegetation	other descriptions
		6/1/2002	608	1258	yes	131	1	131	0	n/a	n/a	relict corridor on north bank has heavy tree cover; meander bends are eroding tree bank vegetation in places	stream has meandering planform, though meander belt (400' wide) has high sediment deposition and little vegetation; no evidence of flood control levees (meanders have widened to erode levees); active channel includes meander belt and area of significant recent sediment deposition to the north of the meander belt
		2/1/2005	674	1240	yes	97	3	192	1	475	155	almost no vegetation within active channel; relict corridor on both banks has moderate tree cover; much vegetation eroded away since 2002	numerous very small channels present as well
X3	downstream of county line	8/16/1947	362	805	yes, at this xs	80	2	121	can't define	n/a	n/a	outer banks of braiding corridor seem heavily vegetated	there seems to be one main channel through this reach, with extensive deposition of sediment outside of the channel
		7/20/1966	140	714	yes	51	2	77	0	n/a	n/a	banks of braiding corridor are heavily vegetated	
		5/26/1989	273	864	yes	91	2	114	1	136	23	only scattered vegetation on banks of braiding corridor	braiding corridor looks as though it may be a leveed flood control channel
		2/1/2002	249	1466	yes	41	3	79	2	344, 219	66, 36	scattered vegetation on u/s ends of islands; some recent deposition of sediment within relict braiding corridor (which is predominately heavily vegetated	
		2/1/2005	587	1472	yes	97	3	145	1	543	110	no vegetation in active corridor; right bank has heavy shrub cover with some trees, left bank has light shrub cover	
X4	upstream of Piru Basin	8/16/1947	282	885	yes	121	1	121	can't define	n/a	n/a	little to no vegetation within braiding corridor; relict braiding corridor has heavy tree/shrub cover	
		7/20/1966	281	383	no	n/a	3	26	poorly defined	n/a	n/a		
		5/26/1989	318	591	yes	68	1	68	1	91	23	meander belt banks lined with trees; meander belt itself covered with shrubs	"braiding corridor" is actually the meander belt; meander belt outside of channel is heavily vegetated
		2/1/2002	266	426	yes	35	3	45	1	340	36		secondary channels may be present in other photos, but resolution is poor, esp. 1948
		2/1/2005	281	495	yes	44	1	44	0	n/a	n/a	vegetation on right bank of main channel has diverted some flow over the relict corridor, though conditions are similar in 2002; moderate to heavy trees and shrubs on both banks	conditions are very similar to 2002, but with slightly wider and much clearer channel

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Cross section	location description	photo date	width of active braiding corridor (feet)	width of relict braiding corridor (feet)	is there one primary channel visible?	width of main channel (feet)	number of identifiable channels	total width of channels (including main) (feet)	number of islands	length of islands encountered (feet)	width of islands (feet)	vegetation	other descriptions
X5	upstream of Piru confluence	4/1/1927	1834	3191	no	n/a	many	n/a	3	3060, 1170, 468	540, 450, 90	sparse scrub vegetation within active corridor, but enough to define the complex channel pattern; only slightly more vegetation (or possibly just less recent sediment deposition) in relict corridor	relict channel is mainly an artifact of flow deflection by several long levees just upstream; typical braided stream with channels of varying widths and scales (can not define number of channels due to complexity and scale variation of channels); only measured large islands
		8/16/1947	1449	3066	no	n/a	0	n/a	1	1282	279	island appears heavily vegetated; relict channel has moderate vegetation, possibly some farming	active channel is very burnt in; no evidence of levees, but would be difficult to see
		11/10/1966	957	3051	no	n/a	complex channel pattern	n/a	too complex to define	n/a	n/a	no vegetation within active corridor; sparse scrub vegetation within relict corridor, but very patchy (may be due to clearing)	flood control channel is present down middle of active corridor (196' wide); stream has complex braiding pattern, even with flood control channel present
		6/20/1989	1796	2993	no	n/a	complex channel pattern	n/a	too complex to define	n/a	n/a	light scrub vegetation within active corridor; vegetation is obviously stabilizing small islands, at least until the next big event; relict corridor is sparsely vegetated	little evidence of flood control channel but may have been some excavation in middle of active corridor (~300' wide);
		6/1/2002	1730	2452	no	n/a	5	1000	3	1200, 1085, 1520	384, 406, 400	moderate scrub vegetation on islands within active channel, similar to 1989 but slightly heavier	channels were relatively easy to pick out due to moderate scrub vegetation; channel width does not necessarily correlate to other measurements (where the only measurable parameter was wetted width)
X6	downstream of Piru confluence	4/1/1927	1713	1983	yes	18	1	18	0	n/a	n/a	no vegetation within braiding corridor; only scattered vegetation on relict corridor; heavy trees along portions of the south bank of relict corridor	very wide braided corridor with little definition (too burnt-in to define secondary channels)
		8/16/1947	1767	1983	no	n/a	0	n/a	0	n/a	n/a	looks similar to 1927 conditions	
		9/1/1957	1220	1449	yes	25	3	51	2	875, 1750	325, 425	very sparse scrub vegetation in active corridor; some small trees on relict corridor (where corridor is present)	well-defined flood control channel through this reach (136' wide), but there are several secondary channels outside the levees; diversion ponds present near the north bank; larger island cut by flood control channel
		11/10/1966	1132	1563	yes	32	4	388	2	2125, 750	850, 250	large island is moderately vegetated with scrub and one line of heavy vegetation; relict braiding corridor is similarly vegetated	braiding corridor has been confined on both sides by levees (especially on the northern portion); looks like the southern levee was recently overtopped (that area was included in the relict corridor); main channel divides in two in some areas
		6/20/1989	1082	1082	no	n/a	n/a	n/a	1	685	180	sparse scrub vegetation growing on poorly-defined islands within channel and near piers	lots of recent grading within the channel, several levees in the middle of the corridor and a series of piers on the southern bank
		6/1/2002	1050	1245	no	n/a	none	n/a	0	n/a	n/a	very little vegetation in this portion of the stream; some scattered scrub on relict corridor, even less within active channel	217-foot wide flood control channel begins just d/s of xs (poorly defined, though)

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Cross section	location description	photo date	width of active braiding corridor (feet)	width of relict braiding corridor (feet)	is there one primary channel visible?	width of main channel (feet)	number of identifiable channels	total width of channels (including main) (feet)	number of islands	length of islands encountered (feet)	width of islands (feet)	vegetation	other descriptions
X7	between Piru and Sespe (ground-water upwelling)	8/16/1947	1694	2472	no	n/a	4	difficult to define the widths	can't define	n/a	n/a	this area is heavily vegetated; difficult to distinguish active braiding corridor from relict corridor	looks like there has been some flood control work in this area, two very straight channels through here, but masked some by vegetation
		9/1/1957	1446	2253	yes	168	4	370	2	4624, 8500	272, 408	northern portion of the corridor (including flood control channels) have heavy vegetation outside of the channels; the southern portion of the corridor has sparse vegetation	the main channel, and possibly the secondary channel, have been altered for flood control
		6/20/1989	749	2697	yes	37	2	150	1	1386	449	thick vegetation (with trees) along main channel; very little vegetation otherwise within active braiding corridor; moderate vegetation in northern portion of relict corridor, but only scattered brush in southern	no evidence of flood control alteration; downstream the corridor has been severely constrained by encroaching agriculture
		6/1/2002	551	2767	yes	42	2	65	1	396	108	heavy vegetation (trees) along secondary channel along north bank; scattered shrub (with some trees) vegetation within active corridor, some defining the edges of bars; heavy scrub vegetation on south relict corridor with scattered trees; heavy trees and scrub on northern relict corridor	just upstream there is a distinct main active corridor and an overbank area of deposition; the main active corridor has portions lined with heavy trees, but becomes less distinct further upstream (no vegetation)
X8	just downstream of Sespe Creek	8/20/1947	2003	2003	no	n/a	6	601	can't define	n/a	n/a	limited, if any	photo very burnt in, but channels less well-defined than in other photos
		8/13/1967	701	2203	yes	100	3	250	1	2804	401	limited, if any	one single-thread channel with one minor channel
		6/20/1989	1532	1723	yes, but less so than 1967	153	5	306	poorly defined; small and well-vegetated	n/a	n/a	islands are more heavily vegetated away from main channel; main channel bank is ~75 vegetated w/ thin vegetation line; more vegetation than in other photos	
		6/1/2002	670	1820	no	n/a	3	170	1	801	216	islands are moderately well-vegetated; relict corridor has scattered vegetation, Sespe mainstem has heavy vegetation along low-flow channels	interpretation complicated by Sespe confluence, but looks very similar to 1989 photo

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FIGURES

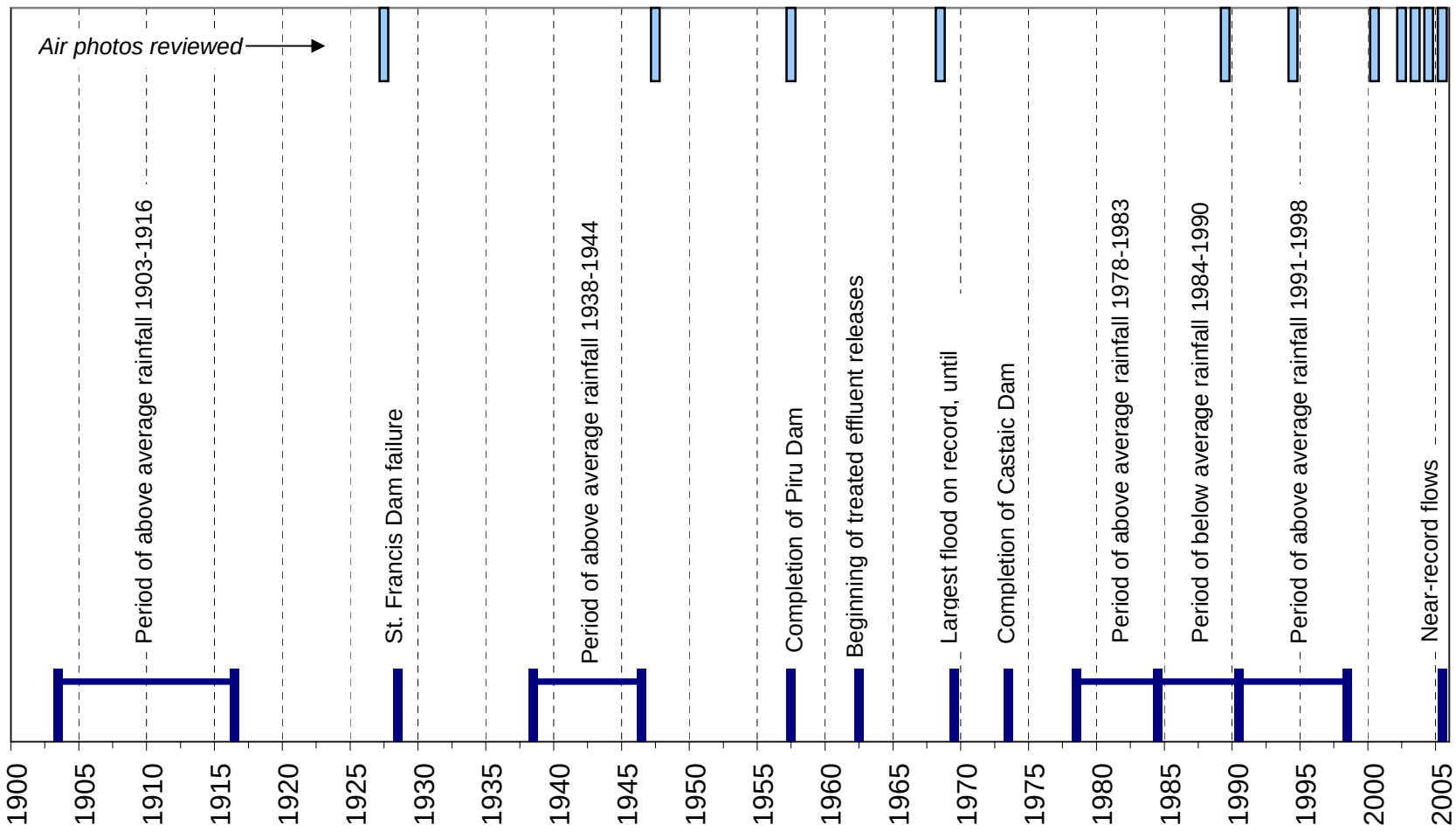

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Figure 1. Timeline of selected major events in the upper Santa Clara River, California. Also shown (at top) are the years for which aerial photographs were analyzed.

205018 Timeline table.xls, Graph

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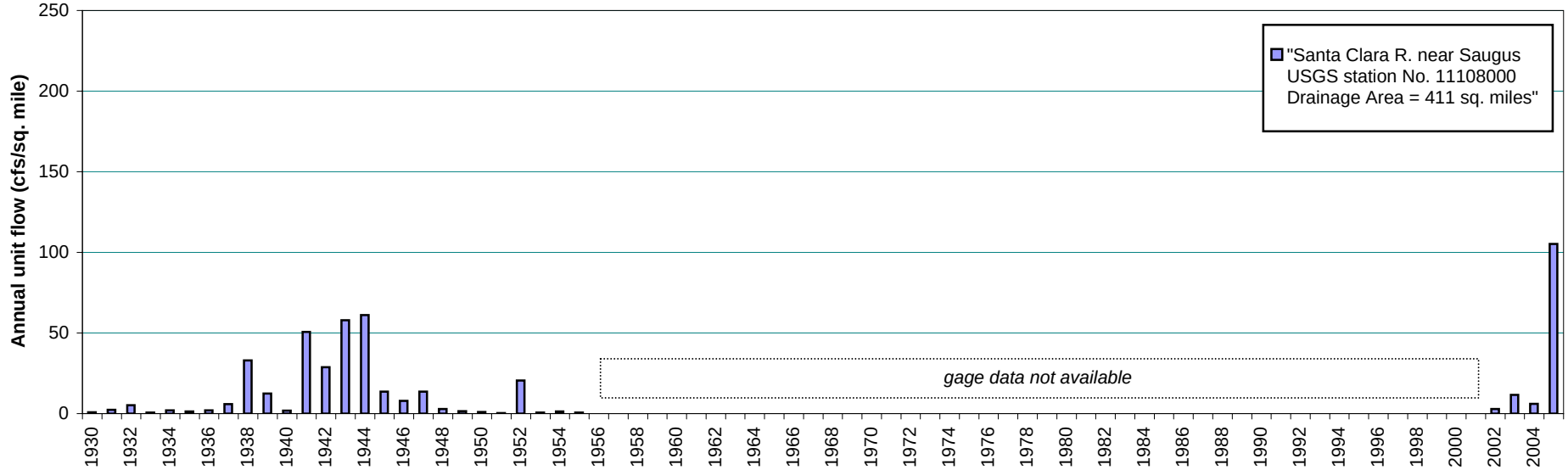

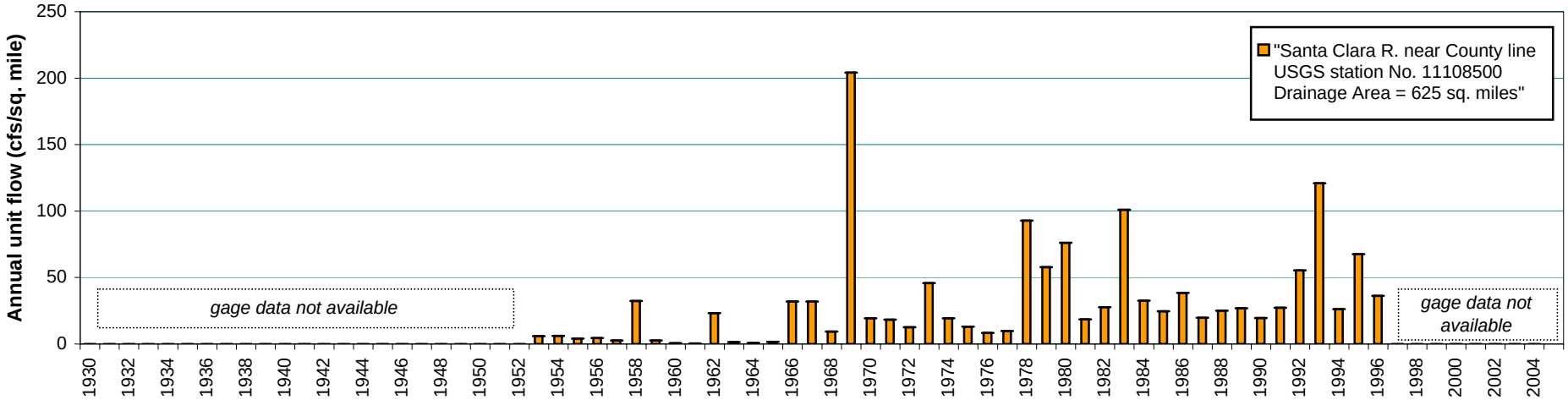

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Figure 2. Annual unit runoff (annual flow per square mile) for the Santa Clara River near Newhall at two separate gaging stations. Note that flow in drier years has increased since the 1960s, most likely due to release of treated effluent to the River.

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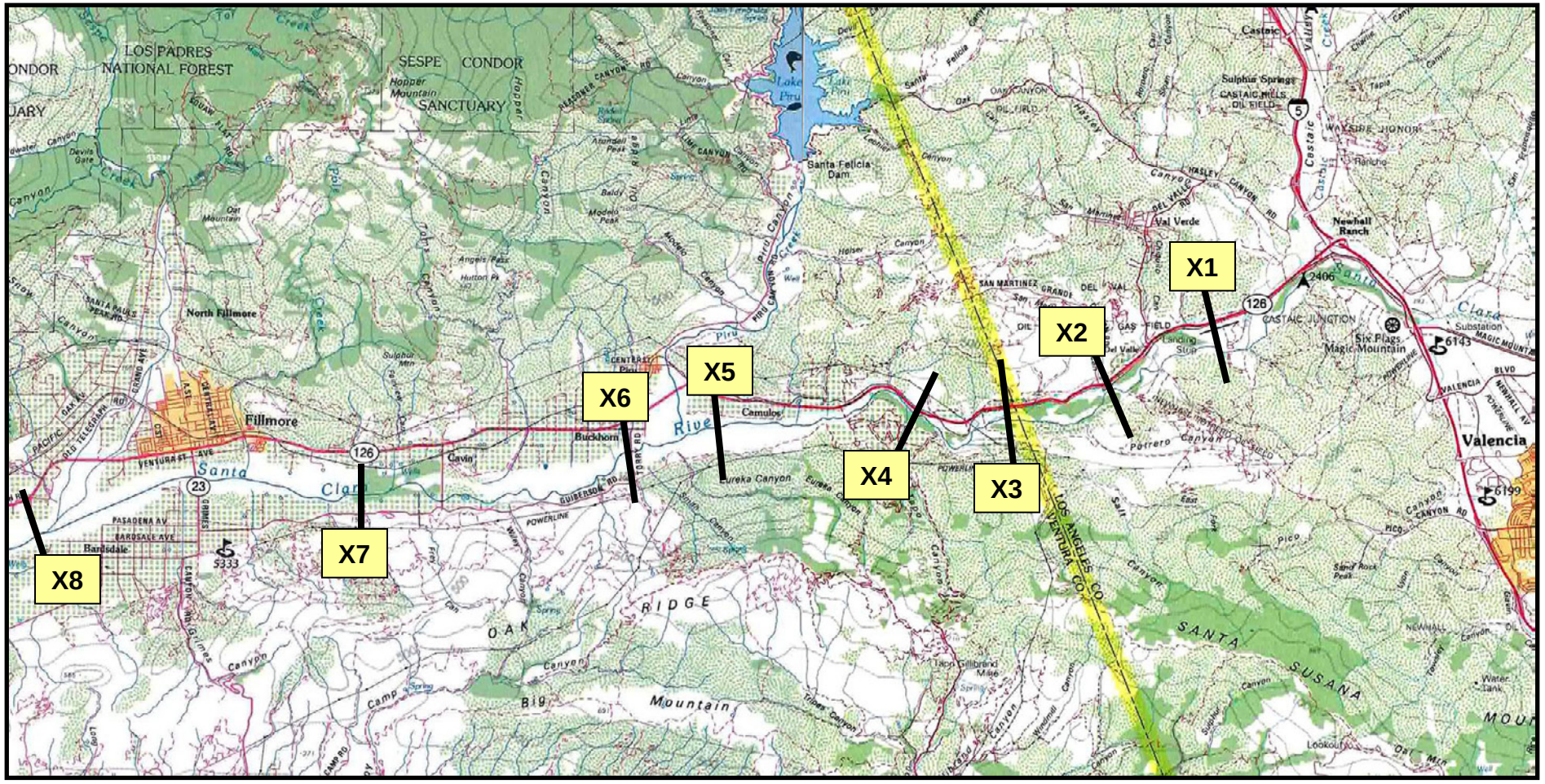

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Figure 3. Location of channel cross sections on the Santa Clara River, measured on aerial photographs.

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Figure 4. Comparison of 2004 and 2005 conditions on the Santa Clara River, just downstream of the L.A./Ventura County line. Note that significant channel widening occurred in response to the 2005 events, even in heavily vegetated areas. See appendix A for photo sources.

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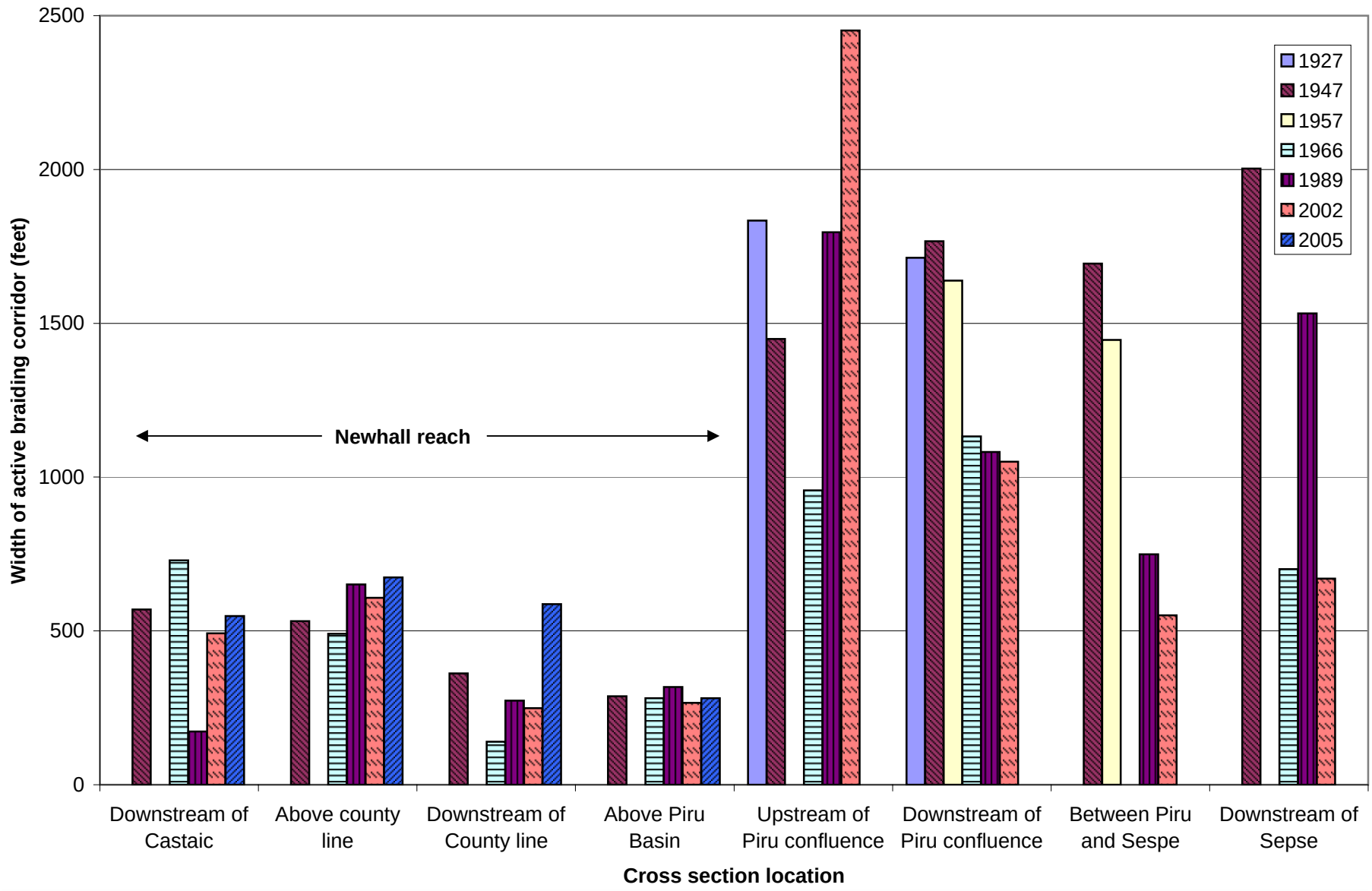

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Figure 5. Measurements of active braiding corridor width from aerial photographs, for cross sections on the Santa Clara River.

Photo cross section data.xls, Summary graph

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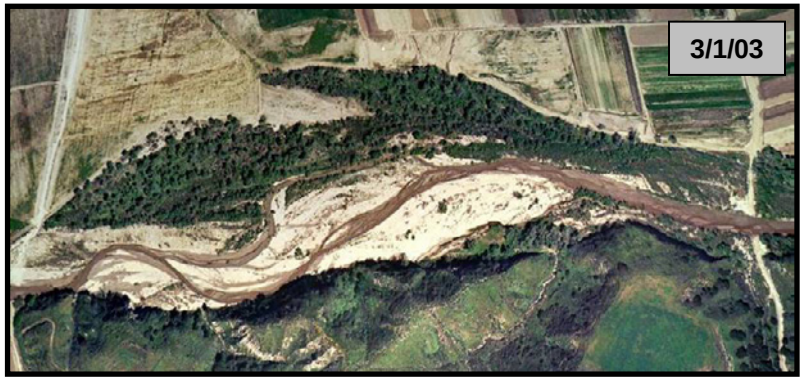

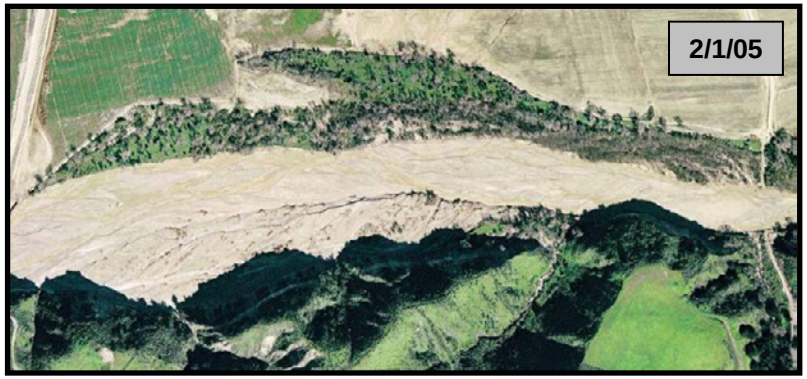

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Figure 6. Progression of aerial photographs downstream of Castaic Canyon, showing channel change between 1993 and 2005. Note that there was little change between 2000 and 2004, but the active corridor widened significantly in response to the 2005 events, and that channel traces within the active corridor were effectively erased. See appendix A for photo sources.

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APPENDICES

Appendix A: Summary of aerial photographs used for assessment of potential hydromodification effects on the Santa Clara River, Newhall, California.

Date	Number of photos	Nominal Scale	Hard Copy?	Electronic copy?	Image Type	Source/Vendor	Remarks
1927	6	2000	yes	yes	b/w	Whittier College: 80, 82, 84, F27, F28, F31	Only available photography prior to the March 1928 collapse of the Saint Francis Dam. Photos show area near Piru confluence
August 16, 1947	34	24000	no	yes	b/w - Vert Cart	USGS_GS-EM, Rolls 3, 5, 7	Previews downloaded already are sufficient.
1957	2	2000	yes	yes	b/w	Whittier College: 109, 123	1957 photos are for justdownstream of Piru Creek. Piru Dam was closed in 1957.
March 6, 1963	1 (2)	21670	no	yes	b/w - Vert Recon	USGS_ARMC630001L0049 a,b	high resolution scans
July 20, 1966	2 (4)	21670	no	yes	b/w - Vert Recon	USGS_ARM6625001L1362 a,b USGS_ARM6625001R1357 a,b	high resolution scans
August 19, 1966	1 (2)	21670	no	yes	b/w - Vert Recon	USGS_ARM6628502L1314 a,b	high resolution scans
September 13, 1966	1 (2)	21670	no	yes	b/w - Vert Recon	USGS_ARM6631405R1165 a,b	high resolution scans
November 10, 1966	2 (4)	21670	no	yes	b/w - Vert Recon	USGS_ARM6638605L1238 a,b USGS_ARM6638605L1242 a,b	high resolution scans
August 13, 1967	1	30000	no	yes	b/w - Vert Cart	USGS_AR1VBUK00010110	Preview already obtained. Downstream of Sespe Creek
May 26, 1989	5	31680	yes	yes	b/w	WAC-89CA, 27-42	LA County
						WAC-89CA, 27-62	LA County
						WAC-89CA, 27-84	LA County
						WAC-89CA, 27-109	LA County
						WAC-89CA, 27-135	LA County
May 1, 1989	6	2000	yes	yes	Color	PAS_89 06-20 PW VEN 7-229	Ventura County
						PAS_89 06-20 PW VEN 7-231	Ventura County
						PAS_89 06-20 PW VEN 7-233	Ventura County
						PAS_89 06-20 PW VEN 7-235	Ventura County
						PAS_89 06-20 PW VEN 7-269	Ventura County
						PAS_89 06-20 PW VEN 7-237	Ventura County
June 1, 1994	n/a	unknown			b/w, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
April 1, 2000	n/a	unknown	no	yes	color, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
February 1, 2002	4	Unknown	no	yes	Color, georeferenced	AirPhotoUSA (from GeoSyntec)	Covers all of Newhall project area

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Date	Number of photos	Nominal Scale	Hard Copy?	Electronic copy?	Image Type	Source/Vendor	Remarks
July 23, 2002	n/a	unknown	no	yes	Color, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
March 1, 2003	n/a	unknown	no	yes	Color, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
April 1, 2004	n/a	unknown	no	yes	Color, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
October 13, 2004	n/a	unknown	no	yes	Color, georeferenced	GlobeXplorer	downloaded select sections from LA and Ventura County
February 1, 2005	n/a	unknown	no	yes	Color, georeferenced	GlobeXplorer	only avaialable for LA County

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Newhall Ranch

River Fluvial Study

PHASE 1 | FINAL DRAFT

SANTA CLARA RIVER

Prepared for:

NEWHALL LAND
A LENNAR/LNR COMPANY

Prepared by:

PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

March 9, 2006 Revised
December 9, 2005 Revised
September 19, 2005 Revised
July14, 2005
#8197E

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

17520 Newhope Street, Suite 200 ▪ Fountain Valley, California 92708 ▪ 714.481.7300 ▪ fax: 714.481.7299

March 6, 2006

Ben Willardson
LACDPW
Water Resources Division
900 South Fremont, 3rd Floor
Alhambra, CA 91803
(626) 458-6117

Re: Santa Clara River Fluvial Study, January 2006 #8197E

Dear Mr. Willardson;

Pacific Advanced Civil Engineering, Inc. (PACE) is pleased to provide the following responses to the Los Angeles County Department of Public Works for the above-referenced project. The responses from PACE are as follows:

General Comments

1. *The HEC-RAS models approved by the separate hydraulic model review should be the only models used in this study. The only exception will be the data used for SAM, which is converted from the approved HEC-RAS data. The SAM data however must also be based on the approved HEC-RAS models. The calculations should be carried consistently through all tables, charts, text, and figures. All referenced models should be included in the report and on the CD in Appendix 4.3. The models must include the Existing and Proposed Conditions for the n=0.025 and n=0.085 models using the Capital Flood in the mixed flow regime. The two-year Proposed Condition, n=0.085 should also be included in the report and CD to verify the bottom width column of Appendix Ch 6.2.*

   PACE Response:
   Calculations in the present draft of the report are based on the approved HEC-RAS model. SAM numerical modeling is converted from the approved model. All models utilized in this report are included in the CD-ROM in the Appendix.

2. *All relevant general comments from the Castaic Creek review that affect the body of text need to be included in the Santa Clara River report.*

   PACE Response:
   Comments from the previously reviewed Castaic Creek First Phase Fluvial Study were reviewed and comments that pertained to the present report were included here.

Technical Comments

1. *PACE response to Comment 3 from the previous review, no changes were observed in the text on page 2. The comment still applies. All of the other previous comments have been adequately addressed.*

   PACE Response:
   The text has been updated to include the previous response.

2. *Page ii, the third sentence of the second paragraph states that the 2004 Sikand study relied on previous work conducted by SLA. PACE response to previous Comment 4 states that the "HEC-6 Sediment Transport Analysis..." was conducted by Sikand not SLA. Then in Section 2.1 the last sentence of the first paragraph states that the [2004] Sikand study relied on previous work conducted by Sikand. Rectify the apparent discrepancy.*

   PACE Response:
   The text has been updated to adequately differentiate the Sikand and SLA studies.

3. *Page ii, the ninth line of the third paragraph states that the average D50 value for all the SCR samples was 1.12 mm. This is not correct, the average of the D50 values is 1.18 for the 18 SCR samples or 1.09 mm for all 23 samples. According to Figure 3.2B the D50 of the average gradation is more like 0.79 mm by observation. Please note that an average of the individual D50 values will not give a valid D50 for the average gradation. The average of individual D50's and the D50 of the average gradation do not represent the same value. Calculating the D50 of the average gradation requires a geometric mean since the values are averaged on a logarithmic scale.*

   PACE Response:
   Based on conversations with LACDPW personnel (B. Willardson, February 22, 2006) Geometric mean calculations were determined not to be the appropriate method for determining average D_{50} values. In previous versions of this report, D_{50} was determined by averaging the values provided by Seward Engineering Geology. In this draft of the report, D_{50} is read directly from the semi-log plots presented in Chapter 3. The values in the text and tables have been updated to reflect change in methodology. It is important to note that the change in values was small in every case and did not require changing the transport function selected to determine transport potential.

4. *Page iii, the thirteenth line of the second paragraph states that the County approved the Sikand project. As stated previously, the County did not approve the Sikand project and models. The models have been significantly altered by PACE and are under final review for approval.*

   PACE Response:
   The text has been updated as per instructions given in the Castaic Creek Fluvial Study Phase 1 Final Draft.

5. *Page 4, last sentence of the first paragraph, clarify according to Comment 2 above.*

PACE Response:
The text has been updated to adequately differentiate the Sikand and SLA studies.

6. *Page 7, Table 3.1, update the D50 values according to Comment 3 above. According to the SAM output data the D50 values for the reaches are as follows: A,B 0.523; C 0.976; D 1.042; E 1.072. Also add another column called "Used for SAM Reach" that will show for which reach the sediment data was applied to in the SAM analysis.*

PACE Response:
The D_{50} values have been updated based upon the response to Comment 3. Additionally, Table 3.1 indicates the reaches where the respective gradation data is applied.

7. *Page 17, Table 4.3, SRB2, for Delta (ft) does not add up, see General Comment 4 above.*

PACE Response:
The table has been updated to resolve any round-off issues. Please see response to general Comment 4.

8. *Page 19, Table 4.4, the 1/11/06 submittal did not include any of the recent changes in calculations either for SAM on 1/6/06 or EC n=0.025 on 1/11/06. Update Existing Conditions LACH&SM column according to changes submitted on 1/11/06. Update SAM columns according to changes submitted on 1/6/06.*

PACE Response:
The table has been updated according to the latest SAM data.

9. *Page 21, Tables 5.1A-B, include the 1963 Area in the 1947 column with footnote for SRA1 according to previous discussions.*

PACE Response:
The table has been updated to reflect this comment.

10. *Page 22, eighth line of the first paragraph, replace "overbanks" with "sides" or similar wording because the left bank is 35' high and cannot be overtopped. Also add discussion about the loss of significant bank material in 2005 of the Magic Mountain parking area as shown in Figure 5.2A (150' lateral migration). If there is other bank armoring besides the treatment plant, please add the information.*

PACE Response:
Based on phone conversations with LACDPW (B. Willardson, February 22, 2006) the developed area is now referred to as banks. Additional information is provided discussing the loss of parking area at the theme park.

11. *Page 23, first sentence of the second paragraph, the "spike at station 200" is not evident to the reviewer. Please add more discussion to clarify.*

    PACE Response:
    A spike in the1999 topography is present from station 200 to station 300. Because the spike is in the 1999 topography, the reference has been removed. As noted in personal communication with County personnel (B. Willardson, February 22, 2006) the radar sampling technique used in creating the 1999 topography has difficulty in discerning the difference between dense woody brush and solid ground. The feature addressed in this comment, as well as similar comments, are a result of the surveying technique. The text has been updated in several locations to address where dense vegetation has been misinterpreted in the sampling.

12. *Page 23, the fourteenth line of the second paragraph states that the poor quality of the 1930 topography "renders a direct comparison difficult." If the topography is too poor to make a comparison it should not be included. If it does contribute some value, then the inaccuracies or shortcomings must be discussed further to show the reader what confidence is given to the data. This is true for any questionable data.*

    PACE Response:
    This data is included in the report based on a previous request by the County to include the complete record. Based on personal commutation with County personnel (B. Willardson, February 22, 2006) the text has been updated to improve readability.

13. *Page 24, second paragraph, discuss the presence of berms in the 2004 and 2005 data and the problems with the 1930 data for section 23000. More discussion is needed on how the canyon tributaries "may have played a role."*

    PACE Response:
    The text has been updated to the following:

    > **Sections 23000 (SRC4) and 20845 (SRD1) are the first historically aggradational sections analyzed (Figure 5.2J and 5.2K, respectively). Section 23000 is adjacent to the Chiquito Canyon Creek and Long Canyon Creek tributaries at the west end of the proposed Landmark development and between two historic agricultural production areas. Section 20845 is downstream of the proposed Landmark site and the left overbank has historically been used for agriculture. Both banks of section 20885 are tree-lined. Both sections are relatively wide and straight with braided channel beds. Both sections have aggraded over the period of historic record: 1.9 and 1.4 feet, respectively. In the most recent short term, however, section 23000 has aggraded 0.7 feet while section 20845 has degraded 0.5 feet. Section 23000 shows some incising below the 1930 historical bed although the average bed elevation is higher now than in the past. The dominant change in bed elevation between 2004 and 2005 at section 20845 occurred to the left of station 2600, while**

the remaining portion remained stable. It is not clear why this occurred, although agricultural practices or high discharges from the Chiquito and Long tributaries may have played a role. Agricultural practices may have stabilized the bank position and height while the creeks may influence the bed by discharging high volumes of water and sediments that have the dual ability to erode or deposit at this location. It should be noted that the topographic artifact between station 2600 and 3000 in the 1999 topography is a function of topographic sampling. As noted above, the dense brush in this and other woody sections may make the topography appear to be at a higher elevation than is actually present and results from the aerial survey technology used to create the topography.

14. *Page 24, last sentence of the second paragraph, the large inaccuracy in the 1999 data for section 20845 cannot be left as-is and explained only as a function of topographic conversion. This data appears inconsistent with the cross-section used in the HEC-RAS analysis. Similar to Comment 12 above, if the data is bad it should be thrown out or fixed. If it is good, the presence of this mound only in the 1999 topography needs to be explained. If an assumed cross-section was used it should be explained why this value should be accepted as reliable.*

PACE Response:
The text has been updated to reflect this comment. Please see response to Comment 13.

15. *Page 24, third paragraph, more discussion is needed on the four cross-sections. Section 14315 appears very active over the period of record. Sections 16305 &12195 both show a 1.1 foot average degradation between 2004 and 2005 as mentioned; only two other subreaches degrade more. The first sentence makes it sound like the general trend is for an inactive area, but it is observed to have pretty dramatic oscillations and rearrangements of sediment up to 8-feet plus of elevation difference. Mention should also be made of the diversion through sections 16305 and 14315 to the north near the 126 highway.*

PACE Response:
The text has been updated to the following:

Sections 18650 (SRD2), 16305 (SRD3), 14315 (SRE1), and 12195 (SRE2) all exhibit very mild long-term degradation (one foot or less) between 1947 and 2005 (Table 5.1). Additionally, short-term adjustment for all of these sections ranges between -0.6 and -1.2 feet between 2004 and 2005. Sections 16305 and 12195 exhibit 1.2 and 1.1 feet of degradation, respectively, and are among the five highest single season changes in bed elevation of the sections examined. Sections in SRA3 and SRB1 degrade significantly more with -2.3 and -1.7 feet, respectively. All of the sections from 18650 to 12195 are recovering from the 1928 dam break event, the sections low elevations, and all sections exhibit oscillations in bed elevation over the historic record (Figure 5.2L though 5.2O, respectively). These sections have in common a relatively wide, straight and braided bed. Grande Canyon Creek and Potrero Canyon Creek confluence with the River at near section 17000. The influence of the confluences is not immediately evident but may include some of the observed fluctuations in bed elevation as well as affecting the wide historic meandering

between the north and south bank (Figure 5.1). The observed features in the 1999 and 2004 topographies in section 16305 at stations 425 and 850 appear to be the south and north low-flow banks, respectively. Several of the features in the 1999 bed at section 14315 appear to correlate to the presence of vegetation on the bank and relate to surveying methodology, as noted above.

16. *Figure 5.2B, add more discussion of the 800' of bank migration from 1963 to1999.*

PACE Response:
The text has been updated to the following:

Section 42215 (SRA2) appears to have greatly down cut and widened since 1947, degrading an average 8.1 feet along the section. Some of the observed long-term change may be related to the presence of the theme park and water treatment facility on the bank at this location. In recent years (1999-2005), the creek appears to have become relatively stable: area has increased from 17946 to 17101 over the period (Figure 5.2B). The River is relatively wide at this location although a bend is present. Development has occurred on both banks with agricultural development on the north bank and the Magic Mountain theme park on the south bank. Historical development may have led to the observed degradation, although at present the bed appears to be stable or degrading only slightly. The impacts of woody vegetation in this section may have played a role in the recent degradation. Finally, the 2004-2005 winter was very wet and high flows were present on the River. During the heavy storms of December 2004 and January 2005, approximately 4.4 acres of the south bank was lost to the Santa Clara River. Some of the single-season degradation may possibly be attributed to this event. The features located at station 775 and 1325 in the 1999 topography are expected to be related the aerial surveying methodology, as noted above.

17. *Figure 5.2C, discuss the apparent berms/hills at stations 775 and 1325 in the 1999 topography, and the movement of the thalweg adjacent to the south bank.*

PACE Response:
The text has been updated to the following:

Similar to the other sections in Reach A, section 40825 (SRA3) is also degrading. The section has degraded 5.2 feet on average over the period of record (Table 5.1B). The 1963 data is insufficient in this section as indicated by the flat portions of the section, although the other years sufficiently indicate the trend. The 2005 thalweg is at the approximate elevation of the 1930 thalweg, although the present channel is more incised than the historic channel. The presently observed channel widening may possibly be attributed to recent high discharges, and migration of the channel may be related to these discharges. Features in the 1999 topography at stations 775 and 1325 are expected to be related to the aerial surveying methodology, as noted above.

18. *Figure 5.2E, correct the stationing between 0 and 200. Include discussion of any existing bank stabilization for the trailer park in this reach.*

    PACE Response:
    The figure has been updated to reflect this comment.

19. *Figure 5.2J, show assumptions for the northwest bank on all data sets. If there is a defined bank beyond the limit of the viewport expand the view to include it. The area for 2004 should end at the berm at station 1325, if there is a reason for not doing this state it, similarly with the berm in the 2005 data. The 1930 data does not show a thalweg, it continues to decline out–of-sight. It needs to be removed if the data is bad.*

    PACE Response:
    The viewport has been expanded to show a greater portion of the section.

20. *Figure 5.2M, discuss apparent berms in 1999 and 2004 data at stations 425 and 850.*

    PACE Response:
    The text has been updated to reflect this comment. Please see response to Comment 13.

21. *Figure 5.2N, discuss large migrations and sediment depositions according to Comment 14 above.*

    PACE Response:
    The text has been updated to reflect this comment. Please see response to Comment 13.

22. *Figure 5.2P, discuss the apparent berms in the 1999 and 2004 data at station 625.*

    PACE Response:
    The text has been updated to reflect this comment.

23. *Page 27, the twenty-fifth line makes a comparison between the existing and proposed conditions for total adjustment. This needs to be presented in tabular format as a new table or an addition to 7.1B & D.*

    PACE Response:
    As per personal communication with County personnel (B. Willardson, March 3, 2006) a reference has been added to refer to Appendix 6.1 and Table 8.

24. *Page 30-32, Tables 7.2A-D, add another column to show the difference between the two methodologies, a negative value corresponding to LACH&SM governance.*

PACE Response:
The table has been updated to reflect this comment.

25. *Page 30, second to last line, clarify the "existing" minimum bed elevation. It is assumed this is not the "Existing Conditions" bed which is based on the 1999 topography, but rather the 2005 topography.*

PACE Response:
The text has been updated to reflect this comment.

26. *Figures 7.2A-D, currently the downstream end of the toe-down elevation data is shown as ascending to meet the model bed at the county line. Since Newhall Ranch is responsible for levees all the way to the county line, the toe-down should continue at the depth of the final cross section and parallel to the model bed.*

PACE Response:
The figure has been updated to reflect this comment.

27. *Figures 7.3A-D, the 1999 minimum model bed does not match the same for Figures 7.2A-D near section 31000. Also, change to design toe-down as discussed in the January meeting.*

PACE Response:
Both figures employ the same data to create the model bed representation. The line types have been changed in an attempt to have the figures represent the bed data in a more uniform manner.

28. *Page 34-35, section 8, update section as previously discussed to include the more conservative method between the LACFCDDM and the LACH&SM with SAM calculations for general scour. Also include a new figure in Section 8 similar to Figure 7.3 that will show the most conservative toe-down, the 1999 minimum (model bed) and the 2005 minimum bed elevations.*

PACE Response:
The text has been updated so that the deeper of the LACFCDDM and the LACH&SM methodologies is used for total toe-down.

29. *Table 8, update toe-down depths and elevations to show the hydrology manual standard practice, including the LACFCDDM. This change is in accordance with discussions at Public Works between PACE, the County, and Newhall Land. Also as discussed move the old version to the appendices. The new Table 8 will be used to check levee elevations during the Tentative Tract Map review and possibly final design, depending on the Phase 2 study.*

PACE Response:
The table has been updated to reflect discussions between the County, PACE and Newhall Land.

Formatting Comments

1. *The memorandum should be proof-read for typographic errors that were not caught by this review.*

   PACE Response:
   Additional proof-reading has been completed for the text, tables and figures.

2. *Many small errors were observed in the tables, apparently as a result of rounding decimals not shown in the table. For example 13.1 – 5.1 = 8.1. As previously discussed with Ben Willardson of the County, figures should be truncated to the level of confidence. If the data is only good to the nearest tenth, then any calculations done with that data can only be good to the nearest tenth (and maybe less). All tables should be corrected to calculate and show significant figures. All values in a table should be consistently rounded to the same decimal place.*

   PACE Response:
   In previous drafts of this report, all tables used the appropriate number of decimal places. In the present draft, the tables have been edited to remove any rounding errors.

3. *Verify the measurement scale of all maps, even reduced maps must have a scale corrected for the reduction factor.*

   PACE Response:
   Previous map scales were applied correctly; however, some maps were printed at half scale. The present drafts include scales based on the print size.

4. *Where references are made to an appendix, use the full appendix designation. For example Appendix Chapter 3.2 not Appendix Chapter 3.*

   PACE Response:
   Appendix references have been updated.

5. *Fully justify the whole body of text.*

   PACE Response:
   The formatting of the report has been updated to reflect this comment.

6. *Figure 1, the Q_{cap} labels are of the old LADPW flow rate. Revise to show the new flow rates used to develop the mapped floodplain. (This error was also observed in the HEC-RAS study map).*

   PACE Response:
   The figure has been updated to reflect this comment.

7. *Page iii, a typo in the first line of the third paragraph, delete "form."*

   PACE Response:
   The formatting of the report has been updated to reflect this comment.

8. *Page iii, a typo in the third line of the fourth paragraph, delete "presented in," which occurs twice.*

   PACE Response:
   The formatting of the report has been updated to reflect this comment.

9. *Page iv, first through third lines of the page, all of the maximum and minimum adjustment values need to be updated to reflect changes in their respective tables (8 values in total).*

   PACE Response:
   The formatting of the report has been updated to reflect this comment.

10. *Page iv, fifth line of the second paragraph states that all of the cross sectional areas were used to calculate the average change in bed elevation over time. In fact, only the 1947, 2004 and 2005 areas were analyzed and only the 1947 and 2005 data were used to determine the long-term degradation.*

    PACE Response:
    The text has been updated to reflect this comment.

11. *Page v, the first paragraph lists the components of other scour but then presents the data in a confusing manner. Rearrange the sentences to follow the order that the subcategories are listed in. Include the results for the bend scour in existing conditions. Update the maximum value for bed form height to be consistent with the calculated values in Appendix 6.*

    PACE Response:
    The text has been updated to reflect this comment.

12. *Page v, last line of the first paragraph, replace "creek crossings" with "river crossings."*

    PACE Response:
    The text has been updated to reflect this comment.

13. *Page v, a typo in the second line of the second paragraph, "LACH&SM" is misspelled.*

    PACE Response:
    The text has been updated to reflect this comment.

14. *Page v, sixth through ninth lines of the second paragraph, reports the findings of the general bed adjustment. These figures need to be corrected for updates to Tables 7.2 A-D (8 values in total).*

    PACE Response:
    The text has been updated to reflect this comment.

15. Page v, a typo in the tenth line of the third paragraph, "adjustment" is misspelled.

    PACE Response:
    The text has been updated to reflect this comment.

16. *Page v, third sentence of the third paragraph, state whether the referenced calculations for SRC2 are proposed or existing conditions.*

    PACE Response:
    The text has been updated to reflect this comment.

17. *Page v, fifth line of the last paragraph, the freeboard values need to be corrected for updates to Tables 7.3A-D.*

    PACE Response:
    The text has been updated to reflect this comment.

18. *Page vi, third line, the toe-down values need to be corrected for updates to table 8.*

    PACE Response:
    The text has been updated to reflect this comment.

19. *Figure 1.1, clarify the subreach boundaries graphically, especially at the end of SRE3, the beginning of SRA1, and the SRA1/SRA2 interface. Use "SRA1" labels in place of "RA1." Graphically depict which cross-sections were used in the long term analysis. Graphically depict which cross sections were used in the SAM analysis. Show approximate locations of sediment samples. Fix the scale.*

    PACE Response:
    The figure has been updated to reflect this comment. Also, please see response to formatting Comment 3.

20. *Page 4, first sentence of the second paragraph, spell out "Simons, Li and Associates", (SLA).*

PACE Response:
The text has been updated to reflect this comment.

21. *Page 4, a typo in the second sentence of the second paragraph, should read "quantitative ~~and~~ analysis."*

PACE Response:
The text has been updated to reflect this comment.

22. *Page 5, delete last line of the first paragraph, "The text has been updated to reflect this."*

PACE Response:
The text has been updated to reflect this comment.

23. *Page 7, second line of the second paragraph, 18 samples were collected on the river and 23 total including the tributaries. Correct the text which says "17 samples."*

PACE Response:
The text has been updated to reflect this comment.

24. *Page 7, Table 3.1, the first station should read "37135 ~~8"~~".*

PACE Response:
The text has been updated to reflect this comment.

25. *Page 8, second paragraph, update all D50 values according to Technical Comment 3 above.*

PACE Response:
The text has been updated to reflect this comment.

26. *Page 8, a typo in the seventh line of the third paragraph, "…variation ~~of~~ in..."*

PACE Response:
The text has been updated to reflect this comment.

27. *Figures 3.1A-E, update D50 values according to Technical Comment 3 above. Also clean up stray lines near No. 4 line and between Nos. 8 & 16, and add dashed lines for Nos. 30 & 50.*

PACE Response:
The figure has been updated to reflect this comment.

28. *Figures 3.2A, clean up stray lines, label the same sieve sizes as Figure 3.1, cleanup the axes. Also make a reference to the fact that reaches A & B use exactly the same data.*

    PACE Response:
    The figure has been updated to reflect this comment. Also, please see response to technical Comment 6.

29. *Figure 3.2B, clean up stray lines as above, update D50 value according to Technical Comment 3.*

    PACE Response:
    The figure has been updated to reflect this comment.

30. *Page 17, second line of the second paragraph, update range of proposed conditions general adjustment.*

    PACE Response:
    The text has been updated to reflect this comment.

31. *Page 17, Tables 4.2A-B, a typo in the heading, "Conditions" is misspelled.*

    PACE Response:
    The table has been updated to reflect this comment.

32. *Figures 4.1A-B, delete "Outside Curved Reach" from the heading because there is no "inside" figure and the distinction is not necessary. Eliminate the first point of each series because it does not represent actual data. Change the symbol for one of the series to a filled, solid symbol making the two series easier to distinguish visually.*

    PACE Response:
    The figure has been updated to reflect this comment.

33. *Page 20, fifth line of the first paragraph, revise to say "…creating contour lines ~~of equal ground surface elevation~~…"*

    PACE Response:
    The text has been updated to reflect this comment.

34. *Page 20, a typo in the thirteenth line of the first paragraph, "STA 42215."*

    PACE Response:
    The text has been updated to reflect this comment.

35. *Page 21, Tables 5.1A-B, increase the font of the footnotes to make them more legible. Also fix the rounding errors according to Formatting Comment 2 above.*

    PACE Response:
    The table has been updated to reflect this comment.

36. *Pages 22-24, update the references to Figures 5.2 A-P according to their reordering. Also, as in the Castaic Creek study, a differentiation must be made between the longitudinal and cross-sectional stationing for all of Long-term Degradation, Section 5.*

    PACE Response:
    The text has been updated to reflect this comment.

37. *Page 23, first line of the second paragraph, update "SRB1" to "SRA4".*

    PACE Response:
    The text has been updated to reflect this comment. "As applied to…" is added.

38. *Page 23, fourth line of the second paragraph, insert "degraded" to read, "the section has degraded 3.2…"*

    PACE Response:
    The text has been updated to reflect this comment.

39. *Page 23, ninth line of the second paragraph, insert words to read, "single season degradation may be possibly attributed to the woody nature…"*

    PACE Response:
    The text has been updated to reflect this comment.

40. *Page 23, a typo in the sixteenth line of the second paragraph, "considered"*

    PACE Response:
    The text has been updated to reflect this comment.

41. *Page 24, a typo in the second line of the third paragraph, "less_between."*

    PACE Response:
    The text has been updated to reflect this comment.

42. *Page 24, second to last sentence of the third paragraph, Grande Canyon confluences with the River near Section 17000 not 15335 as stated.*

    PACE Response:
    The text has been updated to reflect this comment.

43. *Figure 5.1, use "SRA1" labels instead of "RA1." Correct the scale.*

    PACE Response:
    The figure has been updated to reflect this comment. Also, please see response to formatting Comment 3.

44. *Figure 5.2K, expand the viewport to include both banks (at least to the top width line) and the proposed levee. Correct the 1999 data as stated in Technical Comment 14 above.*

    PACE Response:
    The figure has been updated to reflect this comment.

45. *Page 25, seventeenth line, update the ranges of SAM aggradation and degradation.*

    PACE Response:
    The text has been updated to reflect this comment.

46. *Page 25, a typo in the twentieth line, "is observed to have the opposite trend than that predicted…"*

    PACE Response:
    The text has been updated to reflect this comment.

47. *Page 26, typos in the second to last sentence of the last paragraph, "height ranges from 0.5 to ~~and~~ 9.1…" and "from 0.5 to ~~and~~ 8.3…" Also update the values in the last paragraph according to the appropriate tables.*

    PACE Response:
    The text has been updated to reflect this comment.

48. *Page 27, the second sentence states that SAM analysis represents a long-term trend. SAM is not a long-term analysis tool since it only utilizes one storm flow for calculations. Correct the text accordingly.*

    PACE Response:
    The text has been updated to reflect this comment. Punctuation is added to clarify the

meaning of the text.

49. *Page 27, discussion of the content found in Tables 7.1 A-D needs to be presented in the order in which the tables are presented to avoid confusion. Also references made on page 27 to these and other tables need to be updated based on the final approved models.*

    PACE Response:
    The text has been updated to reflect this comment.

50. *Page 27, nineteenth line, references to stations do not use the STA designation. Add it for consistency.*

    PACE Response:
    The text has been updated to reflect this comment.

51. *Page 27, twenty-second line update the range of degradation depths, and include STA 24795 which also has the same depth as STA 13030.*

    PACE Response:
    The text has been updated to reflect this comment.

52. *Page 27, a typo in the twenty-ninth line, "components ~~are~~ differ significantly…"*

    PACE Response:
    The text has been updated to reflect this comment.

53. *Page 28, Table 7.1A, a new table was not included with the 1/11/06 .pdf files. Make sure it is updated according to the changes in Appendix Chapter 6.1A.*

    PACE Response:
    The table has been updated to reflect this comment.

54. *Figures 7.1A-D, use points instead of lines to depict adjustments. Use symbols that are easily distinguishable. Remove the first data point near STA 9000 because it does not represent a real data point. Also on Figure 7.1A correct the typo "Bed Adjustment" on the Y-axis.*

    PACE Response:
    The figure has been updated to reflect this comment.

55. *Page 30, Table 7.1A, update the LACFCDDM values to reflect the most recent changes, especially SRA3, SRC1, SRD2, and SRE1.*

PACE Response:
The table has been updated to reflect this comment.

56. *Page 31, Table 7.1C, update the LACFCDDM values to reflect the most recent changes, especially SRC1, SRD2, and SRE1.*

PACE Response:
The table has been updated to reflect this comment.

57. *Page 32, fourth line of the first paragraph, update the range of values for LACFCDDM, from "8 ~~10~~ to 21," or as necessary according to the approved, updated models.*

PACE Response:
The text has been updated to reflect this comment.

58. *Figure 7.3C, The calculated toe-down including SAM needs to be updated according to the latest figures.*

PACE Response:
The text has been updated to reflect this comment.

59. *Page 34, sixth line of the second paragraph, specify the trend of general adjustment, aggradation or degradation.*

PACE Response:
The text has been updated to reflect this comment.

60. *Page 34, a typo in the tenth line of the second paragraph, "aggradation ~~iton.~~"*

PACE Response:
The text has been updated to reflect this comment.

61. *Page 34, sixth line of the third paragraph, update the range of general adjustment. Also, seventh line of the third paragraph, update the range of other adjustment to include the straight and inside curve values (4.9 minimum). Also, tenth line of the third paragraph, update the range of total toe-down to include the straight and inside curve values (7.5 minimum).*

PACE Response:
The text has been updated to reflect this comment.

62. *Page 34, a typo in the first line of the fourth paragraph, "four ~~three~~ subreaches."*

    PACE Response:
    The text has been updated to reflect this comment.

63. *Page 35, fifth line of the first paragraph, update the range of general adjustment. Also, eighth line of the first paragraph, update the range of other adjustment to include straight and inside curve values (3.9 minimum). Also, tenth line of the first paragraph, update the range of total toe-down to include the straight and inside curve values (4.5 minimum).*

    PACE Response:
    The text has been updated to reflect this comment.

64. *Page 35, eighth line of the second paragraph, update the range of other adjustment (-4.6 minimum). In the tenth line of the second paragraph, update the local scour of the bridge piers at section 15335, "12.7 ~~12.5~~ feet." Also, last line of the second paragraph, include section 18830 which has the maximum freeboard of 4.2 feet as well as section 19050.*

    PACE Response:
    The text has been updated to reflect this comment.

65. *Page 35, seventh line of the third paragraph, update the other adjustment to include straight and inside curve values (-4.7 minimum).*

    PACE Response:
    The text has been updated to reflect this comment.

66. *Appendix 4.1, include the most current and approved HEC-RAS output for the Existing Conditions model with n=0.085 and n=0.025.*

    PACE Response:
    The appendix has been updated to reflect this comment.

67. *Appendix 4.2, include the most current and approved HEC-RAS output for the Proposed Conditions model with n=0.085 and n=0.025.*

    PACE Response:
    The appendix has been updated to reflect this comment.

68. *Appendix 4.3, include the most current and approved HEC-RAS models for all relevant 'n-values'.*

PACE Response:
The appendix has been updated to reflect this comment.

69. *Appendix 4.4, update using the most current and approved HEC-RAS model and output. Also state which 'n-value' is being used for the output.*

PACE Response:
The appendix has been updated to reflect this comment.

70. *Appendix 4.6, Figures A4.6A and B update using the most current and approved HEC-RAS model and output. Convert this output again to HEC-2 and SAM input. Use comma delimiting for transport volumes to emphasize differences in magnitude. Make rounding consistent in the width column.*

PACE Response:
The appendix has been updated to reflect this comment.

71. *Appendix 6.1, Figures A6.1A-F, update according to the most current and approved HEC-RAS model and output. Include changes made to pier width for the proposed conditions. Revise the text under "general" heading which states that the maximum velocity allowed by the table is 20-fps. Many velocities are higher than 20. Also revise the typo "LACDPW ~~DWP~~". Also update the pier widths and locations according to the approved proposed models.*

PACE Response:
The appendix has been updated to reflect this comment.

72. *Appendix 6.2, Figures A6.2A-B, update according to the most current and approved HEC-RAS model and output.*

PACE Response:
The appendix has been updated to reflect this comment.

If you have any questions regarding the above responses, please do not hesitate to contact us at (714) 481-7300.

Sincerely,
PACIFIC ADVANCED CIVIL ENGINEERING, INC. (PACE)

David A. Jaffe, Ph.D., P.E.
Project Engineer – Stormwater Division

DAJ/as

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PACIFIC ADVANCED CIVIL ENGINEERING, INC.

17520 Newhope Street, Suite 200 ▪ Fountain Valley, California 92708 ▪ 714.481.7300 ▪ fax: 714.481.7299

December 9, 2005

Ben Willardson
LACDPW
Water Resources Division
900 South Fremont, 3rd Floor
Alhambra, CA 91803
(626) 458-4974

Re: Newhall Ranch -- Santa Clara River Fluvial Study #8197E

Dear Mr. Willardson,

Pacific Advanced Civil Engineering, Inc. (PACE) is pleased to provide the following responses to the Los Angeles County Department of Public Works comment letter dated October 13, 2005, for the above-referenced project. The responses from PACE are as follows:

Previous Comments

4. *Page 7, discussion of sediment gradation size is included in both paragraphs. The bore logs from the Simons, Li, and Associates study show cobbles at certain depths. However, no cobbles are found in any of the gradations used for this study. Many of the cobbles were found below the depths sampled by Seward Engineering Geology. Large flow rates will carry cobbles and the reasons for not including cobbles in the gradations should be included in the discussion. (The upper foot of sediment is most likely not the active bed in the Santa Clara River as shown by Table 5.1. The bed elevation changed by 1 to 2 feet in the period from 2004 to 2005. The portion of the bed moving during peak flows may actually be much deeper. Although the second sampling set collected by Seward may be adequate for SAM analysis, there is some uncertainty in the gradation and distribution as shown by other studies. See comment 6 below.)*

   PACE Response:
   The County has noted that cobbles are present in the SLA study boring logs, which is true. Cobbles are not present in any of the grain size distribution curves in the SLA study (particularly in the Landmark study reach), however, and a careful review of the boring logs down to approximately 10 feet (approximately five times the SAM single event depth) notes only sporadic cobble observances, generally less than 5% and rarely as much as 10%. More importantly, is the fact that at sample location 11 (in the Landmark Village study reach), p. B.5, not until 8.5 feet are any cobbles observed. Because of the lack of cobble occurrence in the

both the boring logs and their depth below the SAM single event depth, taken here as the active depth, PACE believes that the sampling data collected by Seward is representative of the active bed. The text has been updated to reflect this comment.

Present Comments

1. *Page 2, the second set of bullets, number 1, indicates that field investigations were performed for the Santa Clara River. Were other field investigations conducted besides the bed sample collection? If so, the investigation needs to be added.*

   PACE Response:
   Photos of a previous field investigation are included in Appendix Chapter 3.

2. *Page 2, the second set of bullets, number 2, indicates cross-sections were determined to provide adequate representation of channel geometry. Was this done by PACE, or were the cross-sections based on the Sikand study and model?*

   PACE Response:
   An RMS file was provided by Sikand, which was exported to HEC-RAS. In addition to review of the Sikand base line HEC-RAS model, PACE prepared the proposed condition model geometry file modification to model the proposed bridges and bank protection associated with the proposed Newhall Ranch Project.

3. *Page 2, the second set of bullets, number 3, indicates a baseline hydraulic model. The year for the baseline needs to be specified.*

   PACE Response:
   The base topography is from 1999. The text has been updated to reflect this response.

4. *Page 4, the first paragraph states that Sikand relied on previous work conducted by Simons, Li, and Associates and submitted June 1998. Who was the SLA study submitted to?*

   PACE Response:
   The study in question, *HEC-6 Sediment Transport Analysis for ACOE General Permit on Santa Clara River (from Castaic Creek to Cottonwood Avenue) and San Francisquito Creek (from Santa Clara River to 15000' Northerly,* was prepared by Sikand Engineering, not by SLA. The text does not mention to whom the report was submitted. The text has been updated to reflect this comment.

5. *Page 4, the second to last paragraph states that 1500 cfs was required to generate sediment transport. This number is too high since sediment transport has been observed at much lower flow rates. This number should be compared to measured sediment transport data from the USGS. Sediment transport at lower rates may affect braiding and low flow channel armoring.*

   PACE Response:
   USGS data (*Sediment Discharge in The Santa Clara River Basin, Ventura and Los Angeles Counties, California*) notes in Table 3 that in 1971 at 1470 cfs 99% of the transport was silt at the County Line. It is important to note that PACE is citing the SLA study and not making the claim. PACE does not model silt in the present study since it is generally transported as wash load and is not pertinent to the present study's goals. The text has been updated to reflect this.

6. *Page 6, the sediment data represented in Section 3 are not the same as the data submitted in the previous version of the Santa Clara River Fluvial Study. As discussed in previous comment 4 from the previous review, the active bed is not one foot deep. The previous study from Seward, dated January 25, 2005, had sediment taken at depths of 25 feet below the surface. No discussion is made on why the February 25, 2005, sampling by Seward replaced the January 25, 2005, sampling. Both sets of data may be valuable and provide insight into the river behavior. More discussion needs to be added to the report on why the previous set of data was discarded if it was found to be inadequate. If not, both sets of data should be compared and analyzed.*

   PACE Response:
   A careful review of the data reveals that most of the sampling for the January report provided by Seward was for upland and tributary locations. Some of the samples in that report included River sample sites, however, only including single grabs. The February report includes multiple grabs at each sample location providing a much greater degree of confidence in the data in the form of being able to spot outliers (here in the statistical sense), and at several locations within the River bed. Because there is no way to independently determine the efficacy of the samples in the January report, the values were replaced with more verifiable data.

7. *Page 7, Section 3.3 discusses sediment characterization. The current study uses the same sediment gradation for both existing and proposed conditions. Modeling with HEC-6 will require that changes in sediment production also be considered. Some of these changes should be discussed in Section 5 that is looking at long-term historical trends.*

   PACE Response:
   As per a personal communication of 10/17/05 with Ben Willardson of the County, any and all HEC-6 related comments and responses will be delayed

until the second phase of the fluvial analysis following the approval of the Tentative Tract Map(s).

8. *Page 8, the reference to HEC-6 in this section should be removed as discussed in the response to comments from Castaic Creek. Other typographical errors in general sections of the fluvial studies can be corrected as discussed in the Castaic Creek comments from 08/23/05.*

   PACE Response:
   The text has been updated to reflect this comment.

9. *Page 10, the Sikand models discussed were modified significantly since they were developed. The reference should indicate that PACE has updated these models to meet Public Works standards.*

   PACE Response:
   The text has been updated to reflect this comment.

10. *Page 13, the second paragraph discusses outliers for sediment transport capacity calculations. More discussion needs to be added on how outliers are determined. The entire section should be updated as discussed in the Castaic Creek comments.*

    PACE Response:
    Outliers are values under analysis in a data set that reside far outside most other values in a data set. In this case, when the one of the results of a SAM.SED calculation that is three orders of magnitude or more different from the median, the data is excluded from analysis and noted as an outlier. The raw data is presented in Appendix Chapter 4.6. The text has been updated to reflect this response.

11. *Page 18, The HEC-6 study outlines for both Castaic Creek and the Santa Clara River should be similar. There are some differences in available data. These can be discussed once the SAM and long-term historic data are analyzed correctly and the tentative map approval is moving forward.*

    PACE Response:
    Please see PACE Response to Present Comment 7, above.

12. *Page 18, information needs to be provided regarding changes to sediment inflow based on the development of the watershed for the proposed conditions.*

    PACE Response:
    Please see PACE Response to Present Comment 7, above.

13. *The HEC-6 studies need to include historic cross-sections for comparison during the model calibration phase.*

    PACE Response:
    Please see PACE Response to Present Comment 7, above.

14. *Table 5.1 is not the same in the Santa Clara River and Castaic Creek studies. The same methodology should be used for both. More analysis and discussion of the river system needs to be added. An example of this type of analysis is provided as a guide: Station 11015 mean elevations from 1930, 1947, 1960, 1999, 2004, and 2005 are respectively 827.8, 831.3, 828.4, 832.1, 832.8, and 832.3. This cross-section appears to be fairly stable over time. Station 25000 mean elevations from 1930, 1947, 1960, 1999, 2004, and 2005 are respectively 915.1, 912.7, 912.1, 911.8, 910.3, and 909.5. This cross-section appears to be degrading over time. The cause of this long-term degradation may be the installation of the dam on Castaic Creek in 1971. More of this type of analysis is required. Some portions of the river fluctuate over the time period studied, while others aggrade or degrade. The trends in the river are shown by the mean elevations. These trends may be impacted as sediment production from some of the major tributaries are restricted by development. These issues need to be analyzed and discussed. The analysis and discussions can be validated using the HEC-6 model during the next phase. An understanding of the river system and changes must be portrayed and related to the top-of-levee heights and toe-down depths determined for the tentative map.*

    PACE Response:
    In the current draft of the report the historic thalweg analysis has been replaced with a historic cross-section analysis. The sections provide a more clear and complete picture of the trends of the creek bed in a given section. An analysis of the trends of the various sections is included in Chapter 5. This analysis separately considers the periods immediately following (1930) and later following (1947 and after) the failure of the St. Francis Dam in 1928. The data from the thalweg analysis is included for completeness in Appendix Chapter 5.

15. *Page 21, the comments in the second paragraph should be checked against Table 5.1. These assumptions do not appear to be correct now that the calculation procedures have been corrected.*

    PACE Response:
    Please see PACE Response to Present Comment 14, above.

16. *Figure 5.4 and Table 5.5 should use mean bed elevations for comparison of changes in the time period between 2004 and 2005. Comparison of the 1999, 2004, and 2005 data may provide more information. All tables should have the same station order as the to facilitate comparison, i.e., 9042 to 46195 or 46195 to*

9042. Again, general sections and comments in the fluvial studies for Castaic Creek and the Santa Clara River should be consistent. Both studies need to provide more analysis of data provided by the models. The analysis should include discussion on how the model results relate to toe-down, top-of-levee, and protection of other property owners.

PACE Response:
The purpose of the '04-'05 single season analysis is to illustrate bed changes that occur over a single season or single event. Including the 1999 data in this section does not offer any insight into the kinds of changes that occur during the '04-'05 rainy season or any other single event or season. Also, please see PACE Response to Present Comment 14, above.

If you have any questions regarding the above responses, please do not hesitate to contact us.

Sincerely,
PACIFIC ADVANCED CIVIL ENGINEERING, INC. (PACE)

David A. Jaffe, Ph.D., P.E.
Project Engineer – Stormwater Division

CC: Steve Sheridan/LACDPW
Mo Kajbaf/ LACDPW
Mark Subbotin/NLF
Glen Adamick/NLF

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PACIFIC ADVANCED CIVIL ENGINEERING, INC.

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August 10, 2005

Mo Kajbaf
LACDPW
Land Development
900 South Fremont, 3rd Floor
Alhambra, CA 91803
(626) 458-4974

Re: Santa Clara River Fluvial Study

Dear: Mr. Kajbaf

Pacific Advanced Civil Engineering, Inc. (PACE) is pleased to provide the following responses to the Los Angeles County Department of Public Works for the above-referenced project. The responses from PACE are as follows:

1. *Page 4, the reference to the Sikand Study for the Santa Clara River should indicate that the results were not accepted by Public Works. The comments on the last review of the study in 2004 were not addressed.*

   PACE Response:

   The text was updated to reflect this comment in a previous partial draft sent to Public Works.

2. *Page 5, the Simons, Li, and Associates study references sediment gradation data and boring logs that are available in the copy of the report provided to PACE and available at LADPW Headquarters Technical Library.*

   PACE Response:

   The text has been updated to reflect the D_{50} for the two gradation curves in the SLA study and in the present study reach. While the boring logs are present, no map of the location of the borings is present in the PACE copy of the study. If a map showing the locations of the borings becomes available, PACE will further update the report to account for the boring data.

3. *Page 7, the second paragraph refers to Figures 3.2A-E, but only 3.2A and 3.2B are included in the report.*

   PACE Response:

   The text should refer to Figures 3.2A-B. The text has been updated to reflect this correction.

4. *Page 7, discussion of sediment gradation size is included in both paragraphs. The bore logs from the Simons, Li, and Associates study show cobbles at certain depths. However, no cobbles are found in any of the gradations used for this study. Many of the cobbles were found below the depths sampled by Seward Engineering Geology. Large flow rates will carry cobbles and the reasons for not including cobbles in the gradations should be included in the discussion.*

   PACE Response:

   Seward sampling was conducted on approximately the upper foot (recently active layer) of the bed. To be conservative no armoring layer (cobble layer) depth is assumed in sampling which allows the bed to fluctuate freely in numerical modeling. Additionally, the true armoring layer has not been observed in field measurements including Seward field studies and SLA boring logs. This study assumes that the grab sampling at the surface represents the below-surface bed. While the SLA boring logs do show vertical variation of in grain size distribution, a consistent grain size vertical distribution is not evident.

   The text has been revised to reflect this comment.

5. *Page 10, section 4.1.2, discusses correlation between hydraulic parameters and location along the channel. River stationing does not necessarily determine hydraulic parameters. Correlation between flow or velocity at a location, and the parameters such as depth, width, and slopes is more reasonable. Several different relationships were used for the reaches (A-F) to determine sub-reaches. Correlation of one hydraulic variable with a fairly constant correlation variable would make more sense. A few of the correlation calculations show velocity versus hydraulic parameters, but this is only done for approximately 20% of the analyzed reaches. No explanation is provided on why either of these methods was used.*

   PACE Response:

   SAM modeling is based on channel subreaches determined by correlating hydraulic characteristics with longitudinal cross-section location to preserve the along-stream character of the flow. The hydraulic parameters examined are discharge, energy slope, bed slope, Froude number, top width, hydraulic velocity and flow area based on the 100-year discharge. First, correlation coefficients are calculated for each station against the hydraulic parameters. The hydraulic parameter that produces the greatest correlation is plotted against cross-section location. Subreaches are then selected in a manner that preserves the trend of the hydraulic parameter as well as produces approximately equal subreach lengths, which are generally 1000 feet long. This methodology seeks to maintain continuity of analysis by producing similar length subreachs while analyzing the hydraulic parameters that largely control sediment transport.

   The text was updated to reflect this comment in a previous partial draft sent to Public Works. The correlation calculations for velocity versus hydraulic parameters produced low correlation relative to channel position and have been removed from the text.

6. Pages 11-13, references to the MPM method that are spelled out should be written as Meyer-Peter and Muller, rather than Meyer, Peter, and Muller.

PACE Response:

This typographical error has been corrected in the text.

7. *Pages 11-14, more discussion needs to be added on why the MPM method was chosen for modeling sediment transport in the study area. MPM is a gravel transport equation. Although the sediment transport capacity appears reasonable for a zero dimension model, the measured transport through the downstream reach exceeds the transport specified by MPM at lower flows.*

PACE Response:

The MPM equation was found to be the representative transport equation for all subreaches for the existing and proposed conditions. This is because transport estimates based on other transport equations (i.e. Yang), when used to estimate general adjustment and transport, produced values in excess of both historical values of general adjustment (as much as approximately 15 feet) and values of general adjustment that might be physically expected during a single event (over approximately 20 feet). In other cases some transport equations (i.e. Brownlie D_{50}) estimated sediment transport that produced general adjustment calculations much smaller than expected (as little as approximately 1 foot).

The text was updated to reflect this comment in a previous partial draft sent to Public Works.

8. *Pages 21-22, these pages discuss the long-term trends in the river. The earliest topography is 1930, two years after the St. Francis Dam failure. This event released a flood wave with a peak flow of 1.3 million cfs measured 1.4 miles downstream of the dam. This flow made its way down San Francisquito Canyon and into the Santa Clara River. It seems that this flow may have created the river channel shown in the 1930 topography. The scour from this flood wave may have resulted in the lower elevations in 1930. It appears that areas with 1930 elevations higher than the elevations shown in other years are near the outlets of major watersheds, such as Castaic Creek. The channel in the last 50-years may be reworking itself to reach a more stable state than that caused by the dam failure. Inclusion of the 2005 topographic data will provide valuable insight into the channel response since the events of the last storm year were very significant for sediment transport.*

PACE Response:

It is important to note that the failure of the St. Francis Dam in March, 1928, is likely captured in Figure 5.3. The 1930 thalweg generally represents the lowest bed elevation over the period of record except between STA 30000 to STA 32000 (Castaic Creek confluence). The scour resulting from the flood wave progression is believed account for the lower than average bed elevations observed in the historical topography. The high point at Castaic Creek may represent the sediment transport from the Creek into the River in the period following the Dam failure.

The text was updated to reflect this comment. Topography from 2005 had become available to PACE within the last week. Analysis of the 2004-2005 water year

events bed change and a continued historical evaluation with this data will be included in the final draft of the report once the data has been analyzed.

9. *In general, most of the technical background work is in place. More discussion needs to be added on the methods followed so that future readers can understand the processes and procedures used to develop the results for this study.*

   PACE Response:

   PACE will continue to work closely with Public Works to update the discussion in the text. These updates will be available in the final draft of the report.

Items Completed After Meetings and Phone Conversations

1. The SAM sediment input gradation data was incorrect for several sub-reaches due to a data conversion process error. The data have been corrected and the models have been re-run to provide correct information and figures.

2. Calculations for whether the channel was aggrading or degrading were reversed. The previous calculations showed that if transport capacity upstream was more than the transport in the reach downstream, the bed degraded. This is backwards based on the volume continuity equation $I - O = \Delta S$. If inflow (sediment transport capacity from upstream) is greater than the outflow (transport capacity in the reach downstream) the change in storage is positive. Positive storage is aggradation, negative storage is degradation. These calculations have been updated by PACE.

3. Reach D of the proposed conditions from HEC-2 did not match the data in SAM. This was corrected when the model was run with the sediment gradation corrections.

If you have any questions regarding the above responses, please do not hesitate to contact us at (714) 481-7300.

Sincerely,
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

David A. Jaffe, Ph.D., P.E.
Project Engineer – Stormwater Division

DAJ

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River Fluvial Study – Phase 1 Final Draft

Newhall Ranch
Santa Clara River

March 6, 2006

Prepared For Submittal to:

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Executive Summary

This technical study provides an evaluation of the existing and proposed fluvial characteristics and long-term stability of Santa Clara River between Interstate 5 and an area generally west of the Los Angeles/Ventura County line in the vicinity of the Newhall Ranch Specific Plan. Development along the River within the study area has the potential to modify the fluvial mechanics of the River. The proposed buried soil cement bank protection on both the north and south banks of the River is intended to provide long-term erosion protection from lateral migration of the bank and flood protection for the adjacent proposed development areas. This analysis evaluates impacts from build-out of Newhall Ranch from (1) fluvial modifications of the river bed from single hypothetical storm events, and (2) changes in the floodplain fluvial operation over the long-term.

Three sediment transport studies were previously conducted within the study reach in the last 25 years. The first study conducted by Sikand Engineering (June 2000, and revised November 2004) was to provide HEC-6 sediment transport analysis for the Santa Clara River and to determine the possible effects of the Newhall Ranch Development on river bed stability. The study relied on previous work conducted by Simons, Li & Associates (SLA) (June 1998). The second study, produced by SLA (November 1990), sought to provide information for flood and fluvial process management in the Santa Clara River. The SLA report was reviewed in detail by LADPW and response to comments made, however, the report was not revised to obtain final LADPW approval. The final study was conducted by USGS, whereby the study collected sediment data from 1967 to 1975 at three sites in the Santa Clara River basin including the Los Angeles-Ventura County line. The study estimated long-term sediment discharge by applying the sediment and water discharge relationship observed from 1967 to 1975 to long-term records of water discharge (1928-1975).

Sediment data collection for the Santa Clara River along the study reach was conducted by Allan E. Seward Engineering Geology Inc. Eighteen samples were collected at six different locations positioned along River subreaches. All sampling was conducted using grab samples of the upper foot of the active or recently active portion of the bed. No fine material is included in the sediment analysis because fine material is generally transported as wash load. A review of the raw gradation curves indicates that most samples are comprised of poorly graded sands with gravels and silts. The D_{50} values for all samples ranged from 0.25 to 4.67 mm with an average of 0.8 mm. Additionally, previous studies noted above also found similar sandy characteristics. No cobbles are present in the Seward study and sampling was not conducted for cobble grain sizes. Cobbles are not present in any of the grain size distribution curves in the heretofore discussed SLA study (particularly in the Landmark study reach), and a careful review of the boring logs down to approximately 10 feet (approximately five times the SAM single event depth) notes only sporadic cobble observances, generally less than 5% and rarely as much as 10%. More important is the fact that at sample location 11 (in the Landmark Village study reach), p. B.5, not until 8.5 feet are any cobbles observed. Because of the paucity of cobble occurrence in the both the boring logs and their depth below the SAM single event depth, taken here as the active depth, PACE believes that the sampling data collected by Seward is representative of the active bed.

Modifications to the river bed are measured as bed adjustment in feet. Positive adjustment indicates aggradation and negative adjustment indicates degradation. Several types of adjustment are considered in this study including general adjustment, long-term adjustment, and other scour. General adjustment is scour that occurs in an individual discharge event and is calculated as the difference between sediment inflow and outflow of a given River reach. Long-term adjustment consists of fluvial processes that occur over several years. Other scour is made up of local scour, bend scour, low-flow incisement, and bedform formation.

General adjustment was estimated in this study using the US Army Corps of Engineers (ACOE) SAM steady-state zero-dimensional numerical model. SAM is utilized to provide a first approximation of sediment transport potential for subreaches within Santa Clara River. The SAM numerical model is built upon hydraulic and fluvial representations of the study bed. The hydraulic component includes representations of bed characteristics and discharge. The fluvial component includes representation of bed gradation and sediment transport functions. SAM's hydraulic component utilized average cross-section data imported from HEC-2 numerical models of the river converted from HEC-RAS numerical models. The conversion process modifies the original numerical model, as discussed in Chapter 4, so some differences in numerical models are created. Both the existing and proposed conditions HEC-RAS models were originally developed by Sikand Engineering in the *Newhall Ranch Santa Clara River HEC-RAS Study* (June 2000) and submitted as part of the Newhall Ranch Specific Plan. The HEC-RAS model that is the basis of the SAM modeling, and will be the basis for the HEC-6 model, has been refined by PACE and has been submitted (concurrently with this Fluvial Study) to LADPW for review and approval. The current model resembles the Sikand model but has been refined to address current LACDPW modeling standards and updated proposed project conditions. River subreaches that make up the SAM model are determined by examining the hydraulic parameters of the individual HEC-RAS cross-sections and identifying correlations between those hydraulic parameters and the longitudinal position in the channel.

Representation of sediment grain size distribution in SAM is percent finer data obtained from sieve analysis of channel sediment samples. At each sample location, multiple samples are collected and the average data is input into the model. Sediment transport equations used in all SAM modeling were chosen with the assistance of the Army Corps' SAM.AID subroutine. The SAM.AID subroutine determines the most representative transport function based on the hydraulic parameters and percent finer data by comparing model data with peer-reviewed sediment transport studies. The study found that Meyer-Peter and Muller (MPM) was the representative transport function for all subreaches for both existing and proposed conditions because it produced adjustment values within physical reason.

SAM was run for all River reaches and bed stability was estimated based on the change in potential transport between adjacent channel subreaches for the Q_{CAP} discharge. General adjustment based on SAM modeling is presented in Chapter 4. General adjustment was also calculated using the equation specified in the Los Angeles County Hydrology and Sedimentation Manual (LACH&SM). The LACH&SM general adjustment calculation is based only on flow mean velocity. In most circumstances, adjustment predicted by the LACH&SM is greater (more scour) than that predicted by SAM for both the existing and proposed conditions. SAM results

predict general adjustment from -2.9 to +2.3 feet for the existing condition, and -1.6 and +2.1 feet for the proposed condition. LACH&SM methodology predicts general adjustment from -2.1 to -8.1 feet for the existing and -1.8 to -7.6 feet for the proposed condition, both outside of curves. In this report the outside of the curve values and inside of curve values are considered separately, as per LACDPW criteria, since outsides of curves tend to degrade while insides of curves tend to aggrade. It is not presently clear if the changes in general adjustment result from the alteration of the hydrology caused by full build-out, or from changes in the velocity in the River associated with specific individual project improvements. It is expected that various Newhall related impacts will be localized, and, with respect to implementation of the proposed improvements, that the River will continue to behave fluvially as it did prior to construction of these proposed improvements. Long-term changes to hydrology and sediment production are not addressed in the first phase report, but may be addressed in the second phase HEC-6 numerical modeling. Finally, the general trend in general adjustment for the study reach as indicated by SAM modeling is not apparent for either the existing or proposed condition.

Long-term adjustment was calculated based on historical records in the form of topographic data. Topographic data dating from 1930, 1947, 1963, 1999, 2004 and 2005, was digitized. Cross-sections were cut at the locations of select HEC-RAS sections for each historical topography. At least one cross-section was chosen for each subreach established in Chapter 4. Areas of the 1947, 1963, 1999, 2004 and 2005 sections are calculated and the areas of the 1947, 2004 and 2005 bed are used to calculate the average change in bed elevation over time. The 1930 topography is not used to calculate average change in bed because the trends in bed change that occurred during this year occurred immediately following the failure of the St. Francis Dam upstream of the project site. Several events within the available historical record (1930 to present) have had an impact on the River bed and fluvial mechanics. These events include failure of the upstream dam, construction of bridges spanning the River, agricultural infill along the River banks, and periodic burning of surrounding vegetation during forest fires. The most significant historical event in the formation of the present bed condition was the failure of the Dam. Within the project reach, the failure of the Dam appears to have resulted in the abrupt scour of the bed. The sectional analysis finds that some historical sections (SRD2, SRD3, SRE1, SRE2) show little change between 1947 and 2005 suggesting an approximate equilibrium state for these subreaches. Between 1947 and 2005, 0.5, 0.7, 1.0, and 0.8 feet, respectively, of cumulative degradation appears to have occurred on these sections. Upstream sections SRA1 to SRC3 show continuous degradation over the period of record from 1947 to the present. Three sections, SRC4, SRD1 and SRE3 aggraded cumulatively between 1947 and 2005 by 1.9, 1.4, and 3.1 feet on average, respectively. While it is unclear why the observed aggradation occurred, it is presently believed to be the result of the fires of the Summer of 2004 and the heavy rains of the 2004/2005 rainy season. This combination had the potential to produce high sediment runoff loading into the River. Degradation seems to be more prevalent on the upper half of the study reach while mild fluctuations about a mean are more apparent on the lower half. This appears to result from the relatively steep, narrow, winding upper portion of the study reach versus the relatively flat, wide, braided channel in the lower portion of the study reach of the River. Agricultural activities occurred, primarily in downstream sections but in upstream sections as well, so some of the observed channelization may have resulted from these activities.

Other scour considered in this study is comprised of four sub-categories: local scour, bend scour, low-flow incisement, and bedform height. Local scour occurs in the vicinity of flow obstructions including piers and abutments. Bend scour occurs because of velocity gradients around curves in fluvial systems. Three distinct bends are located in the study reach. Low flow incisement is included to represent thalweg or low flow channel depth. On-site inspection and review of historic data of this feature suggest a thalweg depth of approximately two feet. Finally, bedform height represents the dunes and anti-dunes that develop in active soft-bottomed channels during flow events. In this study, bedform height has been limited after Kennedy (1963). Local scour ranges from 0.0 to 17.4 feet in the proposed conditions at the various river crossings. Results of calculations of bend scour vary from 0.0 to 11.3 feet for the existing condition and 0.0 to 8.9 feet for the proposed condition. For both the existing condition and the proposed condition, the bedform height ranges from 0.5 to 8.3 feet. Changes between the existing and proposed conditions are a reflection primarily of the change in velocity brought about by the proposed condition.

General adjustment, long-term adjustment, and other scour are summed to determine total potential bed adjustment following LACH&SM methodology. For cross-sections where SAM modeling predicts aggradation, the general adjustment contribution to total bed adjustment is not included for degradation calculations. The existing condition is predicted to have a combined bed adjustment of approximately -6.9 to -19.7 feet for the outside of curved reaches and -6.2 to -15.4 feet for the inside of curved and straight reaches. Calculations in the proposed condition predict that the combined bed adjustment ranges from approximately -6.7 to -26.2 feet for both the outside of curved reaches and for the inside of curved and straight reaches.

A comparison of total bed adjustment estimated by both the summed methodology and the LACFCDDM methodology shows that the more intensive LACH&SM methodology using SAM for general adjustment and historical analysis for long-term adjustment predicts a shallower toe-down for both the existing and proposed conditions than does the LACFCDDM methodology except for sections in the vicinity of subreach SRA2, SRB1, SRC2, and SRE1. In subreach SRA2 section 43820, very high long-term adjustment causes LACH&SM calculations of this section to exceed LACFCDDM calculations by 1.4 feet for both outside of curved reaches and straight or inside of curved reaches in the existing and proposed conditions. In SRC2 section 29140, higher general adjustment and higher bedform height cause LACH&SM calculations of this section to exceed LACFCDDM calculations by 0.6 feet in outside curved reaches and 1.2 feet in straight and inside of curved reaches. In SRB1 section 36080 and SRE1 section 15125, the presence of proposed bridges causes LACH&SM calculations of this section to greatly exceed LACFCDDM calculations, by more than 10 feet. LACH&SM methodology utilizing SAM calculations predicts a deeper toe-down than does the LACFCDDM at these locations methodology because the LACFCDDM does not account for the effects of local degradation as effectively.

Freeboard is considered for the purposes of this report to be the additional height required above the top of a levee or other bank protection to prevent overtopping. Freeboard elevation is calculated in this study based on LACH&SM Chapter 5A-3, and includes LACFCDDM calculations. The freeboard for the River ranges from approximately 2.5 to 5.2 feet for both outside of curved and straight or inside of curved

reaches in the proposed condition. Maximum total toe-down, total freeboard, toe-down elevation and freeboard elevation are presented in Table 8.

Previous studies estimated that a toe-down of 12.5 feet would be required for adequate protection. The results of this study, however, suggest that a variable toe-down from approximately 5 to 27 feet based on SAM modeling, or 8 to 21 feet based on LACFCDDM. A large portion of this difference can be attributed to the difference in general adjustment. It is expected that HEC-6 modeling will be on the order of 1 to 5 feet general adjustment.

DRAFT

1 Introduction

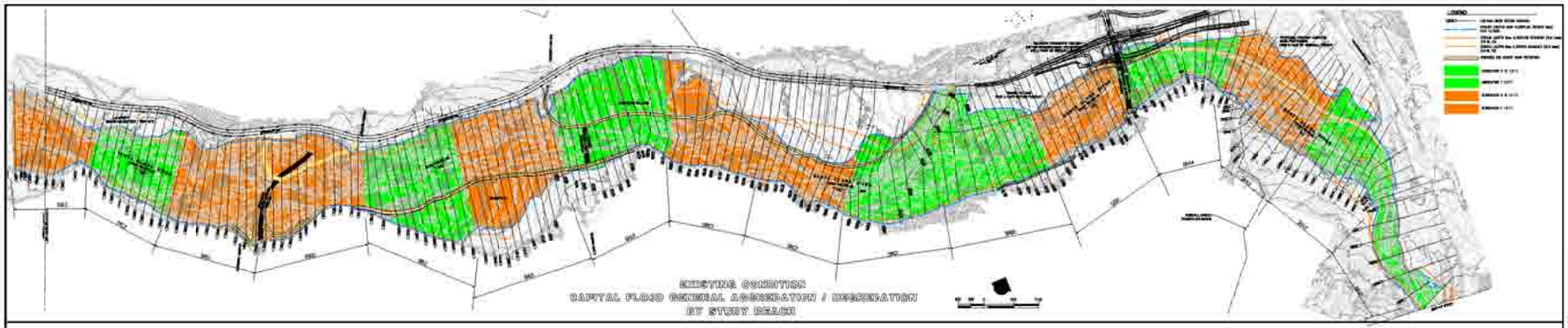
The following technical investigation provides a detailed and focused evaluation of the fluvial characteristics and long-term stability of the Santa Clara River for the reach including all of Newhall Lands' proposed Newhall Ranch and Phase 1 Landmark Village development. The River study reach is located from Interstate 5 on the east and to a point directly downstream of the Ventura County/Los Angeles County line (Figure 1.1). This reach includes the Newhall Ranch Specific Plan and the proposed Entrada project. The first phase of the Newhall Ranch Specific Plan (Landmark Village) is bounded by the River on the south, State Highway 126 on the north, Castaic Creek on the east, and Grande Canyon on the west (Figure 1.1). The Santa Clara River fluvial system extends from Acton, California in the east to the Pacific Ocean, the River's natural terminus, in the west. Adjacent development along the River within the study reach has the potential to modify the fluvial response of the watershed through changes in the runoff and reduction in the sediment supply from the developed areas. The proposed buried soil cement bank protection on both the north and south banks of the River within the study reach is intended to provide long-term erosion protection from lateral migration of the bank and flood protection for the adjacent proposed development areas. These modifications to the river system have the potential to modify the fluvial operation of the floodplain and cause changes to the stream mechanics. The intent of this analysis is to evaluate these impacts from (1) fluvial modifications of the river bed from single hypothetical storm events, (2) changes in the floodplain fluvial operation over the long-term; and, (3) to determine the top and toe of the proposed bank protection.

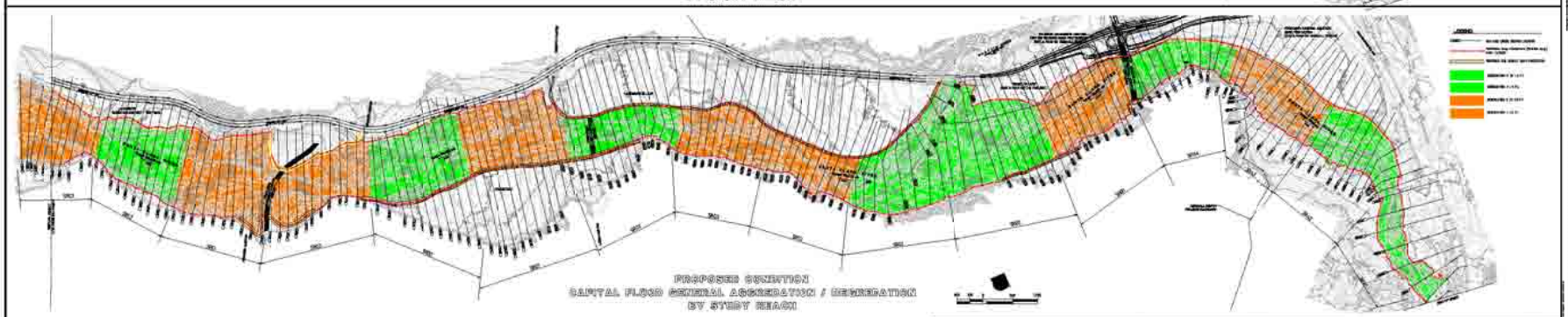
1.1 Types of Adjustment

Modifications to the river system are measured as bed adjustment in feet. Positive adjustment indicates bed aggradation while negative adjustment indicates bed degradation. Several types of adjustment are considered in this study including general adjustment, long-term adjustment, and other scour. General adjustment consists of scour that occurs in an individual discharge event, and may be considered as the difference between sediment inflow and outflow. That is, if sediment inflow into a given reach is higher than sediment outflow for the same reach, aggradation will occur. In contrast, if sediment outflow exceeds inflow for a given reach, degradation in the form of scour will occur in the reach. Long-term adjustment consists of fluvial processes that occur over many rainy seasons and contribute fluctuation of bed elevation of a river or creek. Other scour is comprised of local scour, bend scour, low-flow incisement, and bedform formation. These are discussed in detail, below.

1.1.1 Study Objectives

The primary objective of this report is to develop the technical engineering analysis to assess river bed impacts from potential modifications of fluvial operation from proposed development west of Interstate 5, including the Newhall Ranch Specific Plan. The intent is to provide a comprehensive assessment of short- and long-term bed adjustment. This report provides technical analysis for (1) general adjustment, (2) long-term adjustment, (3) other scour, (4) study reach gradation, (5) SAM modeling and analysis, (6) HEC-6 modeling and





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PHASE 1 FLUVIAL STUDY

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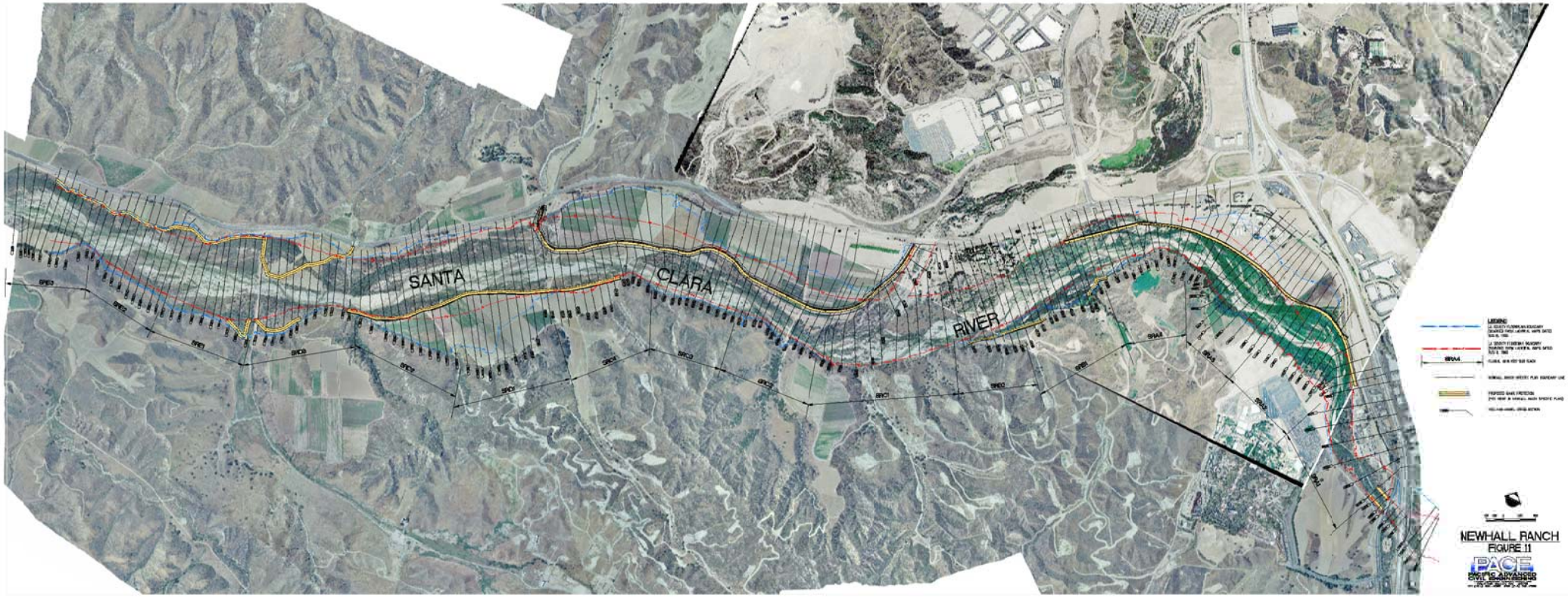
SANTA
CLARA
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FIGURE 11
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PACE'S ADVANCED
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analysis, and (7) total soil cement bank protection toe-down design. The objectives of the fluvial assessment for the proposed development project include the following:

1. Quantify the fluvial parameters that are representative of the river bed characteristics.
2. Model the existing and proposed conditions river bed and fluvial processes.
3. Provide preliminary assessment of the streambed stability through determination of the sediment transport capacities within different reaches of the floodplain.
4. Provide toe-down depth assessment throughout the study reach.
5. Provide freeboard height assessment throughout the study reach.
6. Determine any impacts to off-site properties.

A variety of engineering analysis and tasks were associated with both the different aspects of the watershed hydrology and floodplain hydraulics. A technical framework was developed to guide the analysis of the system. These major task areas of study reflected the various objectives of the study and included the following:

1. Floodplain field investigations – Perform field reconnaissance of the existing watershed conditions as well as ground photo survey along the entire existing creek system within the fluvial study boundary.
2. Baseline digital floodplain cross-section geometry – Layout appropriate spacing and location of cross-sections to establish the representative channel geometry. Digitally develop extremely accurate cross-section coordinate points using topographic digital terrain models (DTM) and CAD subroutines suitable for hydraulic model format. Adjust cross-section data to include horizontal variation of roughness and other attributes.
3. Baseline HEC-RAS hydraulic model – Prepare floodplain model in HEC-RAS based on the 1999 digital geometry and existing condition flowrates. Evaluation based on single storm event and steady flow conditions.
4. HEC-2 model creation – Conversion of HEC model formats for use in SAM and HEC-6 modeling.
5. Floodplain reach characterization and parameter estimation – Prepare an assessment of the hydraulic parameters and evaluate the statistics. Determine hydraulic subreaches based on hydraulic statistics. The analysis involves determining the average hydraulic properties for each reach and then applying the appropriate sediment transport relationship to each grain size fraction.
6. Sediment transport capacity analysis – Prepare steady state sediment transport capacity analysis through dividing the channel system into different reaches and comparing the capacity within each reach.

7. Analyze historic trends in river bed adjustment – Consider available historic data to gain insight into changes in bed characteristics throughout the period of record.
8. Analysis of local bed adjustment components – Study of the individual components of local bed adjustment.
9. Calculate toe-down depth – Calculate the total toe-down depth of proposed soil cement bank protection based on the analysis of individual bed adjustment components.

DRAFT

2 Previous Fluvial Analyses for Study Reach

2.1 Introduction

Three sediment transport studies have been conducted within the study reach between Interstate 5 and the Los Angeles/Ventura County line in the last 25 years. The first study conducted by Sikand Engineering was submitted in June 2000, and revised November 2004. The purpose of the Sikand study was to provide HEC-6 sediment transport analysis for the Santa Clara River to determine the possible effects of the Newhall Ranch Development on river bed stability. The Sikand study relied on previous work conducted by SLA which was submitted June 1998 in *HEC-6 Sediment Transport Analysis for ACOE General Permit on Santa Clara River (from Castaic Creek to Cottonwood Avenue) and San Francisquito Creek (from Santa Clara River to 15000' Northerly)*.

The second study produced by Simons, Li, and Associates and submitted November 1990, sought to provide information for flood and fluvial process management in the Santa Clara River from Soledad Canyon to Castaic Creek. The study included multiple tasks including data collection, quantitative analysis and mathematical modeling, alternatives evaluation and other assignments.

The final study was conducted by the United States Geological Survey and completed in August 1979. The study sought to determine the sediment discharge in the Santa Clara River Basin in Los Angeles and Ventura Counties using sediment trap (1968-1975) and historical data (1928-1975). Sediment data was collected for the period 1967 to 1975 at the Los Angeles/Ventura County line.

2.2 Sikand Engineering Associates, 2004

The Sikand study covers the portion of Santa Clara River from Interstate 5 to the Los Angeles/Ventura County line. The study utilized the ACOE HEC-6 model to assess how improvements in the River as part of the Newhall Ranch Development will alter sediment transport. The primary focus of the study was the long-term degradation of the river bed and the toe-down depth required for proposed improvements. Both the existing and proposed model conditions were developed in HEC-RAS and the only differences between the models was the incorporation of proposed levees. Soils data was taken from the SLA study in Chapter 4 of the Interim Report, Existing Conditions Data Collection. Grain size distribution plots indicate poorly graded sand with gravel and a D_{50} of approximately 1 mm in the vicinity of the Castaic Creek confluence. Only HEC-6 input files offer sediment information. The inflow sediment boundary condition and grain size distribution was also taken from the SLA study. Conversions from tons sediment per day to feet of scour was calculated by assuming a four day duration and sediment specific gravity of 2.65. Several discharges were run in the numerical modeling including the Capital and 100-year storm events. The report does not specifically note the discharge of either event.

The study found that for seven subreaches in the present condition, the bed is in steady state, but that the proposed conditions are expected to cause minimal degradation (an average of one foot) in some subreaches and minimal aggradation (an average of three feet) in some subreaches. The study also analyzed the historical record of gage data at the county line from 1953 to 1993, and determined that a 1500 cfs minimum discharge was required to generate sediment transport. By comparison, USGS data (*Sediment Discharge in The Santa Clara River Basin, Ventura and Los Angeles Counties, California*) notes in Table 3 that in 1971 at 1470 cfs, 99% of the transport was silt at the county line. It is important to note that PACE is citing the SLA study and not making the claim. PACE does not model silt in the present study since it is generally transported as wash load and is not pertinent to the present study's goals.

It is important to note that the results of this study were not accepted by Los Angeles County Department of Public Works, and the comments on the last review of the study in 2004 were not addressed.

2.3 Simons, Li & Associates, 1990

The SLA study is broad in reach and included use of the proprietary QUASED numerical model for fluvial analysis. At present, it is not clear if this model is still applicable or how it compares to other fluvial modeling software such as HEC-6. The study included a large volume of data analysis including flood flow frequency analysis, HEC-2 numerical modeling, historic photograph analysis, and sediment yield calculation. Supplemental design criteria are provided for subsequent studies. Sediment gradation data was presented in an interim report that indicates an average D_{50} of approximately 1.3 mm below Interstate 5. Boring logs are present in the SLA study. There is no apparent consistent vertical distribution of sediment grain size between boring logs.

The study suggests a 100-year return period discharge in the River of 47,100 cfs in the vicinity of the Interstate 5 bridge. For the portion of the River downstream of Interstate 5, the bed was found to be adjusting between -0.1 to +1.0 feet. The study notes that the River appears to be in "pseudo-equilibrium" and "shows no trend toward either aggradation or degradation and significant lateral migration of the channel is not apparent." QUASED modeling suggests that some reaches increase degradation potential as the result of encroachment by improvements as compared to the existing condition. For the portion of the River downstream of Interstate 5, some portions of the bed are expected to aggrade more, while others are expected to degrade more. Downstream of Mint Canyon on the River toe-down, design depth of 12.50 feet is recommended with a general scour of 2.68 feet, a bed form height of 4.92 feet, a low flow incisement of 2 feet, and a total scour of 7.14 feet (Table 3.20, p. 3-54).

The SLA report was reviewed in detail by LADPW and response to comments made, however, the report was not revised to obtain final LADPW approval.

2.4 USGS, 1979

The USGS study collected sediment data from 1967 to 1975 at three sites in the Santa Clara River basin including the Los Angeles-Ventura County line. The study estimated long-term sediment discharge by applying the sediment and water discharge relationship observed from 1967 to 1975 to long-term records of water discharge (1928-1975).

During the short-term period (1968-1975), total sediment discharge was 63.5 million tons, 59.5 million tons of which was carried in suspension. Coarse sediment accounted for 28% of the total sediment discharge (17.7 million tons). Transport of the majority of sediment occurred during only a few days of flood flow each year (55% of the total sediment within 2 days and 92% within 53 days).

Sediment deposited in reservoirs (Lake Piru and Pyramid Lake) resulted in a 6% reduction of sediment to the River basin during the historical period (1928-1975) and 12% during the period most affected by dams (1953-1975). Castaic Creek interception of sediment reduced the amount of sediment in the River by another 2% from 1928-1975 and 4% from 1953-1975. It is not clear how these reductions are directly related the completion of the Castaic Creek Dam because it was not completed until 1971.

DRAFT

3 Sediment Characterization and Analysis

3.1 Sediment Data Collection

To characterize the sediment of the river bed and by extension the possible bed load of sediment during discharge events, a sediment grain size analysis was conducted. The goal of the analysis is to gain a statistical representation of the size distribution of soil components of the river bed. Grain size distribution analysis is a powerful tool because the results can represent both a qualitative description of soil make up as well as quantitative input for further predictive measures, such as fluvial modeling.

Sediment collection for the Santa Clara River along the study reach was conducted by Allen Seward Engineering Geology, Inc. Eighteen samples were collected along the river with a total of 23 including samples taken at the tributaries. The relevant sampling locations are compiled in Table 3.1. All sampling was conducted using grab samples of the upper foot of the active or recently active portion of the bed. At least three samples at different locations within a sampling station were taken at each River sampling location. Sampling locations for the study are presented in a February 14, 2005 report, reproduced in Appendix Chapter 3.2.

Table 3.1: Santa Clara River Location and Average D_{50} of Sediment Samples

Reach	Station	Sample Number	Reach Average D_{50} (mm)[1]
A & B	37135	CB1	0.5
	37135	CB2	
	36515	CB3	
C	28500	HR1	0.95
	28500	HR2	
	28500	HR3	
	24115	LC1	
	24115	LC2	
	24115	LC3	
D	22195	AC1	1.0
	22195	AC2	
	22195	AC3	
D & E	15335	MC1	1.0
	15335	MC2	
	15335	MC3	

1: Reach average is the average of all samples I the reach.

3.2 Sediment Gradation Analysis

Generally, grain size distribution analysis is broken down into three distinct steps. The first step is to dry the samples. Drying is accomplished in a desiccator or similar apparatus. The second step is to sieve or otherwise

separate the sediment by particle size. Finally, fine material (smaller than standard mesh 200) is analyzed using hydrometric techniques. The sediment distributions are plotted on semi-log plots by percent finer for a given sample size. For this study, no fine material is included in analysis because fine material is generally transported as wash load, which is not of concern here. Distribution data has been averaged on a station by station basis. Averaging is accomplished by taking the mean of the three samples from a given station. Averaging provides a single representative sediment grain size distribution for a given station that can be used for numerical modeling or other analysis. Plots of the mean grain size distribution for each sampling station are presented in Figure 3.1A-E. Raw grain size distribution plots for the study are presented in the February 14, 2005 Seward report, reproduced in Appendix Chapter 3.2.

3.3 Sediment Characterization

A review of the raw gradation curves indicates that most samples are comprised of poorly graded sands with gravels and silts. The D_{50} values for all samples ranged from 0.25 to 4.67 mm with an average of 0.8 mm. A comparison with Figure 3.2A-B indicates that averaging retains the sandy character of the sampled soil. The averaged D_{50} values range from 0.5 to 1.0 mm. Additionally, previous SLA study noted above also found similar sandy characteristics, however, the average grain size was found to be approximately D_{50}=1.3 mm, somewhat more coarse that the current sampling.

Seward sampling was conducted on approximately the upper foot (recently active layer) of the bed, as noted above. To be conservative, no armoring layer (cobble layer) depth is assumed in sampling which allows the bed to fluctuate freely in numerical modeling. Additionally, the true armoring layer has not been observed in field measurements including Seward field studies and SLA boring logs. This study assumes that the grab sampling at the surface represents the below-surface bed. While the SLA boring logs do show vertical variation in grain size distribution, a consistent grain size vertical distribution is not evident.

The County has noted that cobbles are present in the SLA study boring logs, which is true. Cobbles are not present in any of the grain size distribution curves in the SLA study (particularly in the Landmark study reach), however, careful review of the boring logs down to approximately 10 feet (approximately five times the SAM single event depth) notes only sporadic cobble observances, generally less than 5% and rarely as much as 10%. More importantly, is the fact that at sample location 11 (in the Landmark Village study reach, p. B.5) no cobbles are observed until 8.5 feet. Because of the paucity of cobble occurrence in both the boring logs and their depth below the SAM single event depth, taken as the active depth, PACE believes that the sampling data collected by Seward is representative of the active bed.

LACDPW has noted that previous versions of this report included different sediment gradation data than is present currently. Careful review of the data reveals that most of the sampling for the January 2005 PACE draft report, compiled by Seward, was for upland and tributary locations, many at the proposed Landmark site. Some of the samples in that report included River

sample sites; however, only single grabs were included. The February 2005 PACE draft report includes multiple grabs by Seward at each River sample location providing a much greater degree of confidence in the data by being able to spot outliers (here in the statistical sense). Because there is no way to independently determine the efficacy of the samples in the January 2005 report, the gradation data was replaced with more verifiable data. The January 2005 data is not included in this draft.

DRAFT

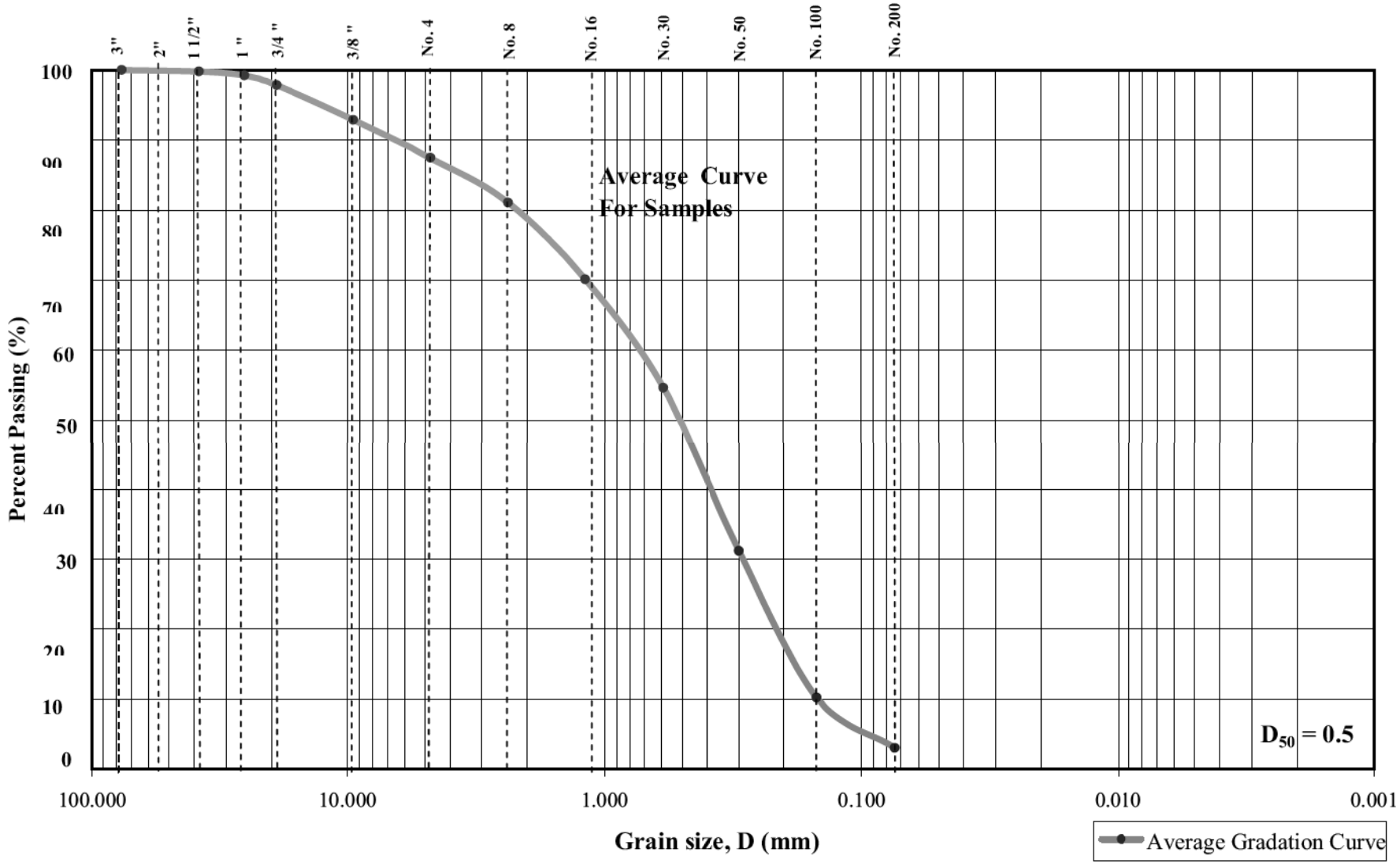

Figure 3.1A. Santa Clara River Reach A Average Gradation Curve

P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\scrgrainsize - new reach a (cb 1, 2, 3) 10-02-05

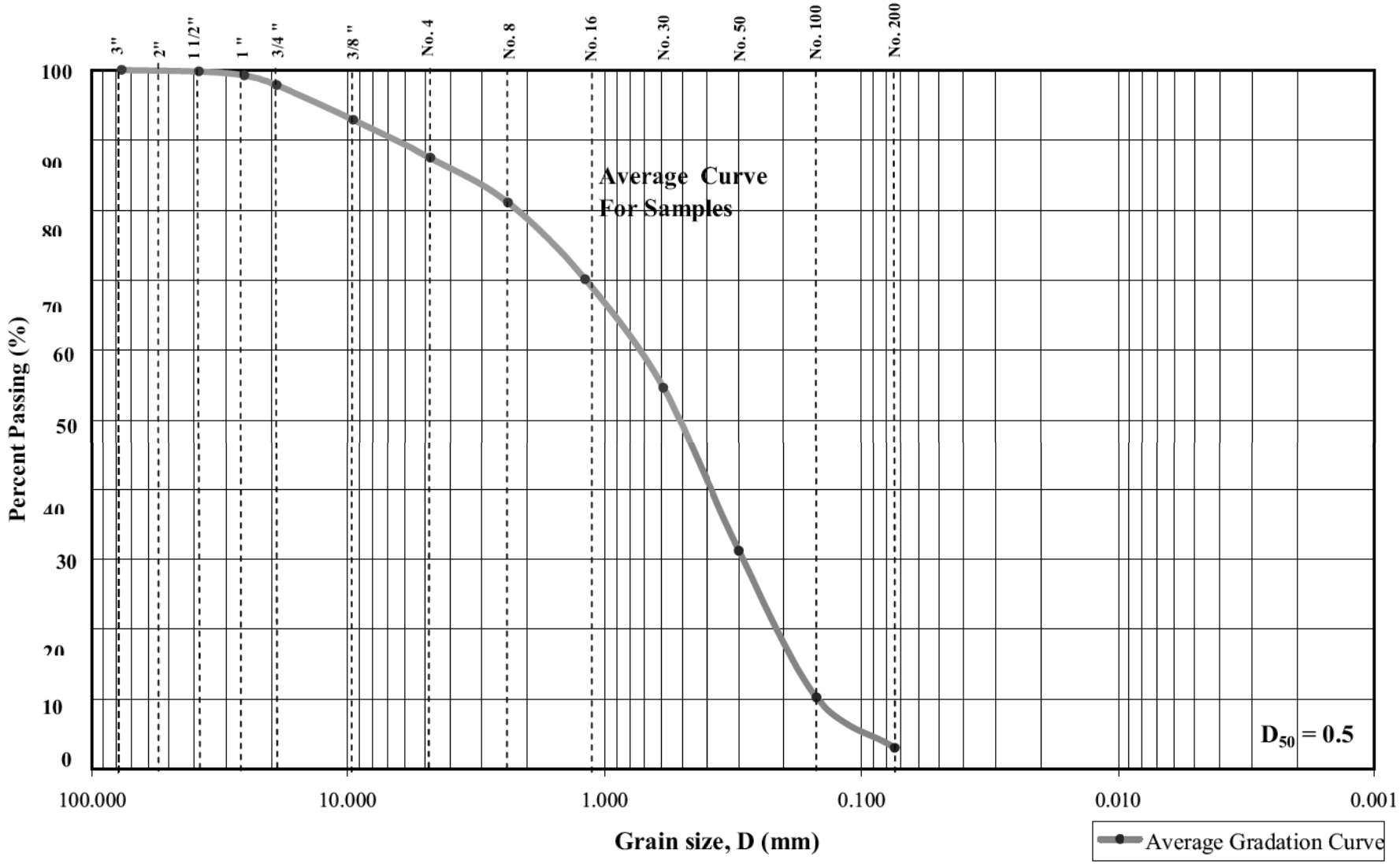

Figure 3.1B. Santa Clara River Reach B Average Gradation Curve

P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\scrgrainsize - new reach b (cb 1, 2, 3) 10-02-05

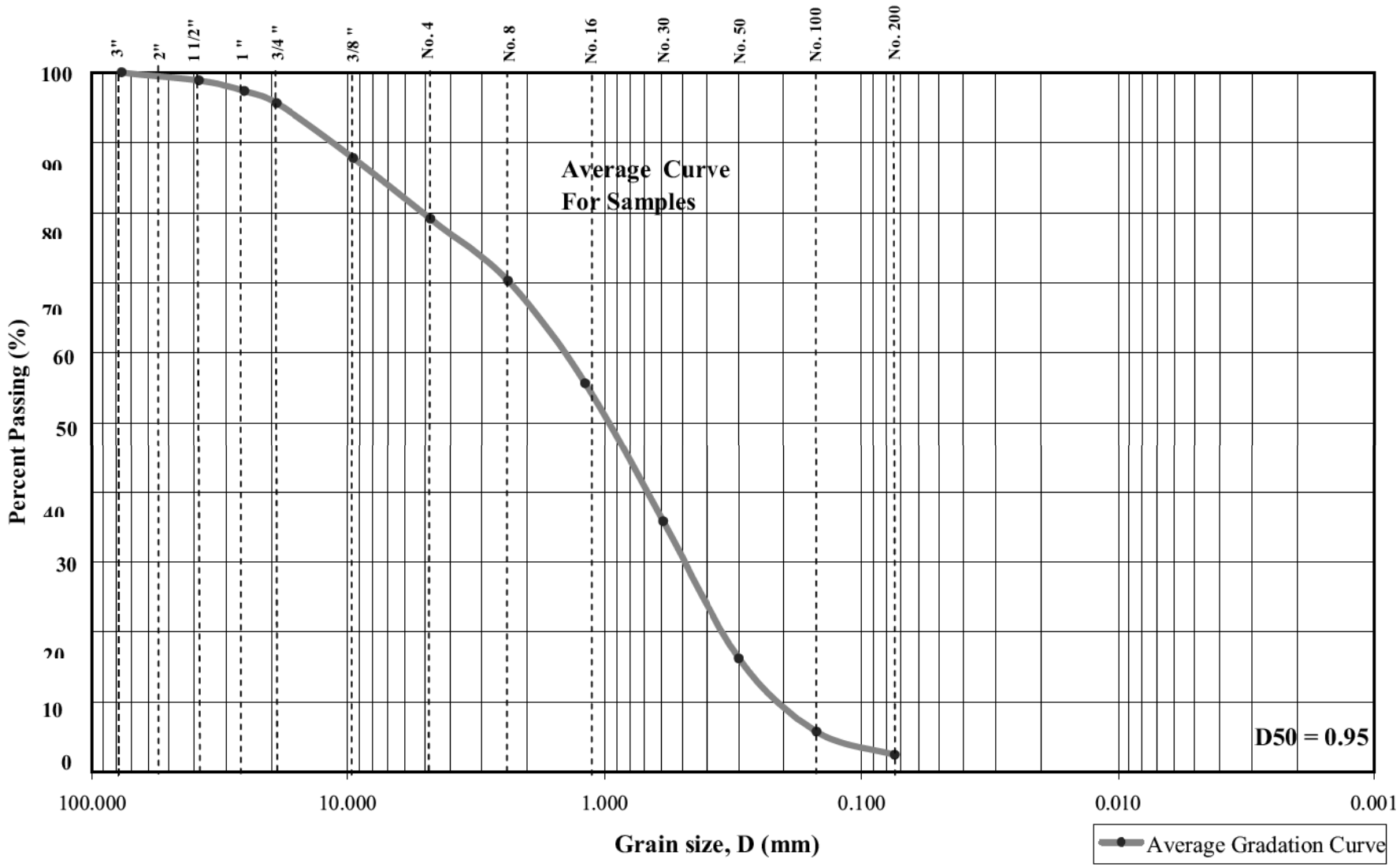

Figure 3.1C. Santa Clara River Reach C Average Gradation Curve

P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\scrgrainsize - new reach c (hr 1, 2, 3 & lc 1, 2, 3)

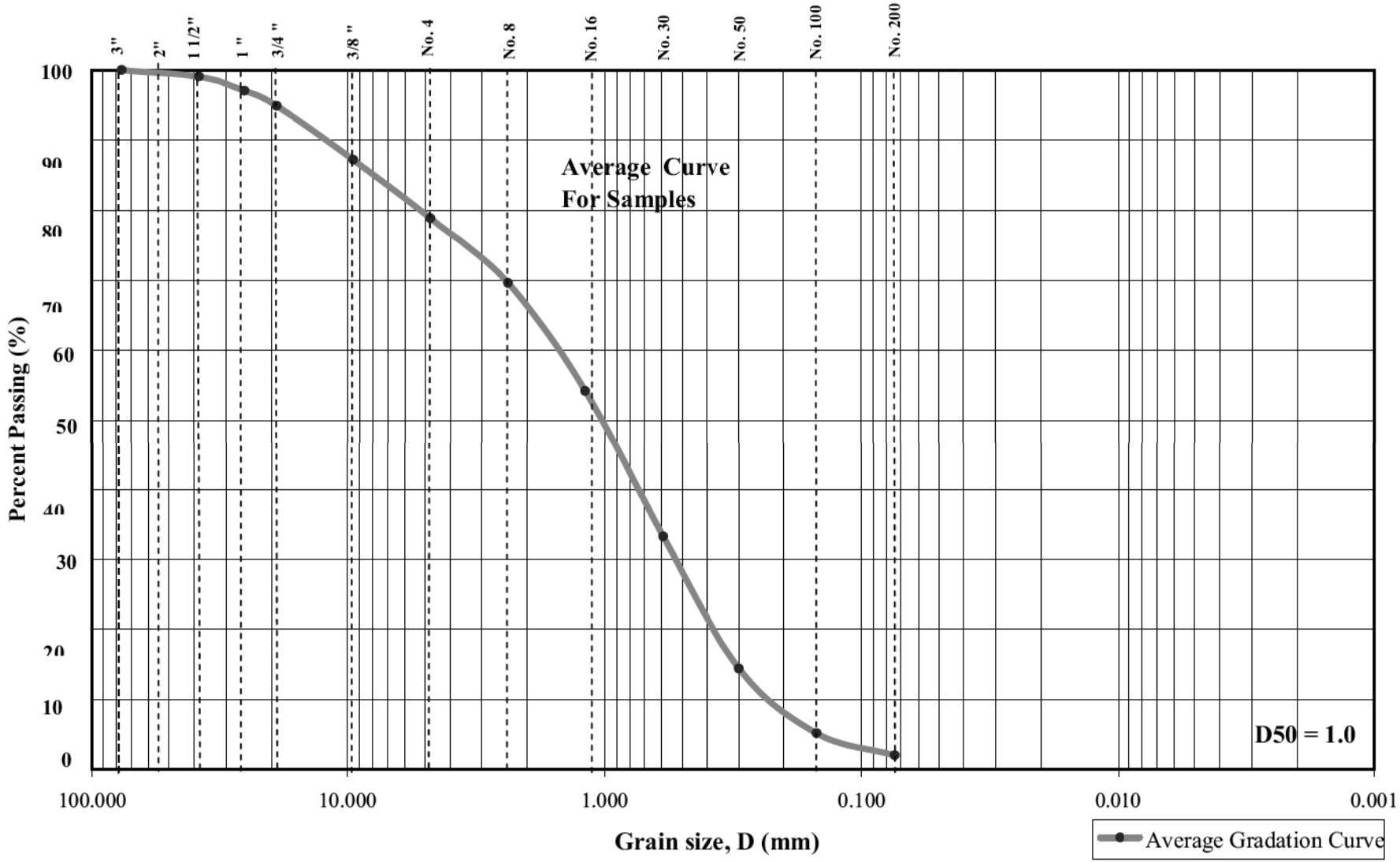

Figure 3.1D. Santa Clara River Reach D Average Gradation Curve

P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\scrgrainsize - new reach d (ac 1, 2, 3 & mc 1, 2, 3) 9-19-05

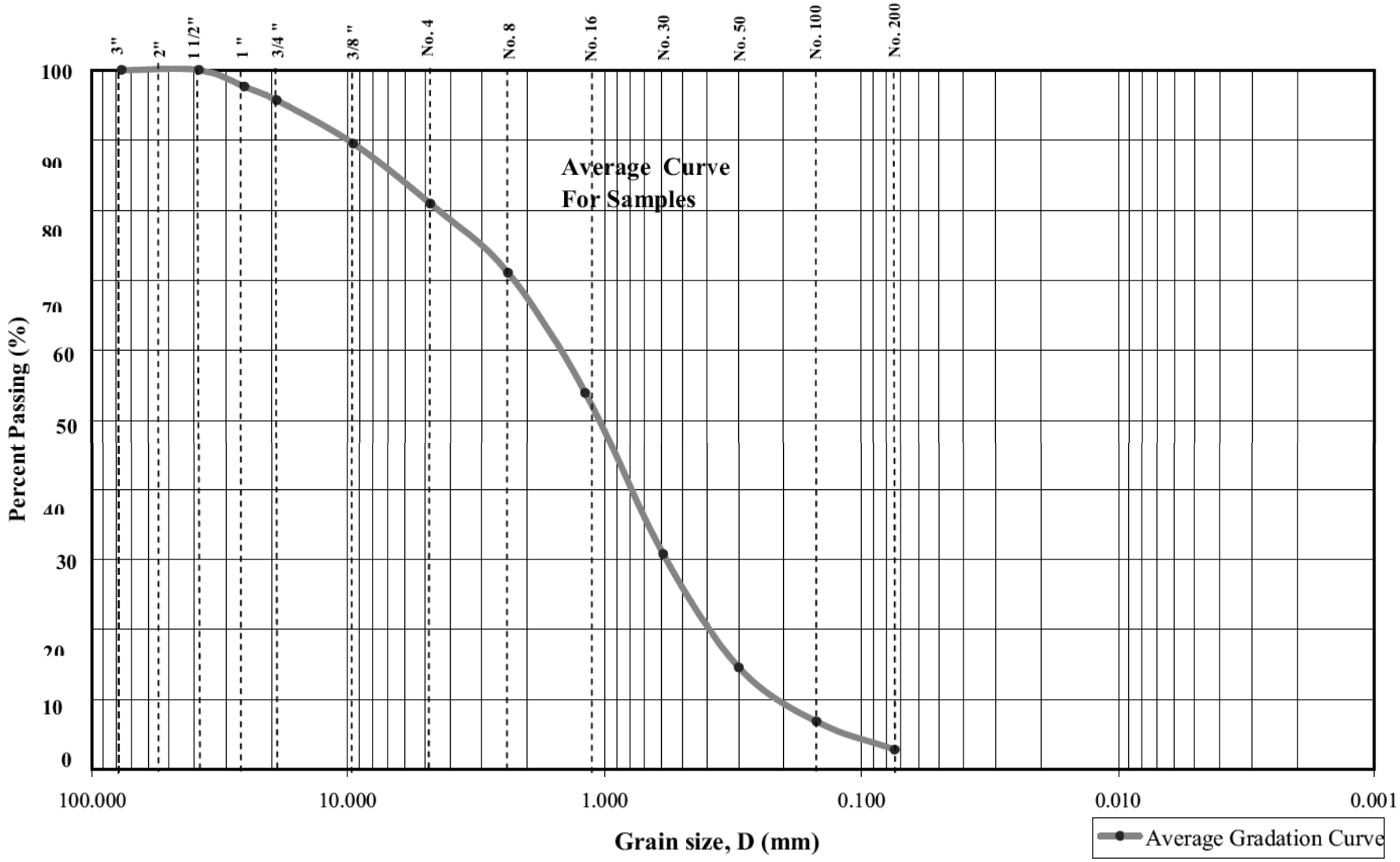

Figure 3.1E. Santa Clara River Reach E Average Gradation Curve

P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\scrgrainsize - new reach e (mc 1, 2, 3) 9-19-05

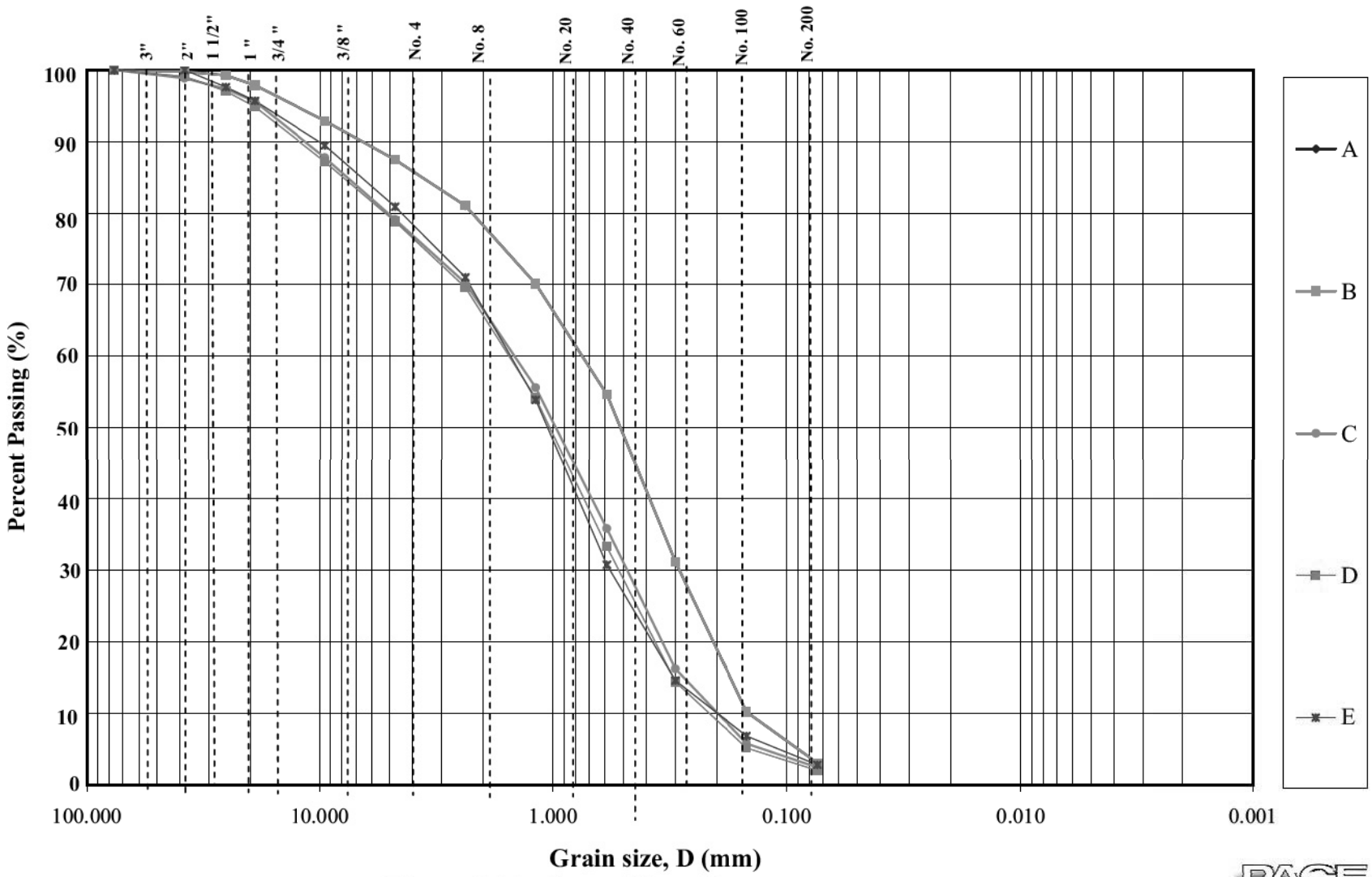

Figure 3.2A. Santa Clara River Streambed Grain Size

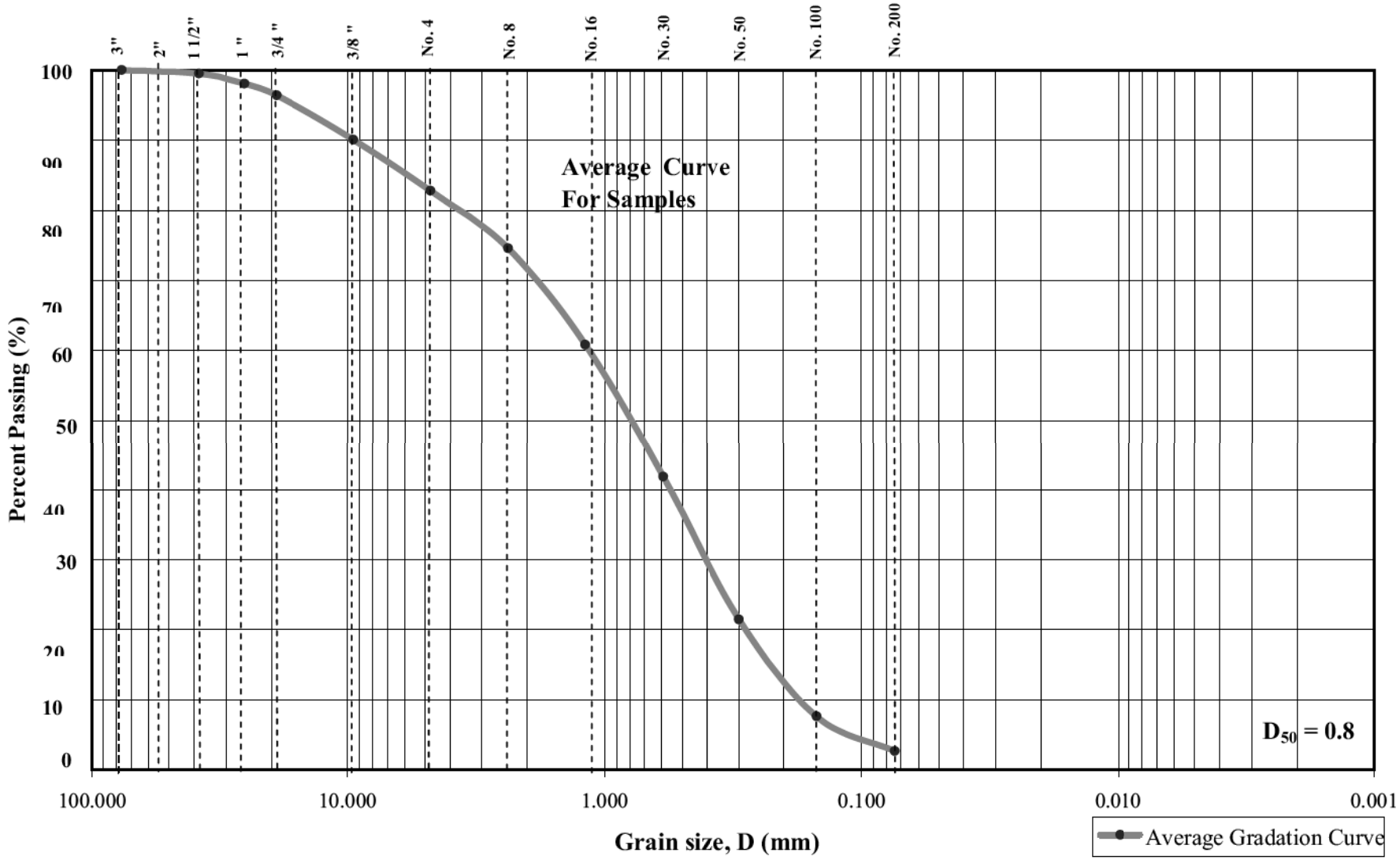

Figure 3.2B. Santa Clara River Average Gradation Curve

4 General Adjustment

4.1 SAM Model

General adjustment was estimated in this study using the US Army Corps of Engineers (ACOE) SAM steady-state numerical model. Here, SAM was employed to provide a first calculation of sediment transport potential for multiple subreaches within the Santa Clara River (SCR). The SAM Sediment Hydraulic Package is an integrated system of programs developed through the Flood Damage Reduction and Stream Restoration Research Program to aid in the analyses associated with designing, operating, and maintaining flood control channels and stream restoration projects. SAM combines the hydraulic information and the bed material gradation information to compute the sediment transport capacity for a given channel or floodplain hydraulic cross-section for a given discharge at a single point in time. A number of sediment transport functions are available for this analysis and SAM has the ability to assist in selecting the most appropriate sediment transport equation.

The three primary fluvial components of SAM are SAM.HYD, SAM.SED and SAM.AID. SAM.HYD provides a steady state, normal-depth, one-dimensional representation of channel hydraulics. The SAM.SED module combines the hydraulic parameters with the bed material gradation curve to compute bed material discharge rating curves by size classification. The SAM.AID module provides the user with recommended sediment transport equations based on the best matches between hydraulic parameters and grain size distribution of the study reach with parameters of from widely accepted and published research.

4.1.1.a SAM Model Theory and Limitations

The SAM numerical model is built upon hydraulic and fluvial components. The hydraulic components include representations of river bed characteristics that are input into an analytical procedure. The fluvial component includes representation of bed gradation as percent finer statistics and a selection of up to twenty sediment transport equations. SAM's hydraulic component will accept either average reach parameters or cross-section data imported from HEC-2/HEC-6 models. Hydraulic modeling is based on a uniform flow equation where discharge is the dependent variable such that,

$$Q = f(D, n, W, z, S)$$

where Q is discharge in cfs, D is flow depth in feet, n is the Manning's number, W is bottom width in feet, z is the channel side slope, and S is the energy slope. The bottom width is representative of the total moveable bed width of the channel and Manning's number is a composite value. Normal depth is calculated using Manning's equation, and effective values of width and depth are calculated following normal depth calculations. In cases where HEC-2 cross-sections are used for modeling, as in this study, the

effective depth and width are calculated from the cross-section data based on the channel hydraulics.

The fluvial component is based on sediment transport functions to calculate the bed portion of the sediment discharge-rating curve.

The sediment transport equations are of the form,

$$GS_i=f(V, D, S_e, B_e, d_e, \rho_s, G_{sf}, d_s, i_b, \rho_f, T)$$

where GS_i is the transport rate for sediment size class i; the hydraulic terms V, D, S_e, and B_e, are the average velocity, effective flow depth, energy slope, and effective flow width, respectively; the sediment particle parameters d_e, ρ_s, and G_{sf} are the effective particle size, particle density, and grain size shape factor, respectively; the sediment mixture properties, d_s and i_b are the geometric mean particle size of sediment class i and fraction of class i in the bed, respectively; and the fluid properties ρ_f, and T, the water density and temperature, respectively. Twenty well known, published, peer-reviewed transport equations are available including Ackers-White, Colby, Laursen-Copeland, Laursen–Madden, MPM, Toffaleti, Yang, Van Rijn and others. Once the data assembly is complete, the SAM.SED module can be used to create a sediment discharge-rating curve based on grain size distribution. The reader is referred to the SAM user's documentation for further reference.

It is important to note that the SAM model is a zero-dimensional computational package that is only based on a single cross-section at a particular point in time. As such, SAM simulations can only represent a reach average during a steady state discharge. Because SAM applies sediment transport to a point, no variability in size distribution in either space or time is calculated. With these limitations in mind, in this study SAM is intended to provide a first approximation to sediment transport to which other more sensitive calculations can be compared.

4.1.1.b SAM Model Assembly

In this study, hydraulic representation of the river bed is accomplished in several distinct steps. First, the HEC-RAS numerical model (1999 base topography) is thinned to no more than 100 stations per cross-section using HEC-RAS's cross-section points filter. Second, the HEC-RAS geometry is converted to HEC-2 format using the Army Corps RAS2UNET software. Next, the HEC-2 model deck is arranged to run in sub critical mode and all features, such as ineffective flow areas and levees, are added. Once the HEC-2 model is complete, it is re-imported into HEC-RAS and compared to the original model. Any cross-sectional differences between the RAS and 2 models are resolved. Once the original and re-imported models match, the HEC-2 model is run to

produce the Army Corps' T95 binary hydraulic simulation output file. Next, the T95 file is then read directly into SAM using the SAM model's M95 subroutine using the reach length option. Sections are chosen based on the reach characterization described below. A comparison of output and discussion is presented in Appendix Chapter 4.4.

This conversion methodology is powerful because it ensures that data created for, and analyzed using HEC-RAS and HEC-2 hydraulic software, is fully compatible with, and implemented in, SAM fluvial analyses. Copies of the HEC-RAS and HEC-2 models for both the existing and proposed conditions are included in Appendix Chapter 4.3. A table comparing the velocity and depth of the different models used in each phase of the project described previously is also included in Appendix Chapter 4.4. Both the existing and proposed conditions HEC-RAS model were originally developed by Sikand Engineering in *Newhall Ranch Santa Clara River HEC-RAS Study* (June 2000) and submitted as part of the Newhall Ranch Specific Plan. The Sikand model was further modified by PACE to create a model that was reviewed and accepted by LACDPW. The newest model Q_{CAP} discharge was approved by LACDPW for this study in 2005. Slight differences exist between the PACE and Sikand models in terms of discharge and stationing and have been made to meet LACDPW criteria, otherwise the models are the same. Otherwise, the only changes made to the HEC-RAS model occur in the proposed condition where the alignment of soil cement bank protection was revised to reflect the most current proposed condition, and the afore mentioned Q_{CAP} discharge. The current position of the bank protection avoids River jurisdictional areas and is further outside the River than the bank protection originally proposed in the Sikand model. The HEC-RAS model discharges in the present models were originally included in the Sikand model, except for the revised Q_{CAP} discharge, which was provided by LACDPW, as noted above. Finally, subreaches within the SAM model are specified and average hydraulic parameters are calculated for those subreaches. Subreaches are determined by examining the hydraulic parameters of the individual HEC-RAS cross-sections and identifying correlations between those hydraulic parameters and the longitudinal position in the channel of the individual cross-section. This process is presented in Appendix Chapter 4.5.

4.1.2 Reach-by-Reach Channel Hydraulic Characterization

Reaches are defined by changes in discharge within Santa Clara River. These changes occur at HEC-RAS sections STA 46195, STA 36080, STA 32265, STA 22195, and STA 15125, as shown in Figure 1.1. As noted above, SAM modeling is based on channel subreaches determined by correlating hydraulic characteristics with longitudinal cross-section location to preserve the along-stream character of the flow. The hydraulic parameters examined are discharge, energy slope,

bed slope, Froude number, top width, hydraulic velocity, and flow area based on the Q_{CAP} discharge. First, correlation coefficients are calculated for each section against the hydraulic parameters. The hydraulic parameter that produces the greatest correlation is plotted against cross-section location. Subreaches are then selected in a manner that preserves the trend of the hydraulic parameter as well as produces approximately equal subreach lengths, which are generally 1000 feet long. This methodology seeks to maintain continuity of analysis by producing similar length subreaches while analyzing the hydraulic parameters that largely control sediment transport. Correlation values typically vary from r=±0.25 to r=±0.82. In the case of the Santa Clara River, all subreaches have been defined based on locations of trend changes within the River. Subreaches are defined in Table 4.1A-B and shown in Figure 1.1. Both the existing and proposed conditions models employ identical subreach lengths and locations. However, because the HEC-RAS models were created separately by Sikand, slight differences in the model hydrology occur. These minor differences are not expected to significantly alter comparisons between the two models. The use of identical subreaches was employed for two reasons: to ensure consistency between existing and proposed conditions analysis, and because correlation values between sections and various hydraulic parameters for both the existing and proposed conditions are similar. Statistical analysis of the reaches for both the existing and proposed conditions is shown in Appendix Chapter 4.5.

Table 4.1A: Santa Clara River Existing Conditions Sub-Reach Stationing

Subreach	US Sta	DS Sta	Transport Equation[1]
SRA1	46195	44210	MPM
SRA2	43820	41460	MPM
SRA3	41280	38925	MPM
SRA4	33880	36265	MPM
SRB1	36080	29385	MPM
SRB2	33880	32605	MPM
SRC1	32265	29385	MPM
SRC2	29140	27155	MPM
SRC3	26990	25000	MPM
SRC4	24795	22415	MPM
SRD1	22195	20070	MPM
SRD2	19855	17785	MPM
SRD3	17510	15335	MPM
SRE1	15125	13190	MPM
SRE2	13030	11180	MPM
SRE3	11015	9025	MPM

1: MPM - Meyer, Peter and Muller, 1948

Table 4.1B: Santa Clara River Proposed Conditions Sub-Reach Stationing			
Subreach	US Sta	DS Sta	Transport Equation[1]
SRA1	46195	44210	MPM
SRA2	43820	41460	MPM
SRA3	41280	38925	MPM
SRA4	38710	36265	MPM
SRB1	36080	34090	MPM
SRB2	33880	32605	MPM
SRC1	32265	29385	MPM
SRC2	29140	27155	MPM
SRC3	26990	25000	MPM
SRC4	24795	22415	MPM
SRD1	22195	20070	MPM
SRD2	19855	17785	MPM
SRD3	17510	15335	MPM
SRE1	15125	13190	MPM
SRE2	13030	11180	MPM
SRE3	11015	9025	MPM

1: MPM - Meyer, Peter and Muller, 1948

4.1.3 Input Data and Selection of Transport Functions

Representation of sediment grain size distribution in SAM takes the form of percent finer data obtained from sieve analysis of channel sediment grab samples. At each sampling location, multiple samples are collected and analyzed, and the average data is input into the model. All sampling and sieve analysis was conducted by Seward Engineering Geology, and sample locations were chosen based on either the presence of recently active alluvium or the presence of adjacent/underlying older alluvium commonly incorporated into stream sediment load during major events. Environmental constraints on subsurface investigations in active drainages limited sampling locations in some instances, and in these cases the most representative, obtainable data is used as previously described in Chapter 3.

4.1.3.a SAM.AID Application and Theory

Sediment transport equations used in all SAM modeling were chosen with the assistance of the Army Corps' SAM.AID subroutine. The SAM.AID subroutine determines the most representative transport function based on the hydraulic parameters and percent finer data for each subreach by comparing model data with the results of 20 peer-reviewed and widely acknowledged sediment transport studies. This case-by-case transport equation selection is more likely to provide a robust representation of channel sediment transport than choosing an individual transport equation for all reaches.

Application of different transport functions to an individual channel reach may provide significantly differing model output. This is

because the parameters of a given study from which the function is derived, vary greatly. To accomplish the task of guiding the user in selecting an appropriate transport function, SAM.AID assumes that the function that best represents sediment transport in a gauged stream would also best represent transport in an ungauged stream with similar sediment and hydraulic characteristics. SAM.AID begins by comparing study parameters (V, D, S_e, B_e, D_{50}) with parameters in the transport function database. Comparison begins by determining if D_{50} falls within one of the ranges identified in the database. Once the initial matches have been made in the database, the three best-matched sediment transport functions for the study reach are listed along with the parameters that matched the data set.

Once the best transport equation matches have been determined by SAM.AID, the most representative equations are run in SAM.SED for each subreach. Yang (Yang, 1984) and MPM (Meyer-Peter and Muller, 1948) equations are added to all simulations where they are not explicitly matched by SAM.AID so that there is a continuity of comparison between subreaches. Following SAM.SED computations sediment transport potential for each subreach can then be estimated by reviewing the calculations from each equation and analyzing the results. Any SAM.SED calculation outliers are excluded and calculations of bed adjustment are made using mean estimate of transport potential. Outliers are values under analysis in a data set that reside far outside most other values in a data set. In this case, when one of the results of a SAM.SED calculation is three orders of magnitude or more different from the median, the data is excluded from analysis and noted as an outlier. The raw data is presented in Appendix Chapter 4.6.

The MPM equation was found to be the representative transport equation for all subreaches for the existing and proposed conditions. This is because transport estimates based on other transport equations (i.e. Yang), when used to estimate general adjustment and transport, produced degradation values in excess of both historical values of general adjustment (as much as approximately 15 feet) and values of general adjustment that might be physically expected during a single event (over approximately 20 feet). In other cases, some transport equations (i.e. Brownlie D_{50}) estimated sediment transport that produced general adjustment calculations much smaller than expected (as little as approximately 0.1 feet). The full summary of transport potential by subreach for the various transport equations for both existing and proposed conditions is provided in Appendix Chapter 4.6. Since the D_{50} for a given reach is the same for both the existing and proposed conditions models, the differences in transport function applicability is related to hydraulic differences between the two conditions.

4.1.4 SAM Bed Stability

Bed stability can be examined based on the change in potential transport between channel subreaches. Subreaches are readily determined from changes in hydraulic parameters, and frequently the most significant hydraulic parameter in terms of impact on stream stability is discharge (volume per unit time). If a channel subreach has equal potential transport both entering and exiting the reach, then the subreach is said to be in equilibrium. Frequently, however, channel subreaches are either in an aggrading or degrading condition. For the purposes of this study, aggrading reaches are those whereby the potential transport entering the reach (the potential transport of the subreach upstream of that under immediate consideration) is higher than the potential transport leaving the subreach (the potential transport of the subreach under immediate consideration). In degrading subreaches, the opposite is true and potential transport entering the reach is lower than that leaving the subreach. While it would appear that downstream subreaches would degrade constantly because discharge generally increases in downstream subreaches and in turn increases the transport potential as one moves downstream, other factors such as hydraulic depth, mean subreach velocity, hydraulic top width, and bed slope contribute significantly to potential transport.

Bed stability was determined by calculating the difference between subreach upstream and downstream sediment potential transport for the Q_{CAP} discharge. Transport potential for each reach is shown in Table 4.2A-B. The table shows no clear trend in transport potential as a function of subreach. The difference in transport potential, ΔTP (ton/day) between two cross-sections, was converted to bed adjustment, *GA* (feet), as:

$$GA = \frac{\Delta TP}{\rho b RL} day$$

where ρ is density in tons per cubic feet, *b* is channel width in feet, *day* denotes one day's time, and *RL* is reach length in feet. Density has been taken as 165.36 lb/ft^3. A summary of the adjustment for each reach is shown in Table 4.3.

General adjustment is based on SAM modeling presented in Figure 4.1A-B and Table 4.4A-B for the existing and proposed conditions, respectively. It is important to note that no apparent pattern of aggradation/degradation is apparent between cross-sections in the figure. General adjustment calculated using the equation presented in the Los Angeles County Hydrology and Sedimentation Manual (LACH&SM) is also shown in the figures. This latter calculation methodology is only based on flow mean velocity at a given channel section as computed by the HEC-RAS model of the system. In most circumstances, scour predicted by the LACH&SM is greater than that predicted by SAM for both the existing and proposed conditions except

at Commerce Center Bridge. It should be noted that scour predicted by the ACOE HEC-6 numerical model is expected to be approximately the same as or shallower than SAM predictions in terms of depth, although some longitudinal deviation from SAM results is expected.

The tables and figures indicate the general adjustment ranges from -2.9 to +2.3 feet for the existing condition, and -1.6 to +2.1 for the proposed condition. In Reach A (SRA1 to SRA4), the general adjustment does not vary by more than ±0.2 feet between the existing and proposed condition. SRA1 is predicted to have no change in general adjustment between the two conditions, and only SRA3 is expected to decrease degradation. The remaining sections are expected to decrease aggradation. In Reach B, either a minor increase in degradation between the existing and proposed general adjustment (0.1 feet ,SRB1) or minor increase in aggradation (0.2 feet, SRB2), is expected. In Reach C, no change between the existing and proposed condition is expected in SRC1 or SRC4, while SRC2 and SRC3 have 1.3 and 0.9 feet of decreased and increased degradation, respectively. No pattern of aggradation or degradation change in Reach D is observable. The subreaches in Reach D decrease degradation, increase aggradation, and increase degradation in subreaches SRD1 to SRD3 respectively. Reach E also has no pattern of aggradation or degradation change between the existing and proposed conditions ranging from 0.2 feet of decreased aggradation in SRE2 to 0.1 feet of increased degradation in SRE3. Finally, the general trend in general adjustment for the study reach as indicated by SAM modeling is not apparent for either the existing condition or proposed condition. It is not expected that short reaches (on the order of 500 feet) with minor lateral changes (on the order of 100 feet) in the positions of the proposed conditions improvements will affect these results significantly except where velocity changes are greater than approximately 25 percent.

Table 4.2A: Santa Clara River Existing Conditions Bed Stability

Subreach	US Sta	DS Sta	Trans Eq	Transport (ton)	Top Width (ft)	Depth (ft)	A/D	Grade Change (ft)
SRA1	46195	44210	MPM	403,938	525.6	0.6		0.6
SRA2	43820	41460	MPM	330,678	977.0	0.4	AGGRADE	0.4
SRA3	41280	38925	MPM	401,167	1,242.2	0.3	DEGRADE	-0.3
SRA4	38710	36265	MPM	343,735	952.0	0.3	AGGRADE	0.3
SRB1	36080	34090	MPM	483,359	1,389.0	0.6	DEGRADE	-0.6
SRB2	33880	32605	MPM	488,063	1,650.3	0.0	DEGRADE	0.0
SRC1	32265	29385	MPM	101,035	1,965.8	0.8	AGGRADE	0.8
SRC2	29140	27155	MPM	470,866	780.8	2.9	DEGRADE	-2.9
SRC3	26990	25000	MPM	558,797	1,492.1	0.4	DEGRADE	-0.4
SRC4	24795	22415	MPM	468,697	2,008.5	0.2	AGGRADE	0.2
SRD1	22195	20070	MPM	675,434	2,009.0	0.6	DEGRADE	-0.6
SRD2	19855	17785	MPM	241,344	1,936.3	1.3	AGGRADE	1.3
SRD3	17510	15335	MPM	623,943	1,812.5	1.2	DEGRADE	-1.2
SRE1	15125	13190	MPM	796,646	1,878.9	0.6	DEGRADE	-0.6
SRE2	13030	11180	MPM	307,423	1,372.4	2.3	AGGRADE	2.3
SRE3	11015	9025	MPM	624,904	1,390.6	1.4	DEGRADE	-1.4

Table 4.2B: Santa Clara River Proposed Conditions Bed Stability								
Subreach	US Sta	DS Sta	Trans Eq	Transport (ton)	Top Width (ft)	Depth (ft)	A/D	Grade Change (ft)
SRA1	46195	44210	MPM	403,938	525.6	0.6		0.6
SRA2	43820	41460	MPM	359,566	958.6	0.2	AGGRADE	0.2
SRA3	41280	38925	MPM	385,857	1,022.2	0.1	DEGRADE	-0.1
SRA4	38710	36265	MPM	370,217	797.6	0.1	AGGRADE	0.1
SRB1	36080	34090	MPM	534,683	1,376.0	0.7	DEGRADE	-0.7
SRB2	33880	32605	MPM	494,553	1,709.1	0.2	AGGRADE	0.2
SRC1	32265	29385	MPM	147,697	1,859.8	0.8	AGGRADE	0.8
SRC2	29140	27155	MPM	389,467	899.2	1.6	DEGRADE	-1.6
SRC3	26990	25000	MPM	633,550	1,159.3	1.3	DEGRADE	-1.3
SRC4	24795	22415	MPM	603,656	860.1	0.2	AGGRADE	0.2
SRD1	22195	20070	MPM	661,922	1,511.4	0.2	DEGRADE	-0.2
SRD2	19855	17785	MPM	319,200	1,431.8	1.4	AGGRADE	1.4
SRD3	17510	15335	MPM	620,768	1,274.3	1.3	DEGRADE	-1.3
SRE1	15125	13190	MPM	731,941	1,588.9	0.4	DEGRADE	-0.4
SRE2	13030	11180	MPM	291,031	1,375.5	2.1	AGGRADE	2.1
SRE3	11015	9025	MPM	635,705	1,399.4	1.5	DEGRADE	-1.5

Table 4.3: Santa Clara River SAM Existing vs Proposed Conditions Bed Stability					
Subreach	US Sta	Existing Conditions Grade Change (ft)	Proposed Conditions Grade Change (ft)	Delta (ft)	Result
SRA1	46195	0.6	0.6	0.0	NO CHANGE
SRA2	43820	0.4	0.2	0.2	DECREASE AGG
SRA3	41280	-0.3	-0.1	-0.2	DECREASE DEG
SRA4	38710	0.3	0.1	0.2	DECREASE AGG
SRB1	36080	-0.6	-0.7	0.1	INCREASE DEG
SRB2	33880	0.0	0.2	-0.2	INCREASE AGG
SRC1	32265	0.8	0.8	0.0	NO CHANGE
SRC2	29140	-2.9	-1.6	-1.3	DECREASE DEG
SRC3	26990	-0.4	-1.3	0.9	INCREASE DEG
SRC4	24795	0.2	0.2	0.0	NO CHANGE
SRD1	22195	-0.6	-0.2	-0.4	DECREASE DEG
SRD2	19855	1.3	1.4	-0.1	INCREASE AGG
SRD3	17510	-1.2	-1.3	0.1	INCREASE DEG
SRE1	15125	-0.6	-0.4	-0.2	DECREASE DEG
SRE2	13030	2.3	2.1	0.2	DECREASE AGG
SRE3	11015	-1.4	-1.5	0.1	INCREASE DEG

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Figure 4.1A: Santa Clara River Existing Conditions General Adjustment

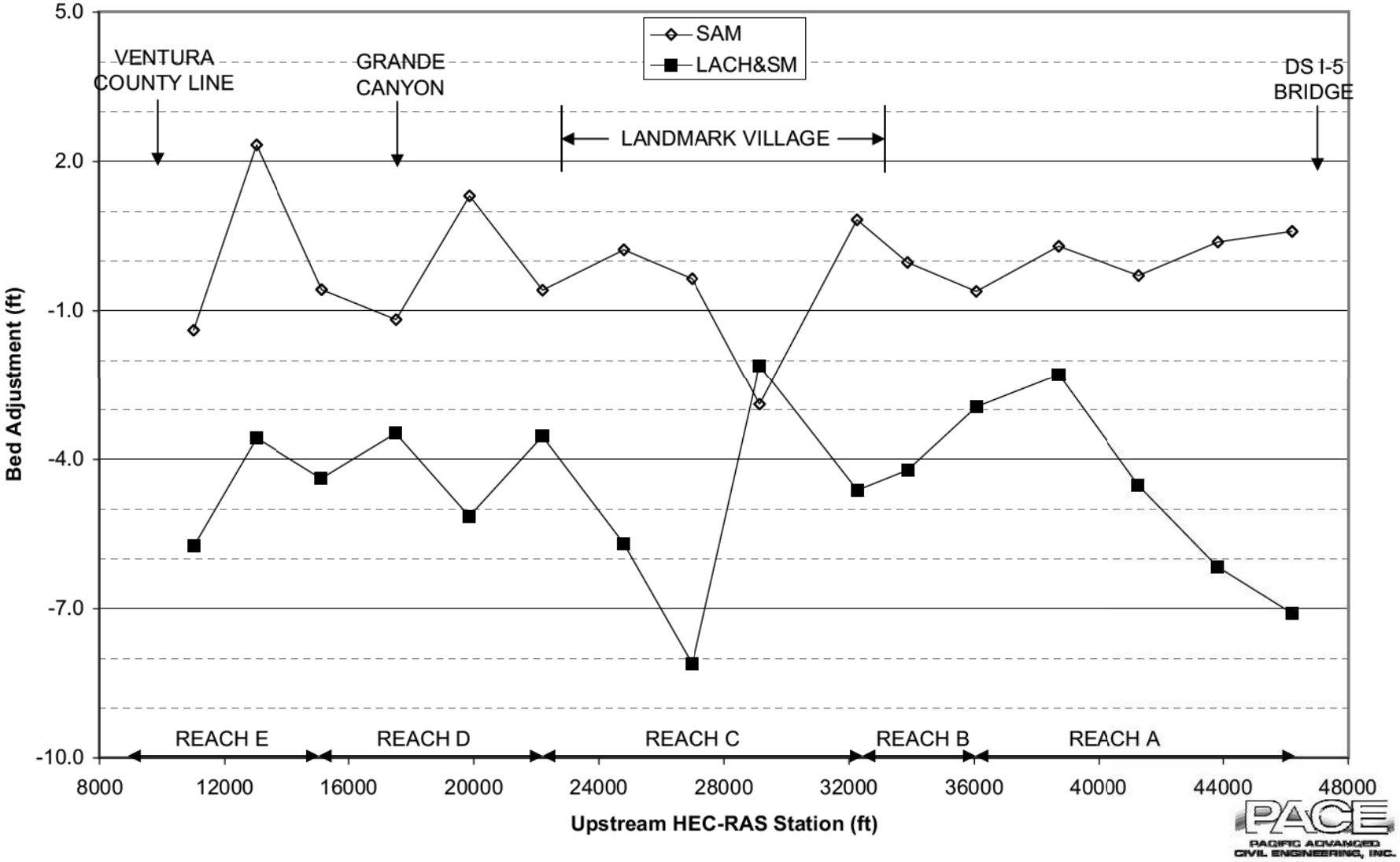

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Figure 4.1B: Santa Clara River Proposed Conditions General Adjustment

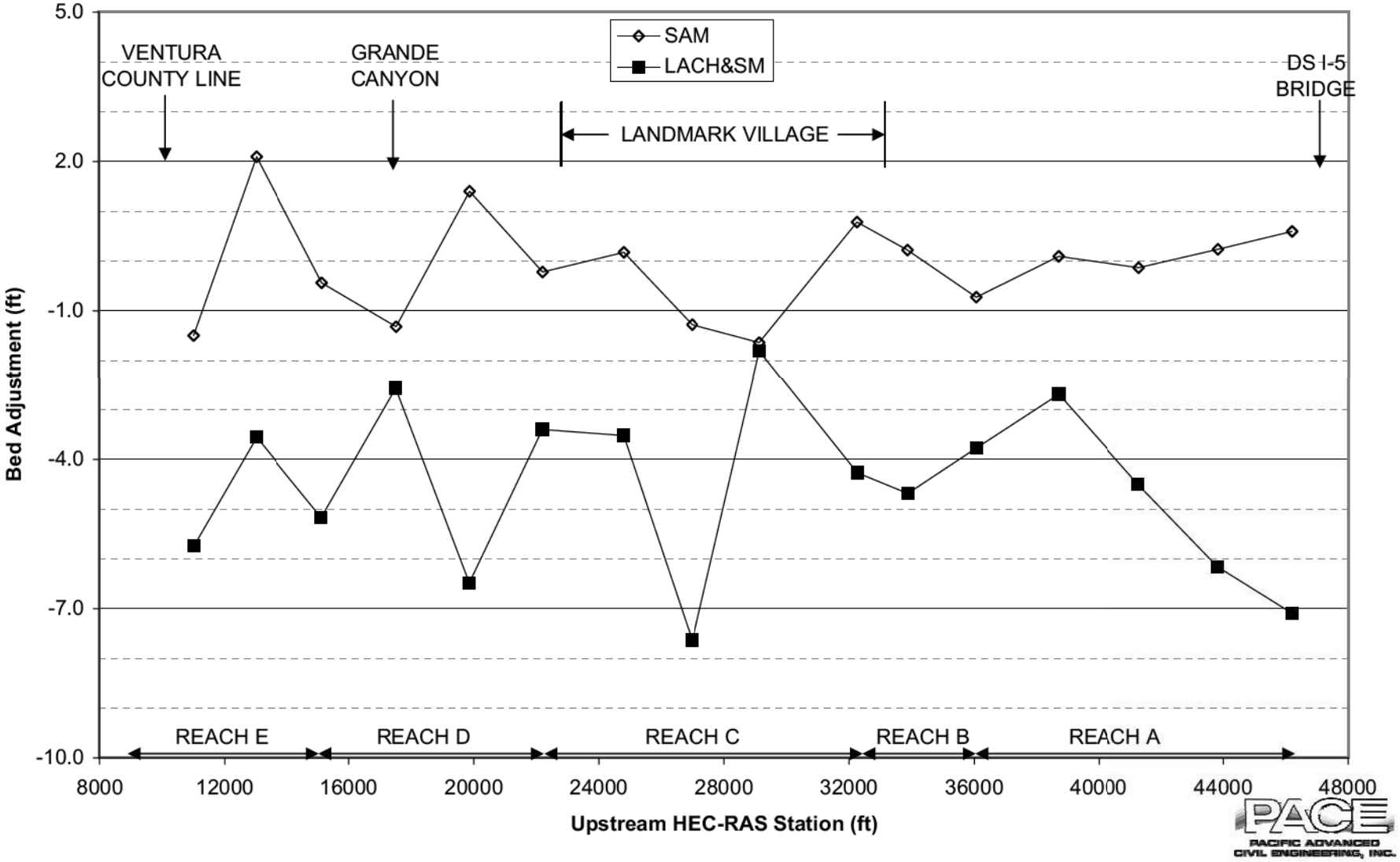

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Table 4.4: Santa Clara River SAM & LACH&SM General Adjustment Comparison (ft)

Subreach	US Sta	Existing Conditions		Proposed Conditions	
		SAM[1]	LACH&SM[2]	SAM[1]	LACH&SM[2]
SRA1	46195	0.6	-7.1	0.6	-7.1
SRA2	43820	0.4	-6.2	0.2	-6.2
SRA3	41280	-0.3	-4.5	-0.1	-4.5
SRA4	38710	0.3	-2.3	0.1	-2.7
SRB1	36080	-0.6	-2.9	-0.7	-3.8
SRB2	33880	0.0	-4.2	0.2	-4.7
SRC1	32265	0.8	-4.6	0.8	-4.3
SRC2	29140	-2.9	-2.1	-1.6	-1.8
SRC3	26990	-0.4	-8.1	-1.3	-7.6
SRC4	24795	0.2	-5.7	0.2	-3.5
SRD1	22195	-0.6	-3.5	-0.2	-3.4
SRD2	19855	1.3	-5.1	1.4	-6.5
SRD3	17510	-1.2	-3.5	-1.3	-2.6
SRE1	15125	-0.6	-4.4	-0.4	-5.2
SRE2	13030	2.3	-3.6	2.1	-3.6
SRE3	11015	-1.4	-5.7	-1.5	-5.7

1: Sam calculations represent an entire subreach

2: LACH&SM calculations represent one cross-section

4.2 HEC-6

The ACOE HEC-6 model is a one-dimensional moveable bed open channel hydraulic and sediment transport model. The model was designed to simulate change in river bed profiles resulting from sediment scour and deposition over long periods of time. The model segments hydrograph data into a progression of steady flow events with varied discharge and duration. Every segment of flow is used to calculate a water surface profile and associated hydraulic parameters (e.g. velocity, depth, etc.). From the hydraulic parameters, potential sediment transport rates are estimated for each model reach and scour or deposition is next estimated so that cross-section shape can be updated. Sediment calculations are based on grain size distribution so that sorting and armoring can be considered.

A one dimensional energy approximation to the equations of motion is used for hydraulic calculations in HEC-6. Manning's equation is utilized to incorporate bed friction. The model also uses both an up- and down-stream boundary condition with internal conditions optional. Krone's method is for deposition of fines and Ariathurai and Krone's method is used for scour. Sediment transport functions are user selectable and 13 different equations are possible. Colby's method is used to adjust transport potential and armoring is simulated using Gessler's method. Sediment boundary conditions operate such that inflowing sediment load is a function of inflow discharge.

At this date the "T" enhancement of the HEC-6 program, created by Mobile Boundary Hydraulics, is expected to be used.

5 Long-Term Adjustment

Long-term adjustment was calculated based on historical records in the form of topographic data. First, topographic data, provided by Allan E. Seward Engineering Geology dating from 1930, 1947, 1963, 1999, 2004 and 2005, was digitized (See Appendix Chapter 5.1). This was accomplished by determining a common coordinate system and creating contour lines within the study area. Topographic data was available in several formats including digital elevation maps (1999, 2004, 2005), topographic surveys (1963) and quad maps (1930, 1947). Digital elevation maps were only adjusted for horizontal location. Cross-sections were next cut at the locations of select HEC-RAS sections for each historical topography (shown in Figure 5.1). At least one cross-section was chosen for each subreach established in Chapter 4 based on engineering interest. The sections chosen are section 10390, section 12195, section 14315, section 16305, section 18650, section 20845, section 23000, section 25965, section 27925, section 30445, section 33500, section 34720, section 36080, section 40825, section 42215, and section 44585. Section 36080 is actually in SRB1 not SRA4, although it was chosen since it is directly upstream of a tributary and near the proposed Commerce Center Drive Bridge. Areas of the 1947, 1963, 1999, 2004 and 2005 sections are calculated and these areas are used to calculate the average change in bed elevation over time. The other topography (1930) is not used to calculate average change in bed because of the impacts of the failure of the St. Francis Dam in 1928, as discussed below. To calculate the area of a given cross-section the lowest historical point on the section is determined and the area of each vertical foot of the section in one-foot intervals is calculated, as shown in Figure 5.2A-P, for each topography. The area of a section is the sum of the one-foot area intervals, also shown in Figure 5.2A-P. All areas for a given section have a common toe and top from which the area is calculated. In cases where available topography ends abruptly, areas are calculated assuming a vertical wall at the end. The relative average change in depth for a given section and topography is calculated as the area divided by the top width, where the top width is taken as the width of the upper most one-foot area. The top width in this sense is not a hydraulic characteristic but a physical one, which along with the sectional area determines the maximum capacity of the section. Moreover, the calculated depth is a relative physical value based on the section area and represents an average physical characteristic of the section as a whole.

Several events within the available historical record (1930 to present) have had an impact on the River bed and fluvial mechanics. These events include failure of the upstream St. Francis Dam, construction of bridges spanning the River, agricultural infill along the River banks, and periodic burning of surrounding vegetation during forest fires. These different historical events can be placed into two categories: the St. Francis Dam failure in 1928, and those that occurred both prior to and following Dam failure. The most significant historical event in the formation of the present bed condition was the aforementioned failure of the Dam. The consequence of this event is tied to the River's recovery from the erosion caused by the extremely high flow of floodwater. Within the project reach, the failure of the Dam appears to have resulted in the severe scouring of the bed, detailed below. In its current state, the River bed appears to have mostly recovered from dam flood scour as evidenced by the cross-sections presented in this chapter. Placement of the bridges does not appear to have had a measurable impact on long-term bed characteristics, except for very local

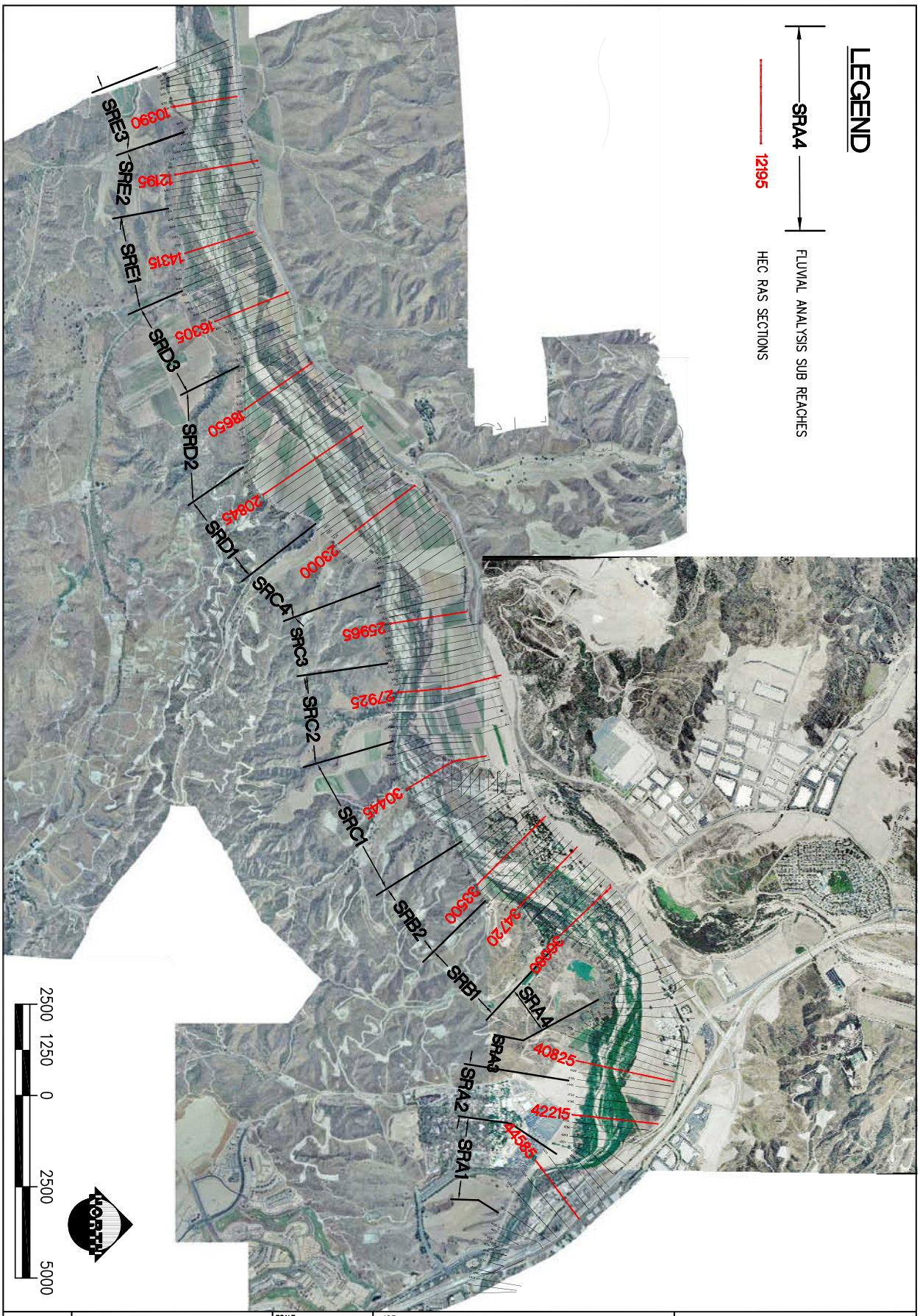

FIGURE 5.1

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DRAWN	DAD
CHECKED	D.J.
DATE	09/17/05
JOB NO.	8197E

JOB

NEWHALL RANCH
SANTA CLARA RIVER
FLUVIAL STUDY

LOS ANGELES COUNTY CA

TITLE

SANTA CLARA RIVER
HISTORIC SECTIONS
ANALYSIS LOCATION MAP

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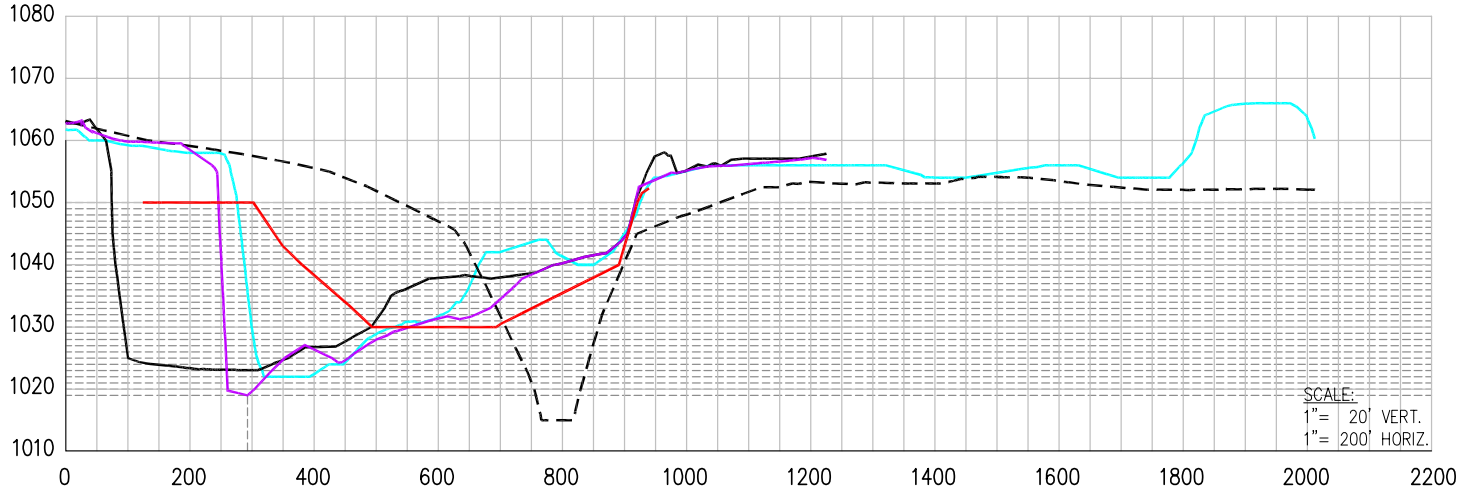

SUBREACH SRA1 SECTION 44585

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 44585 (sf)					
ELEV	1947	1963	1999	2004	2005
1020.0	NA	0.0	0.0	25.2	0.0
1021.0	NA	0.0	0.0	48.3	0.0
1022.0	NA	0.0	0.0	58.2	0.0
1023.0	NA	0.0	83.5	68.1	0.0
1024.0	NA	0.0	102.1	78.5	124.2
1025.0	NA	0.0	141.9	100.6	228.6
1026.0	NA	0.0	154.8	146.6	266.3
1027.0	NA	0.0	165.8	197.4	293.6
1028.0	NA	0.0	176.8	234.9	350.0
1029.0	NA	0.0	191.6	257.0	369.4
1030.0	NA	0.0	213.6	282.0	388.9
1031.0	NA	212.3	248.9	313.8	402.9
1032.0	NA	243.0	298.2	370.3	411.2
1033.0	NA	274.0	318.5	417.1	419.4
1034.0	NA	304.8	329.7	435.2	427.0
1035.0	NA	336.3	344.1	446.8	433.5
1036.0	NA	368.0	351.4	458.4	446.7
1037.0	NA	399.7	357.9	469.9	471.9
1038.0	NA	431.4	363.6	480.9	500.6
1039.0	NA	463.1	369.0	500.5	645.2
1040.0	NA	494.8	374.5	523.6	693.5
1041.0	NA	517.3	422.7	558.1	728.9
1042.0	NA	530.4	463.2	598.0	769.2
1043.0	NA	543.6	528.6	628.9	800.6
1044.0	NA	555.1	568.3	641.8	813.9
1045.0	NA	564.8	613.8	652.1	824.5
1046.0	NA	574.6	621.8	658.1	830.6
1047.0	NA	584.3	629.2	661.0	833.3
1048.0	NA	594.1	636.3	663.9	836.0
1049.0	NA	603.8	642.2	666.8	838.6
1050.0	NA	613.6	646.7	669.6	841.2
Area	NA	9208.9	10358.4	12311.6	14989.6

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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DATE: 12/20/05
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FIGURE 5.2A

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

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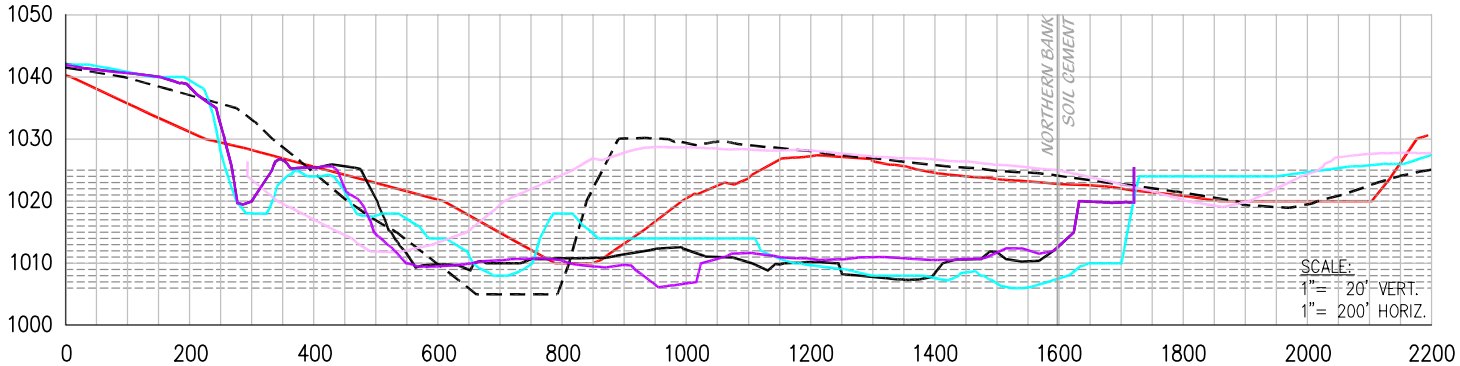

SUBREACH SRA2 SECTION 42215

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 42215 (sf)					
ELEV	1947	1963	1999	2004	2005
1007.0	0.0	0.0	58.7	31.4	0.0
1008.0	0.0	0.0	112.6	79.5	95.4
1009.0	0.0	0.0	370.2	95.4	148.4
1010.0	0.0	0.0	502.0	183.9	223.1
1011.0	0.0	80.5	641.6	412.8	588.7
1012.0	7.2	114.1	679.1	920.5	898.3
1013.0	86.6	146.5	709.3	1055.3	1028.1
1014.0	136.6	178.9	736.3	1093.5	1073.1
1015.0	181.3	211.3	1041.4	1115.8	1090.6
1016.0	222.4	243.5	1067.9	1129.1	1104.3
1017.0	254.2	274.7	1099.1	1134.2	1110.1
1018.0	286.0	305.7	1143.3	1140.1	1115.7
1019.0	317.8	336.6	1284.1	1146.4	1121.9
1020.0	395.8	367.6	1309.9	1159.8	1133.8
1021.0	509.5	692.9	1326.8	1263.7	1245.8
1022.0	601.5	843.7	1341.2	1301.3	1260.7
1023.0	700.1	1008.7	1357.4	1315.9	1275.2
1024.0	802.4	1236.4	1380.0	1329.3	1289.6
1025.0	1107.8	1398.5	1697.5	1342.9	1304.2
Area	5609.2	7439.6	17858.4	17250.9	17107.1

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE
HISTORICAL CROSS SECTIONS BY STATION

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FIGURE
5.2B

Xrefs: 8197 - 2004 CONTOURS.dwg; 8197 - 2005 CONTOURS.dwg; 8197 - 1999 CONTOURS.dwg; 8197 - 1963 CONTOURS.dwg; 8197 - 1947 CONTOURS.dwg; 8197 - 1930 CONTOURS.dwg; 8065-Lining.dwg; 8197-SANTA CLARA TITLE BLOCK.dwg; 7104E-COPY OF-7904-E-WRP soil cement bank (NEW 8-11-
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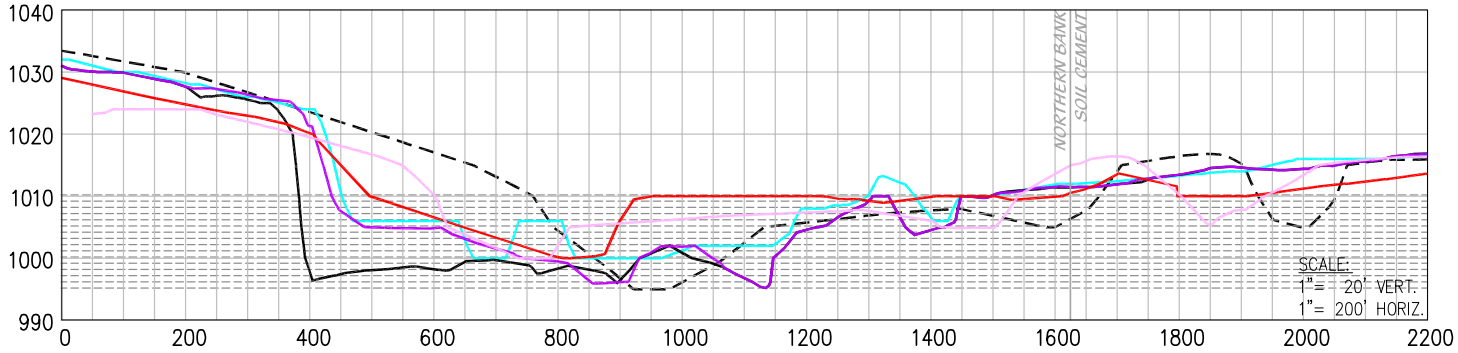

SUBREACH SRA3 SECTION 40825

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 40825 (sf)

ELEV	1947	1963	1999	2004	2005
996.2	0.0	0.0	0.0	9.7	12.9
997.2	0.0	0.0	0.0	69.9	67.0
998.2	0.0	0.0	0.0	86.7	188.6
999.2	0.0	0.0	0.0	103.3	456.3
1000.2	11.9	15.1	37.4	154.0	625.4
1001.2	70.2	98.4	217.6	218.8	708.1
1002.2	98.7	132.7	282.6	423.1	759.7
1003.2	128.3	167.0	414.0	510.9	783.1
1004.2	158.0	201.3	437.1	551.2	796.9
1005.2	214.6	235.7	454.0	674.5	863.0
1006.2	409.0	270.0	518.5	838.5	930.2
1007.2	639.8	304.0	749.3	880.3	958.5
1008.2	938.6	338.0	779.8	921.8	987.0
1009.2	1028.9	371.7	862.1	958.0	1016.8
1010.2	1063.6	695.0	918.3	1002.5	1056.7
Area	4761.4	2829.0	5670.9	7403.2	10210.2

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

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FIGURE 5.2C

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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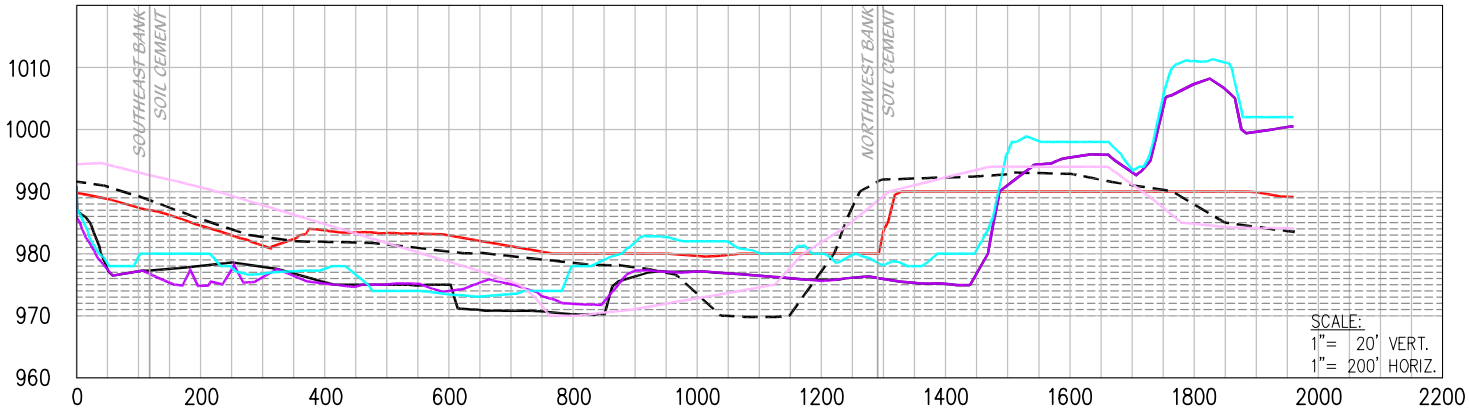

SUBREACH SRA4 SECTION 36080

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 36080 (sf)					
ELEV	1947	1963	1999	2004	2005
971.0	93.7	0.0	0.0	0.0	91.0
972.0	174.6	0.0	0.0	10.6	239.1
973.0	239.8	0.0	0.0	82.2	246.8
974.0	307.3	0.0	102.4	115.5	252.5
975.0	377.1	0.0	304.6	222.6	263.0
976.0	430.9	0.0	324.4	671.8	605.5
977.0	468.8	0.0	354.8	1056.6	910.2
978.0	508.6	0.0	494.3	1374.2	1221.1
979.0	550.5	0.0	716.4	1418.3	1387.9
980.0	592.7	31.1	856.6	1431.8	1423.4
981.0	638.7	556.0	1187.3	1440.9	1430.6
982.0	687.7	651.4	1265.1	1448.5	1435.4
983.0	736.8	762.1	1397.2	1456.8	1441.2
984.0	785.7	978.5	1448.0	1463.4	1447.0
985.0	833.2	1103.9	1456.6	1469.3	1452.5
986.0	878.1	1137.3	1465.1	1473.5	1460.6
987.0	923.4	1171.0	1472.8	1476.4	1467.8
988.0	968.8	1217.1	1477.5	1479.2	1472.7
989.0	1014.1	1254.0	1480.3	1482.1	1477.6
990.0	1059.5	1281.8	1483.1	1485.0	1482.5
Area	12270.0	10144.3	17286.2	21058.6	21208.4

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

SCALE: AS NOTED
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FIGURE 5.2D

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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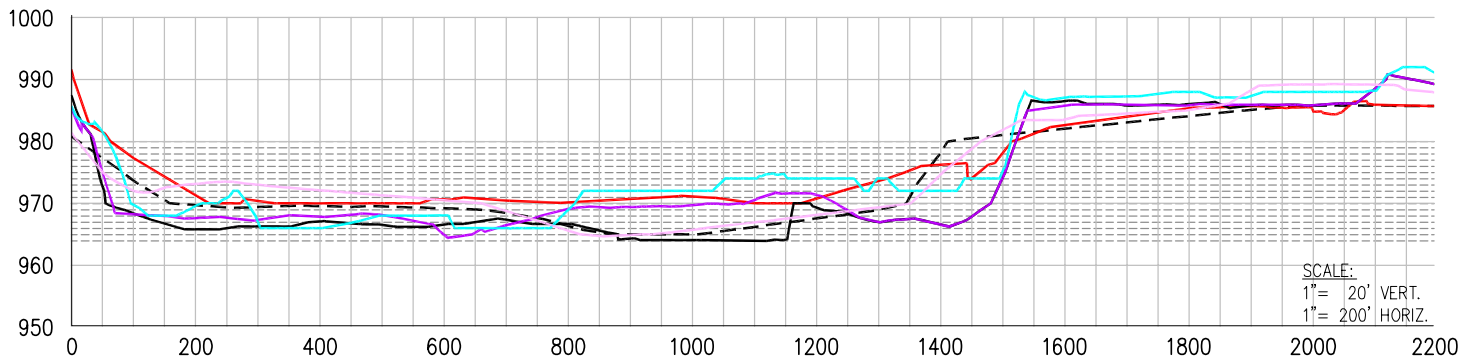

SUBREACH SRB1 SECTION 34720

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 34720 (sf)					
ELEV	1947	1963	1999	2004	2005
965.0	9.7	0.0	0.0	10.3	231.3
966.0	168.0	0.0	0.0	65.0	303.0
967.0	282.7	0.0	271.2	135.7	634.9
968.0	401.3	0.0	351.3	398.2	1136.8
969.0	514.8	0.0	551.0	863.0	1275.0
970.0	628.3	0.0	609.6	1066.6	1366.9
971.0	750.5	597.2	679.8	1291.9	1426.6
972.0	885.8	1013.8	712.6	1369.9	1433.7
973.0	1075.3	1075.4	1046.2	1433.9	1440.6
974.0	1275.9	1129.0	1106.4	1441.5	1448.6
975.0	1340.0	1190.1	1370.2	1449.0	1455.7
976.0	1361.8	1247.1	1421.8	1456.0	1462.2
977.0	1382.1	1349.4	1429.3	1462.3	1468.0
978.0	1402.4	1401.4	1435.1	1468.7	1473.5
979.0	1422.7	1421.1	1441.6	1474.9	1479.0
980.0	1443.0	1440.7	1448.8	1481.0	1484.6
Area	14344.4	11865.3	13874.8	16867.7	19520.2

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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FIGURE 5.2E

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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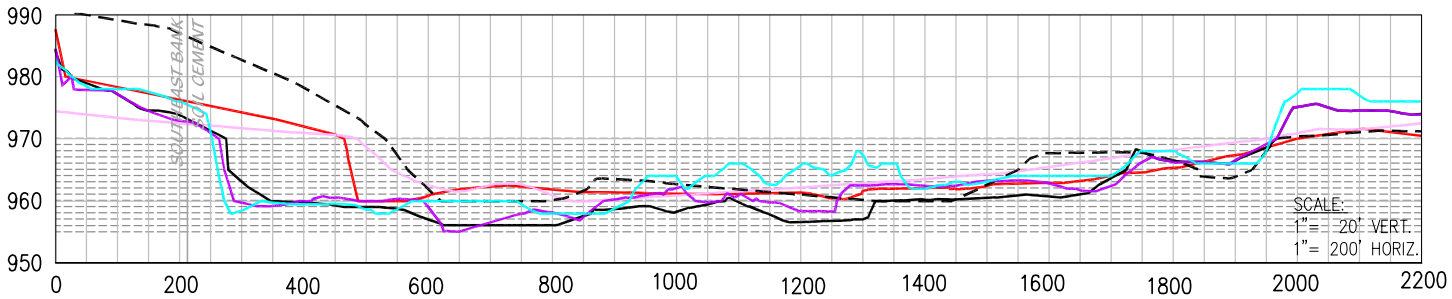

SUBREACH SRB2 SECTION 33500

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 33500 (sf)					
ELEV	1947	1963	1999	2004	2005
956.1	0.0	0.0	0.0	41.8	0.0
957.1	0.0	0.0	0.0	82.3	240.8
958.1	0.0	0.0	9.0	155.0	418.0
959.1	0.0	0.0	197.7	297.4	554.4
960.1	4.4	6.4	392.5	452.2	853.2
961.1	140.8	138.3	656.4	807.3	1176.6
962.1	341.9	580.7	666.0	956.7	1345.8
963.1	613.6	1022.2	767.1	1103.1	1374.8
964.1	831.7	1194.0	932.7	1424.0	1404.0
965.1	980.6	1263.3	1230.8	1454.8	1433.7
966.1	1074.3	1339.2	1352.6	1469.8	1449.3
967.1	1154.5	1388.8	1565.6	1593.4	1454.5
968.1	1236.3	1440.9	1618.0	1651.7	1459.8
969.1	1329.6	1481.3	1697.5	1673.1	1671.6
970.1	1424.1	1517.7	1702.9	1694.4	1686.9
Area	9131.9	11372.7	12788.7	14857.0	16523.3

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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FIGURE 5.2F

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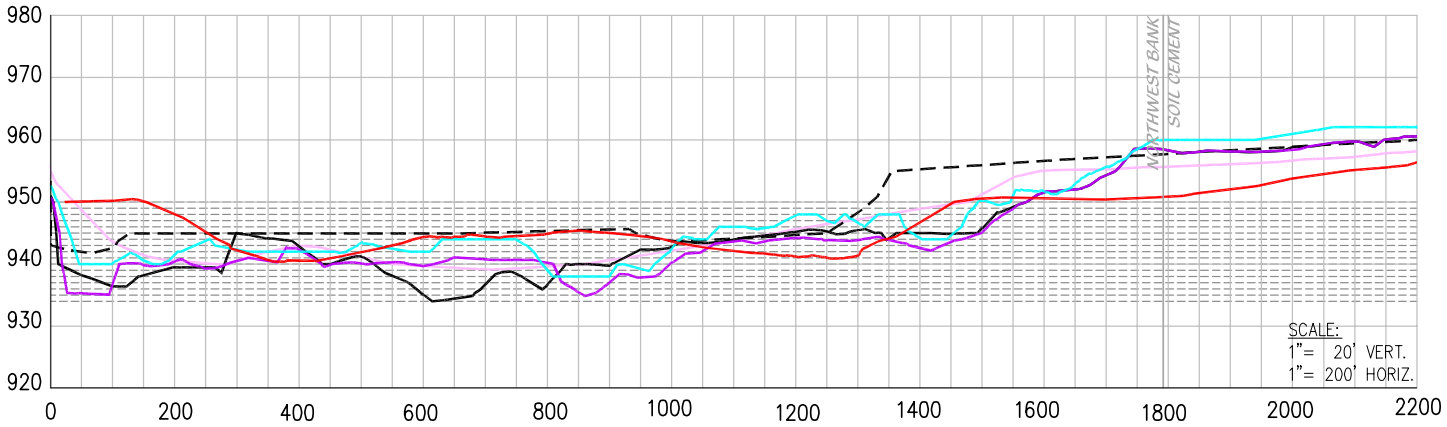

SUBREACH SRC1 SECTION 30445

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 30445 (sf)					
ELEV	1947	1963	1999	2004	2005
935.0	0.0	0.0	0.0	0.0	43.9
936.0	0.0	0.0	0.0	82.0	90.9
937.0	0.0	0.0	0.0	133.4	149.9
938.0	0.0	0.0	97.2	166.4	247.4
939.0	0.0	0.0	142.4	241.3	367.5
940.0	139.1	0.0	190.2	313.7	518.4
941.0	399.9	46.1	303.6	707.6	703.1
942.0	551.9	274.3	146.9	964.2	785.1
943.0	712.0	473.6	667.1	1049.7	852.0
944.0	847.3	610.9	817.6	1187.7	943.5
945.0	916.0	849.6	1073.7	1450.1	1115.0
946.0	980.4	1114.6	1131.3	1490.5	1446.4
947.0	1048.6	1167.4	1261.1	1502.5	1499.6
948.0	1122.7	1201.3	1347.1	1518.1	1509.8
949.0	1189.5	1240.3	1461.8	1536.3	1526.3
950.0	1264.9	1280.2	1484.2	1554.1	1552.1
Area	9172.4	8258.3	10124.1	13897.6	13350.9

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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FIGURE 5.2G

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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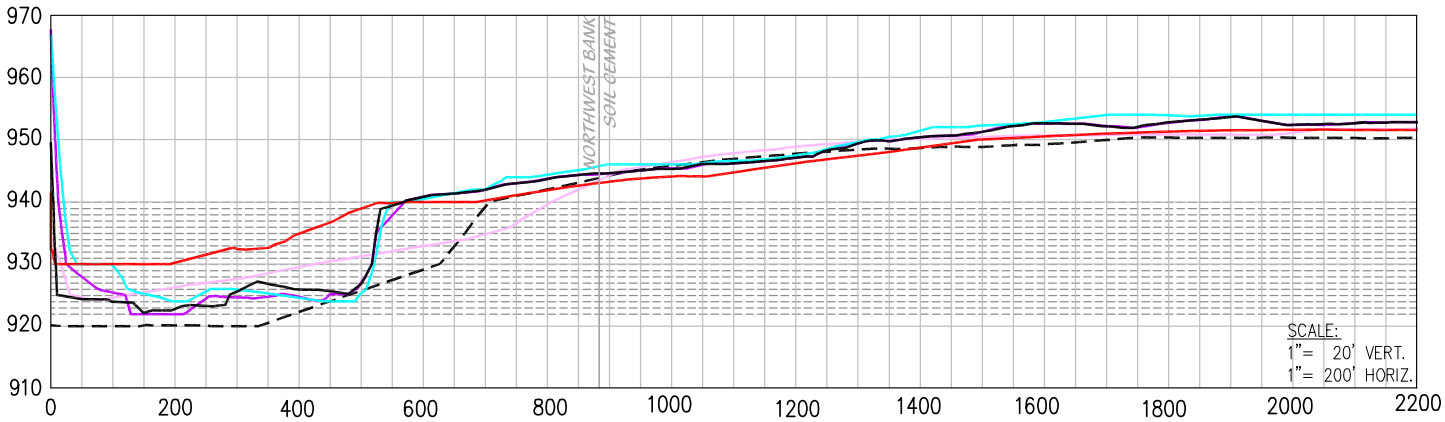

SUBREACH SRC2 SECTION 27925

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 27925 (sf)

ELEV	1947	1963	1999	2004	2005
922.9	0.0	0.0	0.0	93.2	24.2
923.9	0.0	0.0	0.0	110.4	116.8
924.9	31.0	0.0	116.9	153.2	224.6
925.9	116.8	0.0	265.7	369.4	307.0
926.9	181.8	0.0	383.0	424.8	430.6
927.9	259.0	0.0	396.4	445.0	491.4
928.9	322.5	0.0	405.9	464.7	500.1
929.9	375.5	0.0	416.7	482.0	505.7
930.9	433.3	181.2	475.3	493.3	509.8
931.9	498.0	244.8	488.5	495.7	511.7
932.9	562.7	308.8	494.8	498.4	513.5
933.9	627.2	368.6	498.3	501.2	515.3
934.9	689.3	388.8	501.7	504.0	517.1
935.9	730.7	413.1	505.0	511.1	519.0
936.9	745.7	441.0	508.7	521.1	521.1
937.9	761.4	464.1	512.9	531.0	523.2
938.9	778.5	485.0	518.0	541.1	525.4
939.9	795.6	514.3	524.0	551.2	545.5
AREA	7908.8	3809.7	7011.7	7690.7	7801.9

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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FIGURE 5.2H

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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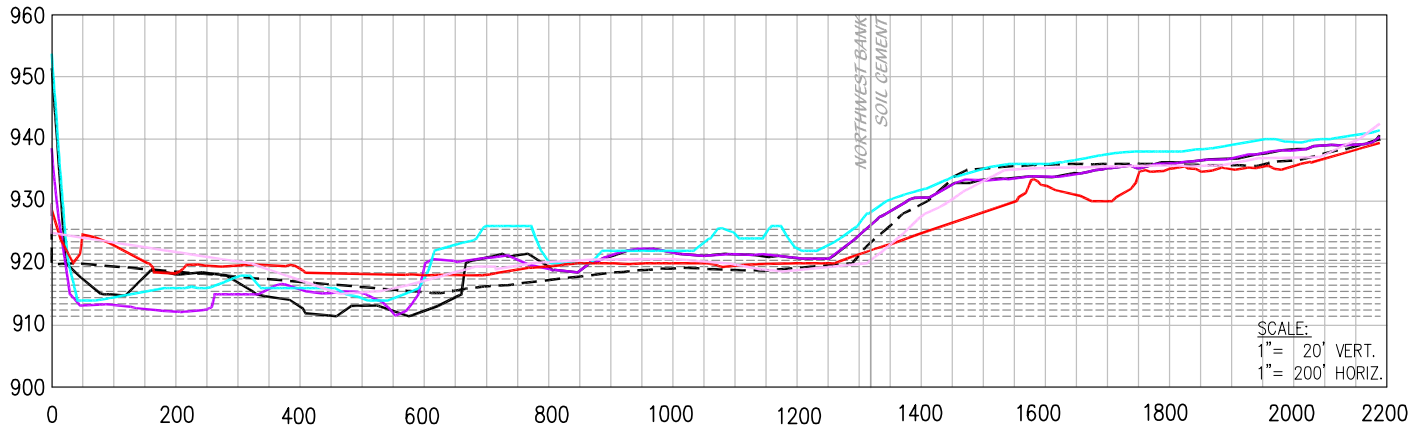

SUBREACH SRC3 SECTION 25965

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 25965 (sf)					
ELEV	1947	1963	1999	2004	2005
912.5	0.0	0.0	0.0	26.8	76.8
913.5	0.0	0.0	0.0	174.7	177.5
914.5	0.0	0.0	42.0	278.4	257.8
915.5	16.2	0.0	174.6	366.4	347.7
916.5	113.4	0.0	358.1	522.6	408.7
917.5	183.8	0.0	511.8	566.9	449.5
918.5	250.0	84.3	557.3	572.3	504.1
919.5	384.0	396.2	577.2	619.3	662.5
920.5	689.2	884.8	615.7	690.5	722.9
921.5	1050.0	1150.5	669.2	915.0	893.2
922.5	1149.7	1199.2	778.9	1191.1	1195.9
923.5	1226.4	1249.5	947.5	1263.7	1261.5
924.5	1303.6	1304.0	1043.2	1278.3	1274.7
925.5	1367.8	1394.3	1121.5	1291.0	1286.5
Area	7734.2	7662.7	7397.0	9757.0	9519.2

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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FIGURE 5.21

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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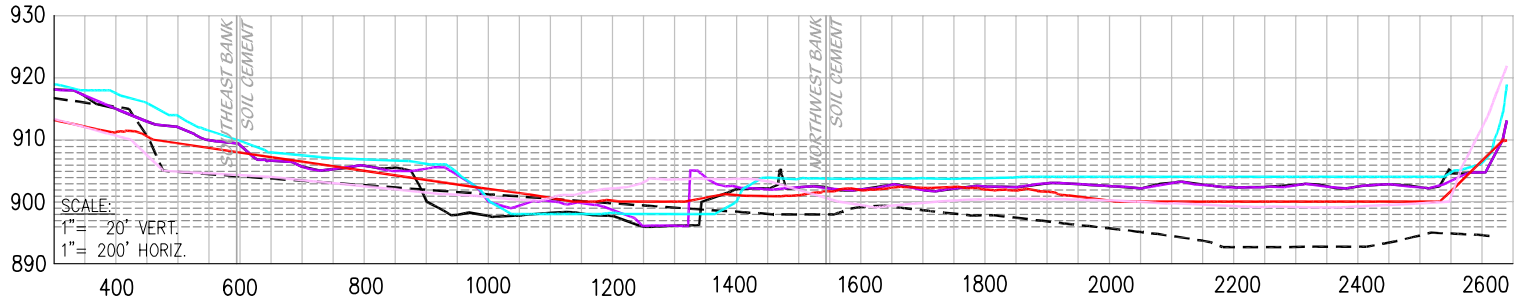

SUBREACH SRC4 SECTION 23000

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 23000 (sf)					
ELEV	1947	1963	1999	2004	2005
896.9	0.0	0.0	0.0	61.7	89.1
897.9	0.0	0.0	0.0	89.8	153.8
898.9	0.0	0.0	313.2	116.0	381.3
899.9	302.5	0.0	377.5	156.1	430.9
900.9	926.6	725.1	402.7	319.0	456.6
901.9	1278.1	1110.9	415.2	339.4	489.5
902.9	1487.7	1518.6	436.0	909.3	558.9
903.9	1706.5	1663.0	468.2	1544.6	582.8
904.9	1990.7	1740.8	1540.7	1609.7	589.5
905.9	2094.6	1818.6	1634.9	1814.1	1822.6
906.9	2110.3	1896.4	1732.9	1946.9	1946.9
907.9	2125.8	1974.1	1903.3	2000.1	2000.1
908.9	2141.4	2051.6	1979.2	2016.7	2016.7
909.9	2156.9	2129.0	2008.1	2044.7	2044.7
Area	18321.2	16628.1	13211.7	14968.1	13563.3

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE
HISTORICAL CROSS SECTIONS BY STATION

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FIGURE
5.2J

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
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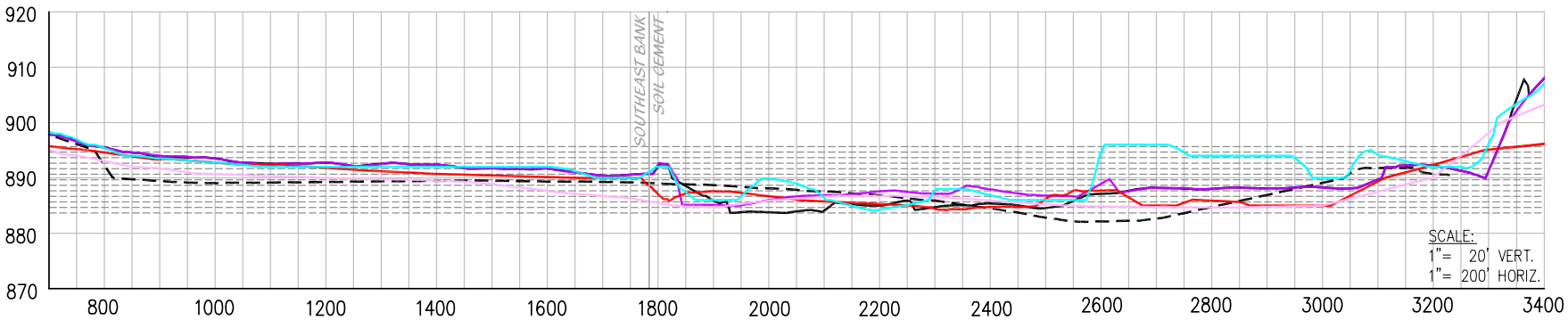

SUBREACH SRD1 SECTION 20845

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 20845 (sf)

ELEV	1947	1963	1999	2004	2005
884.7	0.0	24.3	19.2	0.0	150.4
885.7	452.5	415.1	108.7	73.4	442.9
886.7	691.1	825.4	339.0	171.1	658.8
887.7	1429.9	1056.2	496.3	461.1	733.8
888.7	1566.1	1284.4	615.1	956.0	1015.0
889.7	1707.6	1319.7	689.2	1235.6	1247.2
890.7	2042.6	1505.0	861.5	1298.3	1289.4
891.7	2272.0	1843.3	974.7	1484.4	1486.8
892.7	2377.0	2063.6	1499.5	1854.8	1853.7
893.7	2445.9	2286.8	1891.4	2282.6	2283.6
894.7	2514.1	2433.1	2192.5	2417.1	2427.1
895.7	2569.9	2558.2	2348.7	2502.7	2502.7
Area	20068.6	17615.1	12035.8	14737.0	16091.2

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

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FIGURE 5.2K

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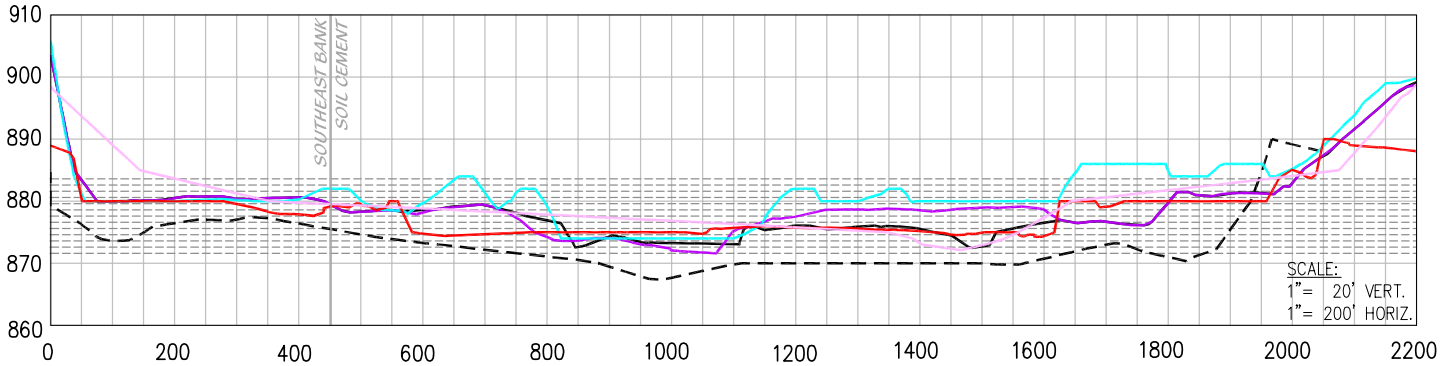

SUBREACH SRD2 SECTION 18650

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 18650 (sf)					
ELEV	1947	1963	1999	2004	2005
872.6	14.7	0.0	0.0	63.6	1.7
873.6	102.7	0.0	0.0	133.2	134.8
874.6	158.5	10.7	180.4	265.4	310.8
875.6	247.2	556.7	307.9	322.1	405.3
876.6	441.9	1011.6	328.6	386.3	694.8
877.6	654.2	1048.1	340.5	566.5	980.3
878.6	869.6	1120.0	359.9	726.4	1064.1
879.6	1094.1	1248.2	443.3	1236.2	1285.5
880.6	1300.2	1706.9	906.3	1457.7	1456.8
881.6	1437.6	1915.9	1293.2	1805.3	1802.1
882.6	1569.2	1923.4	1474.1	1925.6	1925.6
883.6	1699.4	1930.9	1556.6	1949.4	1949.4
Area	9589.2	12472.3	7190.7	10837.7	12011.1

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE
HISTORICAL CROSS SECTIONS BY STATION

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

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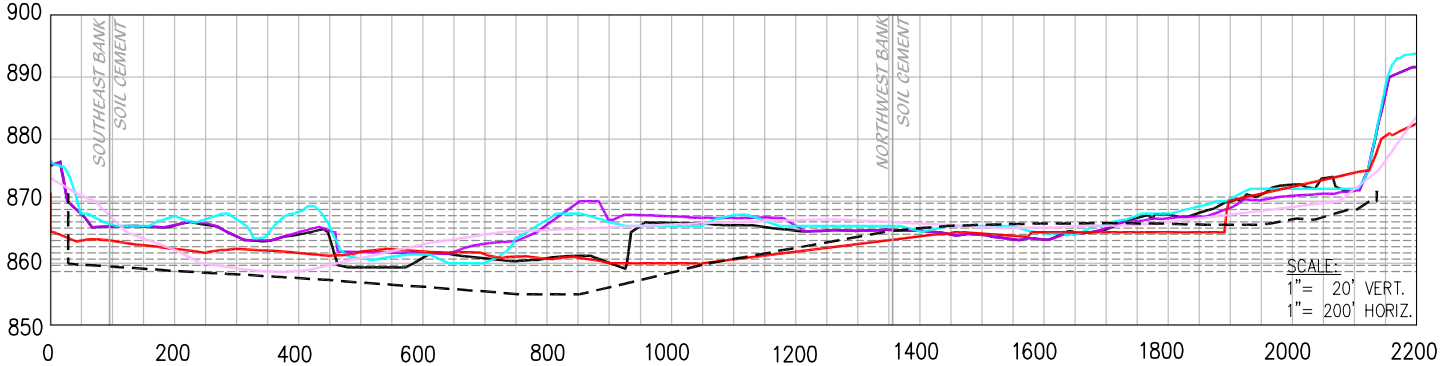
FIGURE
5.2L

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
P:\8197E\Engineering\GlobalExhibits\8197 Santa Clara River HEC Cross Sections and End Area Data.dwg – Tab: HEC 18650 – 5.2L By: ddrahn on Mar. 14, 2006 at 05:07 pm



SUBREACH RD3 SECTION 16305

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 16305 (sf)					
ELEV	1947	1963	1999	2004	2005
859.6	116.8	0.0	0.0	0.0	36.9
860.6	225.0	121.1	44.8	0.0	170.0
861.6	293.0	414.5	183.6	0.0	369.2
862.6	358.9	892.9	268.2	180.1	475.4
863.6	432.1	1172.9	282.0	243.7	481.4
864.6	521.6	1363.3	307.5	444.6	628.8
865.6	643.2	1755.6	434.3	778.8	966.6
866.6	1122.9	1892.0	921.7	1157.1	1432.7
867.6	1681.2	1893.0	1359.0	1424.1	1691.5
868.6	1833.9	1894.1	1668.7	1759.2	1796.9
869.6	1924.7	1895.9	1793.3	1820.6	1842.8
870.6	2005.0	1906.3	1846.8	1896.1	1880.2
Area	11158.2	15201.5	9110.0	9704.3	11772.3

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

LOS ANGELES COUNTY CA

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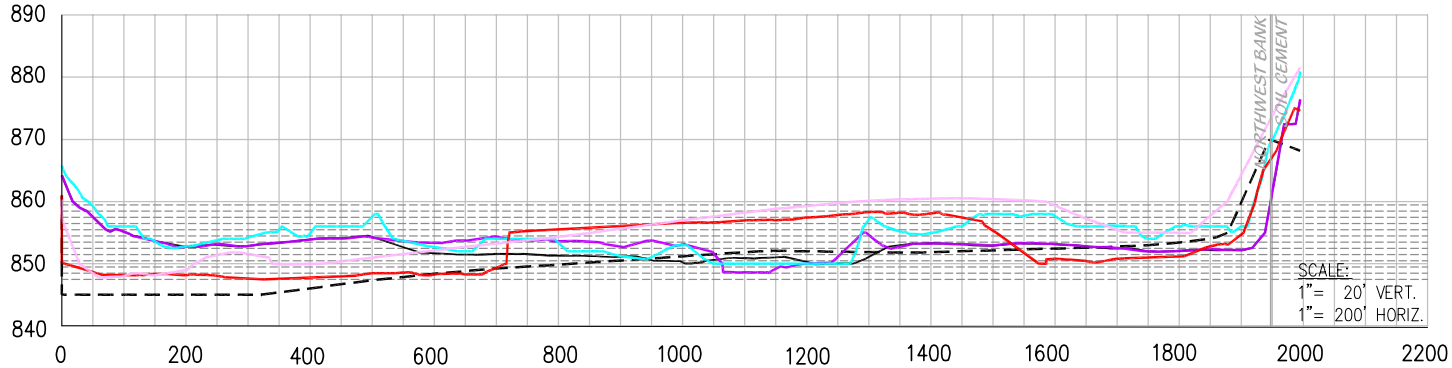
FIGURE 5.2M

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
P:\8197E\Engineering\GlobalExhibits\8197 Santa Clara River HEC Cross Sections and End Area Data.dwg – Tab: HEC 16305 – 5.2M By: ddrahn on Mar. 14, 2006 at 05:07 pm



SUBREACH SRE1 SECTION 14315

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 14315 (sf)					
ELEV	1947	1963	1999	2004	2005
848.5	43.7	241.8	0.0	0.0	0.0
849.5	153.8	650.6	0.0	71.9	0.0
850.5	237.3	718.0	107.7	143.8	55.0
851.5	384.3	892.6	274.1	193.5	347.3
852.5	556.7	998.3	398.1	286.3	800.8
853.5	659.2	1047.6	604.4	807.3	1273.6
854.5	758.3	1090.6	828.5	1592.4	1703.6
855.5	899.6	1132.2	1081.0	1830.5	1835.8
856.5	1065.8	1302.0	1398.1	1873.9	1873.9
857.5	1183.6	1555.3	1662.9	1886.2	1886.2
858.5	1301.7	1798.4	1792.2	1898.3	1898.3
859.5	1425.5	1918.4	1865.8	1915.1	1915.1
Area	8669.5	13345.8	10012.7	12499.2	13589.6

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE
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FIGURE
5.2N

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

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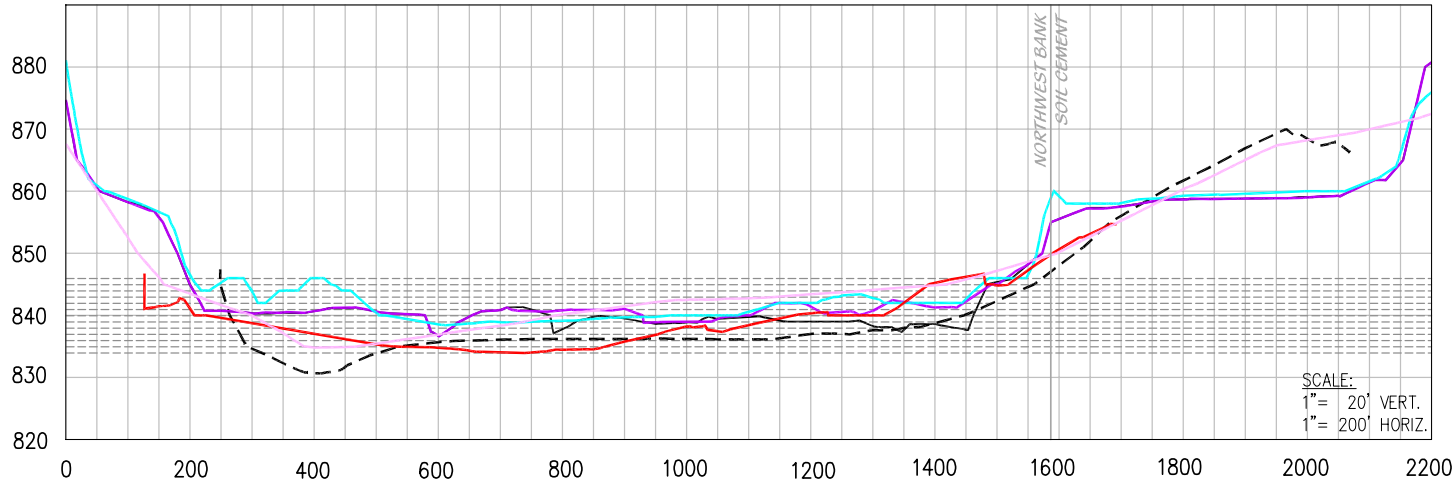

SUBREACH SRE2 SECTION 12195

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 12195 (sf)					
ELEV	1947	1963	1999	2004	2005
834.9	0.0	158.7	0.0	0.0	0.0
835.9	119.1	387.7	0.0	0.0	0.0
836.9	204.3	492.5	0.0	1.0	1.0
837.9	289.0	605.3	0.0	22.5	35.3
838.9	375.4	768.6	25.4	41.9	183.8
839.9	450.2	884.2	300.2	179.4	571.9
840.9	533.1	1086.7	583.8	422.2	914.9
841.9	638.1	1143.6	641.8	923.4	1217.1
842.9	779.7	1205.6	881.3	1221.6	1258.1
843.9	1003.2	1232.1	1009.7	1258.5	1268.5
844.9	1167.2	1249.6	1127.4	1279.4	1279.0
845.9	1279.6	1280.2	1201.1	1307.6	1304.0
Area	6838.7	10494.9	5770.7	6657.4	8033.7

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

JOB: SANTA CLARA RIVER FLUVIAL STUDY

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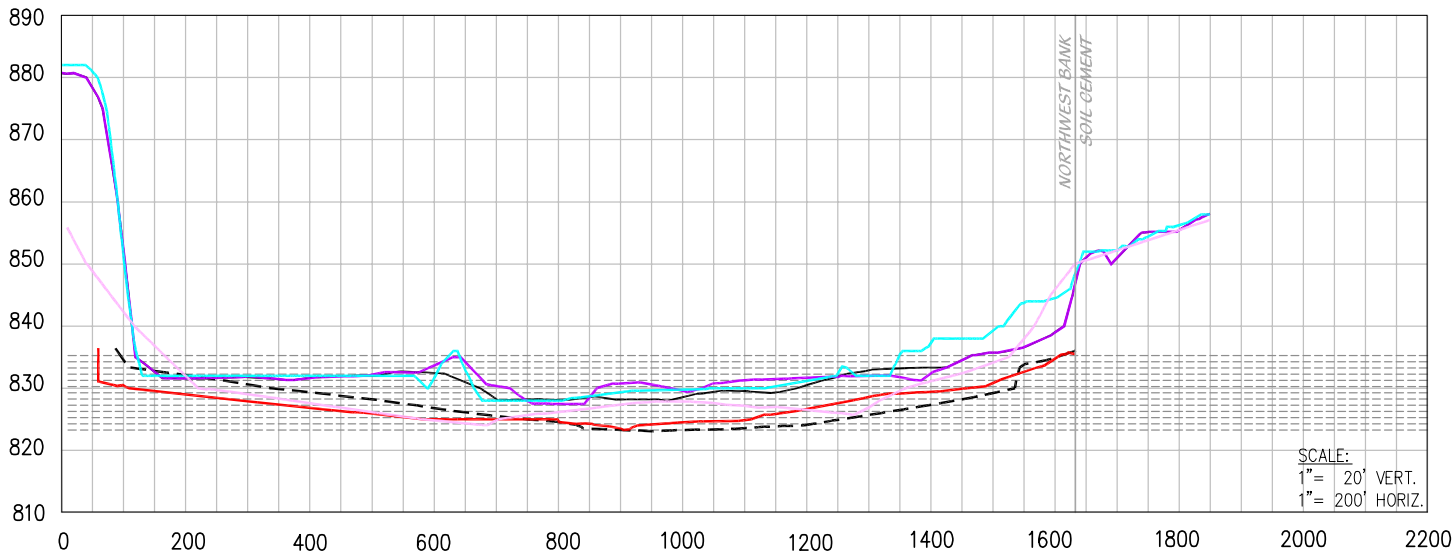
FIGURE 5.20

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
P:\8197E\Engineering\GlobalExhibits\8197 Santa Clara River HEC Cross Sections and End Area Data.dwg – Tab: HEC 12195 – 5.20 By: ddrahn on Mar. 14, 2006 at 05:07 pm



SUBREACH SRE3 SECTION 10390

LOOKING DOWNSTREAM

CROSS SECTIONAL AREAS AT STA 10390 (sf)					
ELEV	1947	1963	1999	2004	2005
824.3	3.9	43.1	0.0	0.0	0.0
825.3	94.2	315.5	0.0	0.0	0.0
826.3	252.1	633.1	0.0	0.0	0.0
827.3	533.3	801.6	0.0	0.0	0.0
828.3	853.0	945.9	36.7	73.0	24.6
829.3	1015.2	1093.0	184.0	114.7	306.3
830.3	1109.9	1302.8	345.4	169.4	475.5
831.3	1174.3	1422.9	529.3	332.7	554.3
832.3	1223.3	1464.8	739.8	793.6	816.8
833.3	1269.3	1494.6	1147.2	1159.9	1125.6
834.3	1308.6	1524.2	1180.8	1247.2	1296.9
835.3	1346.9	1541.5	1201.4	1314.9	1332.6
Area	10183.9	12582.9	5364.7	5205.4	5932.6

LEGEND:

- 2005 TERRAIN
- 2004 TERRAIN
- 1999 TERRAIN
- 1963 TERRAIN
- 1947 TERRAIN
- 1930 TERRAIN

TITLE: HISTORICAL CROSS SECTIONS BY STATION

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FIGURE 5.2P

Dimscale = 200; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1
P:\8197E\Engineering\GlobalExhibits\8197 Santa Clara River HEC Cross Sections and End Area Data.dwg - Tab: HEC 10390 - 5.2P By: ddrahn on Mar. 14, 2006 at 05:07 pm

characteristics. The Interstate 5 Bridge has not been outflanked by bed migration since its construction. Moreover, despite narrowing of the bed locally, bridge placement does not appear to have led to general bed degradation on the River as a whole. Periodic fires have burned the flora of the watershed historically, and as recently as the summer of 2004. Fires are important to changes of the River bed because these fires deplete vegetation stalks and root systems that hold soil in upland areas, thereby leading to increased erosion on slopes and increased sediment delivery to creeks and rivers. Agricultural fills are also important to the historic River fluvial mechanics because the fills limit the extent to which the River may migrate, and in turn cause vertical erosion of the creek bed. LACDPW has noted that lateral erosion of agricultural fill has occurred periodically although no data is presently available to date to gage the extent or depth of this erosion. Certainly, the volume of fill laterally eroded is not sufficient to prevent vertical bed erosion. As noted in Table 4.2 above, the River can transport over 730,000 tons (approximately 327,000 cubic yards) of sediment per day in some sections. LACDPW has indicated that the constraining of the lateral erosion at the agricultural infill locations may exacerbate or exceed background erosion downstream.

Table 5.1A shows the long-term historical cross-sections area from 1947 to 2005. The table lists the area for each historical section in a given subreach. The table also lists the difference between historical sections (e.g. 1947 section 23000 area – 2005 section 23000 area). Table 5.1B shows the historical cross-section average depth and average depth change by section and year. As noted above, the average depth is the area of a given section by year divided by the section geometric top width for that year. The difference between historical areas is also shown. It is important to note that the vertical elevation for each section is the same.

Table 5.1A: Santa Clara River Long-term Historical Cross-Section Area & Area Change 1947-2005

Subreach	Station	Area by Year (sf)			Δ Area by Year (sf)			
		1947	2004	2005	47-05	Change	04-05	Change
SRA1	44585 [1,3]	9209	12312	14990	-5781	DEGRADE	-2678	DEGRADE
SRA2	42215	5609	17251	17107	-11498	DEGRADE	144	AGGRADE
SRA3	40825	4761	7403	10210	-5449	DEGRADE	-2807	DEGRADE
SRA4	36080 [2]	12270	21059	21208	-8938	DEGRADE	-149	DEGRADE
SRB1	34720	14344	16868	19520	-5176	DEGRADE	-2652	DEGRADE
SRB2	33500	9132	14857	16523	-7391	DEGRADE	-1666	DEGRADE
SRC1	30445	9172	13898	13351	-4179	DEGRADE	547	AGGRADE
SRC2	27925	7909	7691	7802	107	AGGRADE	-111	DEGRADE
SRC3	25965	7734	9757	9519	-1785	DEGRADE	238	AGGRADE
SRC4	23000	18321	14968	13563	4758	AGGRADE	1405	AGGRADE
SRD1	20845	20069	14737	16091	3978	AGGRADE	-1354	DEGRADE
SRD2	18650	9589	10838	12011	-2422	DEGRADE	-1173	DEGRADE
SRD3	16305	11158	9704	11772	-614	DEGRADE	-2068	DEGRADE
SRE1	14315	8670	12499	13590	-4920	DEGRADE	-1091	DEGRADE
SRE2	12195	6839	6657	8034	-1195	DEGRADE	-1377	DEGRADE
SRE3	10390	10184	5205	5933	4251	AGGRADE	-728	DEGRADE

1 - Long-term change analyzed using 1963 data instead of 1947 data because 1947 data is unavailable at this section

2 - STA 36080 was chosen to represent sra4 because the downstream confluence is of particular engineering interest to that subreach

3- STA 44585 1947 area uses 1963 data since 1947 data is not available.

Table 5.1B: Santa Clara River Historical Cross-Section Average Depth & Average Depth Change Aggradation/Degradation Change 1947-2005

Subreach	Station	Average Depth by Year = Area/Top Width (ft)			Δ Average Depth by Year (ft)			
		1947	2004	2005	47-05	Change	04-05	Change
SRA1	44585 [1,3]	16.0	18.4	17.8	-2.8	DEGRADE	0.6	AGGRADE
SRA2	42215	5.1	12.8	13.1	-8.0	DEGRADE	-0.3	DEGRADE
SRA3	40825	4.5	7.4	9.7	-5.2	DEGRADE	-2.3	DEGRADE
SRA4	36080 [2]	11.6	14.2	14.3	-2.7	DEGRADE	-0.1	DEGRADE
SRB1	34720	9.9	11.4	13.1	-3.2	DEGRADE	-1.7	DEGRADE
SRB2	33500	6.4	8.8	9.8	-3.4	DEGRADE	-1.0	DEGRADE
SRC1	30445	7.3	8.9	8.6	-1.3	DEGRADE	0.3	AGGRADE
SRC2	27925	9.9	14.0	14.3	-4.4	DEGRADE	-0.3	DEGRADE
SRC3	25965	5.7	7.6	7.4	-1.7	DEGRADE	0.2	AGGRADE
SRC4	23000	8.5	7.3	6.6	1.9	AGGRADE	0.7	AGGRADE
SRD1	20845	7.8	5.9	6.4	1.4	AGGRADE	-0.5	DEGRADE
SRD2	18650	5.6	5.6	6.2	-0.6	DEGRADE	-0.6	DEGRADE
SRD3	16305	5.6	5.1	6.3	-0.7	DEGRADE	-1.2	DEGRADE
SRE1	14315	6.1	6.5	7.1	-1.0	DEGRADE	-0.6	DEGRADE
SRE2	12195	5.3	5.1	6.2	-0.9	DEGRADE	-1.1	DEGRADE
SRE3	10390	7.6	4.0	4.5	3.1	AGGRADE	-0.5	DEGRADE

1 - Long-term change analyzed using 1963 data instead of 1947 data because 1947 data is unavailable at this section

2 - STA 36080 was chosen to represent sra4 because the downstream confluence is of particular engineering interest to that subreach

3- STA 44585 1947 area uses 1963 data since 1947 data is not available.

Section 44585 (SRA1) shows a gradual shifting of the thalweg toward the left (looking downstream) bank (Figure 5.2A) over the period of record. Topographic data is not available for this section for 1947, however, between 1963 and 2005, 2.8 feet of degradation has occurred (Table 5.1A-B), although the thalweg elevation increased between 1999 and 2005. Between 2004 and 2005, 0.6 feet of aggradation appears to have occurred (Table 5.1A-B) on the section as a whole. This portion of the River is narrower than most other portions and is slightly bent. Development has occurred on both banks, and this development along with the increased runoff from increased impervious area may have caused the observed degradation. A great deal of woody brush was present in the recent past, which may have rendered some portions of the bed more resistant to erosion, leading to some natural incising of the channel. It is also important to note that the dense brush in this and other woody sections may make the topography appear to be at higher elevation than is actually present. This difference results from the aerial survey technology used to create the topography, and is mostly evident in some portions of the 1999 topography.

Section 42215 (SRA2) appears to have greatly down cut and widened since 1947, degrading an average 8.1 feet along the section. Some of the observed long-term change may be related to the presence of the theme park and water treatment facility on the bank at this location. In recent years (1999-2005), the creek appears to have become relatively stable: area has increased from 17946 to 17101 over the period (Figure 5.2B). The River is relatively wide at this location although a bend is present. Development has occurred on both banks with agricultural development on the north bank and the Magic Mountain theme park on the south bank. Historical development may have led to the observed degradation, although at present the bed appears to be stable or degrading only slightly. The impacts of woody vegetation in this section may have played a role in the recent degradation. Finally, the 2004-2005 winter was very

wet and high flows were present on the River. During the heavy storms of December 2004 and January 2005, approximately 4.4 acres of the south bank was lost to the Santa Clara River. Some of the single-season degradation may possibly be attributed to this event. The features located at station 775 and 1325 in the 1999 topography are expected to be related the aerial surveying methodology, as noted above.

Similar to the other sections in Reach A, section 40825 (SRA3) is also degrading. The section has degraded 5.2 feet on average over the period of record (Table 5.1B). The 1963 data is insufficient in this section as indicated by the flat portions of the section, although the other years sufficiently indicate the trend. The 2005 thalweg is at the approximate elevation of the 1930 thalweg, although the present channel is more incised than the historic channel. The presently observed channel widening may possibly be attributed to recent high discharges, and migration of the channel may be related to these discharges. Features in the 1999 topography at stations 775 and 1325 are expected to be related to the aerial surveying methodology, as noted above.

Section 36080 (as applied to SRB1) borders the SRA4 and SRB1 subreaches. The section is adjacent to a local confluence in the River. The section shows consistent degradation over the period of record amounting to 2.7 feet, on average. The 1930 and 1963 topographies are insufficient in this section; however, widening of the channel in this location is readily apparent (Figure 5.2D). Little or no degradation is observed over the period of record, although a slight increase in the depth of the thalweg is observed during the 2004-2005 rainy season. Agriculture is present on the north overbank of the section although it is not clear how the history of farming practice may have affected the section.

The 1930 and 1963 topographic data of sections 34720 (SRB1) and 33500 (SRB2) is insufficient, as indicated by the long, straight portions of the section. Despite these difficulties, the data illustrate a clear degradational trend in the historic bed. Over the period of record, the section has degraded 3.2 and 3.4 feet, on average respectively, and 1.8 and 1.0 feet, on average respectively, during the 2004-2005 rainy season (Table 5.1). The River is broad and woody in this reach, with the northern end of the Travel Village development occupying the right overbank. It is unclear why a wide, straight portion of the River such as this would be subject to the observed degradation. Some of the long-term and single season may possibly be attributed to the woody nature of the bed and the large recent discharges, respectively. It should be noted that the present thalweg appears to be at an elevation similar to the 1930 thalweg on section 34720, while the thalweg of the 2005 topography at section 33500 may or may not be lower than the 1930 topography. As with other portions of historic topography, features often present at the time of surveying are not highly resolved. When this occurs, historic topography is included for completeness. The degradation of these reaches may also be reflective of the large changes in development along the River upstream of the study area. This may apply to other sections considered as well, although currently it is not clear.

Section 30445 (SRC1) is downstream of two major tributaries, the larger being Castaic Creek, which is discussed in the companion Castaic Creek Fluvial Study, submitted separately. The section is also adjacent to a historic agricultural area and the proposed Landmark project. Historical analysis indicates 1.4 feet of degradation over the historic record, but 0.3 feet of aggradation during the 2004-2005 rainy season

(Table 5.1B). The aggradation appears to be the result of build up of sediments on the Castaic Creek side of the channel. If Castaic Creek contributed to the bed in this location, it may be the result of forest fires during the summer of 2004 and subsequent heavy rains of that winter, as discussed in the Castaic Creek report. It should be noted that some problems exist with the 1947 topography in this section below station 300.

At sections 27925 (SRC2) and 25965 (SRC3), the upstream degradational trends diminish and historic topographic data begin to indicate a bed that is fluctuating about a mean (Figures 5.2H and 5.2I, respectively). Section 27925 is quite narrow and adjacent to historic agricultural practice. The channel at this section is confined between steep bluffs on the left bank and tree-lined agricultural embankments on the right. Data in Table 5.1 indicate that the section has degraded 4.4 feet over the period of record and 0.3 feet during the most recent season. A relatively low-radius bend in the River is also present here. At section 25965, in contrast, the less narrow, although similarly confined and more gradually bending channel, takes an increasingly braided form with only 1.7 feet of degradation over the period of record. Data in Table 5.1 also indicate the most recent trend in this section is 0.2 feet of aggradation.

Sections 23000 (SRC4) and 20845 (SRD1) are the first historically aggradational sections analyzed (Figure 5.2J and 5.2K, respectively). Section 23000 is adjacent to the Chiquito Canyon Creek and Long Canyon Creek tributaries at the west end of the proposed Landmark development and between two historic agricultural production areas. Section 20845 is downstream of the proposed Landmark site and the left overbank has historically been used for agriculture. Both banks of section 20885 are tree-lined. Both sections are relatively wide and straight with braided channel beds. Both sections have aggraded over the period of historic record: 1.9 and 1.4 feet, respectively. In the most recent short term, however, section 23000 has aggraded 0.7 feet while section 20845 has degraded 0.5 feet. Section 23000 shows some incising below the 1930 historical bed although the average bed elevation is higher now than in the past. The dominant change in bed elevation between 2004 and 2005 at section 20845 occurred to the left of station 2600, while the remaining portion remained stable. It is not clear why this occurred, although agricultural practices or high discharges from the Chiquito and Long tributaries may have played a role. Agricultural practices may have stabilized the bank position and height while the creeks may influence the bed by discharging high volumes of water and sediments that have the dual ability to erode or deposit at this location. It should be noted that the topographic artifact between station 2600 and 3000 in the 1999 topography is a function of topographic sampling. As noted above, the dense brush in this and other woody sections may make the topography appear to be at a higher elevation than is actually present and results from the aerial survey technology used to create the topography.

Sections 18650 (SRD2), 16305 (SRD3), 14315 (SRE1), and 12195 (SRE2) all exhibit very mild long-term degradation (one foot or less) between 1947 and 2005 (Table 5.1). Additionally, short-term adjustment for all of these sections ranges between -0.6 and -1.2 feet between 2004 and 2005. Sections 16305 and 12195 exhibit 1.2 and 1.1 feet of degradation, respectively, and are among the five highest single season changes in bed elevation of the sections examined. Sections in SRA3 and SRB1 degrade significantly more with -2.3 and -1.7 feet, respectively. All of the sections from 18650 to 12195 are recovering from the 1928 dam break event, the sections low elevations, and all sections exhibit oscillations in bed elevation over the historic record (Figure

5.2L though 5.2O, respectively). These sections have in common a relatively wide, straight and braided bed. Grande Canyon Creek and Potrero Canyon Creek confluence with the River at near section 17000. The influence of the confluences is not immediately evident but may include some of the observed fluctuations in bed elevation as well as affecting the wide historic meandering between the north and south bank (Figure 5.1). The observed features in the 1999 and 2004 topographies in section 16305 at stations 425 and 850 appear to be the south and north low-flow banks, respectively. Several of the features in the 1999 bed at section 14315 appear to correlate to the presence of vegetation on the bank and relate to surveying methodology, as noted above.

Section 10390 (SRE3) illustrates 3.1 feet of aggradation from 1947 to 2005 and 0.5 feet of degradation between 2004 and 2005 (Table 5.1). In this subreach, the River is relatively very wide and braided. Little woody vegetation is observed on the banks and steep bluffs dominate both banks, although a small farm plot sets the bluff on the right bank back. Figure 5.2P indicates that the bed is recovering from scouring related to the 1928 dam break. The observed feature in the 1999 and 2004 topographies at station 625 appears to be the south bank of the thalweg.

Based on the above analysis and Table 5.1, sections above approximately 25965 appear to be degrading, while sections below appear to be stable or fluctuating around a mean elevation. This may be the result of historic development within the overbank areas or owing to the presence of the generally narrower, winding channel bed in the upstream portion of the study reach. The lower portion of the study reach is relatively flat, broad and straight. Data in Appendix Chapter 4.5 indicate that for reaches A through E the slope decreases as S_0=0.0061, 0.0060, 0.0055, 0.0055, and 0.0054, respectively.

5.1 Single Season Bed Adjustment

With historical topography from successive years, estimates of single-season change can be developed. This is a powerful tool because it can be used to determine the predictive accuracy of SAM modeling. The 2004-2005 rain season was wet on Santa Clara River with strong rain events occurring on already saturated soils both in December 2004 and January 2005. These events produced very high discharges on the River. Topography from before and after these events provides a tool to estimate the impacts of a single large discharge event, in general, and single season cumulative impacts. The 2004 and 2005 beds are described in Table 5.1 and Figure 5.2A-P. The table and figures illustrate that the bed elevations show alternating degradation and aggradation. Degradation ranges from 0.1 to 2.3 feet, on average, with most degrading sections changing less than one foot, on average. Aggrading sections change from 0.2 to 0.7 feet, on average. More sections degrade than aggrade. The pattern of aggradation and degradation over the single season does not appear to be a function of proximity to a river confluence. For comparison, aggradation predicted by SAM in the proposed condition (Table 4.2B) ranges from 0.0 to 2.1 feet, while degradation ranges from 0.0 to 1.6 feet. The values of bed change estimated by SAM vary similar to those observed in the topographic datasets. These differences can be attributed to the discontinuous nature of the zero-dimensional SAM model.

6 Other Scour

The calculation of scour depth for design of toe-down for structures is given in Chapter 5 of LACH&SM. The manual defines the toe-down depth as the sum of long-term adjustment, general adjustment, and five local effects that fall into the category of other scour. Other scour falls into four sub-categories: local scour, bend scour, low-flow incisement, and bed form height. Local scour occurs in the vicinity of flow obstructions including piers and abutments. Bend scour occurs because differential velocity gradients around curves in open channel flow. Three distinct bends are located in the River between Interstate 5 and the end of the study area near the Los Angeles/Ventura County line. These bends have radii of 9,000, 3,000, and 17,000 feet from east to west in the River, respectively. The bends can be seen in Figure 1.1. Low flow incisement is included to represent thalweg or low flow channel depth. On-site inspection and analysis of historic topographic data of this feature estimates the thalweg at approximately two feet. Finally, bedform height represents the dunes and anti-dunes that develop in active soft-bottomed channels during flow events. Because no observations are available, bedform height has been limited after Kennedy (1963).

Bend scour and bedform height have been calculated based on LACH&SM design curves in Chapter 5 and Appendix Q. Bend scour is based on equation Q-6A of the manual, given as (Zeller, 1981):

$$Z_{bs} = \frac{0.0685YV^{0.8}}{Y_h^{0.4}S_e^{0.3}}\left[1.59\left(\frac{w}{r}\right)^{0.2} - 1\right]$$

where Z_{bs} is the bend scour depth, V is mean velocity, Y is maximum depth of flow, Y_h is hydraulic depth of flow, S_e is energy slope, w is channel top width, and r is radius of curvature to the centerline of the channel. Bedform height is given by equation Q-8 of the manual, given as:

$$h = 0.027V^2$$

where h is bedform height.

Results of calculations of other scour components are summarized in Table 6 as well as in LACH&SM calculations tables in Appendix Chapter 6.1 for both the existing and proposed conditions. Pier scour is zero in the existing condition and ranges from 0.0 to 17.4 in the proposed condition. The tables show that in the existing and proposed conditions bend scour ranges from 0.0 to 11.3 feet and 0.0 to 8.9 feet, respectively. Observed changes result from changes to river hydraulics in the study reach. For both the existing and proposed conditions, the table also shows that bed form height ranges from 0.5 to 8.3 feet in both the existing and proposed conditions.

Table 6: Santa Clara River Summary of Other Scour (ft)							
		Existing Condition		Proposed Condition			
Subreach	Section	Outside Curved Reach	Straight-Inside Curved Reach	Outside Curved Reach	Straight-Inside Curved Reach	Δ Curved	Δ Straight
SRA1	46195	8.3	8.3	8.3	8.3	0.0	0.0
	46020	9.9	9.9	9.9	9.9	0.0	0.0
	45545	7.6	7.6	7.6	7.6	0.0	0.0
	45030	10.3	10.3	10.3	10.3	0.0	0.0
	44585	7.0	7.0	7.0	7.0	0.0	0.0
	44210	9.7	9.7	9.7	9.7	0.0	0.0
SRA2	43820	7.3	7.3	7.3	7.3	0.0	0.0
	43610	8.9	8.9	8.9	8.9	0.0	0.0
	43410	7.7	7.7	7.7	7.7	0.0	0.0
	43200	8.2	8.2	8.2	8.2	0.0	0.0
	42975	7.4	7.4	7.4	7.4	0.0	0.0
	42815	7.3	7.3	7.4	7.4	0.1	0.1
	42590	6.9	6.5	7.0	6.6	0.1	0.1
	42430	7.0	6.8	7.3	7.2	0.3	0.4
	42215	5.0	3.5	7.1	6.6	2.1	3.1
	41940	5.4	3.8	5.3	3.8	-0.1	0.0
	41730	5.2	3.9	5.1	3.9	-0.1	0.0
	41460	5.7	3.8	4.7	3.8	-1.0	0.0
SRA3	41280	5.7	5.7	5.6	5.6	-0.1	-0.1
	41080	7.3	7.3	7.4	7.4	-0.1	0.1
	40825	6.9	6.4	6.9	6.4	0.0	0.0
	40585	6.3	5.9	6.3	5.9	0.0	0.0
	40335	5.9	3.7	4.9	3.5	-1.0	-0.2
	40130	6.5	3.7	5.0	3.7	-1.5	0.0
	39945	6.4	3.4	4.9	3.6	-1.5	0.2
	39755	6.7	5.2	5.7	5.7	-1.0	0.5
	39605	7.9	7.1	7.2	7.2	-0.7	0.1
	39310	6.7	5.5	5.9	5.7	-0.8	0.2
	39100	5.7	4.1	7.2	7.2	1.5	3.1
	38925	4.9	3.8	4.2	4.2	-0.6	0.4
SRA4	38710	4.2	3.5	4.0	4.0	-0.2	0.5
	38475	6.3	6.3	6.3	6.3	0.0	0.0
	38300	6.9	6.9	7.1	7.1	-0.2	0.2
	38065	4.7	4.7	4.9	4.9	-0.2	0.2
	37810	6.5	6.5	6.5	6.5	0.0	0.0
	37655	7.1	7.1	7.3	7.3	-0.2	0.2
	37390	5.1	5.1	5.3	5.3	-0.2	0.2
	37135	6.4	5.9	5.7	5.7	-0.7	-0.2
	36930	6.5	5.9	6.1	6.1	-0.4	0.2
	36735	5.9	5.0	5.5	5.5	-0.4	0.5
	36515	7.0	5.8	4.6	4.2	-2.4	-1.6
	36265	5.7	4.3	5.0	4.1	-0.7	-0.2
SRB1	36080	5.7	4.1	19.1	18.2	13.4	14.1
	35845	5.7	3.6	5.3	3.6	-0.4	0.0
	35725	7.0	4.9	6.8	5.0	-0.2	0.1
	35515	7.7	5.9	7.7	5.9	0.0	0.0
	35245	7.2	4.8	7.6	6.0	0.4	1.2
	35040	8.8	7.1	8.9	7.2	0.1	0.1
	34860	7.8	6.4	7.8	6.6	0.0	0.2
	34720	7.9	6.4	8.0	6.6	0.1	0.2
	34495	7.4	6.4	7.1	6.1	-0.3	-0.3
	34310	7.3	6.2	7.0	5.8	-0.3	-0.4
	34090	6.9	6.0	6.9	5.9	0.0	-0.1
SRB2	33880	6.5	5.3	6.9	5.7	-0.4	0.4
	33710	6.9	5.7	6.5	5.2	-0.4	-0.5
	33500	6.9	5.4	7.1	5.5	-0.2	0.1
	33310	7.5	5.4	7.5	5.4	0.0	0.0
	33115	6.7	5.3	5.6	3.4	-1.1	-1.9
	32795	6.3	4.0	6.6	4.3	-0.3	0.3
	32605	6.1	4.7	7.1	4.8	-1.0	0.1
SRC1	32265	8.2	5.8	7.9	5.4	-0.3	-0.4
	31875	6.9	3.6	7.1	4.1	-0.2	0.5
	31585	8.6	5.7	6.6	3.6	-2.0	-2.1
	31360	6.3	3.3	6.3	3.4	0.0	0.1
	31060	5.6	2.8	5.5	2.9	-0.1	0.1
	30720	6.1	2.6	5.9	2.6	-0.2	0.0
	30445	6.0	2.5	5.9	2.5	-0.1	0.0
	30095	6.7	2.6	6.1	2.6	-0.6	0.0
	29815	7.1	2.8	5.7	2.8	-1.4	0.0
	29565	7.4	2.7	5.1	2.7	-2.3	0.0
	29385	7.8	3.0	5.0	2.9	-2.8	-0.1
SRC2	29140	7.8	3.4	4.4	3.1	-3.4	-0.3
	28895	8.8	7.2	7.5	6.8	-1.3	-0.4
	28695	10.0	10.0	9.0	9.0	-1.0	-1.0
	28500	8.8	8.8	8.8	8.8	0.0	0.0
	28280	7.9	7.9	7.6	7.4	-0.3	-0.5
	28080	7.7	7.7	3.9	3.7	-3.8	-4.0
	27925	6.3	6.3	4.3	4.3	-2.0	-2.0
	27725	7.7	7.7	6.9	6.9	-0.8	-0.8
	27545	8.6	8.6	9.0	9.0	0.4	0.4
	27335	8.0	8.0	8.2	8.2	0.2	0.2
	27155	8.6	8.6	6.9	6.9	-1.7	-1.7
SRC3	26990	8.1	7.6	7.9	7.7	-0.2	0.1
	26780	8.5	7.5	8.3	7.6	-0.2	0.1
	26575	12.8	7.5	12.7	7.6	-0.1	0.1
	26355	12.4	5.4	12.1	5.4	-0.3	0.0
	26170	14.1	6.4	13.3	5.9	-0.8	-0.5
	25965	13.7	6.3	13.8	6.5	0.1	0.2
	25785	14.2	7.2	13.4	6.8	-0.8	-0.4
	25600	16.0	7.6	12.6	6.6	-3.4	-1.0
	25425	16.1	7.4	11.8	6.5	-4.3	-0.9
	25215	13.9	4.8	10.7	4.7	-3.2	-0.1
	25000	16.6	6.1	10.4	4.3	-6.2	-1.8
SRC4	24795	17.7	6.9	10.3	4.7	-7.4	-2.2
	24550	17.6	7.4	10.4	5.1	-7.2	-2.3
	24335	15.0	4.8	11.0	6.5	-4.0	1.7
	24115	15.5	6.8	11.5	7.4	-5.0	0.7
	23975	14.6	6.9	11.9	7.8	-2.7	0.9
	23755	13.8	5.8	11.2	6.4	-2.6	0.6
	23565	14.1	4.8	12.5	7.5	-1.6	2.7
	23365	13.3	5.9	12.3	6.6	-1.0	0.7
	23180	13.5	4.3	13.8	8.3	0.3	4.0
	23000	11.0	3.1	11.0	7.6	0.0	4.5
	22790	11.0	3.2	24.8	21.0	13.8	17.8
	22600	13.0	3.7	12.8	7.3	-0.2	3.6
	22415	12.6	3.9	12.0	7.4	-0.6	3.5

Table 6: Santa Clara River Summary of Other Scour (ft) continued							
		Existing Condition		Proposed Condition			
Subreach	Section	Outside Curved Reach	Straight-Inside Curved Reach	Outside Curved Reach	Straight-Inside Curved Reach	Δ Curved	Δ Straight
SRD1	22195	11.8	4.7	11.1	4.5	-0.7	-0.2
	22010	13.6	5.5	13.1	5.5	-0.5	0.0
	21790	13.1	7.2	13.1	7.2	0.0	0.0
	21615	10.4	6.3	10.3	6.3	-0.1	0.0
	21440	13.4	6.8	11.9	6.1	-1.5	-0.7
	21225	16.9	7.1	14.1	6.4	-2.8	-0.7
	21020	12.9	6.4	10.4	6.9	-2.5	0.5
	20845	15.5	5.9	13.0	5.1	-2.5	-0.8
	20595	15.4	5.1	11.9	4.1	-3.5	-1.0
	20435	15.6	4.3	12.2	4.0	-3.4	-0.3
	20280	15.6	4.6	13.2	5.3	-2.4	-0.7
	20070	13.3	6.6	14.6	7.0	1.3	0.4
SRD2	19855	14.2	6.3	12.5	7.1	-1.7	0.8
	19630	12.9	6.3	10.3	6.4	-2.6	0.1
	19440	12.8	3.9	10.2	4.3	-2.6	0.4
	19240	13.3	4.6	11.0	5.4	-2.3	0.8
	19050	12.7	3.6	12.1	6.8	-0.6	3.2
	18830	13.6	3.5	12.5	4.4	-1.1	0.9
	18650	13.5	3.3	12.7	4.0	-0.8	0.7
	18475	12.6	2.9	11.6	3.1	-1.0	0.2
	18290	12.9	3.0	12.1	3.3	-0.8	0.3
	18025	2.8	2.8	2.8	2.8	0.0	0.0
	17785	3.0	3.0	3.0	3.0	0.0	0.0
SRD3	17510	4.6	4.6	3.6	3.6	-1.0	-1.0
	17360	5.9	5.9	5.9	5.9	0.0	0.0
	17110	8.4	8.4	8.7	8.7	0.3	0.3
	16970	8.8	8.8	8.8	8.8	0.0	0.0
	16720	6.5	6.5	6.6	6.6	0.1	0.1
	16515	6.8	6.8	7.1	7.1	0.3	0.3
	16305	7.1	6.8	3.8	3.8	-3.3	-3.0
	16130	6.0	5.5	5.3	5.3	-0.7	-0.2
	15960	6.1	5.4	6.2	6.2	0.1	0.8
	15745	4.5	3.6	4.0	4.0	-0.5	0.4
	15540	4.6	3.6	3.5	3.5	-1.1	-0.1
	15335	5.1	4.2	5.5	5.5	0.4	1.3
SRE1	15125	5.5	5.5	23.7	23.7	18.2	18.2
	14900	4.9	4.9	6.9	6.9	2.0	2.0
	14720	6.0	5.8	6.5	6.4	0.5	0.6
	14480	5.0	4.7	6.5	6.4	1.5	1.7
	14315	5.2	5.0	5.0	4.6	-0.2	-0.4
	14090	4.7	4.6	4.9	4.8	0.2	0.2
	13850	5.4	5.3	4.3	4.2	-1.1	-1.1
	13635	5.2	5.2	5.3	5.2	0.1	0.0
	13425	6.3	6.0	6.2	5.9	-0.1	-0.1
	13190	4.3	4.0	4.3	4.0	0.0	0.0
SRE2	13030	4.9	4.7	4.9	4.7	0.0	0.0
	12835	4.4	4.4	4.4	4.4	0.0	0.0
	12615	4.1	4.1	4.1	4.1	0.0	0.0
	12395	4.0	4.0	4.0	4.0	0.0	0.0
	12195	3.5	3.5	3.5	3.5	0.0	0.0
	11995	4.2	4.2	4.2	4.2	0.0	0.0
	11780	4.1	4.1	4.1	4.1	0.0	0.0
	11605	4.7	4.7	4.6	4.6	-0.1	-0.1
	11405	4.3	4.3	4.3	4.3	0.0	0.0
	11180	5.7	5.7	5.7	5.7	0.0	0.0
SRE3	11015	6.9	6.9	6.9	6.9	0.0	0.0
	10835	7.4	7.4	7.4	7.4	0.0	0.0
	10575	5.7	5.7	5.7	5.7	0.0	0.0
	10390	6.4	6.4	6.4	6.4	0.0	0.0
	10225	6.3	6.3	6.3	6.3	0.0	0.0
	10000	5.0	5.0	5.0	5.0	0.0	0.0
	9820	6.7	6.7	6.7	6.7	0.0	0.0
	9595	4.9	4.9	4.9	4.9	0.0	0.0
	9385	5.5	5.4	5.5	5.4	0.0	0.0
	9220	5.8	5.6	5.8	5.6	0.0	0.0
	9025	5.5	5.4	5.5	5.4	0.0	0.0

7 Total Scour

To be conservative, general adjustment, long-term adjustment, and other scour are summed to determine total potential bed adjustment following LACH&SM methodology, as presented in Chapter 5 of the LACH&SM manual. SAM values represent general adjustment, and the long-term analysis presented in Chapter 5 represent long-term trends. Previous versions of this report used long-term analysis based on historical thalweg analysis. The presently employed cross-section analysis provides greater detail at individual sections and has replaced the thalweg analysis. The historical thalweg analysis is included in Appendix Chapter 5.2 for completeness. Individual and combined scour components are shown in Figure 7.1A-D and Table 7.1A-D, for the existing and proposed conditions. For cross-sections where SAM modeling predicts aggradation, the general adjustment contribution to total bed adjustment is not included. This conservative approach ensures that major trends are captured by the study but local or minor bed adjustments do not decrease total potential degradation. Long-term degradation values are taken as the larger of long-term degradation or two feet. The figure shows that total bed degradation on the outside bank of curved reaches ranges from approximately -6.9 to -19.7 feet in the existing condition at sections 38710/13030 and section 24795, respectively. In the proposed condition, total bed degradation outside of curved reaches range from approximately -6.7 to -26.1 feet at section 38710 and section 15125, respectively. In straight and inside bank of curved reaches in the existing condition, total degradation ranges from -6.2 to -15.4 feet at section 38710 and section 43820, respectively. In straight and inside of curved reaches in the proposed condition, total degradation ranges from -6.7 feet at multiple sections to -26.2 feet at section 15125, respectively. The largest adjustment for both conditions is in the vicinity of the Grande and Portrero confluences. The existing and proposed conditions closely match ($\Delta \leq 1.0$) at all subreaches except at SRC2, SRC4, and SRD2 where the proposed condition total adjustment is shallower than that in the existing condition, and at SRB1 and SRE1 where the proposed condition total adjustment is deeper than the existing condition. In the cases of SRB1 and SRE1, the total degradation in the proposed condition is deeper due to proposed bridges at these locations. In the other cases where total degradation in the existing condition is deeper, general adjustment and other components differ significantly between the existing and proposed conditions. It is important to note that the total toe-down is primarily a function of the large other components, which greatly exceed the general adjustment and long-term degradation components.

Table 7.1A: Santa Clara River Existing Conditions Outside Curved Reach Summary of Degradation Components (ft)

Subreach	US Station	Z_{DEG}	Z_{GS} (SAM)*	Z_{OTHER}	Z_{TOTAL}
SRA1	46195	-2.8	0.6	-8.3	-11.1
SRA2	43820	-8.1	0.4	-7.3	-15.4
SRA3	41280	-5.2	-0.3	-5.7	-11.1
SRA4	38710	-2.7	0.3	-4.2	-6.9
SRB1	36080	-3.2	-0.6	-5.7	-9.5
SRB2	33880	-3.4	0.0	-6.5	-10.0
SRC1	32265	-2.0	0.8	-8.2	-10.2
SRC2	29140	-4.4	-2.9	-7.8	-15.1
SRC3	26990	-2.0	-0.4	-8.1	-10.4
SRC4	24795	-2.0	0.2	-17.7	-19.7
SRD1	22195	-2.0	-0.6	-11.8	-14.3
SRD2	19855	-2.0	1.3	-14.2	-16.2
SRD3	17510	-2.0	-1.2	-4.6	-7.8
SRE1	15125	-2.0	-0.6	-5.5	-8.1
SRE2	13030	-2.0	2.3	-4.9	-6.9
SRE3	11015	-2.0	-1.4	-6.9	-10.3

*Positive values in Z_{GS} represent aggradation

Table 7.1B: Santa Clara River Proposed Conditions Outside Curved Reach Summary of Degradation Components (ft)

Subreach	US Station	Z_{DEG}	Z_{GS} (SAM)*	Z_{OTHER}	Z_{TOTAL}
SRA1	46195	-2.8	0.6	-8.3	-11.1
SRA2	43820	-8.1	0.2	-7.3	-15.4
SRA3	41280	-5.2	-0.1	-5.6	-11.0
SRA4	38710	-2.7	0.1	-4.0	-6.7
SRB1	36080	-3.2	-0.7	-19.1	-23.0
SRB2	33880	-3.4	0.2	-6.9	-10.3
SRC1	32265	-2.0	0.8	-7.9	-9.9
SRC2	29140	-4.4	-1.6	-4.4	-10.4
SRC3	26990	-2.0	-1.3	-7.9	-11.1
SRC4	24795	-2.0	0.2	-10.3	-12.3
SRD1	22195	-2.0	-0.2	-11.1	-13.4
SRD2	19855	-2.0	1.4	-12.5	-14.5
SRD3	17510	-2.0	-1.3	-3.6	-6.9
SRE1	15125	-2.0	-0.4	-23.7	-26.2
SRE2	13030	-2.0	2.1	-4.9	-6.9
SRE3	11015	-2.0	-1.5	-6.9	-10.4

*Positive values in Z_{GS} represent aggradation

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Table 7.1C: Santa Clara River Existing Conditions Straight-Inside Curved Reach Summary of Degradation Components (ft)

Subreach	US Station	Z_{DEG}	Z_{GS} (SAM)*	Z_{OTHER}	Z_{TOTAL}
SRA1	46195	-2.8	0.6	-8.3	-11.1
SRA2	43820	-8.1	0.4	-7.3	-15.4
SRA3	41280	-5.2	-0.3	-5.7	-11.1
SRA4	38710	-2.7	0.3	-3.5	-6.2
SRB1	36080	-3.2	-0.6	-4.1	-7.9
SRB2	33880	-3.4	0.0	-5.3	-8.8
SRC1	32265	-2.0	0.8	-5.8	-7.8
SRC2	29140	-4.4	-2.9	-3.4	-10.6
SRC3	26990	-2.0	-0.4	-7.6	-9.9
SRC4	24795	-2.0	0.2	-6.9	-8.9
SRD1	22195	-2.0	-0.6	-4.7	-7.3
SRD2	19855	-2.0	1.3	-6.3	-8.3
SRD3	17510	-2.0	-1.2	-4.6	-7.8
SRE1	15125	-2.0	-0.6	-5.5	-8.1
SRE2	13030	-2.0	2.3	-4.7	-6.7
SRE3	11015	-2.0	-1.4	-6.9	-10.3

*Positive values in Z_{GS} represent aggradation

Table 7.1D: Santa Clara River Proposed Conditions Straight-Inside Curved Reach Summary of Degradation Components (ft)

Subreach	US Station	Z_{DEG}	Z_{GS} (SAM)*	Z_{OTHER}	Z_{TOTAL}
SRA1	46195	-2.8	0.6	-8.3	-11.1
SRA2	43820	-8.1	0.2	-7.3	-15.4
SRA3	41280	-5.2	-0.1	-5.6	-11.0
SRA4	38710	-2.7	0.1	-4.0	-6.7
SRB1	36080	-3.2	-0.7	-18.2	-22.1
SRB2	33880	-3.4	0.2	-5.7	-9.1
SRC1	32265	-2.0	0.8	-5.4	-7.4
SRC2	29140	-4.4	-1.6	-3.1	-9.2
SRC3	26990	-2.0	-1.3	-7.7	-11.0
SRC4	24795	-2.0	0.2	-4.7	-6.7
SRD1	22195	-2.0	-0.2	-4.5	-6.7
SRD2	19855	-2.0	1.4	-7.1	-9.1
SRD3	17510	-2.0	-1.3	-3.6	-6.9
SRE1	15125	-2.0	-0.4	-23.7	-26.2
SRE2	13030	-2.0	2.1	-4.7	-6.7
SRE3	11015	-2.0	-1.5	-6.9	-10.4

*Positive values in Z_{GS} represent aggradation

Figure 7.2A-D presents a comparison of total bed adjustment for the summed methodology, presented previously, and the methodology based on the Los Angeles County Flood Control District's Design Manual (LACFCDDM), Table F-31. Calculations are shown in Table 7.2A-D. The LACFCDDM methodology is based only on velocity and does not account for any other river parameters. Generally, the

Figure 7.1A: Santa Clara River Existing Conditions Outside Curved Reach Summary of Degradation Components

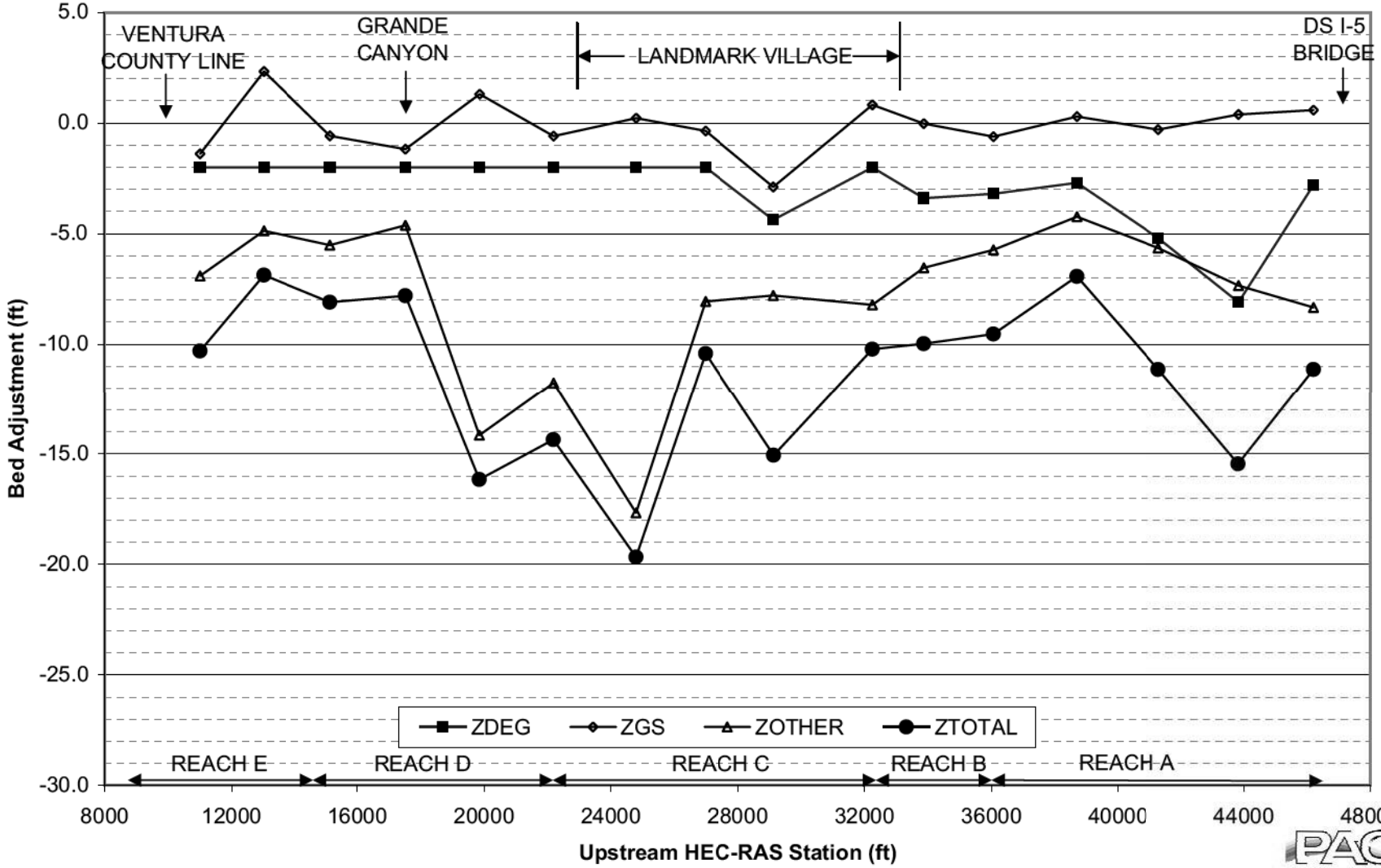

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Figure 7.1B: Santa Clara River Proposed Conditions Outside Curved Reach Summary of Degradation Components

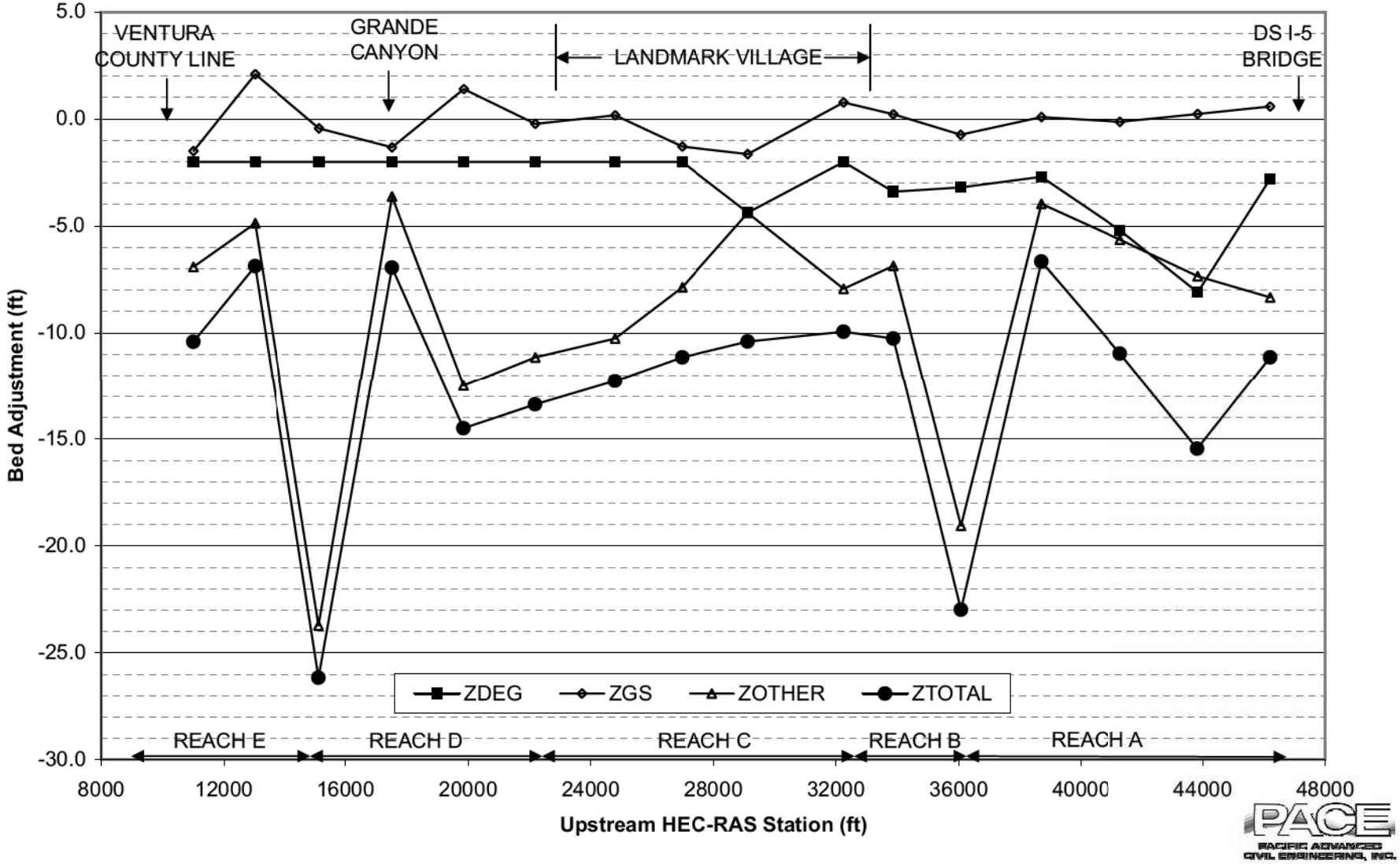

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Figure 7.1C: Santa Clara River Existing Conditions Straight-Inside Curved Reach Summary of Degradation Components

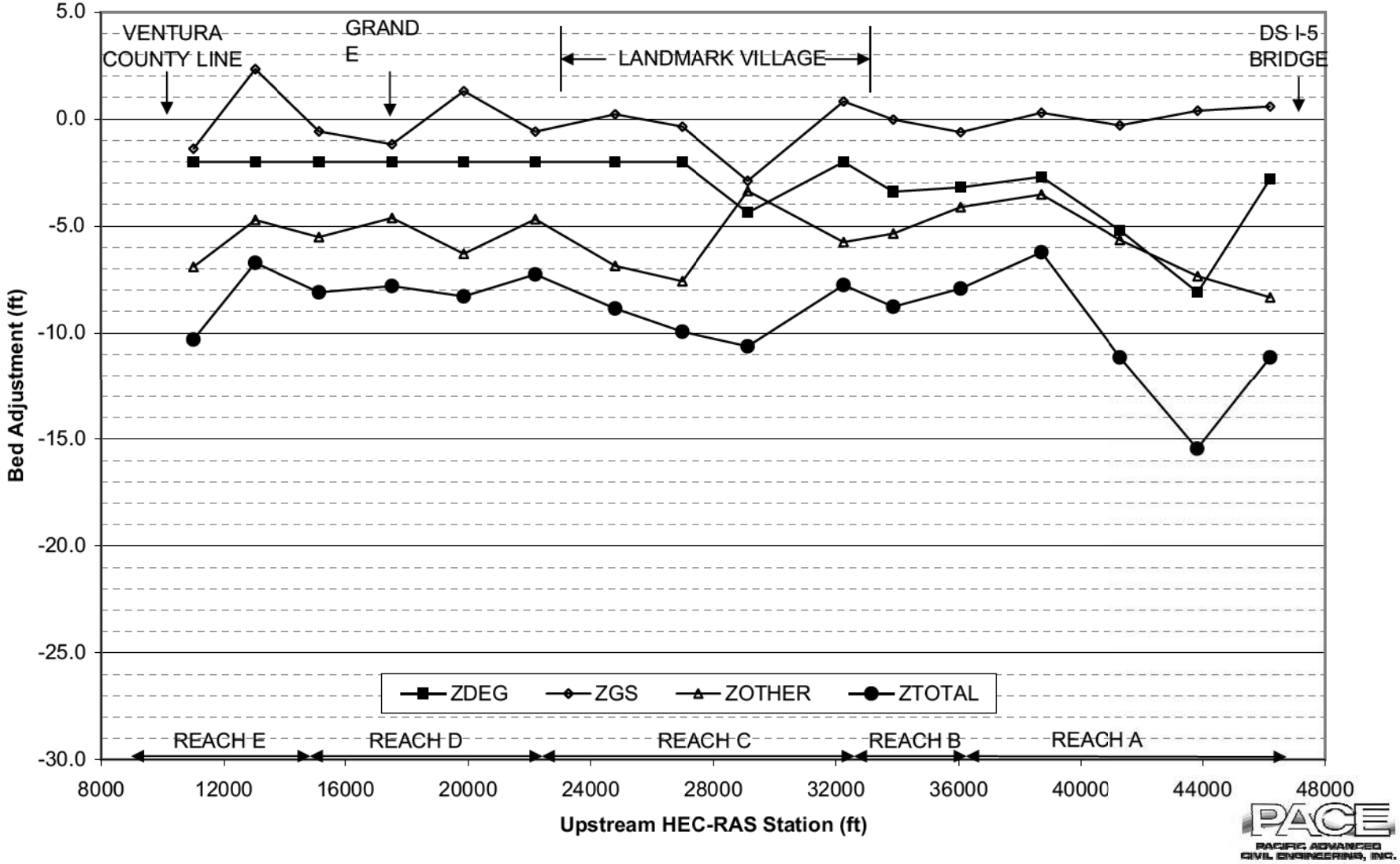

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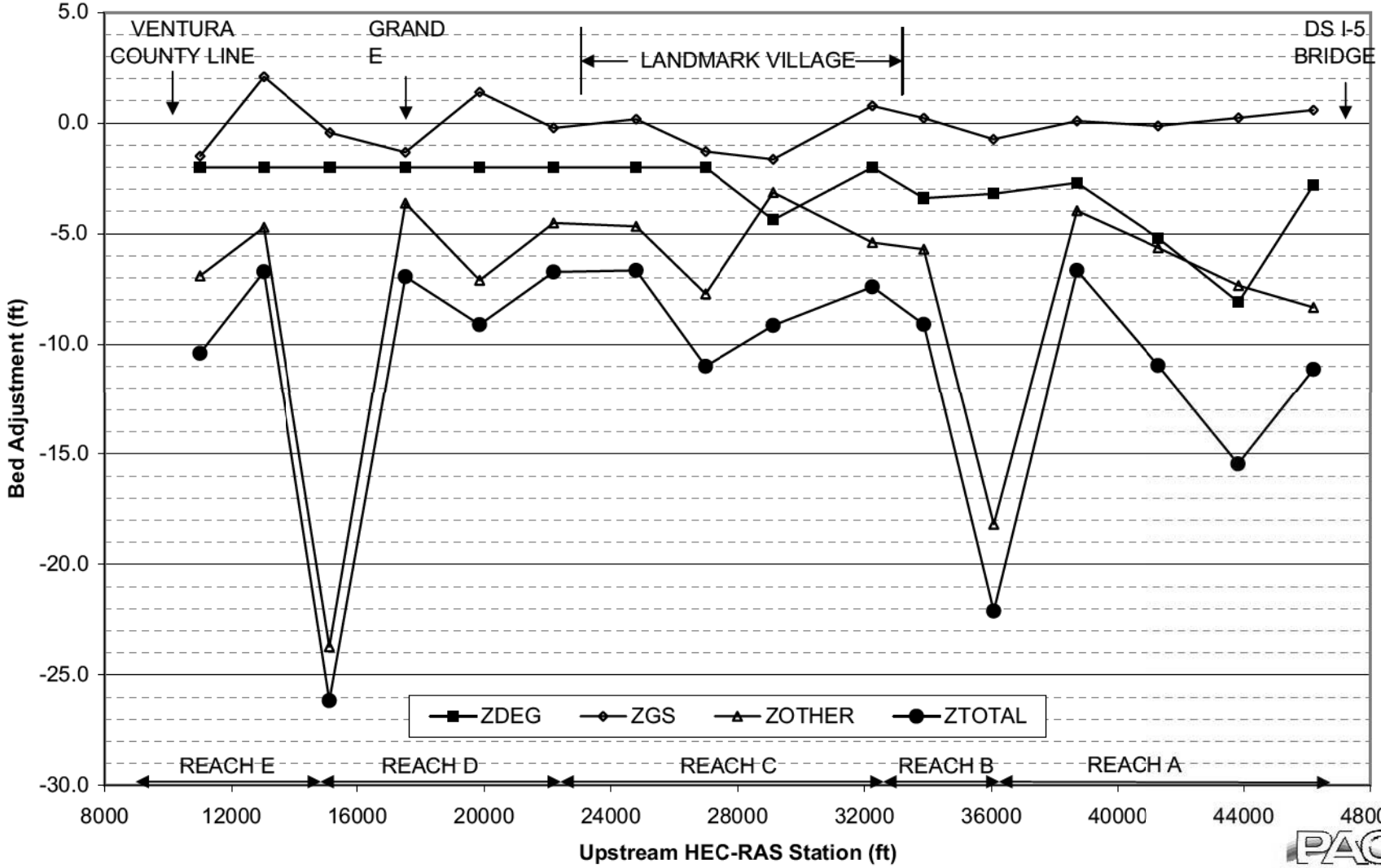
Figure 7.1D: Santa Clara River Proposed Conditions Straight-Inside Curved Reach Summary of Degradation Components



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LACFCDDM is the most conservative among all total scour methodologies. Figure 7.2A-D shows that the more intensive LACH&SM methodology generally predicts a shallower toe-down in both the existing and proposed conditions than does the LACFCDDM methodology for most sections. At section 43820, LACH&SM predicts 1.4 feet deeper toe-down than does the LACFCDDM for both existing and proposed conditions and outside of curved and straight or inside of curved reaches because of very high long-term adjustment. At section 29140 in straight or inside of curved reaches for both existing and proposed conditions, LACH&SM predicts 0.6 and 1.2 feet, respectively, deeper toe-down than does the LACFCDDM because of higher long-term adjustment combined with moderate bedform height in this reach. At section 36080 and section 15125 in the proposed condition, LACH&SM predicts more than 10 feet deeper toe-down than does LACFCDDM due to proposed bridges at these locations. The LACFCDDM does not effectively account for the local degradation; therefore, the LACH&SM methodology utilizing SAM calculations predicts a deeper toe-down at some locations than does the LACFCDDM methodology. Figure 7.3A-D shows the 1999 (model) minimum bed elevation as previously discussed in Chapter 4, the existing bed minimum elevation (2005), and the calculated project toe-down from Figure 7.2A-D. Figure 7.3A-D shows that the calculated toe-down is below the 1999 model and existing 2005 minimum bed elevation at every section examined by approximately 6 to 26 feet, depending on the section.

Table 7.2A: Santa Clara River Existing Conditions Outside Curved Reach Toe-down Summary by Methodology (ft)

Subreach	US Station	HEC-RAS Model (1999) Elevation	LACH&SM (SAM)	LACH&SM Toe-down Elevation	LACFCDDM	LACFCDDM Toe-down Elevation	Δ (LACH&SM-LACFCDDM)
SRA1	46195	1034.6	-11.1	1023.4	-14.0	1020.6	2.9
SRA2	43820	1018.0	-15.4	1002.6	-14.0	1004.0	-1.4
SRA3	41280	1002.0	-11.1	990.9	-12.5	989.5	1.4
SRA4	38710	988.0	-6.9	981.1	-15.0	973.0	8.1
SRB1	36080	973.2	-9.5	963.6	-15.0	958.2	5.5
SRB2	33880	960.0	-10.0	950.0	-18.0	942.0	8.0
SRC1	32265	951.4	-10.2	941.2	-18.0	933.4	7.8
SRC2	29140	932.0	-15.1	916.9	-15.0	917.0	-0.1
SRC3	26990	920.0	-10.4	909.6	-21.0	899.0	10.6
SRC4	24795	908.0	-19.7	888.3	-21.0	887.0	1.3
SRD1	22195	894.0	-14.3	879.7	-15.0	879.0	0.7
SRD2	19855	880.1	-16.2	863.9	-18.0	862.1	1.8
SRD3	17510	868.0	-7.8	860.2	-10.0	858.0	2.2
SRE1	15125	854.0	-8.1	845.9	-12.5	841.5	4.4
SRE2	13030	843.3	-6.9	836.4	-15.0	828.3	8.1
SRE3	11015	832.0	-10.3	821.7	-14.0	818.0	3.7

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Table 7.2B: Santa Clara River Proposed Conditions Outside Curved Reach Toe-down Summary by Methodology (ft)

Subreach	US Station	HEC-RAS Model (1999) Elevation	LACH&SM (SAM)	LACH&SM Toe-down Elevation	LACFCDDM	LACFCDDM Toe-down Elevation	Δ (LACH&SM-LACFCDDM)
SRA1	46195	1034.6	-11.1	1023.4	-14.0	1020.6	2.9
SRA2	43820	1018.0	-15.4	1002.6	-14.0	1004.0	-1.4
SRA3	41280	1002.0	-11.0	991.0	-12.5	989.5	1.5
SRA4	38710	988.0	-6.7	981.3	-10.0	978.0	3.3
SRB1	36080	973.2	-23.0	950.2	-15.0	958.2	-8.0
SRB2	33880	960.0	-10.3	949.7	-18.0	942.0	7.7
SRC1	32265	951.4	-9.9	941.4	-18.0	933.4	8.1
SRC2	29140	932.0	-10.4	921.6	-12.0	920.0	1.6
SRC3	26990	920.0	-11.1	908.9	-21.0	899.0	9.9
SRC4	24795	908.0	-12.3	895.7	-15.0	893.0	2.7
SRD1	22195	894.0	-13.4	880.6	-15.0	879.0	1.6
SRD2	19855	880.1	-14.5	865.6	-21.0	859.1	6.5
SRD3	17510	868.0	-6.9	861.1	-10.0	858.0	3.1
SRE1	15125	854.0	-26.2	827.8	-12.5	841.5	-13.7
SRE2	13030	843.3	-6.9	836.4	-15.0	828.3	8.1
SRE3	11015	832.0	-10.4	821.6	-14.0	818.0	3.6

Table 7.2C: Santa Clara River Existing Conditions Straight-Inside Curved Reach Toe-down Summary by Methodology (ft)

Subreach	US Station	HEC-RAS Model (1999) Elevation	LACH&SM (SAM)	LACH&SM Toe-down Elevation	LACFCDDM	LACFCDDM Toe-down Elevation	Δ (LACH&SM-LACFCDDM)
SRA1	46195	1034.6	-11.1	1023.4	-14.0	1020.6	2.9
SRA2	43820	1018.0	-15.4	1002.6	-14.0	1004.0	-1.4
SRA3	41280	1002.0	-11.1	990.9	-12.5	989.5	1.4
SRA4	38710	988.0	-6.2	981.8	-10.0	978.0	3.8
SRB1	36080	973.2	-7.9	965.3	-10.0	963.2	2.1
SRB2	33880	960.0	-8.8	951.2	-12.5	947.5	3.7
SRC1	32265	951.4	-7.8	943.6	-12.5	938.9	4.7
SRC2	29140	932.0	-10.6	921.4	-10.0	922.0	-0.6
SRC3	26990	920.0	-9.9	910.1	-14.0	906.0	4.1
SRC4	24795	908.0	-8.9	899.1	-14.0	894.0	5.1
SRD1	22195	894.0	-7.3	886.7	-10.0	884.0	2.7
SRD2	19855	880.1	-8.3	871.8	-12.5	867.6	4.2
SRD3	17510	868.0	-7.8	860.2	-10.0	858.0	2.2
SRE1	15125	854.0	-8.1	845.9	-12.5	841.5	4.4
SRE2	13030	843.3	-6.7	836.5	-10.0	833.3	3.3
SRE3	11015	832.0	-10.3	821.7	-14.0	818.0	3.7

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Figure 7.2A: Santa Clara River Existing Conditions Outside Curved Reach Toe-down Depths by Methodology

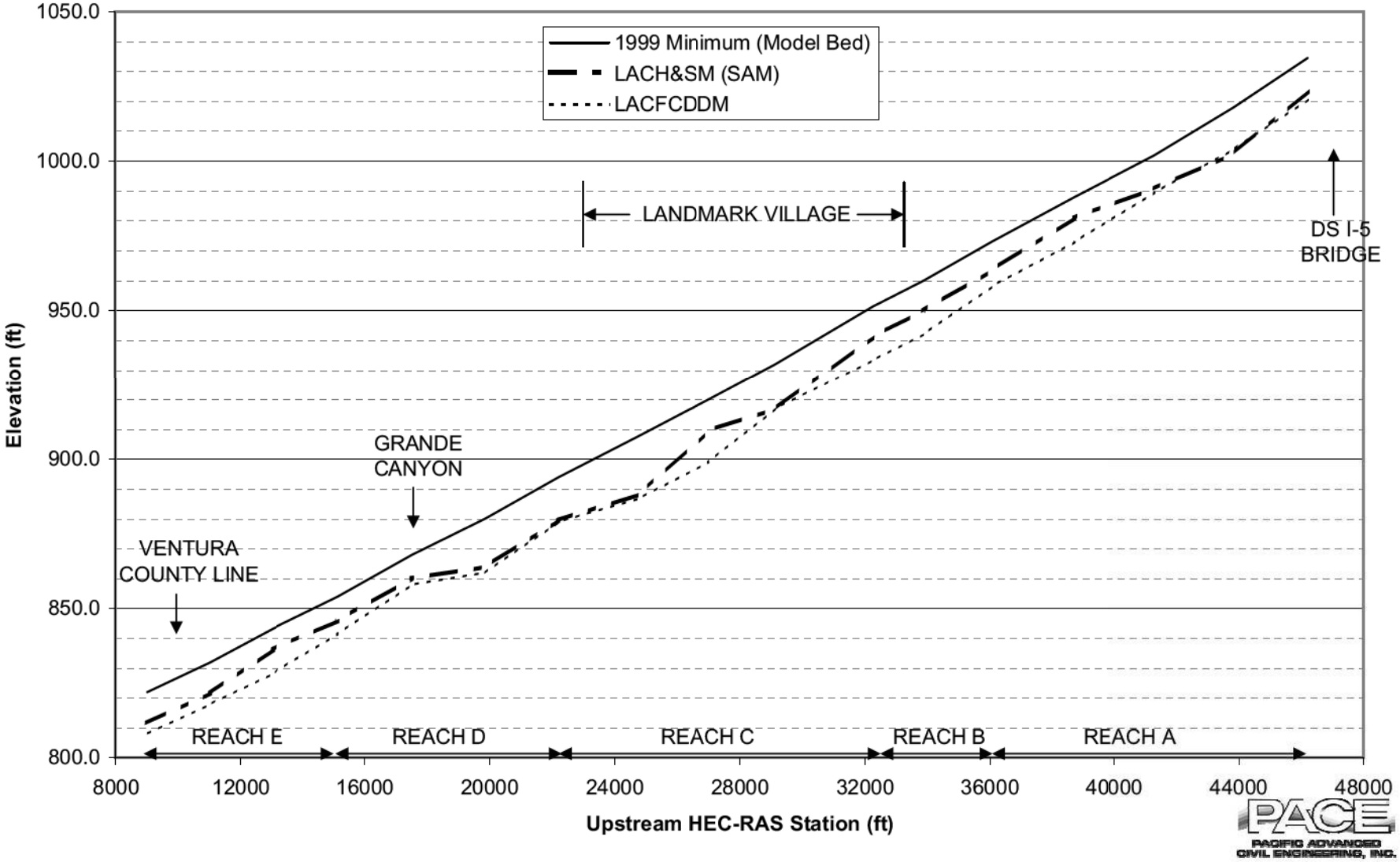

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Figure 7.2B: Santa Clara River Proposed Conditions Outside Curved Reach Toe-down Depths by Methodology

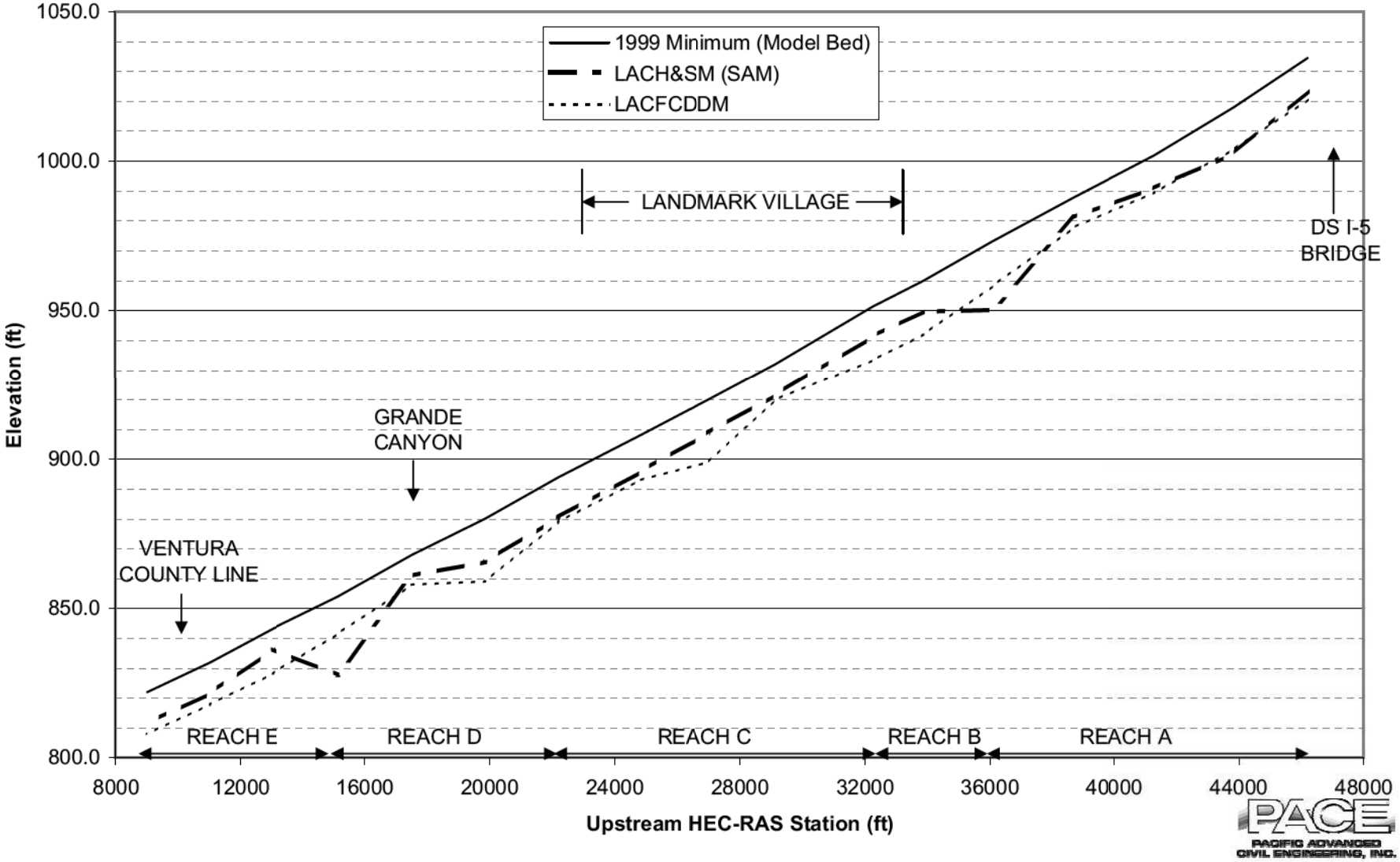

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Figure 7.2C: Santa Clara River Existing Conditions Straight-Inside Curved Reach Toe-down Depths by Methodology

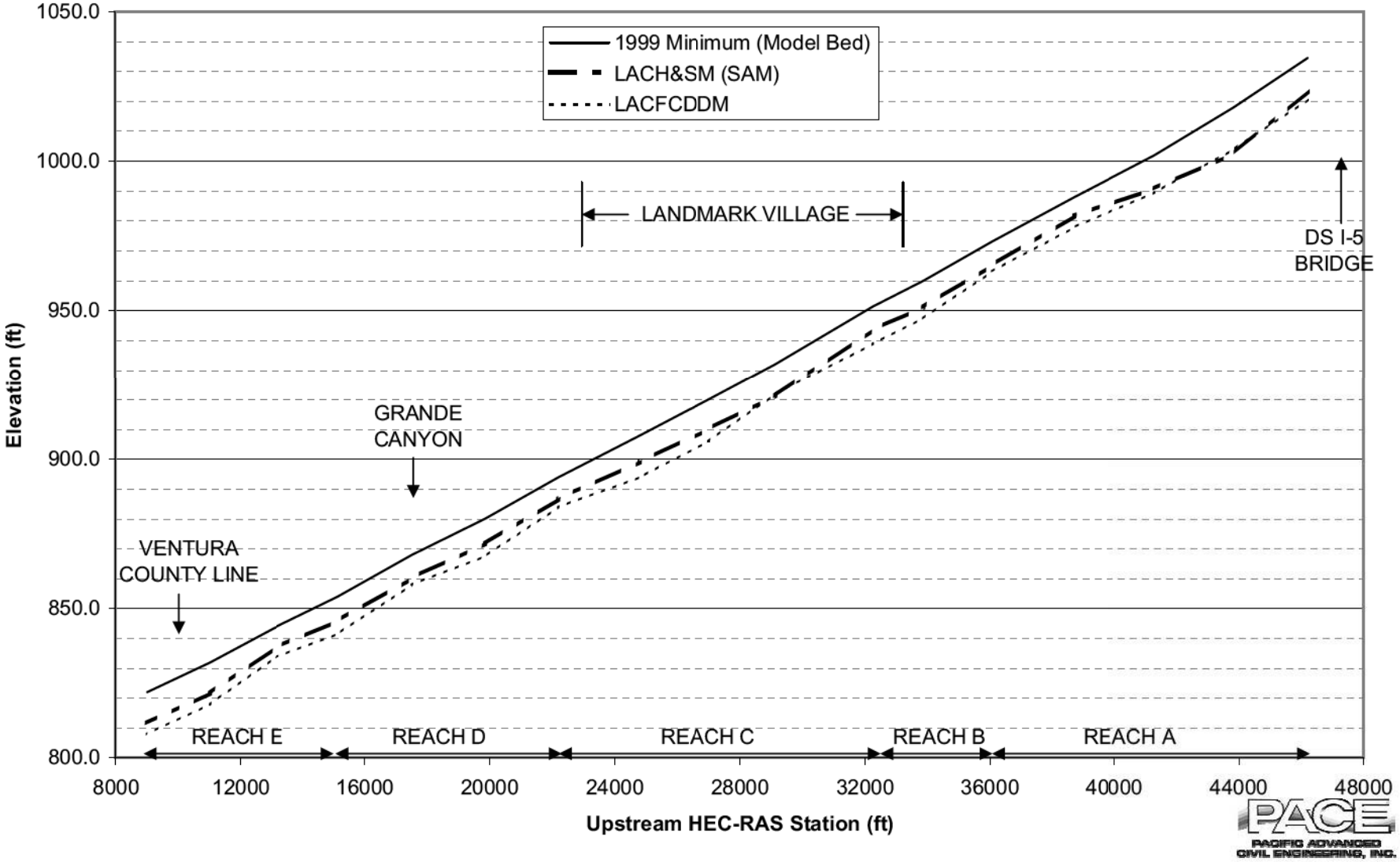

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Figure 7.2D: Santa Clara River Proposed Conditions Straight-Inside Curved Reach Toe-down Depths by Methodology

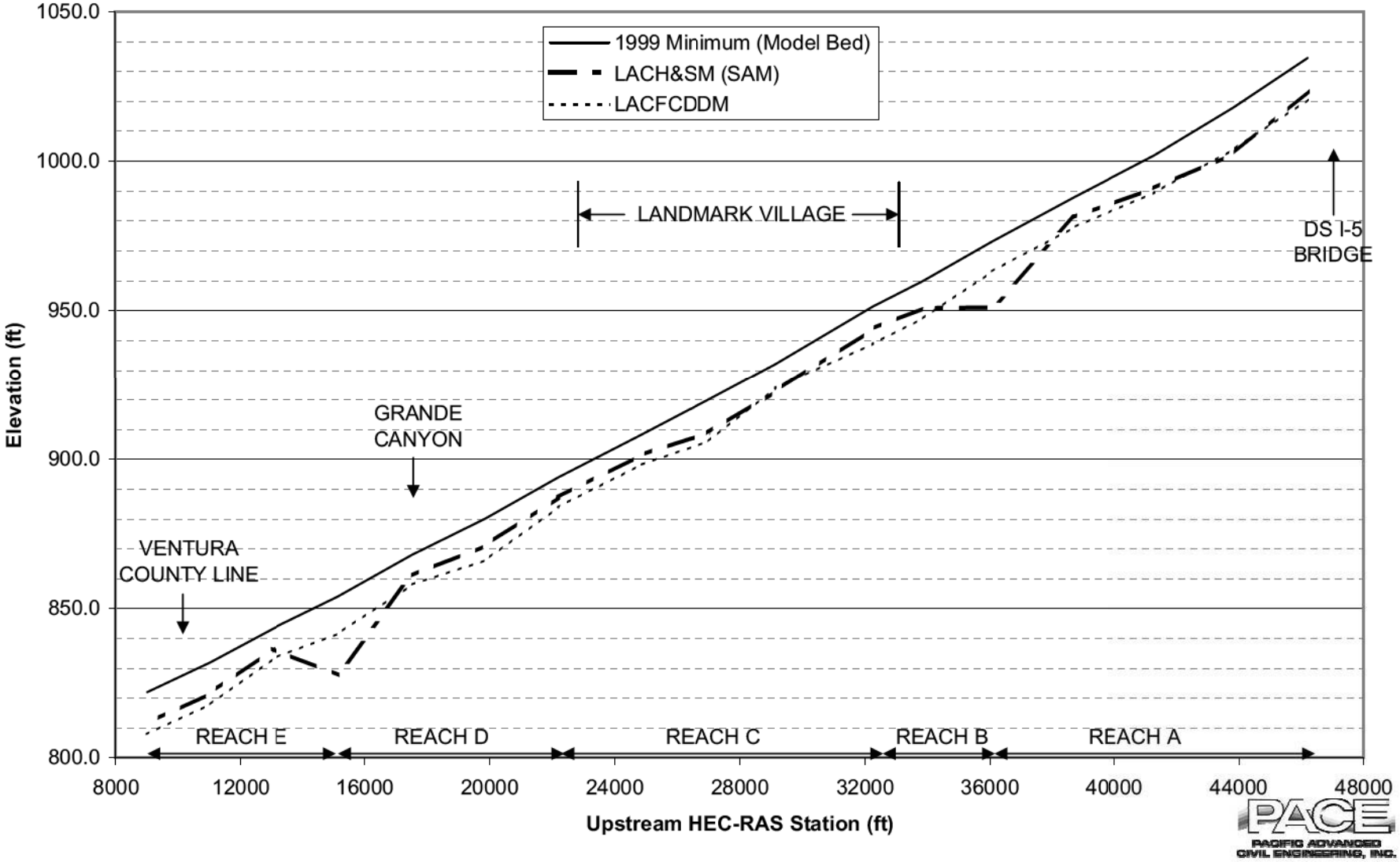

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Figure 7.3A: Santa Clara River Outside Curved Reach Existing, Historic Minimum, and Existing Conditions Toe-down Elevation

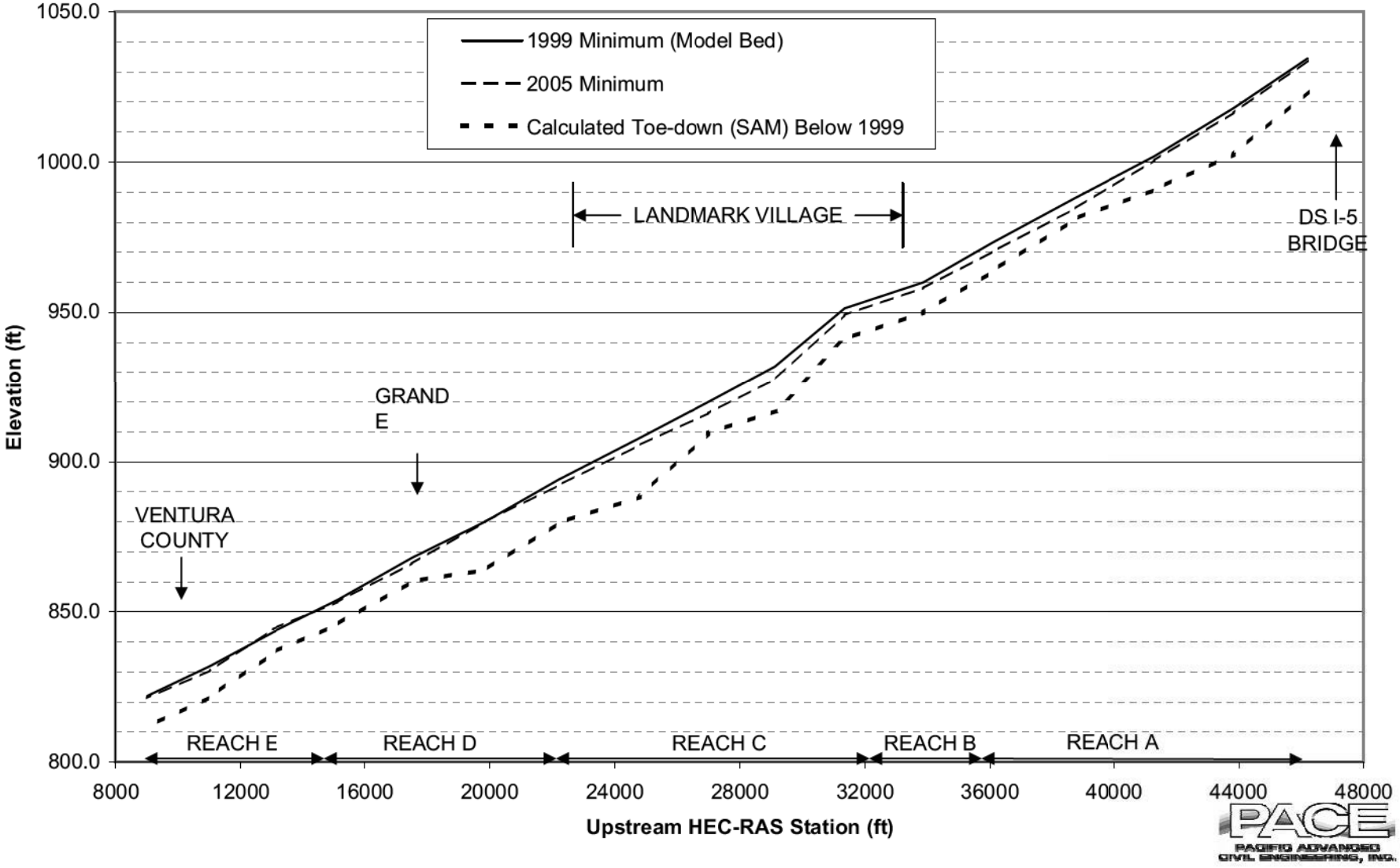

Figure 7.3B: Santa Clara River Outside Curved Reach Existing, Historic Minimum, and Proposed Conditions Toe-down Elevation

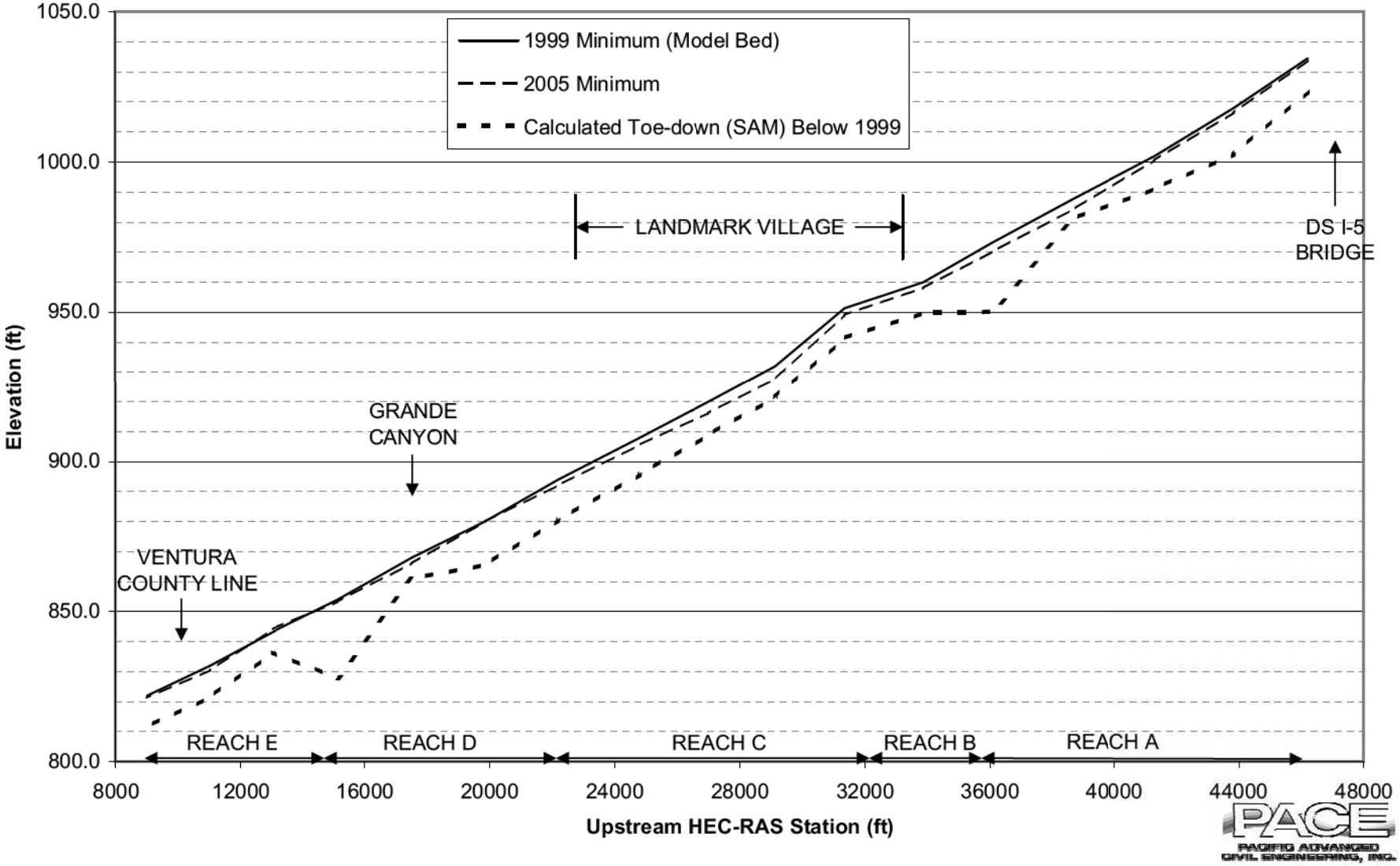

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Figure 7.3C: Santa Clara River Straight-Inside Curved Reach Existing, Historic Minimum, and Existing Conditions Toe-down Elevation

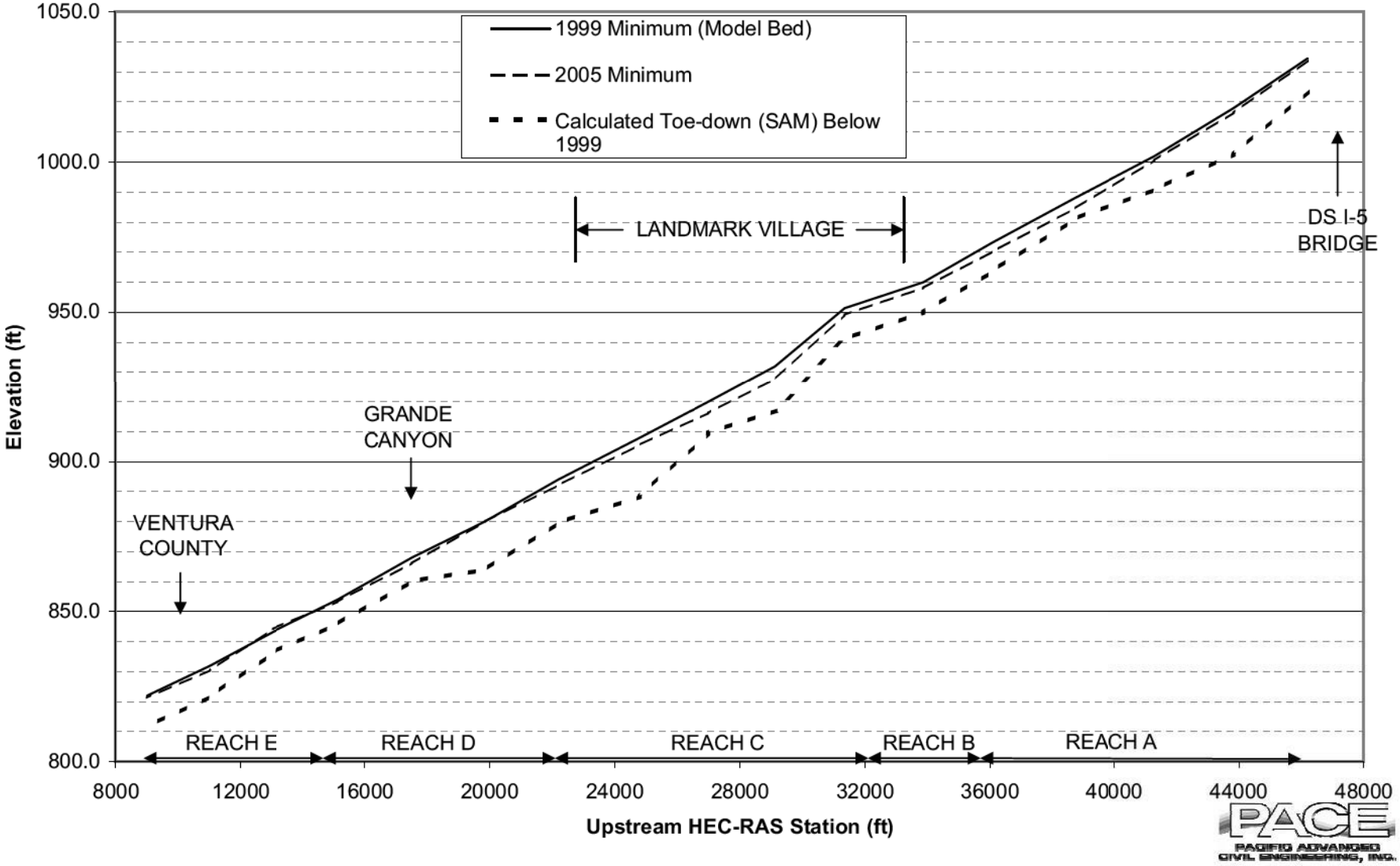

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Figure 7.3D: Santa Clara River Straight-Inside Curved Reach Existing, Historic Minimum, and Proposed Conditions Toe-down Elevation

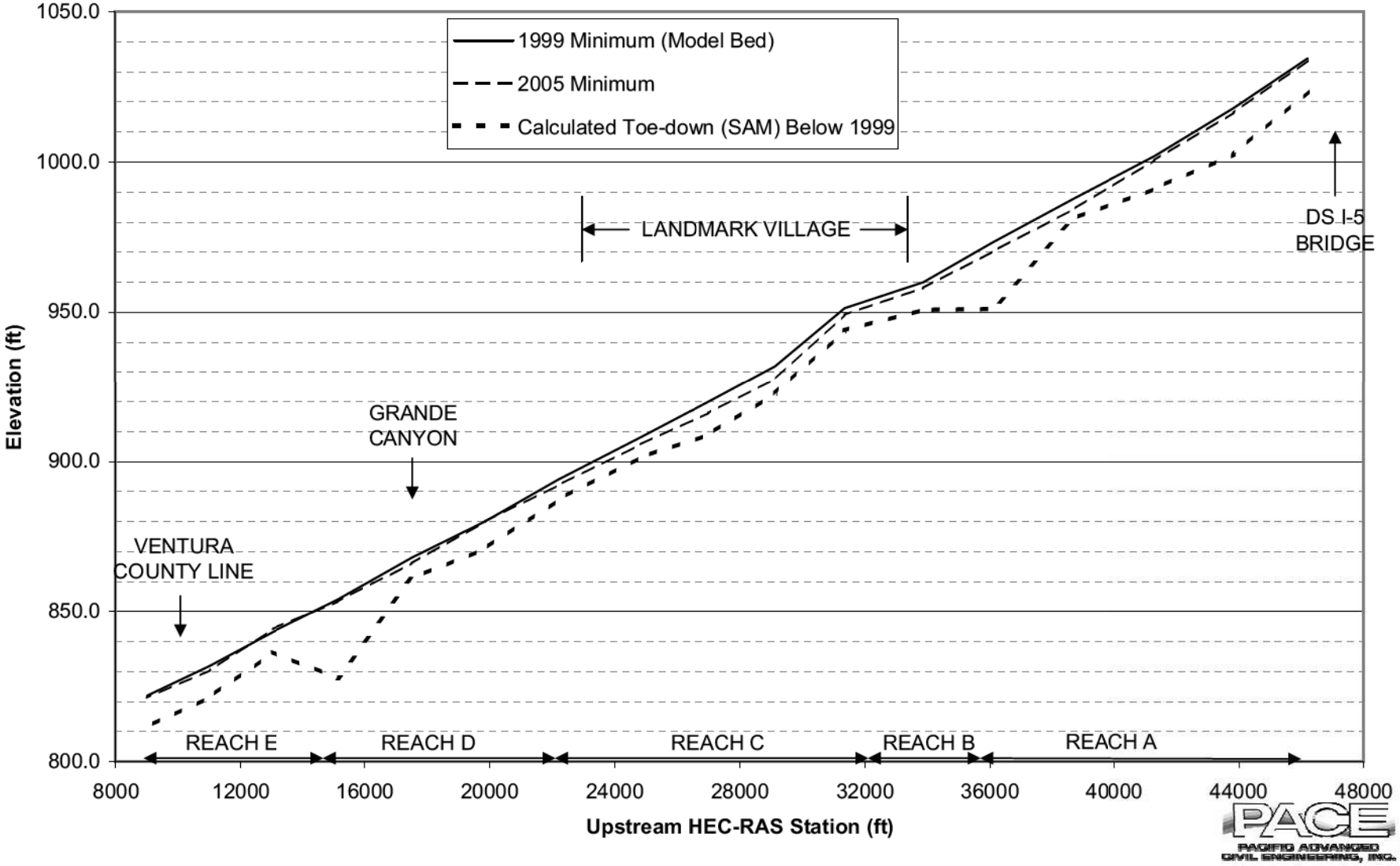

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Table 7.2D: Santa Clara River Proposed Conditions Straight-Inside Curved Reach Toe-down Summary by Methodology (ft)

Subreach	US Station	HEC-RAS Model (1999) Elevation	LACH&SM (SAM)	LACH&SM Toe-down Elevation	LACFCDDM	LACFCDDM Toe-down Elevation	Δ (LACH&SM-LACFCDDM)
SRA1	46195	1034.6	-11.1	1023.4	-14.0	1020.6	2.9
SRA2	43820	1018.0	-15.4	1002.6	-14.0	1004.0	-1.4
SRA3	41280	1002.0	-11.0	991.0	-12.5	989.5	1.5
SRA4	38710	988.0	-6.7	981.3	-10.0	978.0	3.3
SRB1	36080	973.2	-22.1	951.1	-10.0	963.2	-12.1
SRB2	33880	960.0	-9.1	950.9	-12.5	947.5	3.4
SRC1	32265	951.4	-7.4	944.0	-12.5	938.9	5.1
SRC2	29140	932.0	-9.2	922.8	-8.0	924.0	-1.2
SRC3	26990	920.0	-11.0	909.0	-14.0	906.0	3.0
SRC4	24795	908.0	-6.7	901.3	-10.0	898.0	3.3
SRD1	22195	894.0	-6.7	887.3	-10.0	884.0	3.3
SRD2	19855	880.1	-9.1	871.0	-14.0	866.1	4.9
SRD3	17510	868.0	-6.9	861.1	-10.0	858.0	3.1
SRE1	15125	854.0	-26.2	827.8	-12.5	841.5	-13.7
SRE2	13030	843.3	-6.7	836.5	-10.0	833.3	3.3
SRE3	11015	832.0	-10.4	821.6	-14.0	818.0	3.6

Previous studies presented in Chapter 2 found that a toe-down of 12.5 feet would be required for adequate protection of structures within the sphere of the river bed. The results of this study, however, suggest that a variable toe-down from approximately 5 to 27 feet based on SAM modeling, or 8 to 21 feet based on LACFCDDM is appropriate. A large portion of this difference can be attributed to the difference in other adjustment, which in this study was as much as 17.4 feet.

7.1 Freeboard Elevation

Freeboard is considered for the purposes of this report to be the additional height required above the top of a levee or other bank protection to prevent overtopping. The factors considered in the calculation of freeboard are long-term adjustment as aggradation, general adjustment as aggradation, super elevation, and bedform height. Freeboard elevation is calculated in this study based on LACH&SM Chapter 5A-3, and includes LACFCDDM calculations. Freeboard calculations are presented in Appendix Chapter 6.2. Long-term adjustment was calculated based on historical records in the form of topographic data, and taken as the greater of positive long-term area change values as presented in Table 5.1B, or one foot. General adjustment is taken from SAM aggradation values. Table 7.3A-B summarizes the freeboard calculations for both outside of curved reaches and inside of curved or straight reaches. The table shows that long-term aggradation is generally set to one foot. General aggradation ranges from 0 to 2.1 feet with the maximum general aggradation occurring in subreach SRE2. In all cases, either long-term aggradation or bedform height accounts for the largest component of freeboard except in subreach SRD2 and SRE2 where general adjustment dominates. The table also compares the freeboard based on LACH&SM and LACFCDDM methodologies. At the majority of locations, the LACFCDDM values are more conservative and the maximum calculated freeboard based on the two methodologies range from 2.5 to 5.2 feet for either type of reaches.

Table 7.3A: Santa Clara River Proposed Conditions Outside Curved Reach Freeboard Summary (ft)

Subreach	HEC-RAS Station	Y_{AGG}+	Y_{GA}+	Y_{SE}+	H/2	$Y_{H\&SM}$	Y_{DM}	Y_{MAX}
SRA1	46195	1.0	0.6	0.0	1.5	3.1	2.5	3.1
SRA2	43820	1.0	0.2	0.0	2.7	3.9	2.5	3.9
SRA3	41280	1.0	0.0	0.1	1.0	2.1	2.5	2.5
SRA4	38710	1.0	0.1	0.0	0.9	2.0	2.5	2.5
SRB1	36080	1.0	0.0	0.0	0.8	1.9	2.5	2.5
SRB2	33880	1.0	0.2	0.1	0.7	2.0	2.5	2.5
SRC1	32265	1.0	0.8	0.0	0.4	2.2	2.5	2.5
SRC2	29140	1.0	0.0	0.0	0.8	1.9	2.5	2.5
SRC3	26990	1.0	0.0	0.1	1.2	2.3	2.5	2.5
SRC4	24795	1.9	0.2	0.3	1.3	3.7	2.5	3.7
SRD1	22195	1.4	0.0	0.3	0.8	2.4	2.5	2.5
SRD2	19855	1.0	1.4	0.1	0.5	3.0	2.5	3.0
SRD3	17510	1.0	0.0	0.0	0.7	1.7	2.5	2.5
SRE1	15125	1.0	0.0	0.0	0.4	1.4	2.5	2.5
SRE2	13030	1.0	2.1	0.1	1.0	4.2	2.5	4.2
SRE3	11015	3.1	0.0	0.0	0.7	3.8	2.5	3.8

Table 7.3B: Santa Clara River Proposed Conditions Straight-Inside Curved Reach Freeboard Summary (ft)

Subreach	HEC-RAS Station	Y_{AGG}+	Y_{GA}+	Y_{SE}+	H/2	$Y_{H\&SM}$	Y_{DM}	Y_{MAX}
SRA1	46195	1.0	0.6	0.0	1.5	3.1	2.5	3.1
SRA2	43820	1.0	0.2	0.0	2.7	3.9	2.5	3.9
SRA3	41280	1.0	0.0	0.0	1.0	2.0	2.5	2.5
SRA4	38710	1.0	0.1	0.0	0.9	2.0	2.5	2.5
SRB1	36080	1.0	0.0	0.0	0.8	1.8	2.5	2.5
SRB2	33880	1.0	0.2	0.0	0.7	1.9	2.5	2.5
SRC1	32265	1.0	0.8	0.0	0.4	2.2	2.5	2.5
SRC2	29140	1.0	0.0	0.0	0.8	1.8	2.5	2.5
SRC3	26990	1.0	0.0	0.0	1.2	2.2	2.5	2.5
SRC4	24795	1.9	0.2	0.0	1.3	3.4	2.5	3.4
SRD1	22195	1.4	0.0	0.0	0.8	2.2	2.5	2.5
SRD2	19855	1.0	1.4	0.0	0.5	2.9	2.5	2.9
SRD3	17510	1.0	0.0	0.0	0.7	1.7	2.5	2.5
SRE1	15125	1.0	0.0	0.0	0.4	1.4	2.5	2.5
SRE2	13030	1.0	2.1	0.0	1.0	4.1	2.5	4.1
SRE3	11015	3.1	0.0	0.0	0.7	3.8	2.5	3.8

YAGG: LONG-TERM AGGRADATION; YGA: GENERAL AGGRADATION; YSE: SUPER ELEVATION ADJUSTMENT; H: BEDFORM HEIGHT; YH&SM: TOTAL FREEBOARD BASED ON LACDPW H&SM METHODOLOGY; YDM: TOTAL FREEBOARD BASED ON LACFCDDM METHODOLOGY; YMAX: LARGER OF YH&SM AND YDM. YAGG IS CALCULATED AS THE GREATER OF LONG TERM AGGRADATION FROM TABLE 5.1 OR 1 FOOT.

DRAFT

8 Summary

The total toe-down is the sum of the individual degradational components as described in Chapter 7: general adjustment, or single-event degradation, calculated using the SAM zero-dimensional numerical modeling (Chapter 4); long-term adjustment, or long-term degradation, calculated from long-term historical topographic analysis (Chapter 5); and other adjustments calculated using LACH&SM (Chapter 6). Likewise, total freeboard is calculated as the sum of aggradational components: general aggradation from SAM calculations; long-term aggradation from long-term topographic analysis, and other aggradation from LACH&SM calculations, which includes superelevation changes to water surface elevations. This data is summarized in Table 8 for the outside of curved reaches and inside of curved or straight reaches. The table shows the maximum toe-down below the 1999 model minimum channel bed elevation and the total freeboard above the HEC-RAS water surface elevation by subreach and section. A summary of the significant components and influences of each subreach follows.

Reach A: Reach A is comprised of four subreaches that extend from below Interstate 5 to Commerce Center Drive. Relatively steep, narrow, winding channels lined with woody brush highlight the channel in this section of the river. The north overbank of the channel is primarily occupied by agriculture and on the south overbank is the Magic Mountain theme park and tentatively proposed development. In these subreaches, long-term degradation ranges from approximately -2 to -8 feet, with a maximum of 8.1 feet in SRA2, and it is likely that the physical parameters of the channel listed above lead to this change. SAM modeling in this reach predicts a general adjustment of -0.1 to +0.6 feet (Table 4.2) with the predominant trend in the reach being mild aggradation. Other adjustment dominates the toe-down, ranging from -4.0 to -8.3 feet for both curved and straight reaches (Table 7.1). Like the long-term adjustment, local effects are likely the result of river bed physical characteristics in this reach. One proposed bridge is located in this reach at section 36265 with a pier scour of -13.3 feet (Appendix Chapter 6.1). At section 43820, LACH&SM estimates of toe-down exceed that estimated by LACFCDDM calculations; for other sections, LACFCDDM calculations are deeper. Maximum total toe-down based on the LACH&SM and LACFCDDM methodologies ranges from -14.0 to -21.0 feet at section 40825 for outside of curved reaches (Table 8). For straight or inside of curved reaches, maximum total toe-down ranges from -10.0 to -17.0 feet at section 43610 (Table 8). Freeboard in this reach ranges from +2.5 to +4.0 feet with a maximum at section 43610 for both curved and straight reaches.

Reach B: Reach B is comprised of two subreaches. The north overbank is occupied by the existing Travel Village development and steep bluffs mark the south bank. Castaic Creek confluences at the southern terminus of the reach. Reach B is relatively narrow and steep, although it is more braided and less woody than Reach A, possibly owing to the development on the north bank. General adjustment on Reach B ranges from -0.7 to +0.2 feet (Table 4.2) and long-term adjustment ranges from -3.2 to -3.4 feet (Table 5.1). Other adjustment (Table 7.1) ranges from -6.9 to -19.1 feet for outside of curved reaches and from -5.7 to -18.2 for straight or inside of curved reaches. Like Reach A, other adjustment dominates the total potential adjustment. LACFCDDM estimates of total toe-down are greater than LACH&SM estimates in this reach. Maximum total toe-down ranges from -15.0 to -22.9 feet at section 36080 for outside of curved reaches and ranges from -10.0 to -22.0 feet at section 36080 for

straight or inside of curved reaches (Table 8). Freeboard in this reach is +2.5 feet for both types of reaches.

Reach C: Reach C is comprised or four subreaches. The reach contains the confluences of Castaic Creek at its upstream end, the proposed Landmark development on the north overbank, and steep bluffs on the south bank. The channel is relatively steep and narrow, although some braiding is present in the channel. The north bank of this reach is relatively woody. Historically, the north overbank has been the location of agriculture, and some agricultural fill has been placed in the River. Long Canyon Creek confluences at the downstream terminus of this reach. General adjustment on Reach C ranges from -1.6 to +0.8 feet (Table 4.2) and generally the reach is predicted to degrade. Long-term adjustment ranges from -4.4 to +1.9 feet (Table 5.1). Other adjustment (Table 7.1) is moderate in Reach C and ranges from -4.4 to -10.3 feet for outside of curved reaches and ranges from -3.1 to -7.7 feet for straight or inside of curved reaches. A proposed bridge at section 23000 is expected to have -14.7 feet of pier scour. Maximum total toe-down ranges from -12.0 to -26.8 feet at section 22790 for outside of curved reaches and ranges from -8.0 to -23.0 at section 22790 for straight or inside of curved reaches (Table 8). Freeboard in this reach is from +2.5 to +4.8 feet for outside of curved reaches and from +2.5 to +4.7 feet for straight or inside of curved reaches with maximum freeboard at section 28895.

Reach D: Reach D is relatively flatter and wider than more upstream reaches analyzed in this study. The bank is generally braided with woody vegetation on the banks. Reach D resides between the Long and Chiquito tributaries to the east and the Grande and Potrero tributaries to the west. Historical agriculture has occupied both overbanks. Reach D is comprised of three subreaches. General adjustment on Reach D ranges from -0.4 to +0.1 feet (Table 4.2) and generally the reach is predicted to be in balance. Long-term adjustment ranges from -0.7 to +1.4 feet (Table 5.1). Other adjustment (Table 7.1) is varied in Reach D and ranges from -3.6 to -12.5 feet for outside of curved reaches and ranges from -3.6 to -7.1 feet for straight or inside of curved reaches. Maximum total toe-down ranges from -8.0 to -21.0 feet for outside of curved reaches and ranges from -8.0 to -14.0 feet for straight or inside of curved reaches (Table 8). Freeboard in this reach is from +2.5 to +4.1 feet with a maximum freeboard at section 19050 for both types of reaches.

Reach E: Reach E is the most downstream in the study with a relatively mild slope and a wide braided channel. The banks have sparse to moderate woody vegetation and steep bluffs and some minor agriculture dominate the overbanks. There are three subreaches in Reach E. General adjustment on Reach E ranges from -1.5 to +2.1 feet (Table 4.2) and generally the reach is predicted to be slightly aggrading or in balance. Long-term adjustment ranges from -1.0 to +3.1 feet (Table 5.1). Other adjustment (Table 7.1) is relatively small in Reach E except at the proposed bridge and ranges from -4.9 to -23.7 feet for outside of curved reaches and from -4.7 to -23.7 feet for straight or inside of curved reaches. LACFCDDM estimates of total toe-down are greater than LACH&SM estimates in this reach. Maximum total toe-down ranges from -10.0 to -26.1 feet at section 15125 (Table 8), while freeboard in this reach ranges from +2.5 feet to +5.2 feet with a maximum freeboard at section 12615 for both types of reaches.

Table 8: Santa Clara River Summary of Maximum Proposed Toe-down & Freeboard (ft)

Subreach	HEC-RAS Section	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]	Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]		Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]	Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]
SRA1	46195	1035.0	14.0	1021.0	14.0	1021.0	1063.1	3.1	1066.3	3.1	1066.3
	46020	1032.0	14.0	1018.0	14.0	1018.0	1062.0	3.0	1065.0	3.0	1065.0
	45545	1030.0	14.0	1016.0	14.0	1016.0	1057.9	3.4	1061.3	3.4	1061.3
	45030	1025.0	14.0	1011.0	14.0	1011.0	1054.2	3.0	1057.3	3.0	1057.3
	44585	1022.0	14.0	1008.0	14.0	1008.0	1050.6	3.2	1053.8	3.2	1053.8
	44210	1020.0	14.0	1006.0	14.0	1006.0	1047.8	2.9	1050.8	2.9	1050.8
SRA2	43820	1018.0	15.4	1002.6	15.4	1002.6	1042.1	3.9	1046.0	3.9	1046.0
	43610	1017.0	17.0	1000.0	17.0	1000.0	1038.3	4.0	1042.2	4.0	1042.2
	43410	1016.0	15.8	1000.2	15.8	1000.2	1035.8	3.6	1039.4	3.6	1039.4
	43200	1014.0	16.3	997.7	16.3	997.7	1033.2	3.5	1036.7	3.5	1036.7
	42975	1012.0	15.5	996.5	15.5	996.5	1031.0	2.9	1033.8	2.7	1033.7
	42815	1011.0	15.5	995.5	15.5	995.5	1029.7	2.5	1032.2	2.5	1032.2
	42590	1010.0	21.0	989.0	14.7	995.3	1028.4	2.5	1030.9	2.5	1030.9
	42430	1008.0	21.0	987.0	15.3	992.7	1027.5	2.5	1030.0	2.5	1030.0
	42215	1006.0	21.0	985.0	14.7	991.3	1026.7	2.5	1029.2	2.5	1029.2
	41940	1005.0	15.0	990.0	11.9	993.1	1025.6	2.5	1028.1	2.5	1028.1
	41730	1004.0	15.0	989.0	12.0	992.0	1024.6	2.5	1027.1	2.5	1027.1
	41460	1002.0	15.0	987.0	11.9	990.1	1023.2	2.5	1025.7	2.5	1025.7
SRA3	41280	1001.0	12.5	988.5	12.5	988.5	1021.8	2.5	1024.3	2.5	1024.3
	41080	1000.0	14.0	986.0	14.0	986.0	1020.5	2.5	1023.0	2.5	1023.0
	40825	999.5	21.0	978.5	14.0	985.5	1019.3	2.5	1021.8	2.5	1021.8
	40585	998.0	18.0	980.0	12.5	985.5	1018.3	2.5	1020.8	2.5	1020.8
	40335	996.0	15.0	981.0	10.0	986.0	1017.4	2.5	1019.9	2.5	1019.9
	40130	995.0	15.0	980.0	10.0	985.0	1016.6	2.5	1019.1	2.5	1019.1
	39945	994.0	15.0	979.0	10.0	984.0	1015.9	2.5	1018.4	2.5	1018.4
	39755	994.0	12.5	981.5	12.5	981.5	1014.6	2.5	1017.1	2.5	1017.1
	39605	993.0	14.0	979.0	14.0	979.0	1013.7	2.5	1016.2	2.5	1016.2
	39310	992.0	18.0	974.0	12.5	979.5	1012.2	2.5	1014.7	2.5	1014.7
	39100	990.0	14.0	976.0	14.0	976.0	1011.1	2.5	1013.6	2.5	1013.6
	38925	989.5	10.0	979.5	10.0	979.5	1010.3	2.5	1012.8	2.5	1012.8
SRA4	38710	988.0	10.0	978.0	10.0	978.0	1009.2	2.5	1011.7	2.5	1011.7
	38475	986.0	12.5	973.5	12.5	973.5	1007.0	2.6	1009.5	2.6	1009.5
	38300	985.5	14.0	971.5	14.0	971.5	1005.8	2.5	1008.3	2.5	1008.3
	38065	984.0	10.0	974.0	10.0	974.0	1004.1	2.5	1006.6	2.5	1006.6
	37810	983.0	14.0	969.0	14.0	969.0	1001.4	2.8	1004.2	2.8	1004.2
	37655	982.0	14.0	968.0	14.0	968.0	999.9	2.6	1002.5	2.6	1002.5
	37390	981.0	14.0	967.0	14.0	967.0	998.5	2.5	1001.0	2.5	1001.0
	37135	980.0	12.5	967.5	12.5	967.5	996.8	2.5	999.3	2.5	999.3
	36930	978.0	14.0	964.0	14.0	964.0	995.7	2.5	998.2	2.5	998.2
	36735	977.0	12.5	964.5	12.5	964.5	994.6	2.5	997.1	2.5	997.1
	36515	975.0	15.0	960.0	10.0	965.0	993.6	2.5	996.1	2.5	996.1
	36265	974.0	15.0	959.0	10.0	964.0	992.3	2.5	994.8	2.5	994.8
SRB1	36080	973.0	22.9	950.1	22.0	951.0	990.6	2.5	993.1	2.5	993.1
	35845	971.0	15.0	956.0	10.0	961.0	989.1	2.5	991.6	2.5	991.6
	35725	970.0	15.0	955.0	10.0	960.0	988.3	2.5	990.8	2.5	990.8
	35515	969.0	18.0	951.0	12.5	956.5	986.9	2.5	989.4	2.5	989.4
	35245	968.0	18.0	950.0	12.5	955.5	985.0	2.5	987.5	2.5	987.5
	35040	967.0	21.0	946.0	14.0	953.0	983.6	2.5	986.1	2.5	986.1
	34860	966.0	21.0	945.0	14.0	952.0	982.3	2.5	984.8	2.5	984.8
	34720	965.5	21.0	944.5	14.0	951.5	981.3	2.5	983.8	2.5	983.8
	34495	964.0	18.0	946.0	12.5	951.5	979.7	2.5	982.2	2.5	982.2
	34310	963.0	18.0	945.0	12.5	950.5	978.4	2.5	980.9	2.5	980.9
	34090	962.0	18.0	944.0	12.5	949.5	977.0	2.5	979.5	2.5	979.5
SRB2	33880	960.0	18.0	942.0	12.5	947.5	975.7	2.5	978.2	2.5	978.2
	33710	959.0	18.0	941.0	12.5	946.5	974.6	2.5	977.1	2.5	977.1
	33500	958.0	18.0	940.0	12.5	945.5	973.3	2.5	975.8	2.5	975.8
	33310	957.0	18.0	939.0	12.5	944.5	972.3	2.5	974.8	2.5	974.8
	33115	956.0	15.0	941.0	10.0	946.0	971.4	2.5	973.9	2.5	973.9
	32795	954.0	15.0	939.0	10.0	944.0	969.7	2.5	972.2	2.5	972.2
	32605	952.0	15.0	937.0	10.0	942.0	968.7	2.5	971.2	2.5	971.2
SRC1	32265	950.0	18.0	932.0	12.5	937.5	967.2	2.5	969.7	2.5	969.7
	31875	949.0	15.0	934.0	10.0	939.0	965.6	2.5	968.1	2.5	968.1
	31585	946.0	15.0	931.0	10.0	936.0	964.7	2.5	967.2	2.5	967.2
	31360	944.0	15.0	929.0	10.0	934.0	963.9	2.5	966.4	2.5	966.4
	31060	942.0	12.0	930.0	8.0	934.0	963.2	2.5	965.7	2.5	965.7
	30720	940.0	12.0	928.0	8.0	932.0	962.5	2.5	965.0	2.5	965.0
	30445	938.0	12.0	926.0	8.0	930.0	962.1	2.5	964.6	2.5	964.6
	30095	936.0	12.0	924.0	8.0	928.0	961.5	2.5	964.0	2.5	964.0
	29815	935.0	12.0	923.0	8.0	927.0	960.8	2.5	963.3	2.5	963.3
	29565	934.0	12.0	922.0	8.0	926.0	960.3	2.5	962.8	2.5	962.8
	29385	933.0	12.0	921.0	8.0	925.0	959.6	2.5	962.1	2.5	962.1
SRC2	29140	932.0	12.0	920.0	9.1	922.9	958.4	2.5	960.9	2.5	960.9
	28895	930.0	21.0	909.0	14.0	916.0	953.8	4.8	958.6	4.7	958.5
	28695	928.0	15.0	913.0	15.0	913.0	952.9	2.5	955.4	2.5	955.4
	28500	927.5	14.7	912.8	14.7	912.8	950.5	3.1	953.5	2.9	953.4
	28280	926.0	21.0	905.0	14.0	912.0	949.8	2.5	952.3	2.5	952.3
	28080	925.0	15.0	910.0	10.0	915.0	949.1	2.5	951.6	2.5	951.6
	27925	924.0	10.3	913.7	10.3	913.7	948.1	2.5	950.6	2.5	950.6
	27725	923.0	14.0	909.0	14.0	909.0	946.1	2.9	949.0	2.9	949.0
	27545	922.0	15.0	907.0	15.0	907.0	944.3	3.1	947.4	3.1	947.4
	27335	921.0	14.1	906.9	14.1	906.9	943.0	2.7	945.7	2.6	945.6
	27155	920.5	14.0	906.5	14.0	906.5	941.5	2.9	944.4	2.8	944.2
SRC3	26990	920.0	21.0	899.0	14.0	906.0	940.4	2.5	942.9	2.5	942.9
	26780	918.0	21.0	897.0	14.0	904.0	939.3	2.5	941.8	2.5	941.8
	26575	917.0	21.0	896.0	14.0	903.0	938.5	2.5	941.0	2.5	941.0
	26355	916.0	18.0	898.0	12.5	903.5	937.6	2.5	940.1	2.5	940.1
	26170	915.0	18.0	897.0	12.5	902.5	936.9	2.5	939.4	2.5	939.4
	25965	914.0	21.0	893.0	14.0	900.0	936.2	2.6	938.8	2.5	938.7
	25785	913.5	21.0	892.5	14.0	899.5	935.5	2.7	938.2	2.5	938.0
	25600	912.5	21.0	891.5	14.0	898.5	934.8	2.5	937.3	2.5	937.3
	25425	911.0	21.0	890.0	14.0	897.0	934.1	2.5	936.7	2.5	936.6
	25215	910.0	15.0	895.0	10.0	900.0	933.3	2.5	935.8	2.5	935.8
	25000	909.0	15.0	894.0	10.0	899.0	932.5	2.5	935.0	2.5	935.0
SRC4	24795	908.0	15.0	893.0	10.0	898.0	931.5	3.7	935.2	3.4	934.9
	24550	906.0	18.0	888.0	12.5	893.5	930.1	3.6	933.6	3.3	933.4
	24335	905.0	21.0	884.0	14.0	891.0	928.5	3.9	932.4	3.6	932.1
	24115	904.0	21.0	883.0	14.0	890.0	927.0	3.8	930.8	3.5	930.5
	23975	903.5	21.0	882.5	14.0	889.5	926.1	3.5	929.7	3.3	929.4
	23755	902.0	21.0	881.0	14.0	888.0	924.7	3.2	927.9	3.1	927.8
	23565	900.0	21.0	879.0	14.0	886.0	923.6	3.7	927.3	3.4	927.0
	23365	900.0	21.0	879.0	14.0	886.0	922.4	3.5	925.9	3.2	925.6
	23180	899.0	21.0	878.0	14.0	885.0	921.5	3.2	924.6	3.0	924.4
	23000	898.0	21.0	877.0	14.0	884.0	920.0	3.3	923.3	3.0	923.0
	22790	897.5	26.8	870.7	23.0	874.5	917.5	3.1	920.6	3.0	920.5
	22600	896.0	21.0	875.0	14.0	882.0	915.8	3.2	919.0	2.9	918.7
	22415	895.5	21.0	874.5	14.0	881.5	914.4	3.2	917.6	2.9	917.4

1 - Phase 1 Analysis, see end note

2 - Minimum 1999 Bed Elevation

3 - Toe-down and Freeboard based on max of LA County Hydrology & Sedimentation Manual (with SAM general aggradation) and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Values at bridges are approximate. Final design of levee at bridge locations will include detailed bridge analysis

Table 8: Santa Clara River Summary of Proposed Toe-down & Freeboard (ft) continued

Subreach	HEC-RAS Section	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]	Maximum Total Degradation [3]	Proposed Toe-down Elevation [1,4]		Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]	Maximum Total Freeboard [3]	Proposed Top of Levee Elevation [1]
SRD1	22195	894.0	15.0	879.0	10.0	884.0	913.1	2.5	915.6	2.5	915.6
	22010	892.0	18.0	874.0	12.5	879.5	911.4	2.5	913.9	2.5	913.9
	21790	891.5	21.0	870.5	14.0	877.5	909.9	2.6	912.6	2.5	912.4
	21615	892.0	21.0	871.0	14.0	878.0	908.9	2.6	911.5	2.5	911.4
	21440	890.0	18.0	872.0	12.5	877.5	907.8	2.5	910.3	2.5	910.3
	21225	888.0	21.0	867.0	14.0	874.0	906.7	2.5	909.2	2.5	909.2
	21020	887.0	21.0	866.0	14.0	873.0	905.6	2.5	908.1	2.5	908.1
	20845	886.0	18.0	868.0	12.5	873.5	904.7	2.5	907.2	2.5	907.2
	20595	885.0	15.0	870.0	10.0	875.0	903.6	2.5	906.1	2.5	906.1
	20435	884.0	15.0	869.0	10.0	874.0	902.8	2.5	905.3	2.5	905.3
	20280	883.7	18.0	865.7	12.5	871.2	901.8	2.5	904.3	2.5	904.3
	20070	882.0	21.0	861.0	14.0	868.0	900.6	2.5	903.1	2.5	903.1
SRD2	19855	880.5	21.0	859.5	14.0	866.5	899.6	3.0	902.6	2.9	902.5
	19630	880.0	21.0	859.0	14.0	866.0	898.6	2.9	901.5	2.9	901.5
	19440	878.0	15.0	863.0	10.0	868.0	897.9	3.0	900.8	3.0	900.8
	19240	877.5	18.0	859.5	12.5	865.0	896.9	3.4	900.3	3.4	900.2
	19050	876.0	21.0	855.0	14.0	862.0	896.2	4.1	900.3	4.1	900.3
	18830	874.0	15.0	859.0	10.0	864.0	895.4	4.1	899.4	4.0	899.4
	18650	873.5	15.0	858.5	10.0	863.5	894.7	4.0	898.7	4.0	898.7
	18475	872.0	13.6	858.4	8.0	864.0	894.3	3.4	897.6	3.4	897.6
	18290	871.5	14.1	857.4	8.0	863.5	893.6	3.2	896.8	3.2	896.8
	18025	870.0	8.0	862.0	8.0	862.0	892.9	3.1	895.9	3.1	895.9
	17785	868.0	8.0	860.0	8.0	860.0	892.0	3.2	895.2	3.2	895.2
SRD3	17510	868.0	10.0	858.0	10.0	858.0	890.4	2.5	892.9	2.5	892.9
	17360	868.0	12.5	855.5	12.5	855.5	888.3	2.5	890.8	2.5	890.8
	17110	864.0	14.0	850.0	14.0	850.0	885.5	2.5	888.0	2.5	888.0
	16970	863.7	14.0	849.7	14.0	849.7	884.0	2.5	886.5	2.5	886.5
	16720	863.5	14.0	849.5	14.0	849.5	882.3	2.5	884.8	2.5	884.8
	16515	862.0	14.0	848.0	14.0	848.0	881.2	2.5	883.7	2.5	883.7
	16305	860.0	10.0	850.0	10.0	850.0	880.4	2.5	882.9	2.5	882.9
	16130	860.0	12.5	847.5	12.5	847.5	879.4	2.5	881.9	2.5	881.9
	15960	859.0	12.5	846.5	12.5	846.5	878.6	2.5	881.1	2.5	881.1
	15745	858.0	10.0	848.0	10.0	848.0	877.6	2.5	880.1	2.5	880.1
	15540	857.5	10.0	847.5	10.0	847.5	876.7	2.5	879.2	2.5	879.2
	15335	856.0	12.5	843.5	12.5	843.5	874.8	2.5	877.3	2.5	877.3
SRE1	15125	854.0	26.1	827.9	26.1	827.9	872.0	2.5	874.5	2.5	874.5
	14900	853.0	14.0	839.0	14.0	839.0	869.7	2.5	872.2	2.5	872.2
	14720	852.0	21.0	831.0	14.0	838.0	868.4	2.5	870.9	2.5	870.9
	14480	850.5	21.0	829.5	14.0	836.5	866.9	2.5	869.4	2.5	869.4
	14315	850.0	15.0	835.0	10.0	840.0	866.0	2.5	868.5	2.5	868.5
	14090	850.0	15.0	835.0	10.0	840.0	864.8	2.5	867.3	2.5	867.3
	13850	848.0	15.0	833.0	10.0	838.0	863.6	2.5	866.1	2.5	866.1
	13635	846.0	18.0	828.0	12.5	833.5	862.5	2.5	865.0	2.5	865.0
	13425	845.0	21.0	824.0	14.0	831.0	861.8	2.5	864.3	2.5	864.3
	13190	844.0	15.0	829.0	10.0	834.0	861.1	2.5	863.6	2.5	863.6
SRE2	13030	843.0	15.0	828.0	10.0	833.0	860.6	4.2	864.8	4.1	864.8
	12835	842.0	10.0	832.0	10.0	832.0	860.0	4.7	864.7	4.6	864.7
	12615	841.0	10.0	831.0	10.0	831.0	859.3	5.2	864.6	5.2	864.6
	12395	840.0	10.0	830.0	10.0	830.0	858.7	5.1	863.8	5.1	863.8
	12195	839.0	10.0	829.0	10.0	829.0	858.1	4.2	862.3	4.2	862.3
	11995	837.0	10.0	827.0	10.0	827.0	857.3	4.1	861.4	4.1	861.4
	11780	836.0	10.0	826.0	10.0	826.0	856.6	4.0	860.5	4.0	860.5
	11605	835.5	10.0	825.5	10.0	825.5	855.8	4.0	859.8	4.0	859.8
	11405	834.0	10.0	824.0	10.0	824.0	854.6	3.9	858.6	3.9	858.6
	11180	833.0	12.5	820.5	12.5	820.5	852.7	3.9	856.6	3.9	856.6
SRE3	11015	831.5	14.0	817.5	14.0	817.5	850.2	3.8	854.0	3.8	854.0
	10835	831.0	14.0	817.0	14.0	817.0	848.1	3.7	851.8	3.7	851.8
	10575	830.0	14.0	816.0	14.0	816.0	846.1	3.8	849.9	3.8	849.9
	10390	828.0	14.0	814.0	14.0	814.0	845.1	3.1	848.2	3.1	848.2
	10225	827.5	12.5	815.0	12.5	815.0	844.1	3.1	847.2	3.1	847.2
	10000	826.0	10.0	816.0	10.0	816.0	842.6	3.1	845.7	3.1	845.7
	9820	824.0	14.0	810.0	14.0	810.0	841.4	3.1	844.5	3.1	844.5
	9595	823.8	10.0	813.8	10.0	813.8	839.9	3.1	843.0	3.1	843.0
	9385	823.0	18.0	805.0	12.5	810.5	838.6	3.1	841.7	3.1	841.7
	9220	822.0	18.0	804.0	12.5	809.5	837.6	3.1	840.7	3.1	840.7
	9025	821.0	18.0	803.0	12.5	808.5	836.6	3.1	839.7	3.1	839.7

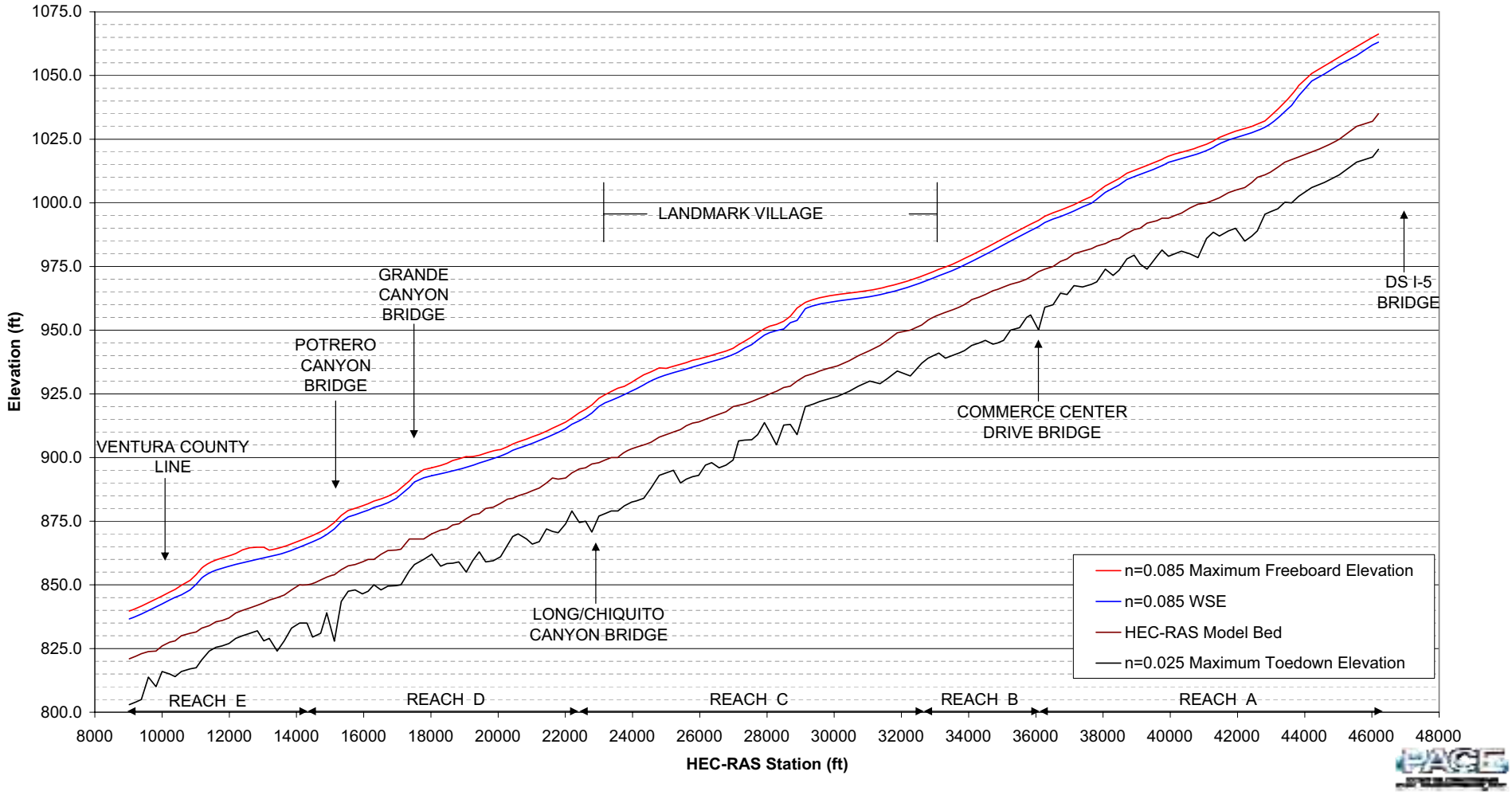
1 - Phase 1 Analysis, see end note

2 - Minimum 1999 Bed Elevation

3 - Toe-down and Freeboard based on max of LA County Hydrology & Sedimentation Manual (with SAM general aggradation) and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Values at bridges are approximate. Final design of levee at bridge locations will include detailed bridge analysis

Figure 8: Santa Clara River Proposed Conditions Outside Curved Reach Maximum Toedown & Freeboard Summary



P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\Table 8 Summary Proposed Toe & Top 02-22-06

9 References

Kennedy, J.F. (1963). The Mechanics of Dunes and Antidunes in Erodible Bed Channels: Journal of Fluid Mechanics, 16, 521-544.

Los Angeles County Department of Public Works Hydrology and Sedimentation Manual (LACH&SM) (December 1991)

Los Angeles County Flood Control District Design Manual (LACFCDDM) (October 1979)

Sikand Engineering in the *Newhall Ranch Santa Clara River HEC-RAS Study* (June 2000)

Simons, Li & Associates (November 1990) Fluvial Study of Santa Clara River and the Tributaries.

US Army Corps of Engineers (ACOE) (September 2002) SAM Hydraulic Design Package For Channels.

US Geological Survey (USGS) (August 1979) Sediment Discharge in the Santa Clara River Basin, Ventura and Los Angeles Counties, California. Water Resource Investigations 79-78.

DRAFT

Santa Clara River Fluvial Study

APPENDIX CHAPTER 3.1

Site Visit Photos

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Photo 1. Santa Clara River looking upstream from I-5.

Photo 2. Santa Clara River immediately upstream of I-5.

Photo 3. Upstream of I-5 Bridge at Santa Clara River Crossing

Photo 4. Santa Clara River downstream of the Old Rd. Bridge

Photo 5. Approximately 1000 ft. downstream of Old Rd. Crossing.

Photo 6. Looking downstream from Magic Mountain Overflow Parking Facility.

Photo 7. Looking downstream from Magic Mountain Overflow Parking Facility (Storm damage to left bank).

Photo 8. Looking upstream at Castaic Junction.

Photo 9. Looking upstream from Feed Mill Rd. approximately 1000 ft. downstream of Magic Mountain Overflow Parking Facility.

Photo 10. Santa Clara River and Castaic Creek confluence looking upstream.

Photo 11 . Santa Clara River and Castaic Creek confluence looking downstream.

Photo 12. Santa Clara River downstream of Potrero Canyon.

Photo13. Santa Clara River downstream of Potrero Canyon looking downstream.

Photo 14. Santa Clara River looking upstream at Ventura County Line. Photo 24.

Santa Clara River Fluvial Study

APPENDIX CHAPTER 3.2

Allan Seward Sampling Study

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

February 14, 2005 Job No: 05-1155BE-9 (2)

Pacific Advanced Civil Engineering, Inc. (PACE)
17520 Newhope Street
Suite 200
Fountain Valley, CA 92708

Attn: Mr. Bruce Phillips

Subject: **NEW SEDIMENT GRADATION TEST DATA**
Fluvial Analysis of Santa Clara River and Tributaries

Project: Newhall Ranch
Los Angeles County, California

Dear Mr. Phillips:

Per your request, we completed gradation tests on sediment samples to assist PACE in completing a fluvial study of the Santa Clara River and its major tributaries on Newhall Ranch. A total of 17 samples were collected adjacent to six different crossings located on various reaches of the Santa Clara River on Newhall Ranch and to the west. Six additional samples were collected from selected tributary canyons as requested. All of the samples were collected by hand from the upper foot of the active or recently active portion of the subject channels. The location and designation of each sample collected are illustrated on the attached Sample Location Map. Particle size distribution test reports and backup data sheets for each sample are attached for your use.

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

This opportunity to be of service is appreciated. If you have any questions concerning this report, please give us a call.

Respectfully,

Brian J. Swanson, CEG 2055
Senior Project Geologist

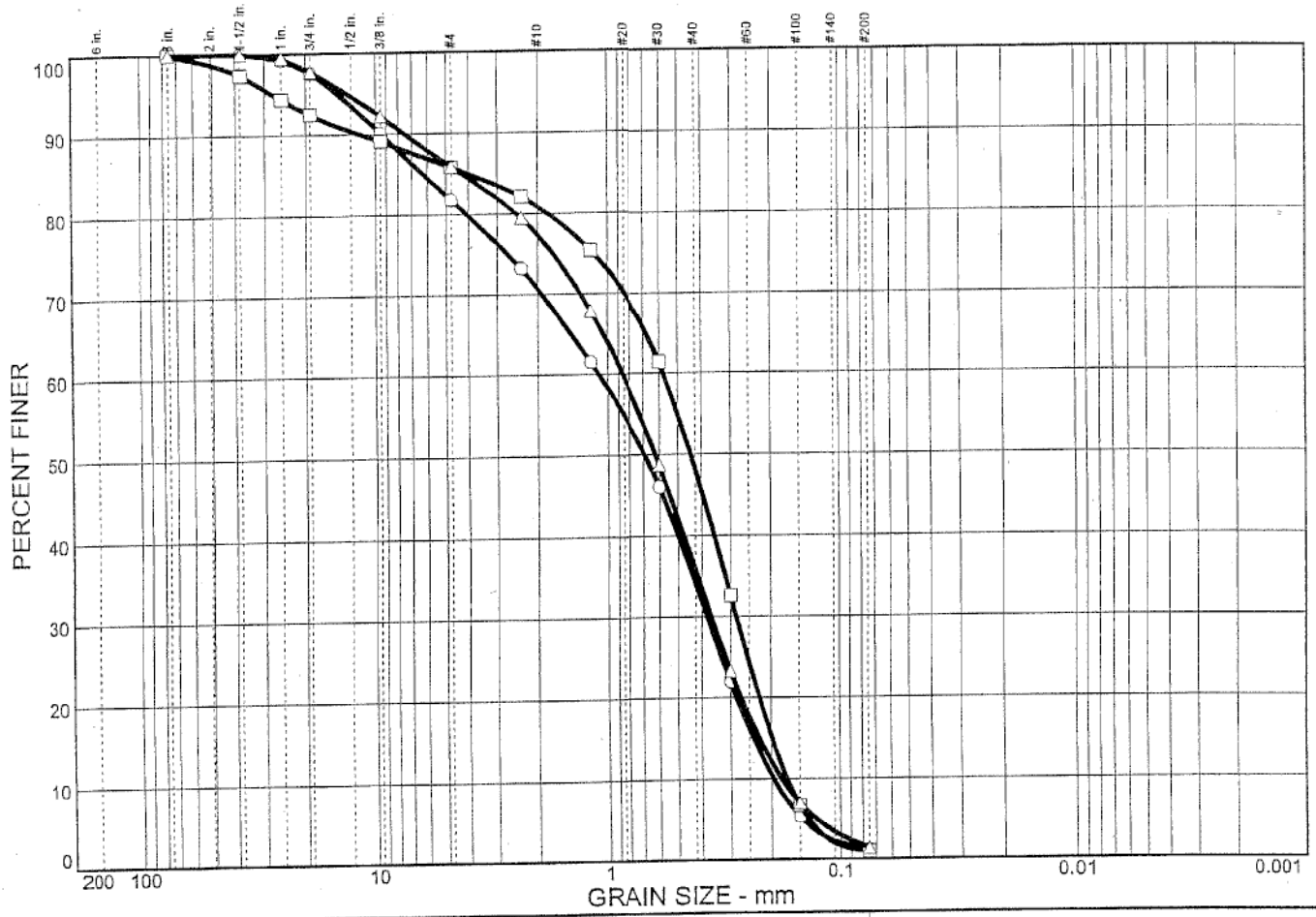
Eric J. Seward, CEG 2110
Principal Engineering Geologist
Vice President

The following attachments complete this report.

Particle Size Distribution Test Reports	Figures 1-8
Laboratory Back up Data Sheets for each Test (23 Total)	
Sample Location Map and Summary Table (Revised)	Plate I

Distribution: (1) PACE
Attn: Addressee
(1) The Newhall Land & Farming Company
Attn: Mr. Glen Adamick

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	2.4	15.8	11.1	36.4	33.1	1.2	
□	0.0	7.5	6.7	4.9	32.6	47.3	1.0	
△	0.0	2.2	11.9	8.5	41.5	34.5	1.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	SC-1		0-1'	Poorly graded SAND with gravel	SP
□	SC-2		0-1'	Poorly graded SAND	SP
△	SC-3		0-1'	Poorly graded SAND	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

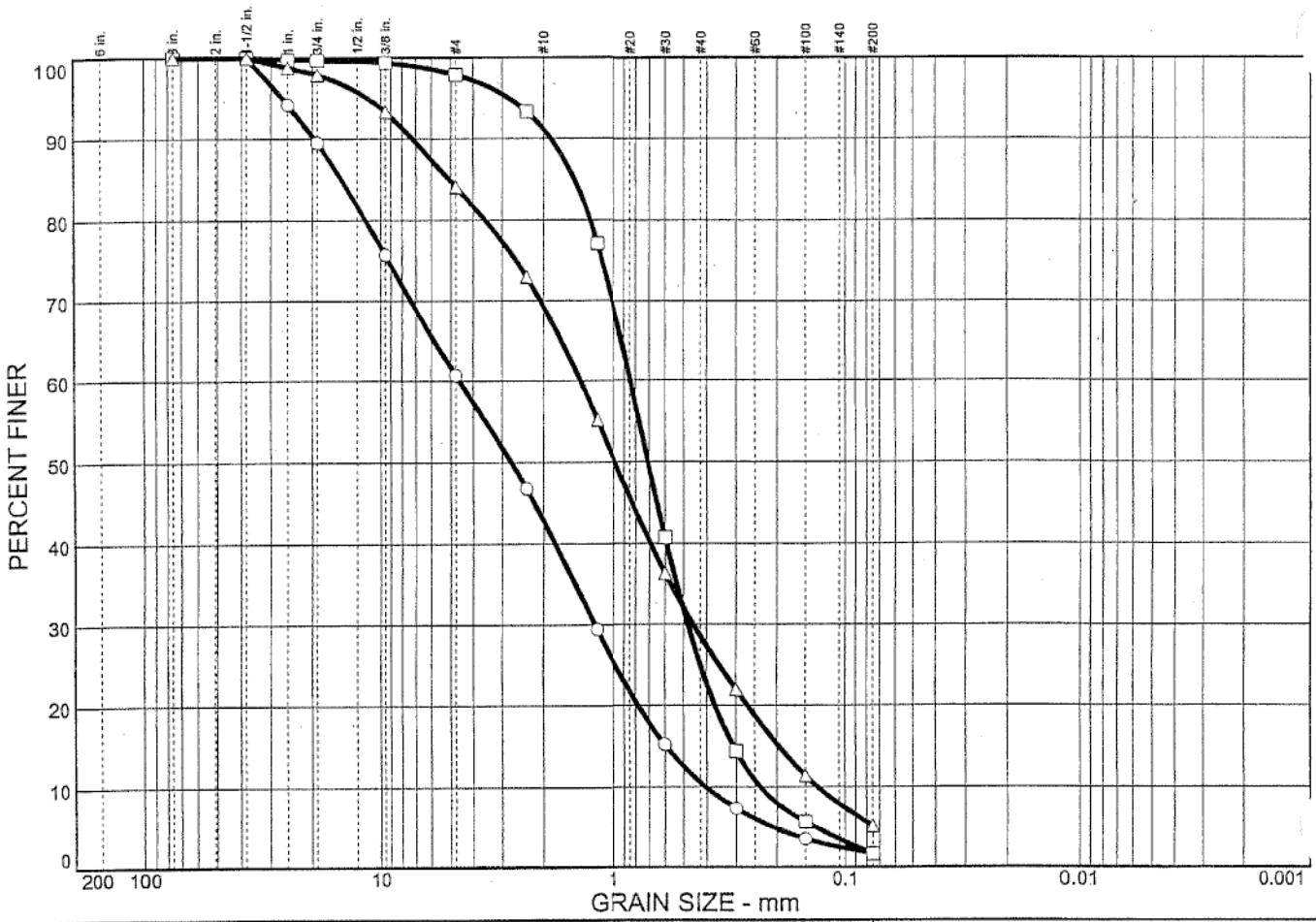
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	10.5	28.8	17.8	32.4	8.8	1.7	
□	0.0	0.3	1.8	6.7	66.1	23.5	1.6	
△	0.0	2.1	13.8	14.7	40.8	23.5	5.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	MC-1		0-1'	Poorly graded SAND with gravel	SP
□	MC-2		0-1'	Poorly graded SAND	SP
△	MC-3		0-1'	Well graded SAND with silt and gravel	SW-SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

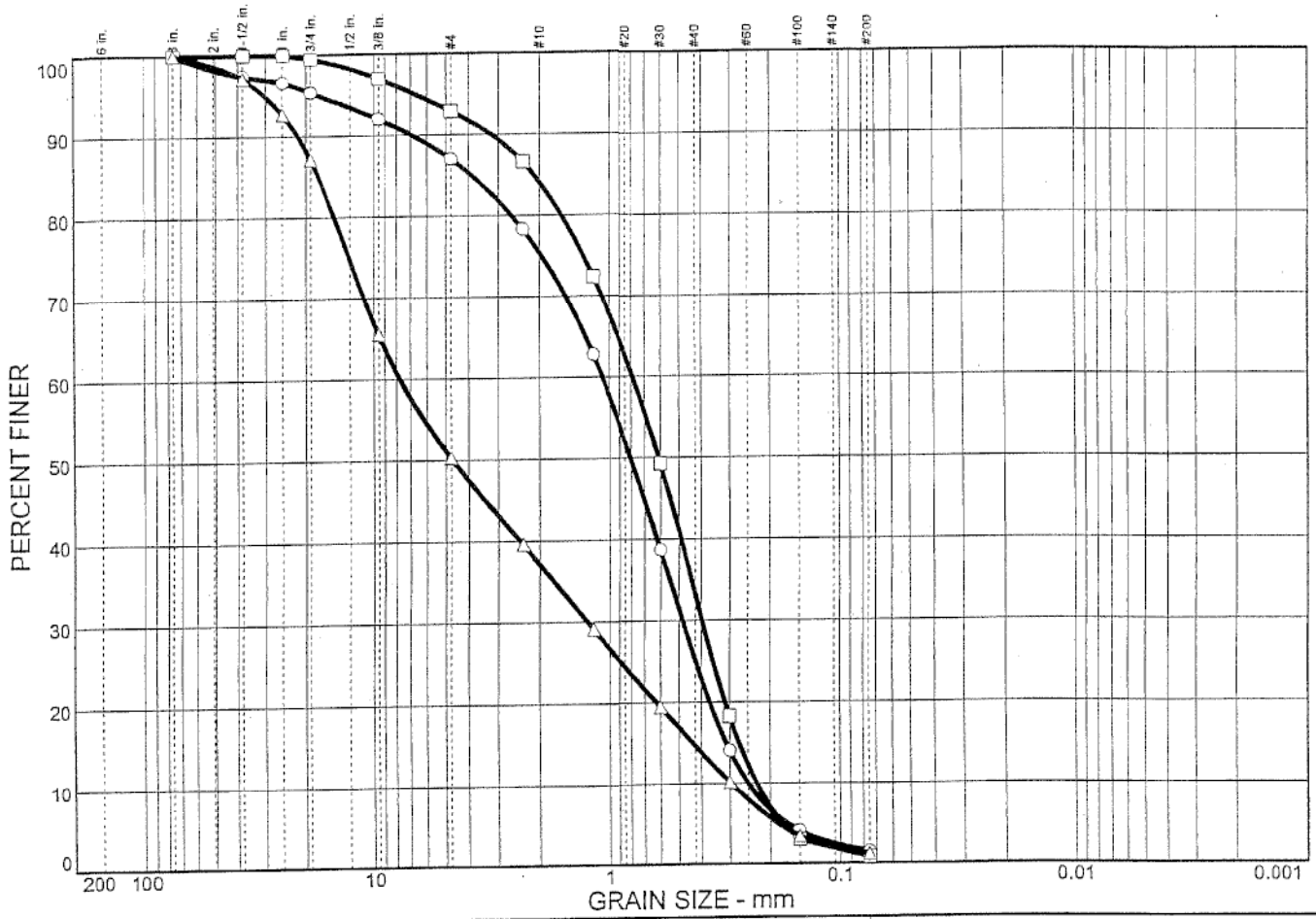
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 2

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	4.6	8.4	11.6	50.1	23.8	1.5	
□	0.0	0.5	6.6	8.9	50.7	32.5	0.8	
△	0.0	12.9	36.8	13.2	22.4	13.5	1.2	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	AC-1		0-1'	Poorly graded SAND	SP
□	AC-2		0-1'	Poorly graded SAND	SP
△	AC-3		0-1'	Poorly graded GRAVEL with sand	GP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

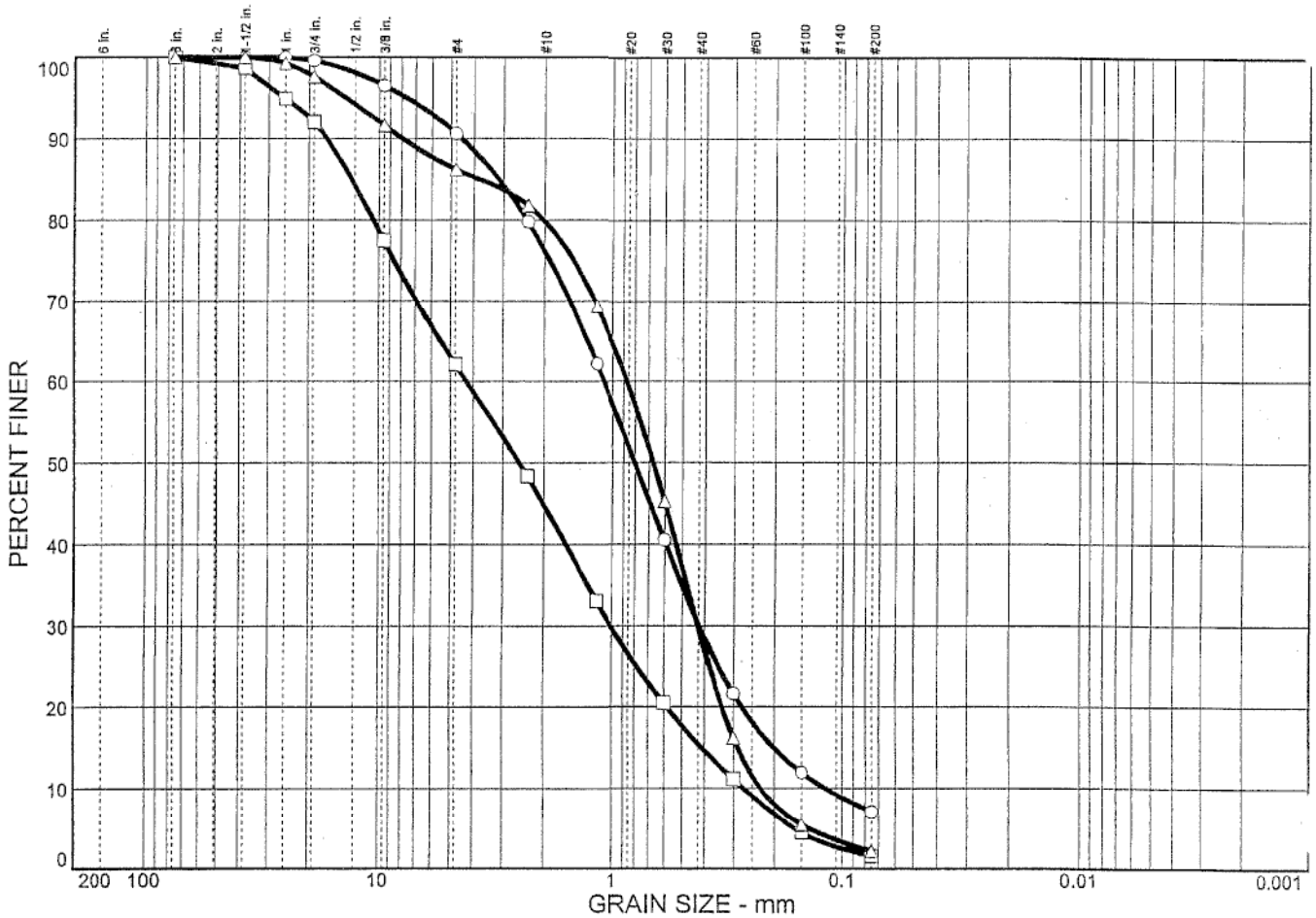
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 3

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.4	9.0	14.4	46.1	23.1	7.0	
□	0.0	8.0	29.9	17.3	29.4	13.8	1.6	
△	0.0	2.4	11.4	6.3	50.2	27.5	2.2	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	LC-1		0-1'	Well graded SAND with silt	SW-SM
□	LC-2		0-1'	Poorly graded SAND with gravel	SP
△	LC-3		0-1'	Poorly graded SAND	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

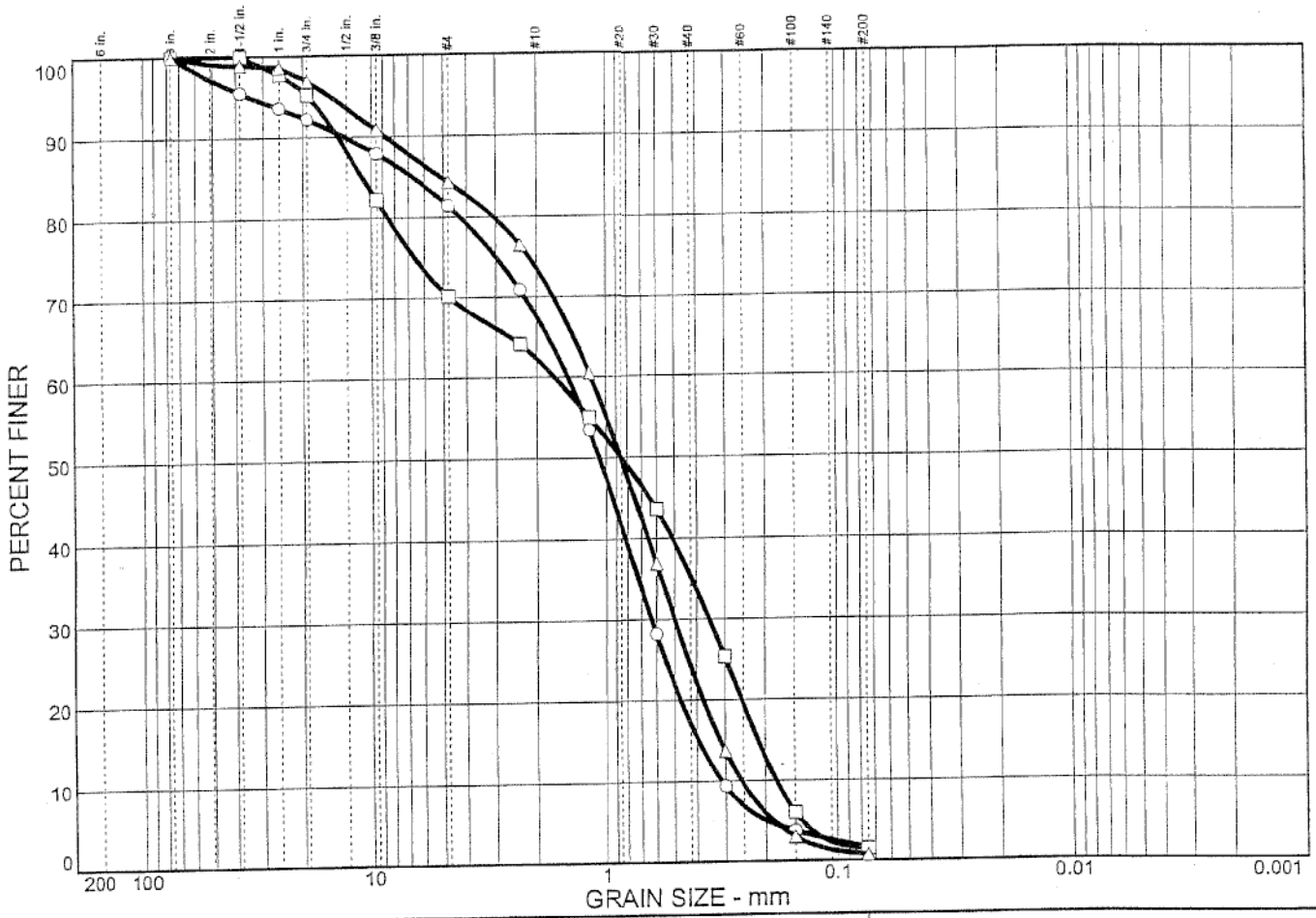
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 4

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	7.8	10.8	13.8	50.4	15.6	1.6	
□	0.0	4.8	25.0	7.9	26.9	33.9	1.5	
△	0.0	3.1	12.6	10.7	49.2	23.7	0.7	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	HR-1		0-1'	Poorly graded SAND with gravel	SP
□	HR-2		0-1'	Poorly graded SAND with gravel	SP
△	HR-3		0-1'	Poorly graded SAND with gravel	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

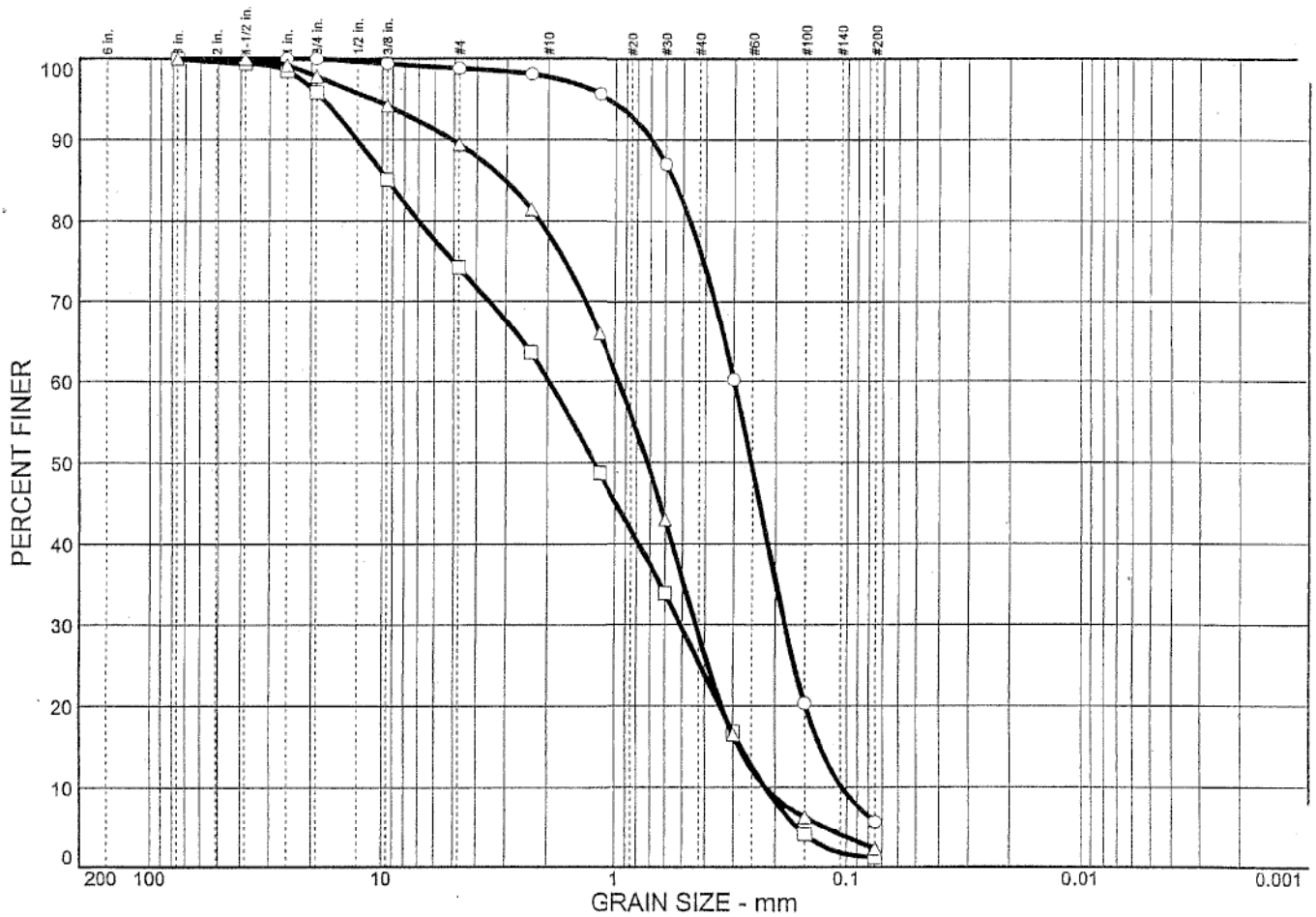
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 5

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	1.2	1.0	21.2	71.0	5.6	
□	0.0	4.2	21.6	13.8	35.0	24.2	1.2	
△	0.0	2.2	8.4	10.9	49.7	26.5	2.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	CB-1		0-1'	Poorly graded SAND with silt	SP-SM
□	CB-2		0-1'	Poorly graded SAND with gravel	SP
△	CB-3		0-1'	Poorly graded SAND	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

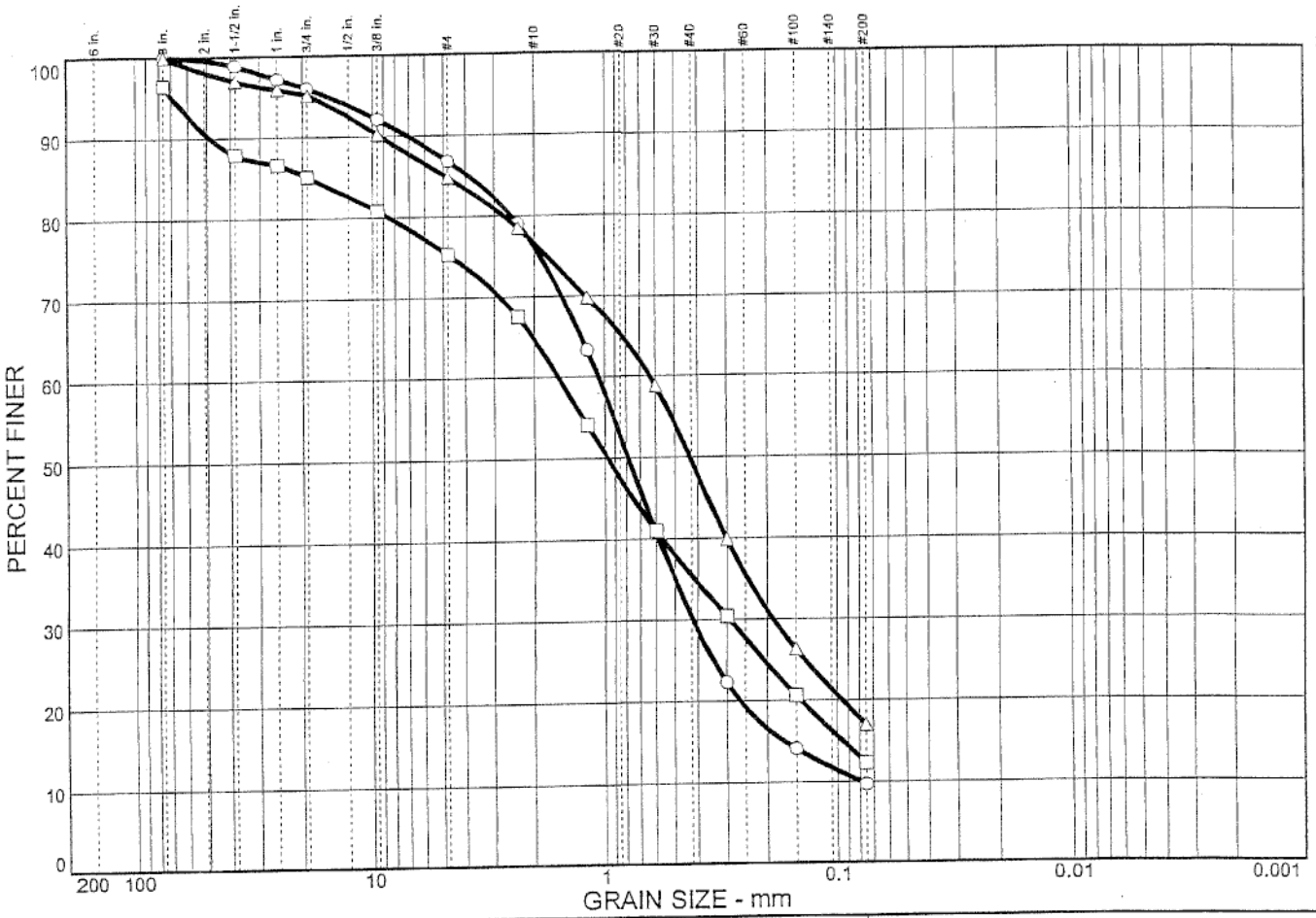
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 6

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	4.0	9.2	10.7	45.7	20.7	9.7	
□	3.5	11.4	9.8	10.6	29.2	23.2	12.3	
△	0.0	4.9	10.3	8.2	27.0	32.6	17.0	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	SM-1		0-1'	Well graded SAND with silt	SW-SM
□	SM-2		0-1'	Silty SAND with gravel	SM
△	SM-3		0-1'	Silty SAND with gravel	SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

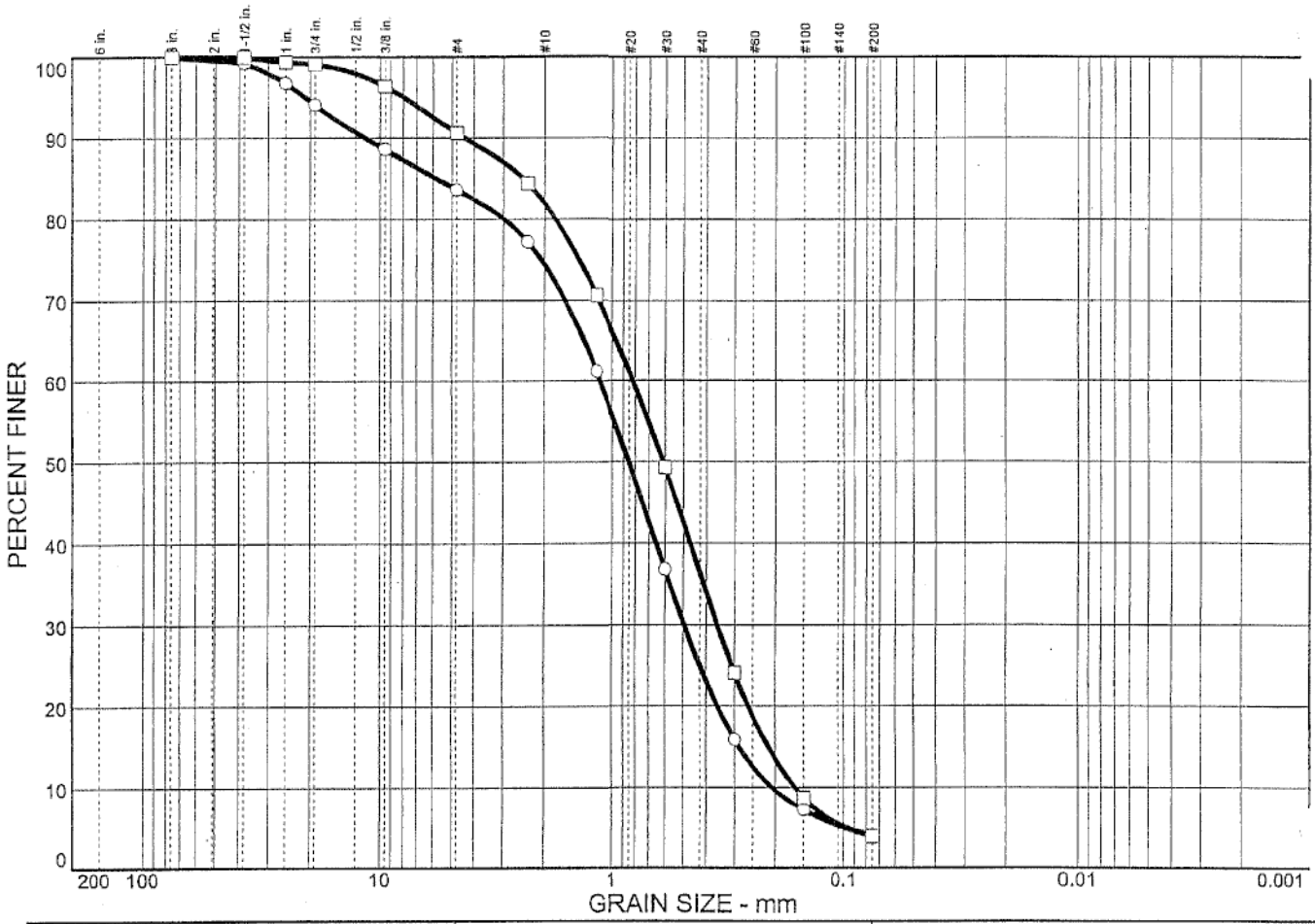
Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 7

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	5.9	10.5	9.1	49.4	21.3	3.8	
□	0.0	0.9	8.5	8.6	45.6	32.5	3.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	CC-1		0-1'	Poorly graded SAND with gravel	SP
□	Lion-1		0-1'	Poorly graded SAND	SP

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Client: The Newhall Land & Farming Company

Project: PACE Fluvial Study of Santa Clara River and Tributaries

Project No.: 05-1155BE-9(2)

Figure 8

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: SC-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17433.60
Tare =	0.00
Dry sample weight =	17433.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 823.18 Tare = .00 Sample weight = 823.18
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	141.95	99.2
3/4 inch	410.74	97.6
3/8 inch	1731.78	90.1
# 4	3171.78	81.8
# 8	86.53	73.2
# 16	204.60	61.5
# 30	360.50	46.0
# 50	602.30	21.9
# 100	769.92	5.3
# 200	811.58	1.2

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 18.2 (% coarse = 2.4 % fine = 15.8)
% SAND = 80.6 (% coarse = 11.1 % medium = 36.4 % fine = 33.1)
% FINES = 1.2

D_{85}= 6.25 D_{60}= 1.09 D_{50}= 0.69
D_{30}= 0.38 D_{15}= 0.24 D_{10}= 0.20
C_c= 0.6717 C_u= 5.5821

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: SC-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17660.60
Tare =	0.00
Dry sample weight =	17660.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 839.37 Tare = .00 Sample weight = 839.37
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	459.98	97.4
1 inch	989.08	94.4
3/4 inch	1326.98	92.5
3/8 inch	1926.73	89.1
# 4	2512.85	85.8
# 8	36.20	82.1
# 16	101.65	75.4
# 30	238.79	61.4
# 50	520.23	32.6
# 100	773.42	6.7
# 200	829.99	1.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 14.2 (% coarse = 7.5 % fine = 6.7)
% SAND = 84.8 (% coarse = 4.9 % medium = 32.6 % fine = 47.3)
% FINES = 1.0

D_{85}= 4.00 D_{60}= 0.57 D_{50}= 0.44
D_{30}= 0.28 D_{15}= 0.20 D_{10}= 0.17
C_c= 0.8205 C_u= 3.3796

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: SC-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17388.20
Tare =	0.00
Dry sample weight =	17388.20

Sample split on number 4 sieve
Split sample data:
Sample and tare = 760.52 Tare = .00 Sample weight = 760.52
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	78.55	99.5
3/4 inch	381.54	97.8
3/8 inch	1356.34	92.2
# 4	2446.02	85.9
# 8	57.04	79.5
# 16	159.19	67.9
# 30	328.93	48.7
# 50	553.86	23.3
# 100	698.78	7.0
# 200	748.36	1.4

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 14.1 (% coarse = 2.2 % fine = 11.9)
% SAND = 84.5 (% coarse = 8.5 % medium = 41.5 % fine = 34.5)
% FINES = 1.4

D_{85}= 4.26 D_{60}= 0.86 D_{50}= 0.62
D_{30}= 0.36 D_{15}= 0.23 D_{10}= 0.18
C_c= 0.8545 C_u= 4.789

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: MC-1
Sample No.:
Elev. or Depth: 0-1' **Sample Length(in./cm.):**
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	22700.00
Tare =	0.00
Dry sample weight =	22700.00

Sample split on number 4 sieve
Split sample data:
Sample and tare = 805.67 Tare = .00 Sample weight = 805.67
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	1308.63	94.2
3/4 inch	2378.82	89.5
3/8 inch	5513.99	75.7
# 4	8911.63	60.7
# 8	184.41	46.8
# 16	415.41	29.4
# 30	603.77	15.2
# 50	708.14	7.3
# 100	759.62	3.5
# 200	782.57	1.7

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 39.3 (% coarse = 10.5 % fine = 28.8)
% SAND = 59.0 (% coarse = 17.8 % medium = 32.4 % fine = 8.8)
% FINES = 1.7

D_{85}= 14.93 D_{60}= 4.59 D_{50}= 2.74
D_{30}= 1.21 D_{15}= 0.59 D_{10}= 0.40
C_c= 0.7875 C_u= 11.3357

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: MC-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17569.80
Tare =	0.00
Dry sample weight =	17569.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 651.07 Tare = .00 Sample weight = 651.07
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	41.15	99.8
3/4 inch	57.09	99.7
3/8 inch	113.76	99.4
# 4	361.27	97.9
# 8	30.69	93.3
# 16	138.31	77.1
# 30	380.43	40.7
# 50	555.53	14.4
# 100	614.15	5.6
# 200	640.41	1.6

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 2.1 (% coarse = 0.3 % fine = 1.8)
% SAND = 96.3 (% coarse = 6.7 % medium = 66.1 % fine = 23.5)
% FINES = 1.6

D_{85}= 1.48 D_{60}= 0.84 D_{50}= 0.71
D_{30}= 0.48 D_{15}= 0.31 D_{10}= 0.24
C_c= 1.152 C_u= 3.5686

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: MC-3
Sample No.:
Elev. or Depth: 0-1' **Sample Length(in./cm.):**
Location:
Description: Well graded SAND with silt and gravel
USCS: SW-SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	21565.00
Tare =	0.00
Dry sample weight =	21565.00

Sample split on number 4 sieve
Split sample data:
Sample and tare = 839.76 Tare = .00 Sample weight = 839.76
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	250.80	98.8
3/4 inch	448.46	97.9
3/8 inch	1443.29	93.3
# 4	3437.57	84.1
# 8	110.41	73.0
# 16	288.71	55.2
# 30	477.58	36.3
# 50	619.89	22.0
# 100	725.46	11.4
# 200	788.40	5.1

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 15.9 (% coarse = 2.1 % fine = 13.8)
% SAND = 79.0 (% coarse = 14.7 % medium = 40.8 % fine = 23.5)
% FINES = 5.1

D_{85}= 5.06 D_{60}= 1.40 D_{50}= 0.99
D_{30}= 0.46 D_{15}= 0.20 D_{10}= 0.13
C_c= 1.1213 C_u= 10.5481

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: Mesas Area
Alluvial Sediment Gradation Area
Project Number: 05-1155BE-9

Sample Data

Source: AC-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

Initial
Dry sample and tare= 17978.40
Tare = 0.00
Dry sample weight = 17978.40
Sample split on number 4 sieve
Split sample data:
Sample and tare = 728.55 Tare = .00 Sample weight = 728.55
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	458.72	97.4
1 inch	612.11	96.6
3/4 inch	825.84	95.4
3/8 inch	1435.77	92.0
# 4	2338.67	87.0
# 8	73.03	78.3
# 16	202.51	62.8
# 30	404.22	38.7
# 50	610.16	14.1
# 100	694.19	4.1
# 200	716.13	1.5

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 13.0 (% coarse = 4.6 % fine = 8.4)
% SAND = 85.5 (% coarse = 11.6 % medium = 50.1 % fine = 23.8)
% FINES = 1.5

D_{85}= 3.89 D_{60}= 1.08 D_{50}= 0.81
D_{30}= 0.48 D_{15}= 0.31 D_{10}= 0.25
C_c= 0.8622 C_u= 4.3201

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: AC-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	19703.60
Tare =	0.00
Dry sample weight =	19703.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 721.09 Tare = .00 Sample weight = 721.09
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	0.00	100.0
3/4 inch	89.11	99.5
3/8 inch	596.94	97.0
# 4	1405.78	92.9
# 8	49.21	86.6
# 16	159.34	72.4
# 30	338.55	49.3
# 50	579.17	18.3
# 100	697.99	3.0
# 200	714.85	0.8

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 7.1 (% coarse = 0.5 % fine = 6.6)
% SAND = 92.1 (% coarse = 8.9 % medium = 50.7 % fine = 32.5)
% FINES = 0.8

D_{85}= 2.12 D_{60}= 0.79 D_{50}= 0.61
D_{30}= 0.40 D_{15}= 0.27 D_{10}= 0.23
C_c= 0.8691 C_u= 3.4521

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: AC-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded GRAVEL with sand
USCS: GP

Mechanical Analysis Data

	Initial
Dry sample and tare=	23244.80
Tare =	0.00
Dry sample weight =	23244.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 878.11 Tare = .00 Sample weight = 878.11
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	680.15	97.1
1 inch	1686.19	92.7
3/4 inch	2999.30	87.1
3/8 inch	8019.45	65.5
# 4	11551.23	50.3
# 8	187.43	39.6
# 16	369.78	29.1
# 30	537.89	19.5
# 50	700.54	10.2
# 100	817.98	3.4
# 200	856.95	1.2

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 49.7 (% coarse = 12.9 % fine = 36.8)
% SAND = 49.1 (% coarse = 13.2 % medium = 22.4 % fine = 13.5)
% FINES = 1.2

D_{85}= 17.59 D_{60}= 7.75 D_{50}= 4.67
D_{30}= 1.25 D_{15}= 0.43 D_{10}= 0.30
C_c= 0.6872 C_u= 26.2488

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: Mesas Area
Alluvial Sediment Gradation Area
Project Number: 05-1155BE-9

Sample Data

Source: LC-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Well graded SAND with silt
USCS: SW-SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	15209.00
Tare =	0.00
Dry sample weight =	15209.00

Sample split on number 4 sieve
Split sample data:
Sample and tare = 763.95 Tare = .00 Sample weight = 763.95
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	0.00	100.0
3/4 inch	54.29	99.6
3/8 inch	530.62	96.5
# 4	1422.64	90.6
# 8	90.96	79.8
# 16	239.41	62.2
# 30	422.48	40.5
# 50	581.66	21.6
# 100	663.72	11.9
# 200	705.30	7.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 9.4 (% coarse = 0.4 % fine = 9.0)
% SAND = 83.6 (% coarse = 14.4 % medium = 46.1 % fine = 23.1)
% FINES = 7.0

D_{85}= 3.14 D_{60}= 1.10 D_{50}= 0.80
D_{30}= 0.42 D_{15}= 0.20 D_{10}= 0.12
C_c= 1.3693 C_u= 9.2286

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: LC-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	18387.00
Tare =	0.00
Dry sample weight =	18387.00

Sample split on number 4 sieve
Split sample data:
Sample and tare = 832.53 Tare = .00 Sample weight = 832.53
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	242.95	98.7
1 inch	937.81	94.9
3/4 inch	1474.70	92.0
3/8 inch	4129.38	77.5
# 4	6963.31	62.1
# 8	183.83	48.4
# 16	388.23	33.1
# 30	557.04	20.5
# 50	684.35	11.1
# 100	771.61	4.5
# 200	810.78	1.6

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 37.9 (% coarse = 8.0 % fine = 29.9)
% SAND = 60.5 (% coarse = 17.3 % medium = 29.4 % fine = 13.8)
% FINES = 1.6

D_{85}= 13.07 D_{60}= 4.27 D_{50}= 2.55
D_{30}= 1.02 D_{15}= 0.41 D_{10}= 0.27
C_c= 0.8867 C_u= 15.6708

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: LC-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17115.80
Tare =	0.00
Dry sample weight =	17115.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 784.67 Tare = .00 Sample weight = 784.67
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	123.98	99.3
3/4 inch	416.69	97.6
3/8 inch	1442.97	91.6
# 4	2356.78	86.2
# 8	40.11	81.8
# 16	152.53	69.4
# 30	372.23	45.3
# 50	636.75	16.2
# 100	734.31	5.5
# 200	764.19	2.2

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 13.8 (% coarse = 2.4 % fine = 11.4)
% SAND = 84.0 (% coarse = 6.3 % medium = 50.2 % fine = 27.5)
% FINES = 2.2

D_{85}= 3.78 D_{60}= 0.87 D_{50}= 0.67
D_{30}= 0.43 D_{15}= 0.29 D_{10}= 0.23
C_c= 0.9172 C_u= 3.7901

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: HR-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	18704.80
Tare =	0.00
Dry sample weight =	18704.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 807.10 Tare = .00 Sample weight = 807.10
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	841.69	95.5
1 inch	1202.99	93.6
3/4 inch	1450.16	92.2
3/8 inch	2271.86	87.9
# 4	3483.16	81.4
# 8	104.06	70.9
# 16	276.70	53.5
# 30	527.54	28.2
# 50	713.86	9.4
# 100	770.09	3.7
# 200	791.09	1.6

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 18.6 (% coarse = 7.8 % fine = 10.8)
% SAND = 79.8 (% coarse = 13.8 % medium = 50.4 % fine = 15.6)
% FINES = 1.6

D_{85}= 6.71 D_{60}= 1.46 D_{50}= 1.07
D_{30}= 0.63 D_{15}= 0.39 D_{10}= 0.31
C_c= 0.8748 C_u= 4.7071

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: HR-2
Sample No.:
Elev. or Depth: 0-1' **Sample Length(in./cm.):**
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	18704.80
Tare =	0.00
Dry sample weight =	18704.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 733.34 Tare = .00 Sample weight = 733.34
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	433.01	97.7
3/4 inch	899.34	95.2
3/8 inch	3322.51	82.2
# 4	5573.90	70.2
# 8	63.23	64.1
# 16	158.38	55.0
# 30	277.62	43.6
# 50	468.94	25.3
# 100	670.63	6.0
# 200	717.39	1.5

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 29.8 (% coarse = 4.8 % fine = 25.0)
% SAND = 68.7 (% coarse = 7.9 % medium = 26.9 % fine = 33.9)
% FINES = 1.5

D_{85}= 10.86 D_{60}= 1.67 D_{50}= 0.85
D_{30}= 0.35 D_{15}= 0.22 D_{10}= 0.18
C_c= 0.4086 C_u= 9.2675

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: HR-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17660.60
Tare =	0.00
Dry sample weight =	17660.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 740.55 Tare = .00 Sample weight = 740.55
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	195.94	98.9
1 inch	253.36	98.6
3/4 inch	552.46	96.9
3/8 inch	1620.08	90.8
# 4	2777.78	84.3
# 8	68.28	76.5
# 16	209.20	60.5
# 30	416.09	36.9
# 50	620.47	13.7
# 100	713.88	3.0
# 200	734.13	0.7

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 15.7 (% coarse = 3.1 % fine = 12.6)
% SAND = 83.6 (% coarse = 10.7 % medium = 49.2 % fine = 23.7)
% FINES = 0.7

D_{85}= 5.13 D_{60}= 1.16 D_{50}= 0.86
D_{30}= 0.50 D_{15}= 0.32 D_{10}= 0.26
C_c= 0.8384 C_u= 4.5513

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: CB-1
Sample No.:
Elev. or Depth: 0-1' **Sample Length(in./cm.):**
Location:
Description: Poorly graded SAND with silt
USCS: SP-SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	17933.00
Tare =	0.00
Dry sample weight =	17933.00

Sample split on number 4 sieve
Split sample data:
Sample and tare = 742.07 Tare = .00 Sample weight = 742.07
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	0.00	100.0
3/4 inch	0.00	100.0
3/8 inch	103.36	99.4
# 4	223.16	98.8
# 8	5.50	98.1
# 16	23.81	95.6
# 30	88.78	87.0
# 50	289.75	60.2
# 100	589.56	20.3
# 200	700.18	5.6

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 1.2 (% coarse = 0.0 % fine = 1.2)
% SAND = 93.2 (% coarse = 1.0 % medium = 21.2 % fine = 71.0)
% FINES = 5.6

D_{85}= 0.55 D_{60}= 0.30 D_{50}= 0.25
D_{30}= 0.18 D_{15}= 0.13 D_{10}= 0.11
C_c= 1.0559 C_u= 2.8469

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: CB-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	18114.60
Tare =	0.00
Dry sample weight =	18114.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 745.01 Tare = .00 Sample weight = 745.01
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	101.07	99.4
1 inch	275.52	98.5
3/4 inch	759.46	95.8
3/8 inch	2699.95	85.1
# 4	4680.48	74.2
# 8	106.40	63.6
# 16	255.04	48.8
# 30	405.03	33.9
# 50	576.15	16.8
# 100	703.88	4.1
# 200	732.85	1.2

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 25.8 (% coarse = 4.2 % fine = 21.6)
% SAND = 73.0 (% coarse = 13.8 % medium = 35.0 % fine = 24.2)
% FINES = 1.2

D_{85}= 9.47 D_{60}= 1.96 D_{50}= 1.25
D_{30}= 0.51 D_{15}= 0.28 D_{10}= 0.22
C_c= 0.6048 C_u= 8.9372

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: CB-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	19022.60
Tare =	0.00
Dry sample weight =	19022.60

Sample split on number 4 sieve
Split sample data:
Sample and tare = 824.36 Tare = .00 Sample weight = 824.36
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	155.86	99.2
3/4 inch	413.72	97.8
3/8 inch	1112.62	94.2
# 4	2022.57	89.4
# 8	74.07	81.4
# 16	215.58	66.0
# 30	428.05	43.0
# 50	672.06	16.5
# 100	767.22	6.2
# 200	802.70	2.3

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 10.6 (% coarse = 2.2 % fine = 8.4)
% SAND = 87.1 (% coarse = 10.9 % medium = 49.7 % fine = 26.5)
% FINES = 2.3

D_{85}= 3.05 D_{60}= 0.97 D_{50}= 0.72
D_{30}= 0.44 D_{15}= 0.28 D_{10}= 0.22
C_c= 0.9072 C_u= 4.4031

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: Mesas Area
Alluvial Sediment Gradation Area
Project Number: 05-1155BE-9

Sample Data

Source: SM-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Well graded SAND with silt
USCS: SW-SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	23017.80
Tare =	0.00
Dry sample weight =	23017.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 731.81 Tare = .00 Sample weight = 731.81
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	264.51	98.9
1 inch	644.65	97.2
3/4 inch	909.55	96.0
3/8 inch	1825.48	92.1
# 4	3038.96	86.8
# 8	65.91	79.0
# 16	198.29	63.3
# 30	387.07	40.9
# 50	543.90	22.3
# 100	613.20	14.1
# 200	649.63	9.7

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 13.2 (% coarse = 4.0 % fine = 9.2)
% SAND = 77.1 (% coarse = 10.7 % medium = 45.7 % fine = 20.7)
% FINES = 9.7

D_{85}= 3.87 D_{60}= 1.06 D_{50}= 0.79
D_{30}= 0.42 D_{15}= 0.17 D_{10}= 0.08
C_c= 2.0885 C_u= 13.4193

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: SM-2
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Silty SAND with gravel
USCS: SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	60245.80
Tare =	0.00
Dry sample weight =	60245.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 957.88 Tare = .00 Sample weight = 957.88
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	2121.72	96.5
1-1/2 inch	7269.59	87.9
1 inch	8084.04	86.6
3/4 inch	8958.31	85.1
3/8 inch	11591.67	80.8
# 4	14891.85	75.3
# 8	99.38	67.5
# 16	269.61	54.1
# 30	436.80	41.0
# 50	571.38	30.4
# 100	695.68	20.6
# 200	801.50	12.3

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 3.5 % GRAVEL = 21.2 (% coarse = 11.4 % fine = 9.8)
% SAND = 63.0 (% coarse = 10.6 % medium = 29.2 % fine = 23.2)
% FINES = 12.3

D_{85}= 18.73 D_{60}= 1.57 D_{50}= 0.97
D_{30}= 0.29 D_{15}= 0.09

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: PACE Fluvial Study of Santa Clara River and Tributaries
Project Number: 05-1155BE-9(2)

Sample Data

Source: SM-3
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Silty SAND with gravel
USCS: SM

Mechanical Analysis Data

	Initial
Dry sample and tare=	16207.80
Tare =	0.00
Dry sample weight =	16207.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 751.27 Tare = .00 Sample weight = 751.27
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	483.46	97.0
1 inch	671.79	95.9
3/4 inch	799.18	95.1
3/8 inch	1583.39	90.2
# 4	2469.85	84.8
# 8	55.59	78.5
# 16	132.52	69.8
# 30	230.47	58.8
# 50	397.47	39.9
# 100	518.21	26.3
# 200	600.30	17.0

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 15.2 (% coarse = 4.9 % fine = 10.3)
% SAND = 67.8 (% coarse = 8.2 % medium = 27.0 % fine = 32.6)
% FINES = 17.0

D_{85}= 4.87 D_{60}= 0.63 D_{50}= 0.43
D_{30}= 0.19

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: Mesas Area
Alluvial Sediment Gradation Area
Project Number: 05-1155BE-9

Sample Data

Source: CC-1
Sample No.:
Elev. or Depth: 0-1' **Sample Length(in./cm.):**
Location:
Description: Poorly graded SAND with gravel
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	18477.80
Tare =	0.00
Dry sample weight =	18477.80

Sample split on number 4 sieve
Split sample data:
Sample and tare = 779.92 Tare = .00 Sample weight = 779.92
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	135.00	99.3
1 inch	584.04	96.8
3/4 inch	1088.55	94.1
3/8 inch	2113.98	88.6
# 4	3032.35	83.6
# 8	60.03	77.2
# 16	209.43	61.2
# 30	436.82	36.8
# 50	631.92	15.9
# 100	713.17	7.2
# 200	744.09	3.8

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 16.4 (% coarse = 5.9 % fine = 10.5)
% SAND = 79.8 (% coarse = 9.1 % medium = 49.4 % fine = 21.3)
% FINES = 3.8

D_{85}= 5.81 D_{60}= 1.14 D_{50}= 0.86
D_{30}= 0.49 D_{15}= 0.29 D_{10}= 0.21
C_c= 1.0418 C_u= 5.5003

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Newhall Land & Farming Company
Project: Mesas Area
Alluvial Sediment Gradation Area
Project Number: 05-1155BE-9

Sample Data

Source: Lion-1
Sample No.:
Elev. or Depth: 0-1'
Sample Length(in./cm.):
Location:
Description: Poorly graded SAND
USCS: SP

Mechanical Analysis Data

	Initial
Dry sample and tare=	17660.60
Tare =	0.00
Dry sample weight =	17660.60

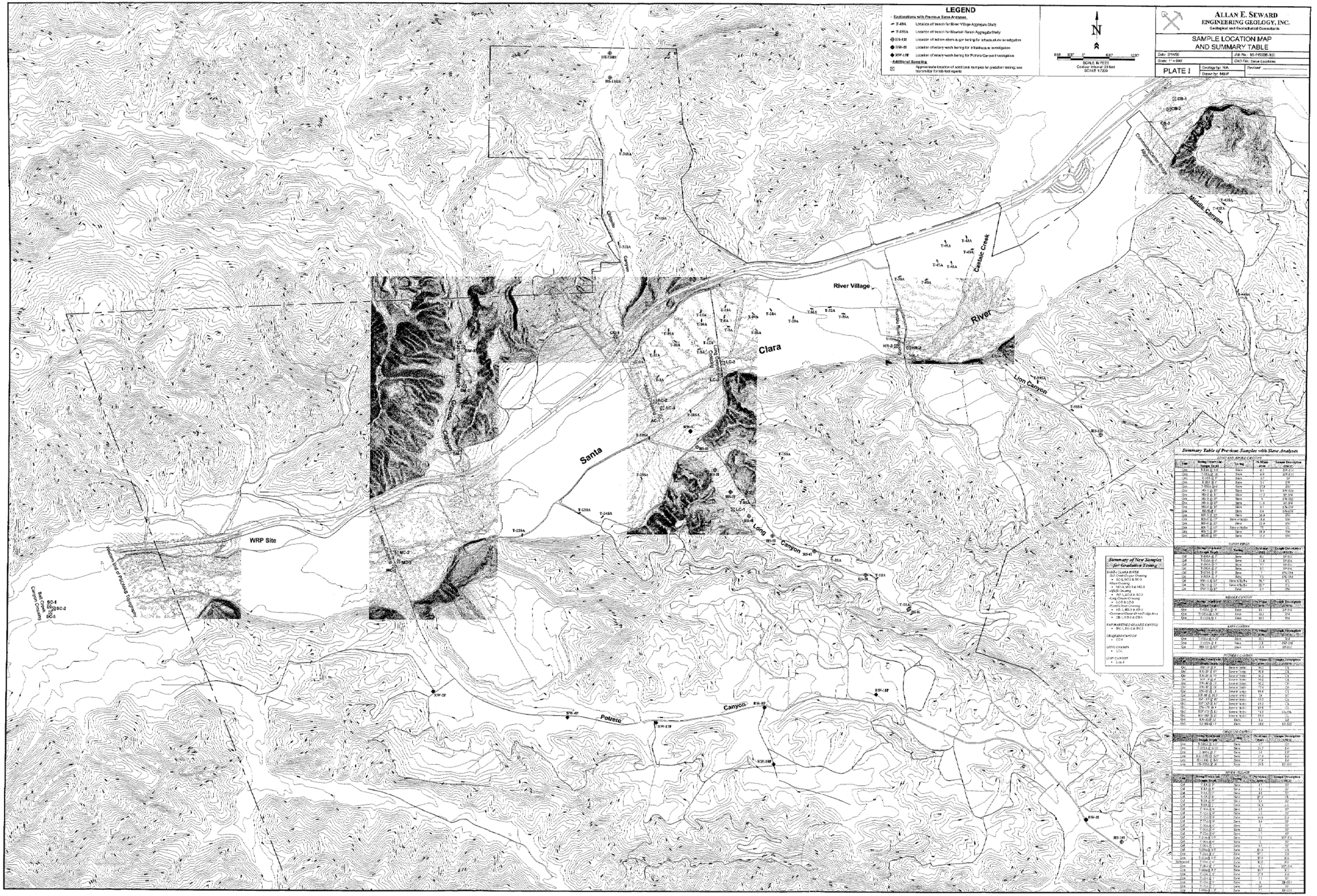
Sample split on number 4 sieve
Split sample data:
Sample and tare = 683.31 Tare = .00 Sample weight = 683.31
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
3 inch	0.00	100.0
1-1/2 inch	0.00	100.0
1 inch	106.88	99.4
3/4 inch	150.98	99.1
3/8 inch	627.92	96.4
# 4	1659.02	90.6
# 8	46.53	84.4
# 16	150.65	70.6
# 30	311.37	49.3
# 50	501.22	24.1
# 100	617.55	8.7
# 200	653.55	3.9

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% COBBLES = 0.0 % GRAVEL = 9.4 (% coarse = 0.9 % fine = 8.5)
% SAND = 86.7 (% coarse = 8.6 % medium = 45.6 % fine = 32.5)
% FINES = 3.9

D_{85}= 2.48 D_{60}= 0.82 D_{50}= 0.61
D_{30}= 0.36 D_{15}= 0.21 D_{10}= 0.16
C_c= 0.9476 C_u= 4.9895


LEGEND
Explorations with Previous Sieve Analyses
T-28A Location of trench for River Village Aggregate Study
T-35A Location of trench for Rosenski Ranch Aggregate Study
BS-12 Location of below-stem auger boring for infrastructure investigation
RW-3 Location of rotary-wash boring for infrastructure investigation
RW-1F Location of rotary-wash boring for Potrero Canyon Investigation
Additional Sampling
Approximate location of additional samples for gradation testing; see transmittal for individual reports
N
SCALE IN FEET
Contour Interval 20 feet
SCALE: 1"=200'
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants
SAMPLE LOCATION MAP
AND SUMMARY TABLE
PLATE I
River Village
Castaic Creek
River
Clara
Santa
Lion Canyon
Long Canyon
Potrero
Canyon
WRP Site
Middle Canyon
Summary Table of Previous Samples with Sieve Analyses
Summary of New Samples for Gradation Testing

Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.1

Existing Condition HEC-RAS Output

Plan	***Description***
FinalEx025	***Fluvial Model, Existing Conditions, n=0.025, subcritical flow***
Exist025	***Approved Model, Existing Conditions, n=0.025, mixed flow***
Exist085	***Approved Model, Existing Conditions, n=0.085, mixed flow***

HEC-RAS model modified for fluvial use. See section 4.1.1B for model assembly. For unmodified, mixed flow regimes used in report, refer also to HEC-RAS Modeling Report prepared by PACE, concurrently submitted to LACDPW.

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

HEC-RAS Plan: FinalEx025 River: Reach #1 Reach: SCR Profile: Rev BB FP

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	46195	Rev BB FP	115111.00	1035.00	1054.30	1054.30	1060.32	0.004006	19.69	5847.54	483.37	1.00
SCR	46020	Rev BB FP	115111.00	1032.00	1052.44	1052.44	1058.13	0.004154	19.14	6013.48	531.51	1.00
SCR	45545	Rev BB FP	115111.00	1030.00	1049.24	1049.24	1055.65	0.004022	20.32	5664.11	446.75	1.01
SCR	45030	Rev BB FP	115111.00	1025.00	1045.55	1044.56	1050.46	0.003176	17.78	6472.94	521.47	0.89
SCR	44585	Rev BB FP	115111.00	1022.00	1043.05	1043.05	1048.75	0.004191	19.17	6003.55	531.86	1.01
SCR	44210	Rev BB FP	115111.00	1020.00	1041.58	1038.72	1044.97	0.001990	14.77	7793.11	585.85	0.71
SCR	43820	Rev BB FP	115111.00	1018.00	1037.47	1037.47	1043.62	0.004071	19.90	5785.45	476.53	1.01
SCR	43610	Rev BB FP	115111.00	1017.00	1034.08	1034.08	1040.13	0.004047	19.74	5832.16	483.68	1.00
SCR	43410	Rev BB FP	115111.00	1016.00	1030.73	1030.73	1035.85	0.004290	18.16	6338.30	623.33	1.00
SCR	43200	Rev BB FP	115111.00	1014.00	1029.28	1029.28	1033.94	0.004388	17.31	6660.68	737.19	1.00
SCR	42975	Rev BB FP	115111.00	1012.00	1026.11	1026.11	1030.25	0.004610	16.33	7050.19	860.39	1.01
SCR	42815	Rev BB FP	115111.00	1011.00	1024.28	1024.28	1027.89	0.004790	15.25	7548.64	1051.01	1.00
SCR	42590	Rev BB FP	115111.00	1010.00	1021.27	1021.27	1024.75	0.004840	14.96	7695.66	1112.88	1.00
SCR	42430	Rev BB FP	115111.00	1008.00	1019.61	1019.61	1023.32	0.004688	15.45	7449.45	1001.02	1.00
SCR	42215	Rev BB FP	115111.00	1006.00	1020.41	1017.69	1022.03	0.001689	10.21	11269.54	1312.59	0.61
SCR	41940	Rev BB FP	115111.00	1005.00	1019.50	1017.71	1021.46	0.002356	11.22	10258.18	1332.54	0.71
SCR	41730	Rev BB FP	115111.00	1004.00	1018.92	1016.50	1020.95	0.002293	11.42	10078.82	1249.08	0.71
SCR	41460	Rev BB FP	115111.00	1002.00	1018.33	1015.19	1020.31	0.002413	11.29	10198.64	1335.15	0.72
SCR	41280	Rev BB FP	115111.00	1001.00	1015.32	1015.32	1019.50	0.004619	16.41	7014.27	851.93	1.01
SCR	41080	Rev BB FP	115111.00	1000.00	1013.55	1013.55	1017.58	0.004646	16.10	7149.54	899.03	1.01
SCR	40825	Rev BB FP	115111.00	999.50	1012.18	1012.18	1015.60	0.004898	14.84	7757.40	1146.76	1.01
SCR	40585	Rev BB FP	115111.00	998.00	1010.63	1010.63	1014.02	0.004921	14.79	7785.23	1161.38	1.01
SCR	40335	Rev BB FP	115111.00	996.00	1010.35	1008.85	1012.23	0.002580	11.01	10452.09	1494.47	0.73
SCR	40130	Rev BB FP	115111.00	995.00	1009.98	1008.43	1011.66	0.002378	10.38	11087.02	1631.34	0.70
SCR	39945	Rev BB FP	115111.00	994.00	1009.80	1007.56	1011.20	0.001767	9.48	12146.73	1639.30	0.61
SCR	39755	Rev BB FP	115111.00	994.00	1007.25	1007.25	1010.49	0.004940	14.43	7974.76	1237.97	1.00
SCR	39605	Rev BB FP	115111.00	993.00	1005.69	1005.69	1009.04	0.004873	14.70	7830.63	1171.12	1.00
SCR	39310	Rev BB FP	115111.00	992.00	1004.14	1004.14	1007.48	0.004928	14.68	7841.97	1184.07	1.01
SCR	39100	Rev BB FP	115111.00	990.00	1004.20	1001.97	1006.14	0.002266	11.20	10276.12	1302.03	0.70
SCR	38925	Rev BB FP	115111.00	989.50	1003.90	1001.28	1005.76	0.001836	10.94	10519.67	1177.05	0.65
SCR	38710	Rev BB FP	115111.00	988.00	1003.69	999.99	1005.37	0.001311	10.39	11078.47	1039.00	0.56
SCR	38475	Rev BB FP	115111.00	986.00	1000.24	1000.24	1004.59	0.004502	16.74	6875.81	795.53	1.00
SCR	38300	Rev BB FP	115111.00	985.50	998.05	997.52	1002.29	0.003650	16.53	6965.85	701.78	0.92
SCR	38065	Rev BB FP	115111.00	984.00	998.22	995.71	1001.31	0.002051	14.09	8168.84	678.40	0.72
SCR	37810	Rev BB FP	115111.00	983.00	995.21	995.21	1000.37	0.004314	18.21	6319.82	622.08	1.01
SCR	37655	Rev BB FP	115111.00	982.00	994.15	994.15	998.54	0.004123	16.80	6851.08	789.42	1.01
SCR	37390	Rev BB FP	115111.00	981.00	989.86	989.86	993.67	0.004341	15.72	7414.85	986.73	0.98
SCR	37135	Rev BB FP	115111.00	980.00	988.56	988.56	992.08	0.004805	15.06	7645.53	1091.59	1.00
SCR	36930	Rev BB FP	115111.00	978.00	987.71	986.88	990.46	0.003082	13.31	8648.06	1125.51	0.85
SCR	36735	Rev BB FP	115111.00	977.00	986.38	986.38	989.70	0.004220	14.61	7881.46	1194.24	1.00
SCR	36515	Rev BB FP	115111.00	975.00	986.32	985.26	988.59	0.002509	12.09	9521.48	1325.55	0.79
SCR	36265	Rev BB FP	115111.00	974.00	985.17	984.78	987.82	0.003492	13.07	8806.95	1373.08	0.91
SCR	36080	Rev BB FP	116236.00	973.00	984.11	984.11	987.01	0.005036	13.69	8492.54	1450.39	1.00
SCR	35845	Rev BB FP	116236.00	971.00	983.85	982.83	985.95	0.002440	11.61	10013.52	1478.08	0.79
SCR	35725	Rev BB FP	116236.00	970.00	982.55	982.55	985.50	0.003815	13.77	8438.90	1427.85	1.00
SCR	35515	Rev BB FP	116236.00	969.00	981.34	981.34	984.38	0.003984	13.99	8309.50	1362.77	1.00
SCR	35245	Rev BB FP	116236.00	968.00	980.14	980.14	983.10	0.004877	13.82	8434.21	1553.42	0.99
SCR	35040	Rev BB FP	116236.00	967.00	978.39	978.32	981.35	0.004794	13.81	8428.24	1401.79	0.98
SCR	34860	Rev BB FP	116236.00	966.00	977.44	977.44	980.48	0.004989	13.99	8307.51	1362.96	1.00
SCR	34720	Rev BB FP	116236.00	965.50	976.17	976.17	979.16	0.005117	13.87	8382.47	1419.56	1.01
SCR	34495	Rev BB FP	116236.00	964.00	974.28	974.28	977.32	0.004209	13.98	8313.86	1380.43	1.00
SCR	34310	Rev BB FP	116236.00	963.00	972.65	972.65	975.83	0.004062	14.32	8114.63	1297.65	1.01
SCR	34090	Rev BB FP	116236.00	962.00	971.64	971.64	974.82	0.004044	14.31	8123.85	1281.00	1.00
SCR	33880	Rev BB FP	116236.00	960.00	970.45	970.45	973.58	0.004005	14.20	8187.96	1320.08	1.00
SCR	33710	Rev BB FP	116236.00	959.00	969.26	969.26	972.35	0.004225	14.11	8238.14	1363.23	1.01
SCR	33500	Rev BB FP	116236.00	958.00	968.15	968.15	970.81	0.003739	13.10	8872.21	1690.39	1.01
SCR	33310	Rev BB FP	116236.00	957.00	967.01	967.01	969.61	0.003786	12.93	8986.36	1751.52	1.01
SCR	33115	Rev BB FP	116236.00	956.00	966.35	965.60	968.34	0.003605	11.33	10261.76	1811.54	0.84
SCR	32795	Rev BB FP	116236.00	954.00	964.95	964.63	967.26	0.003022	12.20	9528.82	1732.86	0.92
SCR	32605	Rev BB FP	116236.00	952.00	963.45	963.45	966.51	0.004030	14.05	8272.67	1344.60	1.00
SCR	32265	Rev BB FP	140776.00	950.00	961.37	961.37	964.12	0.004005	13.31	10579.17	1944.94	1.01
SCR	31875	Rev BB FP	140776.00	949.00	960.00	960.00	961.85	0.003750	10.91	12908.13	2482.20	0.84
SCR	31585	Rev BB FP	140776.00	946.00	957.67	956.99	959.64	0.003504	11.25	12511.05	2181.08	0.83
SCR	31360	Rev BB FP	140776.00	944.00	957.21	955.40	958.92	0.002285	10.51	13391.47	1875.23	0.69
SCR	31060	Rev BB FP	140776.00	942.00	957.24	953.29	958.34	0.000890	8.41	16729.49	1706.23	0.47
SCR	30720	Rev BB FP	140776.00	940.00	957.27	951.33	957.99	0.000542	6.81	20683.35	1886.90	0.36
SCR	30445	Rev BB FP	140776.00	938.00	957.20	949.57	957.83	0.000402	6.38	22074.12	1777.56	0.32
SCR	30095	Rev BB FP	140776.00	936.00	956.95	947.93	957.67	0.000462	6.82	20641.04	1666.43	0.34
SCR	29815	Rev BB FP	140776.00	935.00	956.59	948.10	957.51	0.000632	7.66	18372.99	1572.98	0.40
SCR	29565	Rev BB FP	140776.00	934.00	956.46	947.27	957.34	0.000612	7.51	18750.19	1613.45	0.39
SCR	29385	Rev BB FP	140776.00	933.00	956.05	948.99	957.18	0.000905	8.52	16517.20	1577.58	0.46
SCR	29140	Rev BB FP	140776.00	932.00	954.74	950.98	956.78	0.001928	11.47	12276.15	1324.48	0.66
SCR	28895	Rev BB FP	140776.00	930.00	951.63	951.63	955.99	0.002780	16.75	8402.32	965.72	1.00
SCR	28695	Rev BB FP	140776.00	928.00	947.85	947.85	953.31	0.004258	18.75	7507.53	701.05	1.01
SCR	28500	Rev BB FP	140776.00	927.50	945.09	945.09	951.16	0.003848	19.77	7160.17	654.24	0.99
SCR	28280	Rev BB FP	140776.00	926.00	941.65	941.65	947.91	0.004004	20.08	7009.50	562.69	1.00
SCR	28080	Rev BB FP	140776.00	925.00	942.26	940.11	946.59	0.002276	16.70	8441.98	682.92	0.80
SCR	27925	Rev BB FP	140776.00	924.00	940.35	939.49	946.04	0.003135	19.14	7355.35	549.81	0.92

HEC-RAS Plan: FinalEx025 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	27725	Rev BB FP	140776.00	923.00	939.27	939.27	945.37	0.003256	19.81	7106.64	586.68	1.00
SCR	27545	Rev BB FP	140776.00	922.00	937.65	937.65	943.27	0.003489	19.04	7395.60	656.47	1.00
SCR	27335	Rev BB FP	140776.00	921.00	936.22	936.22	940.84	0.003040	17.25	8160.86	887.01	1.00
SCR	27155	Rev BB FP	140776.00	920.50	935.43	935.43	939.62	0.003289	16.42	8571.55	1033.54	1.01
SCR	26990	Rev BB FP	140776.00	920.00	933.74	933.74	937.63	0.003639	15.83	8895.76	1147.56	1.00
SCR	26780	Rev BB FP	140776.00	918.00	931.35	931.35	935.09	0.003642	15.50	9080.65	1213.45	1.00
SCR	26575	Rev BB FP	140776.00	917.00	930.61	929.96	933.73	0.003645	14.19	9923.76	1259.87	0.89
SCR	26355	Rev BB FP	140776.00	916.00	929.17	929.17	932.77	0.004708	15.22	9247.19	1278.41	1.00
SCR	26170	Rev BB FP	140776.00	915.00	928.86	928.12	931.70	0.003430	13.53	10408.48	1352.53	0.86
SCR	25965	Rev BB FP	140776.00	914.00	927.22	927.22	930.82	0.004764	15.21	9254.71	1290.20	1.00
SCR	25785	Rev BB FP	140776.00	913.50	926.05	926.05	929.53	0.004772	14.97	9402.31	1344.86	1.00
SCR	25600	Rev BB FP	140776.00	912.50	924.93	924.89	927.92	0.004891	13.87	10151.10	1661.55	0.99
SCR	25425	Rev BB FP	140776.00	911.00	925.37	923.83	927.03	0.001843	10.34	13664.53	2021.56	0.69
SCR	25215	Rev BB FP	140776.00	910.00	923.33	923.33	926.30	0.005117	13.83	10181.28	1732.15	1.01
SCR	25000	Rev BB FP	140776.00	909.00	922.13	922.13	924.61	0.003543	12.64	11135.49	2284.18	1.01
SCR	24795	Rev BB FP	140776.00	908.00	920.36	920.36	922.81	0.003986	12.56	11204.68	2315.50	1.01
SCR	24550	Rev BB FP	140776.00	906.00	919.48	917.96	920.95	0.001944	9.74	14446.28	2238.32	0.68
SCR	24335	Rev BB FP	140776.00	905.00	917.62	917.62	920.25	0.004333	12.99	10833.43	2087.54	1.01
SCR	24115	Rev BB FP	140776.00	904.00	915.93	915.93	918.60	0.005232	13.09	10751.27	2018.76	1.00
SCR	23975	Rev BB FP	140776.00	903.50	914.60	914.60	917.35	0.004636	13.31	10577.23	1919.34	1.00
SCR	23755	Rev BB FP	140776.00	902.00	913.25	913.24	916.01	0.004627	13.32	10567.82	1938.03	1.01
SCR	23565	Rev BB FP	140776.00	900.00	912.40	912.40	915.10	0.004610	13.17	10691.96	2036.28	1.01
SCR	23365	Rev BB FP	140776.00	900.00	911.13	911.13	914.01	0.004622	13.63	10329.86	1783.88	1.00
SCR	23180	Rev BB FP	140776.00	899.00	910.96	909.39	912.53	0.001984	10.05	14012.48	2086.48	0.68
SCR	23000	Rev BB FP	140776.00	898.00	910.89	908.39	912.14	0.001366	8.95	15727.65	2065.37	0.57
SCR	22790	Rev BB FP	140776.00	897.50	910.43	908.15	911.83	0.001448	9.49	14833.41	1946.22	0.61
SCR	22600	Rev BB FP	140776.00	896.00	910.14	907.56	911.55	0.001434	9.52	14788.10	1866.40	0.60
SCR	22415	Rev BB FP	140776.00	895.50	909.67	906.93	911.25	0.001552	10.10	13933.69	1712.91	0.62
SCR	22195	Rev BB FP	141426.00	894.00	906.88	906.88	910.54	0.003786	15.36	9204.46	1262.71	1.00
SCR	22010	Rev BB FP	141426.00	892.00	906.16	906.16	909.69	0.003347	15.08	9380.50	1322.09	1.00
SCR	21790	Rev BB FP	141426.00	891.50	904.86	904.86	908.08	0.002972	14.39	9826.50	1586.66	1.00
SCR	21615	Rev BB FP	141426.00	892.00	903.09	903.09	906.00	0.003182	13.67	10342.23	1845.66	1.00
SCR	21440	Rev BB FP	141426.00	890.00	901.21	901.21	904.53	0.003865	14.61	9680.27	1773.54	1.00
SCR	21225	Rev BB FP	141426.00	888.00	899.81	899.81	902.28	0.003807	12.60	11221.48	2263.50	1.00
SCR	21020	Rev BB FP	141426.00	887.00	897.42	897.42	900.35	0.003921	13.75	10350.76	1908.44	0.99
SCR	20845	Rev BB FP	141426.00	886.00	897.00	897.00	899.41	0.003869	12.46	11348.13	2407.34	1.01
SCR	20595	Rev BB FP	141426.00	885.00	896.43	895.88	898.31	0.002651	10.99	12863.10	2527.28	0.86
SCR	20435	Rev BB FP	141426.00	884.00	896.19	895.33	897.84	0.002261	10.32	13709.67	2581.09	0.79
SCR	20280	Rev BB FP	141426.00	883.70	895.03	895.03	897.31	0.003977	12.14	11653.22	2572.83	1.00
SCR	20070	Rev BB FP	141426.00	882.00	892.74	892.74	895.13	0.003743	12.41	11394.63	2436.05	1.01
SCR	19855	Rev BB FP	141426.00	880.50	891.12	891.12	893.79	0.004114	13.12	10778.78	2072.85	1.01
SCR	19630	Rev BB FP	141426.00	880.00	889.83	889.73	892.52	0.003926	13.17	10735.19	1914.99	0.98
SCR	19440	Rev BB FP	141426.00	878.00	889.91	888.74	891.71	0.002179	10.75	13151.45	2083.68	0.75
SCR	19240	Rev BB FP	141426.00	877.50	888.85	888.46	891.14	0.003158	12.14	11650.49	2090.11	0.91
SCR	19050	Rev BB FP	141426.00	876.00	889.03	887.20	890.46	0.001682	9.60	14759.68	2167.39	0.64
SCR	18830	Rev BB FP	141426.00	874.00	888.73	886.52	890.09	0.001481	9.34	15134.89	2098.85	0.61
SCR	18650	Rev BB FP	141426.00	873.50	888.68	885.42	889.80	0.001016	8.50	16644.25	2025.07	0.52
SCR	18475	Rev BB FP	141426.00	872.00	888.66	884.58	889.58	0.000752	7.70	18373.58	1945.01	0.44
SCR	18290	Rev BB FP	141426.00	871.50	888.41	884.39	889.43	0.000811	8.11	17448.54	1844.66	0.46
SCR	18025	Rev BB FP	141426.00	870.00	888.32	882.81	889.21	0.000556	7.57	18674.68	1611.77	0.39
SCR	17785	Rev BB FP	141426.00	868.00	887.90	882.80	889.03	0.000782	8.54	16558.68	1418.63	0.44
SCR	17510	Rev BB FP	141426.00	867.50	886.20	883.72	888.57	0.002372	12.34	11457.08	1289.70	0.73
SCR	17360	Rev BB FP	141426.00	866.50	883.43	883.43	887.88	0.004458	16.92	8357.42	937.14	1.00
SCR	17110	Rev BB FP	141426.00	864.00	881.13	881.13	884.63	0.004863	15.00	9425.53	1362.48	1.01
SCR	16970	Rev BB FP	141426.00	863.70	879.71	879.71	882.95	0.004916	14.43	9799.49	1514.81	1.00
SCR	16720	Rev BB FP	141426.00	863.50	875.31	875.31	878.43	0.005042	14.17	9981.85	1620.98	1.01
SCR	16515	Rev BB FP	141426.00	862.00	873.47	873.47	876.26	0.005133	13.41	10549.67	1886.90	1.00
SCR	16305	Rev BB FP	141426.00	860.00	871.57	871.17	874.03	0.004195	12.59	11236.89	1898.55	0.91
SCR	16130	Rev BB FP	141426.00	860.00	870.50	870.50	873.24	0.004481	13.29	10641.43	1964.99	1.01
SCR	15960	Rev BB FP	141426.00	859.00	869.21	869.21	871.76	0.004764	12.82	11034.61	2192.96	1.01
SCR	15745	Rev BB FP	141426.00	858.00	868.55	867.80	870.41	0.003042	10.94	12927.79	2278.92	0.81
SCR	15540	Rev BB FP	141426.00	857.50	868.10	867.08	869.78	0.002644	10.40	13602.23	2324.38	0.76
SCR	15335	Rev BB FP	141426.00	856.00	866.54	866.54	868.99	0.004652	12.57	11254.13	2302.38	1.00
SCR	15125	Rev BB FP	142475.00	854.00	864.54	864.54	867.47	0.004356	13.74	10371.47	1768.96	1.00
SCR	14900	Rev BB FP	142475.00	853.00	863.28	863.28	866.30	0.005056	13.96	10205.62	1697.82	1.00
SCR	14720	Rev BB FP	142475.00	852.00	862.06	862.06	864.98	0.004688	13.72	10381.85	1810.00	1.01
SCR	14480	Rev BB FP	142475.00	850.50	860.54	860.53	863.45	0.004424	13.69	10409.04	1796.48	1.00
SCR	14315	Rev BB FP	142475.00	850.00	859.85	859.82	862.67	0.004566	13.47	10576.74	1874.03	1.00
SCR	14090	Rev BB FP	142475.00	849.71	858.68	858.68	861.60	0.004613	13.72	10387.90	1766.91	1.00
SCR	13850	Rev BB FP	142475.00	848.00	857.12	857.12	860.09	0.004634	13.84	10293.87	1731.37	1.00
SCR	13635	Rev BB FP	142475.00	846.00	855.96	855.96	859.00	0.004582	13.99	10182.29	1687.45	1.00
SCR	13425	Rev BB FP	142475.00	845.00	854.59	854.59	857.38	0.004390	13.41	10627.77	1893.46	1.00
SCR	13190	Rev BB FP	142475.00	844.00	853.13	852.76	855.64	0.003872	12.71	11213.28	1844.92	0.91
SCR	13030	Rev BB FP	142475.00	843.00	852.67	851.98	855.02	0.003287	12.32	11565.85	1764.20	0.85
SCR	12835	Rev BB FP	142475.00	842.00	852.13	851.03	854.41	0.002756	12.10	11770.00	1607.56	0.79
SCR	12615	Rev BB FP	142475.00	841.00	851.84	849.84	853.81	0.001933	11.27	12646.02	1470.54	0.68
SCR	12395	Rev BB FP	142475.00	840.00	851.49	849.20	853.39	0.001707	11.07	12874.21	1438.10	0.65
SCR	12195	Rev BB FP	142475.00	838.98	851.43	848.08	853.01	0.001240	10.08	14130.68	1388.77	0.56

HEC-RAS Plan: FinalEx025 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	11995	Rev BB FP	142475.00	837.00	850.69	848.07	852.68	0.001558	11.32	12590.58	1281.38	0.64
SCR	11780	Rev BB FP	142475.00	836.00	850.53	847.67	852.30	0.001399	10.65	13373.20	1402.92	0.61
SCR	11605	Rev BB FP	142475.00	835.50	849.74	847.20	851.99	0.001650	12.04	11832.96	1304.15	0.70
SCR	11405	Rev BB FP	142475.00	834.00	849.43	846.23	851.67	0.001422	12.02	11855.13	1132.15	0.65
SCR	11180	Rev BB FP	142475.00	833.00	847.64	845.64	851.13	0.002642	14.99	9504.91	868.52	0.80
SCR	11015	Rev BB FP	142475.00	831.50	844.84	844.84	850.40	0.003841	18.92	7530.61	680.33	1.00
SCR	10835	Rev BB FP	142475.00	831.00	843.79	843.79	848.64	0.003827	17.68	8059.61	834.48	1.00
SCR	10575	Rev BB FP	142475.00	830.00	840.17	840.17	844.13	0.004307	15.98	8918.16	1127.52	1.00
SCR	10390	Rev BB FP	142475.00	828.00	839.47	838.56	842.17	0.002692	13.18	10811.18	1390.10	0.83
SCR	10225	Rev BB FP	142475.00	827.50	838.21	838.21	841.57	0.004024	14.72	9676.62	1447.21	1.00
SCR	10000	Rev BB FP	142475.00	826.00	837.11	837.11	840.43	0.004013	14.62	9744.75	1487.06	1.01
SCR	9820	Rev BB FP	142475.00	824.00	835.35	835.35	838.82	0.004324	14.95	9530.31	1373.15	1.00
SCR	9595	Rev BB FP	142475.00	823.80	834.12	834.12	837.42	0.004911	14.58	9769.14	1619.44	1.00
SCR	9385	Rev BB FP	142475.00	823.00	833.11	833.11	836.03	0.005066	13.73	10378.48	1773.73	1.00
SCR	9220	Rev BB FP	142475.00	822.00	831.81	831.81	834.72	0.004539	13.68	10412.72	1813.72	1.01
SCR	9025	Rev BB FP	142475.00	821.00	830.41	830.41	833.36	0.004214	13.77	10347.97	1751.71	1.00

HEC-RAS Plan: Exist025 River: Reach #1 Reach: SCR Profile: Rev BB FP

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	46195	Rev BB FP	115111.00	1035.00	1053.14	1054.04	1060.43	0.005006	21.67	5313.11	452.97	1.11
SCR	46020	Rev BB FP	115111.00	1032.00	1050.08	1052.47	1059.13	0.008742	24.14	4768.34	520.89	1.41
SCR	45545	Rev BB FP	115111.00	1030.00	1049.23	1049.27	1055.65	0.004028	20.33	5661.33	446.68	1.01
SCR	45030	Rev BB FP	115111.00	1025.00	1041.51	1044.56	1052.09	0.010535	26.10	4410.21	492.54	1.54
SCR	44585	Rev BB FP	115111.00	1022.00	1043.05	1043.07	1048.75	0.004190	19.17	6004.20	531.91	1.01
SCR	44210	Rev BB FP	115111.00	1020.00	1035.36	1038.72	1045.99	0.009463	26.16	4399.47	452.62	1.48
SCR	43820	Rev BB FP	115111.00	1018.00	1037.47	1037.48	1043.62	0.004072	19.90	5785.33	476.53	1.01
SCR	43610	Rev BB FP	115111.00	1017.00	1030.80	1034.06	1041.87	0.010066	26.70	4311.38	450.58	1.52
SCR	43410	Rev BB FP	115111.00	1016.00	1027.33	1031.12	1039.61	0.011140	28.77	4308.74	583.44	1.61
SCR	43200	Rev BB FP	115111.00	1014.00	1026.42	1029.64	1036.81	0.010596	26.11	4615.54	689.15	1.54
SCR	42975	Rev BB FP	115111.00	1012.00	1022.84	1026.28	1033.82	0.016328	26.63	4368.50	735.12	1.82
SCR	42815	Rev BB FP	115111.00	1011.00	1021.61	1024.35	1030.50	0.016385	24.07	4833.92	878.46	1.78
SCR	42590	Rev BB FP	115111.00	1010.00	1018.93	1021.36	1026.81	0.014228	22.59	5182.81	1023.20	1.67
SCR	42430	Rev BB FP	115111.00	1008.00	1017.64	1019.62	1024.35	0.011522	20.83	5543.00	940.48	1.51
SCR	42215	Rev BB FP	115111.00	1006.00	1020.27	1017.68	1021.96	0.001717	10.44	11089.91	1310.38	0.62
SCR	41940	Rev BB FP	115111.00	1005.00	1019.29	1017.71	1021.37	0.002407	11.57	9983.36	1321.54	0.72
SCR	41730	Rev BB FP	115111.00	1004.00	1018.72	1016.50	1020.86	0.002272	11.75	9825.95	1229.51	0.71
SCR	41460	Rev BB FP	115111.00	1002.00	1018.21	1015.19	1020.27	0.002042	11.52	10032.38	1329.00	0.68
SCR	41280	Rev BB FP	115111.00	1001.00	1015.33	1015.33	1019.53	0.004491	16.45	7022.85	852.07	1.00
SCR	41080	Rev BB FP	115111.00	1000.00	1012.07	1013.56	1018.19	0.007468	19.90	5831.66	874.23	1.27
SCR	40825	Rev BB FP	115111.00	999.50	1010.96	1012.05	1016.00	0.007253	18.03	6438.62	1039.92	1.22
SCR	40585	Rev BB FP	115111.00	998.00	1009.71	1010.43	1014.18	0.006366	16.97	6789.33	1005.89	1.15
SCR	40335	Rev BB FP	115111.00	996.00	1010.45	1008.78	1012.35	0.002164	11.11	10609.98	1504.81	0.69
SCR	40130	Rev BB FP	115111.00	995.00	1010.11	1008.56	1011.91	0.001844	11.15	11289.76	1636.51	0.65
SCR	39945	Rev BB FP	115111.00	994.00	1010.06	1007.77	1011.51	0.001383	10.26	12565.23	1648.10	0.57
SCR	39755	Rev BB FP	115111.00	994.00	1007.49	1007.49	1010.91	0.003380	15.35	8268.30	1251.38	0.88
SCR	39605	Rev BB FP	115111.00	993.00	1004.42	1005.91	1010.00	0.006738	19.35	6391.72	1100.64	1.21
SCR	39310	Rev BB FP	115111.00	992.00	1004.42	1004.43	1007.98	0.003512	16.00	8178.22	1204.45	0.90
SCR	39100	Rev BB FP	115111.00	990.00	1004.09	1002.13	1006.32	0.001898	12.37	10137.42	1294.76	0.67
SCR	38925	Rev BB FP	115111.00	989.50	1003.99	1001.39	1005.92	0.001609	11.40	10622.64	1181.25	0.62
SCR	38710	Rev BB FP	115111.00	988.00	1003.86	1000.10	1005.55	0.001174	10.64	11255.51	1043.10	0.54
SCR	38475	Rev BB FP	115111.00	986.00	999.95	999.95	1004.77	0.004258	17.75	6650.60	755.44	1.00
SCR	38300	Rev BB FP	115111.00	985.50	995.32	997.52	1003.33	0.010251	22.72	5066.81	688.08	1.48
SCR	38065	Rev BB FP	115111.00	984.00	998.22	995.71	1001.30	0.002055	14.10	8164.12	678.33	0.72
SCR	37810	Rev BB FP	115111.00	983.00	995.23	995.23	1000.37	0.004288	18.18	6332.08	622.26	1.00
SCR	37655	Rev BB FP	115111.00	982.00	992.29	994.08	999.27	0.008545	21.19	5432.74	735.92	1.37
SCR	37390	Rev BB FP	115111.00	981.00	987.15	989.88	996.01	0.016577	23.93	4834.54	892.17	1.79
SCR	37135	Rev BB FP	115111.00	980.00	987.96	988.63	992.27	0.005950	17.03	6995.53	1088.87	1.12
SCR	36930	Rev BB FP	115111.00	978.00	985.90	987.06	990.89	0.006968	18.32	6620.06	1112.00	1.22
SCR	36735	Rev BB FP	115111.00	977.00	986.56	986.56	989.87	0.003887	15.01	8085.46	1195.65	0.95
SCR	36515	Rev BB FP	115111.00	975.00	984.57	985.42	988.79	0.005510	16.72	7222.58	1306.12	1.15
SCR	36265	Rev BB FP	115111.00	974.00	985.18	984.77	987.82	0.003461	13.04	8831.00	1373.13	0.91
SCR	36080	Rev BB FP	116236.00	973.00	984.66	984.08	987.09	0.003700	12.52	9300.75	1455.39	0.87
SCR	35845	Rev BB FP	116236.00	971.00	984.52	982.90	986.31	0.001825	10.87	11007.98	1496.24	0.68
SCR	35725	Rev BB FP	116236.00	970.00	982.95	982.95	985.91	0.003125	14.70	9008.65	1431.18	0.89
SCR	35515	Rev BB FP	116236.00	969.00	980.94	981.76	985.02	0.004605	17.09	7764.83	1353.35	1.05
SCR	35245	Rev BB FP	116236.00	968.00	980.49	980.49	983.46	0.003192	14.46	8982.03	1555.54	0.88
SCR	35040	Rev BB FP	116236.00	967.00	977.69	978.97	982.44	0.005403	19.45	7455.95	1355.85	1.12
SCR	34860	Rev BB FP	116236.00	966.00	976.05	977.44	981.12	0.008289	18.06	6434.79	1338.93	1.45
SCR	34720	Rev BB FP	116236.00	965.50	974.77	976.17	979.89	0.008895	18.15	6402.85	1411.51	1.50
SCR	34495	Rev BB FP	116236.00	964.00	972.85	974.28	977.92	0.008678	18.08	6430.24	1277.15	1.42
SCR	34310	Rev BB FP	116236.00	963.00	971.99	973.01	976.49	0.005449	17.60	7261.34	1280.76	1.11
SCR	34090	Rev BB FP	116236.00	962.00	970.59	971.64	975.16	0.006767	17.15	6777.33	1267.83	1.31
SCR	33880	Rev BB FP	116236.00	960.00	969.84	970.46	973.69	0.005376	15.75	7378.62	1310.60	1.17
SCR	33710	Rev BB FP	116236.00	959.00	968.38	969.29	972.62	0.006666	16.53	7033.51	1355.12	1.28
SCR	33500	Rev BB FP	116236.00	958.00	967.50	968.41	971.14	0.005805	15.77	7888.10	1474.27	1.09
SCR	33310	Rev BB FP	116236.00	957.00	966.06	967.01	969.97	0.006404	15.86	7329.57	1744.50	1.36
SCR	33115	Rev BB FP	116236.00	956.00	964.72	965.60	968.46	0.008533	15.52	7488.40	1573.15	1.25
SCR	32795	Rev BB FP	116236.00	954.00	964.95	964.63	967.26	0.003022	12.20	9528.82	1732.86	0.92
SCR	32605	Rev BB FP	116236.00	952.00	963.45	963.45	966.51	0.004030	14.05	8272.67	1344.60	1.00
SCR	32265	Rev BB FP	140776.00	950.00	960.23	961.30	964.55	0.007315	16.68	8441.17	1829.94	1.37
SCR	31875	Rev BB FP	140776.00	949.00	960.00	960.00	961.85	0.003638	10.91	12908.13	2482.20	0.84
SCR	31585	Rev BB FP	140776.00	946.00	955.82	956.99	960.09	0.008524	16.58	8491.87	2120.30	1.46
SCR	31360	Rev BB FP	140776.00	944.00	957.86	955.39	959.33	0.001452	9.77	14613.64	1884.43	0.60
SCR	31060	Rev BB FP	140776.00	942.00	957.92	953.29	958.88	0.000719	7.87	17898.38	1711.46	0.43
SCR	30720	Rev BB FP	140776.00	940.00	957.97	951.33	958.60	0.000397	6.40	22006.92	1891.72	0.33
SCR	30445	Rev BB FP	140776.00	938.00	957.92	949.57	958.49	0.000300	6.03	23359.04	1783.69	0.29
SCR	30095	Rev BB FP	140776.00	936.00	957.70	947.93	958.38	0.000278	6.61	21917.00	1730.34	0.28
SCR	29815	Rev BB FP	140776.00	935.00	957.38	948.10	958.27	0.000356	7.69	19642.02	1675.19	0.32
SCR	29565	Rev BB FP	140776.00	934.00	957.34	947.27	958.16	0.000326	7.37	20205.72	1717.44	0.32
SCR	29385	Rev BB FP	140776.00	933.00	956.99	948.97	958.07	0.000447	8.49	18042.34	1675.09	0.37
SCR	29140	Rev BB FP	140776.00	932.00	956.33	950.98	957.88	0.000774	10.06	14550.84	1557.60	0.50
SCR	28895	Rev BB FP	140776.00	930.00	952.39	952.39	957.25	0.002389	19.66	9168.94	1062.28	0.82
SCR	28695	Rev BB FP	140776.00	928.00	943.96	947.96	955.72	0.008766	27.52	5115.18	544.92	1.58
SCR	28500	Rev BB FP	140776.00	927.50	941.05	945.12	953.77	0.010388	28.62	4919.56	503.65	1.61
SCR	28280	Rev BB FP	140776.00	926.00	937.77	941.83	951.33	0.011163	29.67	4853.18	549.28	1.63
SCR	28080	Rev BB FP	140776.00	925.00	936.42	940.05	948.69	0.011257	28.14	5027.76	547.57	1.61
SCR	27925	Rev BB FP	140776.00	924.00	941.45	939.47	946.43	0.002376	17.95	7989.60	612.66	0.80

HEC-RAS Plan: Exist025 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	27725	Rev BB FP	140776.00	923.00	939.31	939.31	945.73	0.003230	20.54	7126.85	587.11	0.93
SCR	27545	Rev BB FP	140776.00	922.00	935.22	937.81	944.62	0.006843	24.72	5836.41	613.02	1.30
SCR	27335	Rev BB FP	140776.00	921.00	932.95	936.26	942.99	0.008302	25.48	5614.41	691.02	1.43
SCR	27155	Rev BB FP	140776.00	920.50	933.67	935.89	940.99	0.005311	22.28	6835.79	856.59	1.15
SCR	26990	Rev BB FP	140776.00	920.00	931.16	933.85	939.67	0.010073	23.47	6088.49	1008.19	1.60
SCR	26780	Rev BB FP	140776.00	918.00	929.02	931.73	937.60	0.009537	23.94	6335.41	1131.68	1.49
SCR	26575	Rev BB FP	140776.00	917.00	928.01	929.98	934.86	0.012746	21.01	6701.47	1216.43	1.57
SCR	26355	Rev BB FP	140776.00	916.00	929.42	929.42	933.07	0.003461	15.83	9559.47	1282.38	0.93
SCR	26170	Rev BB FP	140776.00	915.00	927.98	928.71	932.32	0.003988	17.96	9212.09	1347.94	0.97
SCR	25965	Rev BB FP	140776.00	914.00	927.00	927.74	931.48	0.004061	17.92	8960.72	1288.34	0.98
SCR	25785	Rev BB FP	140776.00	913.50	925.20	926.55	930.53	0.005499	19.54	8264.34	1336.94	1.12
SCR	25600	Rev BB FP	140776.00	912.50	923.79	925.47	929.42	0.006077	20.55	8274.40	1596.52	1.22
SCR	25425	Rev BB FP	140776.00	911.00	922.33	924.23	928.17	0.007953	20.02	7791.92	1773.81	1.45
SCR	25215	Rev BB FP	140776.00	910.00	923.61	923.61	926.64	0.003392	14.51	10667.78	1748.60	0.91
SCR	25000	Rev BB FP	140776.00	909.00	921.22	922.50	925.58	0.005503	17.42	9139.37	2103.24	1.17
SCR	24795	Rev BB FP	140776.00	908.00	919.43	920.87	924.26	0.006914	18.97	9060.11	2311.66	1.32
SCR	24550	Rev BB FP	140776.00	906.00	916.77	918.41	922.31	0.009115	21.33	8402.41	2227.03	1.61
SCR	24335	Rev BB FP	140776.00	905.00	918.13	918.13	920.69	0.003234	14.49	11895.55	2089.54	0.88
SCR	24115	Rev BB FP	140776.00	904.00	915.09	916.28	919.48	0.007920	18.83	9045.64	2015.76	1.28
SCR	23975	Rev BB FP	140776.00	903.50	913.66	914.88	918.15	0.008173	19.03	8772.57	1913.65	1.36
SCR	23755	Rev BB FP	140776.00	902.00	912.91	913.54	916.35	0.005642	16.73	9905.28	1935.37	1.16
SCR	23565	Rev BB FP	140776.00	900.00	912.71	912.71	915.32	0.003871	14.47	11321.84	2039.50	0.98
SCR	23365	Rev BB FP	140776.00	900.00	910.76	911.37	914.32	0.005655	17.04	9677.26	1781.35	1.14
SCR	23180	Rev BB FP	140776.00	899.00	910.83	909.87	912.71	0.002065	13.16	13743.03	2084.20	0.71
SCR	23000	Rev BB FP	140776.00	898.00	911.00	908.40	912.22	0.001301	8.88	15943.92	2069.07	0.55
SCR	22790	Rev BB FP	140776.00	897.50	910.57	908.15	911.92	0.001363	9.35	15109.43	1949.00	0.58
SCR	22600	Rev BB FP	140776.00	896.00	910.06	907.78	911.63	0.001473	11.36	14637.21	1865.20	0.62
SCR	22415	Rev BB FP	140776.00	895.50	909.56	907.11	911.33	0.001596	11.77	13743.30	1705.56	0.65
SCR	22195	Rev BB FP	141426.00	894.00	907.70	906.79	910.76	0.002704	14.10	10265.56	1322.24	0.83
SCR	22010	Rev BB FP	141426.00	892.00	906.38	906.38	910.15	0.003030	15.99	9665.26	1328.02	0.87
SCR	21790	Rev BB FP	141426.00	891.50	903.07	904.87	909.03	0.005884	19.68	7429.43	1145.70	1.16
SCR	21615	Rev BB FP	141426.00	892.00	900.50	903.04	907.59	0.010112	21.40	6678.16	1161.25	1.52
SCR	21440	Rev BB FP	141426.00	890.00	899.69	901.59	905.74	0.007634	20.12	7633.81	1574.63	1.29
SCR	21225	Rev BB FP	141426.00	888.00	898.62	900.27	903.89	0.007531	19.45	8509.78	2217.71	1.27
SCR	21020	Rev BB FP	141426.00	887.00	895.89	897.85	902.14	0.008670	20.80	7679.38	1676.42	1.37
SCR	20845	Rev BB FP	141426.00	886.00	896.38	897.38	900.20	0.005510	17.07	9870.72	2369.34	1.13
SCR	20595	Rev BB FP	141426.00	885.00	895.93	896.42	898.91	0.003386	15.17	11611.25	2463.72	0.88
SCR	20435	Rev BB FP	141426.00	884.00	896.23	895.77	898.29	0.002186	12.93	13821.87	2582.65	0.72
SCR	20280	Rev BB FP	141426.00	883.70	895.55	895.55	897.86	0.002944	13.96	13014.40	2589.59	0.82
SCR	20070	Rev BB FP	141426.00	882.00	891.22	893.00	896.57	0.008994	20.19	8211.27	1767.50	1.37
SCR	19855	Rev BB FP	141426.00	880.50	890.43	891.49	894.67	0.005944	17.83	9393.73	1975.10	1.14
SCR	19630	Rev BB FP	141426.00	880.00	888.94	890.05	893.30	0.006239	17.86	9074.12	1836.22	1.18
SCR	19440	Rev BB FP	141426.00	878.00	890.13	889.11	892.07	0.001973	11.94	13611.33	2095.28	0.70
SCR	19240	Rev BB FP	141426.00	877.50	888.88	888.88	891.51	0.003097	13.92	11714.43	2091.68	0.88
SCR	19050	Rev BB FP	141426.00	876.00	888.85	887.51	890.49	0.001803	10.96	14382.18	2160.84	0.67
SCR	18830	Rev BB FP	141426.00	874.00	888.56	886.80	890.10	0.001579	10.67	14781.82	2094.37	0.64
SCR	18650	Rev BB FP	141426.00	873.50	888.48	886.00	889.80	0.001087	9.89	16256.74	2022.74	0.53
SCR	18475	Rev BB FP	141426.00	872.00	888.57	884.72	889.53	0.000774	8.07	18194.47	1944.40	0.45
SCR	18290	Rev BB FP	141426.00	871.50	888.27	884.54	889.37	0.000832	8.69	17186.39	1843.67	0.47
SCR	18025	Rev BB FP	141426.00	870.00	888.21	882.91	889.13	0.000573	7.83	18485.26	1610.91	0.40
SCR	17785	Rev BB FP	141426.00	868.00	887.78	882.81	888.95	0.000788	8.71	16382.46	1417.47	0.44
SCR	17510	Rev BB FP	141426.00	867.50	885.46	883.72	888.44	0.001981	13.95	10512.58	1243.63	0.75
SCR	17360	Rev BB FP	141426.00	866.50	883.40	883.40	887.90	0.003623	17.03	8326.59	936.59	1.00
SCR	17110	Rev BB FP	141426.00	864.00	879.37	881.59	886.46	0.006287	21.70	7106.91	1274.30	1.26
SCR	16970	Rev BB FP	141426.00	863.70	877.33	880.05	885.35	0.008185	22.92	6449.08	1125.59	1.47
SCR	16720	Rev BB FP	141426.00	863.50	872.47	875.45	882.24	0.018432	25.15	5735.17	1404.63	2.00
SCR	16515	Rev BB FP	141426.00	862.00	871.52	873.72	878.33	0.012326	21.45	7010.27	1622.64	1.67
SCR	16305	Rev BB FP	141426.00	860.00	869.61	871.44	875.64	0.011136	21.47	7604.36	1812.82	1.64
SCR	16130	Rev BB FP	141426.00	860.00	870.19	870.71	873.47	0.005291	16.06	10039.66	1945.14	1.17
SCR	15960	Rev BB FP	141426.00	859.00	868.27	869.21	872.12	0.010630	15.80	8986.11	2180.88	1.37
SCR	15745	Rev BB FP	141426.00	858.00	868.57	867.78	870.42	0.002999	10.93	12967.71	2278.98	0.82
SCR	15540	Rev BB FP	141426.00	857.50	868.06	867.17	869.80	0.002688	11.03	13523.49	2324.20	0.78
SCR	15335	Rev BB FP	141426.00	856.00	866.50	866.50	869.00	0.004731	12.68	11164.20	2302.06	1.01
SCR	15125	Rev BB FP	142475.00	854.00	863.64	864.54	867.69	0.006528	16.15	8838.57	1618.47	1.21
SCR	14900	Rev BB FP	142475.00	853.00	863.42	863.42	866.43	0.004130	14.54	10443.91	1704.50	0.99
SCR	14720	Rev BB FP	142475.00	852.00	861.25	862.19	865.34	0.007984	16.84	8931.26	1763.49	1.25
SCR	14480	Rev BB FP	142475.00	850.50	860.73	860.73	863.62	0.004264	14.25	10759.99	1801.68	0.95
SCR	14315	Rev BB FP	142475.00	850.00	859.35	859.82	862.74	0.006080	14.79	9631.06	1868.05	1.15
SCR	14090	Rev BB FP	142475.00	849.71	858.67	858.67	861.61	0.004639	13.75	10362.56	1766.78	1.00
SCR	13850	Rev BB FP	142475.00	848.00	856.44	857.11	860.23	0.006745	15.61	9128.71	1727.26	1.20
SCR	13635	Rev BB FP	142475.00	846.00	856.32	856.32	859.30	0.003797	15.41	10784.75	1691.89	0.92
SCR	13425	Rev BB FP	142475.00	845.00	853.32	854.58	857.95	0.009231	17.28	8245.16	1854.35	1.44
SCR	13190	Rev BB FP	142475.00	844.00	853.50	852.81	855.77	0.003210	12.22	11882.13	1847.29	0.83
SCR	13030	Rev BB FP	142475.00	843.00	852.58	852.27	855.21	0.003375	14.20	11409.44	1763.01	0.87
SCR	12835	Rev BB FP	142475.00	842.00	852.13	851.23	854.54	0.002745	13.33	11764.70	1607.52	0.79
SCR	12615	Rev BB FP	142475.00	841.00	851.89	850.08	853.94	0.001885	12.39	12717.39	1471.01	0.67
SCR	12395	Rev BB FP	142475.00	840.00	851.51	849.52	853.56	0.001691	12.30	12903.96	1438.40	0.65
SCR	12195	Rev BB FP	142475.00	838.98	851.52	848.24	853.15	0.001176	10.57	14261.92	1389.31	0.54

HEC-RAS Plan: Exist025 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	11995	Rev BB FP	142475.00	837.00	850.66	848.45	852.83	0.001570	12.69	12550.93	1281.09	0.63
SCR	11780	Rev BB FP	142475.00	836.00	850.43	848.15	852.47	0.001415	12.50	13224.83	1400.85	0.61
SCR	11605	Rev BB FP	142475.00	835.50	849.24	847.41	852.11	0.001889	14.05	11187.38	1282.91	0.70
SCR	11405	Rev BB FP	142475.00	834.00	849.07	846.17	851.69	0.001520	13.18	11445.85	1130.21	0.64
SCR	11180	Rev BB FP	142475.00	833.00	846.89	845.65	851.10	0.002564	16.60	8864.64	835.68	0.82
SCR	11015	Rev BB FP	142475.00	831.50	844.78	844.78	850.43	0.003842	19.08	7493.10	679.39	0.99
SCR	10835	Rev BB FP	142475.00	831.00	841.87	843.71	849.32	0.007252	21.91	6502.00	790.38	1.35
SCR	10575	Rev BB FP	142475.00	830.00	837.48	840.15	846.52	0.015561	24.13	5904.16	1108.84	1.84
SCR	10390	Rev BB FP	142475.00	828.00	836.77	839.07	843.84	0.008394	22.72	7222.47	1247.06	1.37
SCR	10225	Rev BB FP	142475.00	827.50	837.04	837.97	841.97	0.006870	17.83	8045.11	1373.79	1.26
SCR	10000	Rev BB FP	142475.00	826.00	837.14	837.14	840.54	0.003943	14.90	9785.52	1488.00	0.96
SCR	9820	Rev BB FP	142475.00	824.00	833.97	835.33	839.34	0.008494	18.59	7663.39	1336.56	1.37
SCR	9595	Rev BB FP	142475.00	823.80	834.13	834.13	837.42	0.004885	14.56	9782.42	1619.67	1.00
SCR	9385	Rev BB FP	142475.00	823.00	832.49	833.19	836.23	0.006100	15.78	9290.53	1770.37	1.19
SCR	9220	Rev BB FP	142475.00	822.00	830.86	831.81	835.03	0.007826	16.39	8703.86	1771.40	1.29
SCR	9025	Rev BB FP	142475.00	821.00	829.91	830.57	833.69	0.005308	15.90	9468.27	1736.85	1.09

HEC-RAS Plan: Exist085 River: Reach #1 Reach: SCR Profile: Rev BB FP

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	46195	Rev BB FP	115111.00	1035.00	1063.12	1054.04	1064.77	0.006261	10.67	11871.29	750.83	0.40
SCR	46020	Rev BB FP	115111.00	1032.00	1062.02	1052.44	1063.64	0.006544	10.21	11277.79	570.22	0.40
SCR	45545	Rev BB FP	115111.00	1030.00	1057.85	1049.24	1059.95	0.008982	11.63	9899.97	524.21	0.47
SCR	45030	Rev BB FP	115111.00	1025.00	1054.23	1044.56	1055.89	0.006629	10.33	11145.02	557.97	0.41
SCR	44585	Rev BB FP	115111.00	1022.00	1050.60	1043.05	1052.39	0.009283	10.74	10717.84	654.38	0.47
SCR	44210	Rev BB FP	115111.00	1020.00	1047.82	1038.72	1049.37	0.006715	9.97	11549.51	619.95	0.41
SCR	43820	Rev BB FP	115111.00	1018.00	1042.08	1037.47	1045.21	0.017543	14.19	8110.90	528.66	0.64
SCR	43610	Rev BB FP	115111.00	1017.00	1038.23	1034.06	1041.46	0.018865	14.41	7990.36	536.80	0.66
SCR	43410	Rev BB FP	115111.00	1016.00	1035.79	1031.12	1038.20	0.012067	13.28	9810.14	728.75	0.55
SCR	43200	Rev BB FP	115111.00	1014.00	1033.10	1029.61	1035.55	0.014949	13.11	9560.66	778.14	0.59
SCR	42975	Rev BB FP	115111.00	1012.00	1030.64	1026.26	1032.42	0.011936	11.00	11112.26	949.35	0.52
SCR	42815	Rev BB FP	115111.00	1011.00	1029.16	1024.33	1030.46	0.009556	9.36	12874.92	1127.61	0.46
SCR	42590	Rev BB FP	115111.00	1010.00	1027.80	1021.36	1028.70	0.005956	7.80	15371.44	1205.17	0.37
SCR	42430	Rev BB FP	115111.00	1008.00	1026.93	1019.62	1027.77	0.005204	7.44	16206.52	1593.65	0.35
SCR	42215	Rev BB FP	115111.00	1006.00	1026.19	1017.68	1026.77	0.003645	6.26	20044.60	1904.81	0.29
SCR	41940	Rev BB FP	115111.00	1005.00	1025.09	1017.71	1025.71	0.004124	6.42	19333.12	2049.42	0.31
SCR	41730	Rev BB FP	115111.00	1004.00	1024.06	1016.50	1024.77	0.004683	6.87	18440.44	2164.96	0.33
SCR	41460	Rev BB FP	115111.00	1002.00	1022.64	1015.18	1023.41	0.005518	7.24	17710.12	2183.35	0.35
SCR	41280	Rev BB FP	115111.00	1001.00	1021.22	1015.33	1022.26	0.007076	8.63	16094.58	2294.98	0.40
SCR	41080	Rev BB FP	115111.00	1000.00	1019.74	1013.55	1020.85	0.006827	8.89	15634.13	2172.37	0.40
SCR	40825	Rev BB FP	115111.00	999.50	1018.37	1012.05	1019.19	0.005782	7.57	17645.24	2239.26	0.36
SCR	40585	Rev BB FP	115111.00	998.00	1017.08	1010.42	1017.84	0.005226	7.28	17989.01	2061.94	0.34
SCR	40335	Rev BB FP	115111.00	996.00	1016.13	1008.78	1016.69	0.003834	6.20	20457.69	2218.13	0.29
SCR	40130	Rev BB FP	115111.00	995.00	1015.32	1008.56	1015.88	0.003905	6.45	20672.41	2115.35	0.30
SCR	39945	Rev BB FP	115111.00	994.00	1014.62	1007.77	1015.16	0.003858	6.47	20759.36	2018.84	0.30
SCR	39755	Rev BB FP	115111.00	994.00	1013.33	1007.49	1014.22	0.005833	8.18	16831.67	1788.58	0.37
SCR	39605	Rev BB FP	115111.00	993.00	1012.55	1005.91	1013.37	0.005051	7.89	17084.59	1638.17	0.35
SCR	39310	Rev BB FP	115111.00	992.00	1011.07	1004.44	1011.82	0.004731	7.73	18174.40	1730.23	0.34
SCR	39100	Rev BB FP	115111.00	990.00	1010.28	1002.13	1010.91	0.003664	6.80	19174.54	1585.97	0.30
SCR	38925	Rev BB FP	115111.00	989.50	1009.52	1001.39	1010.21	0.004043	6.99	18003.52	1446.05	0.31
SCR	38710	Rev BB FP	115111.00	988.00	1008.51	1000.08	1009.31	0.004299	7.44	16801.26	1304.10	0.32
SCR	38475	Rev BB FP	115111.00	986.00	1006.48	999.95	1007.90	0.007873	9.88	12669.19	1018.58	0.43
SCR	38300	Rev BB FP	115111.00	985.50	1005.29	997.52	1006.56	0.006503	9.17	13133.02	960.65	0.40
SCR	38065	Rev BB FP	115111.00	984.00	1003.52	995.71	1004.95	0.007045	9.63	12273.74	874.51	0.41
SCR	37810	Rev BB FP	115111.00	983.00	1000.30	995.23	1002.47	0.012995	11.87	9947.29	823.90	0.55
SCR	37655	Rev BB FP	115111.00	982.00	998.34	994.09	1000.34	0.013555	11.43	10339.29	894.21	0.55
SCR	37390	Rev BB FP	115111.00	981.00	996.69	989.88	997.72	0.006129	8.27	14332.26	1035.91	0.38
SCR	37135	Rev BB FP	115111.00	980.00	995.19	988.63	996.12	0.005987	7.92	14972.85	1117.41	0.37
SCR	36930	Rev BB FP	115111.00	978.00	994.19	987.06	995.00	0.004805	7.46	16289.70	1209.91	0.34
SCR	36735	Rev BB FP	115111.00	977.00	993.22	986.56	994.02	0.005066	7.43	16245.29	1249.96	0.35
SCR	36515	Rev BB FP	115111.00	975.00	992.29	985.40	992.98	0.004355	6.91	17517.05	1353.36	0.32
SCR	36265	Rev BB FP	115111.00	974.00	991.10	984.77	991.81	0.005105	6.78	16998.81	1387.76	0.34
SCR	36080	Rev BB FP	116236.00	973.00	990.12	984.08	990.82	0.005500	6.74	17361.72	1498.29	0.34
SCR	35845	Rev BB FP	116236.00	971.00	988.91	982.89	989.59	0.004952	6.77	17844.10	1607.80	0.34
SCR	35725	Rev BB FP	116236.00	970.00	988.13	982.95	988.93	0.005766	7.75	16788.09	1538.48	0.37
SCR	35515	Rev BB FP	116236.00	969.00	986.78	981.76	987.67	0.006368	8.25	16123.33	1500.16	0.39
SCR	35245	Rev BB FP	116236.00	968.00	984.99	980.49	985.88	0.006898	8.13	16034.87	1580.23	0.40
SCR	35040	Rev BB FP	116236.00	967.00	983.56	978.97	984.47	0.006715	8.80	15960.86	1491.62	0.40
SCR	34860	Rev BB FP	116236.00	966.00	982.28	977.44	983.21	0.007849	7.71	15078.16	1431.69	0.42
SCR	34720	Rev BB FP	116236.00	965.50	981.27	976.17	982.13	0.007058	7.40	15699.07	1450.12	0.40
SCR	34495	Rev BB FP	116236.00	964.00	979.81	974.28	980.61	0.006439	7.20	16154.47	1462.53	0.38
SCR	34310	Rev BB FP	116236.00	963.00	978.54	973.01	979.43	0.006027	8.07	15893.00	1355.84	0.37
SCR	34090	Rev BB FP	116236.00	962.00	977.14	971.64	978.04	0.006788	7.61	15265.48	1316.20	0.39
SCR	33880	Rev BB FP	116236.00	960.00	975.73	970.46	976.59	0.006962	7.46	15582.75	1451.55	0.40
SCR	33710	Rev BB FP	116236.00	959.00	974.64	969.23	975.40	0.006435	6.97	16665.52	1616.75	0.38
SCR	33500	Rev BB FP	116236.00	958.00	973.40	968.41	974.09	0.005844	7.08	17819.12	1720.16	0.36
SCR	33310	Rev BB FP	116236.00	957.00	972.42	967.01	973.03	0.005153	6.27	18547.85	1783.33	0.34
SCR	33115	Rev BB FP	116236.00	956.00	971.47	965.60	972.01	0.004945	5.92	19667.02	1895.57	0.32
SCR	32795	Rev BB FP	116236.00	954.00	969.69	964.63	970.32	0.005717	6.40	18225.40	1917.68	0.36
SCR	32605	Rev BB FP	116236.00	952.00	968.69	963.45	969.24	0.005196	6.07	20132.55	2407.26	0.34
SCR	32265	Rev BB FP	140776.00	950.00	967.14	961.37	967.61	0.004485	5.50	25619.94	2839.88	0.32
SCR	31875	Rev BB FP	140776.00	949.00	965.55	960.00	965.98	0.003821	5.24	27028.75	2630.09	0.28
SCR	31585	Rev BB FP	140776.00	946.00	964.67	956.96	965.05	0.002681	4.95	28485.89	2405.38	0.25
SCR	31360	Rev BB FP	140776.00	944.00	963.99	955.41	964.44	0.002664	5.44	26576.91	1962.49	0.25
SCR	31060	Rev BB FP	140776.00	942.00	963.32	953.29	963.71	0.002122	5.02	28168.09	2195.09	0.24
SCR	30720	Rev BB FP	140776.00	940.00	962.76	951.33	963.08	0.001535	4.52	31325.84	2122.23	0.20
SCR	30445	Rev BB FP	140776.00	938.00	962.37	949.57	962.68	0.001361	4.49	32047.45	2314.72	0.19
SCR	30095	Rev BB FP	140776.00	936.00	961.79	947.93	962.18	0.001460	5.12	30221.52	2339.56	0.20
SCR	29815	Rev BB FP	140776.00	935.00	961.20	948.10	961.71	0.001932	5.96	27202.58	2243.56	0.23
SCR	29565	Rev BB FP	140776.00	934.00	960.71	947.27	961.22	0.001942	5.88	26958.88	2280.34	0.23
SCR	29385	Rev BB FP	140776.00	933.00	960.13	948.97	960.79	0.002694	6.78	24110.69	2215.01	0.27
SCR	29140	Rev BB FP	140776.00	932.00	958.97	950.98	959.94	0.004808	8.05	19093.65	1894.25	0.36
SCR	28895	Rev BB FP	140776.00	930.00	955.75	952.39	958.06	0.011883	14.28	13601.27	1544.41	0.55
SCR	28695	Rev BB FP	140776.00	928.00	954.27	947.96	955.72	0.009038	9.67	14565.01	1446.39	0.54
SCR	28500	Rev BB FP	140776.00	927.50	952.08	945.08	953.95	0.008598	11.42	14381.67	1474.34	0.47
SCR	28280	Rev BB FP	140776.00	926.00	950.52	941.85	952.30	0.006462	11.35	15008.82	1365.30	0.42
SCR	28080	Rev BB FP	140776.00	925.00	949.28	940.04	951.00	0.006263	10.94	14982.78	1251.50	0.41
SCR	27925	Rev BB FP	140776.00	924.00	947.70	939.47	949.86	0.007984	12.13	13253.13	1194.87	0.46

HEC-RAS Plan: Exist085 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	27725	Rev BB FP	140776.00	923.00	945.26	939.31	947.94	0.010900	13.69	11869.05	1095.99	0.53
SCR	27545	Rev BB FP	140776.00	922.00	943.64	937.81	945.96	0.010086	12.76	12472.57	1144.65	0.51
SCR	27335	Rev BB FP	140776.00	921.00	942.09	936.26	943.91	0.008367	11.43	13966.56	1090.51	0.46
SCR	27155	Rev BB FP	140776.00	920.50	940.45	935.90	942.27	0.009256	11.73	14150.62	1201.24	0.48
SCR	26990	Rev BB FP	140776.00	920.00	939.34	933.85	940.67	0.008023	9.51	15709.68	1279.99	0.44
SCR	26780	Rev BB FP	140776.00	918.00	938.08	931.73	939.15	0.005879	8.93	17692.21	1339.59	0.38
SCR	26575	Rev BB FP	140776.00	917.00	936.99	929.98	937.93	0.005756	7.85	18224.55	1342.33	0.36
SCR	26355	Rev BB FP	140776.00	916.00	935.58	929.42	936.61	0.006173	8.54	17754.09	1376.67	0.39
SCR	26170	Rev BB FP	140776.00	915.00	934.47	928.71	935.49	0.006034	8.90	18074.60	1385.31	0.38
SCR	25965	Rev BB FP	140776.00	914.00	932.91	927.74	934.11	0.007349	9.58	16859.15	1407.92	0.42
SCR	25785	Rev BB FP	140776.00	913.50	931.49	926.55	932.67	0.007808	9.64	17323.82	1620.23	0.43
SCR	25600	Rev BB FP	140776.00	912.50	930.39	925.47	931.28	0.006236	8.59	19924.65	1924.40	0.39
SCR	25425	Rev BB FP	140776.00	911.00	929.54	924.28	930.20	0.005044	7.06	22168.16	2056.40	0.34
SCR	25215	Rev BB FP	140776.00	910.00	927.82	923.53	928.79	0.008126	8.48	18780.94	2121.76	0.43
SCR	25000	Rev BB FP	140776.00	909.00	926.32	922.50	927.11	0.006991	7.83	20977.36	2377.04	0.40
SCR	24795	Rev BB FP	140776.00	908.00	924.94	920.87	925.64	0.006301	7.42	21853.30	2329.84	0.38
SCR	24550	Rev BB FP	140776.00	906.00	923.85	918.41	924.38	0.004427	6.44	24258.73	2252.87	0.32
SCR	24335	Rev BB FP	140776.00	905.00	922.58	918.12	923.30	0.006264	7.63	21215.25	2105.65	0.38
SCR	24115	Rev BB FP	140776.00	904.00	921.37	916.28	922.04	0.005674	7.22	21770.86	2035.28	0.35
SCR	23975	Rev BB FP	140776.00	903.50	920.41	914.88	921.07	0.005319	7.00	21786.51	1940.51	0.35
SCR	23755	Rev BB FP	140776.00	902.00	919.31	913.54	919.93	0.004854	6.81	22570.77	2021.77	0.33
SCR	23565	Rev BB FP	140776.00	900.00	918.41	912.73	919.00	0.004714	6.64	23145.30	2111.49	0.33
SCR	23365	Rev BB FP	140776.00	900.00	917.59	911.37	918.13	0.004130	6.49	24160.49	2110.81	0.31
SCR	23180	Rev BB FP	140776.00	899.00	916.98	909.87	917.43	0.002980	6.28	26872.75	2188.46	0.27
SCR	23000	Rev BB FP	140776.00	898.00	916.50	908.40	916.91	0.002668	5.18	27717.50	2208.07	0.25
SCR	22790	Rev BB FP	140776.00	897.50	915.82	908.15	916.30	0.003103	5.58	25614.63	2052.66	0.27
SCR	22600	Rev BB FP	140776.00	896.00	915.10	907.78	915.65	0.003568	6.61	24212.95	1944.52	0.30
SCR	22415	Rev BB FP	140776.00	895.50	914.24	907.11	914.91	0.004404	7.19	22223.89	1868.49	0.33
SCR	22195	Rev BB FP	141426.00	894.00	912.53	906.79	913.67	0.007227	8.75	17295.44	1597.29	0.42
SCR	22010	Rev BB FP	141426.00	892.00	910.70	906.38	912.13	0.009118	10.16	15737.52	1819.81	0.47
SCR	21790	Rev BB FP	141426.00	891.50	908.38	904.87	909.95	0.010764	10.65	15383.26	2121.00	0.50
SCR	21615	Rev BB FP	141426.00	892.00	907.07	903.04	908.13	0.008280	8.76	18572.14	2207.92	0.44
SCR	21440	Rev BB FP	141426.00	890.00	905.72	901.59	906.68	0.007672	8.62	19330.02	2168.70	0.42
SCR	21225	Rev BB FP	141426.00	888.00	904.25	900.27	905.04	0.007187	8.16	22063.44	2868.73	0.40
SCR	21020	Rev BB FP	141426.00	887.00	903.17	897.78	903.78	0.004839	7.21	24970.26	2894.26	0.33
SCR	20845	Rev BB FP	141426.00	886.00	902.34	897.38	902.89	0.004944	6.90	25539.38	2955.11	0.34
SCR	20595	Rev BB FP	141426.00	885.00	901.14	896.42	901.71	0.004763	7.07	25535.02	2931.69	0.33
SCR	20435	Rev BB FP	141426.00	884.00	900.30	895.77	900.90	0.005083	7.27	24746.88	2825.53	0.34
SCR	20280	Rev BB FP	141426.00	883.70	899.33	895.55	899.99	0.006412	7.64	23039.58	2730.97	0.38
SCR	20070	Rev BB FP	141426.00	882.00	898.37	893.00	898.90	0.004321	6.63	25460.53	2597.82	0.31
SCR	19855	Rev BB FP	141426.00	880.50	897.57	891.50	898.03	0.003550	6.27	27221.95	2688.90	0.29
SCR	19630	Rev BB FP	141426.00	880.00	896.84	890.05	897.28	0.003165	6.01	28170.25	2778.54	0.27
SCR	19440	Rev BB FP	141426.00	878.00	896.29	889.11	896.70	0.002745	5.70	29140.07	2906.48	0.26
SCR	19240	Rev BB FP	141426.00	877.50	895.68	888.88	896.12	0.003010	5.84	27751.57	2599.60	0.27
SCR	19050	Rev BB FP	141426.00	876.00	895.20	887.51	895.59	0.002518	5.36	29006.32	2425.30	0.25
SCR	18830	Rev BB FP	141426.00	874.00	894.61	886.80	895.03	0.002641	5.53	27892.40	2225.08	0.25
SCR	18650	Rev BB FP	141426.00	873.50	894.15	886.00	894.58	0.002435	5.66	27923.98	2093.66	0.25
SCR	18475	Rev BB FP	141426.00	872.00	893.77	884.72	894.16	0.002201	5.13	28384.30	1978.73	0.23
SCR	18290	Rev BB FP	141426.00	871.50	893.26	884.54	893.72	0.002543	5.62	26476.96	1877.78	0.25
SCR	18025	Rev BB FP	141426.00	870.00	892.57	882.91	893.05	0.002398	5.66	25578.77	1642.50	0.25
SCR	17785	Rev BB FP	141426.00	868.00	891.70	882.82	892.35	0.003488	6.51	22017.32	1458.06	0.29
SCR	17510	Rev BB FP	141426.00	867.50	889.57	883.72	890.92	0.007690	9.58	15878.49	1354.91	0.44
SCR	17360	Rev BB FP	141426.00	866.50	887.45	883.40	889.41	0.012589	11.39	13139.27	1272.15	0.55
SCR	17110	Rev BB FP	141426.00	864.00	884.24	881.59	886.16	0.013233	11.94	13804.07	1428.48	0.56
SCR	16970	Rev BB FP	141426.00	863.70	881.85	880.06	883.98	0.016799	12.41	13059.54	1534.19	0.63
SCR	16720	Rev BB FP	141426.00	863.50	879.51	875.45	880.65	0.009318	8.94	17147.30	1726.61	0.46
SCR	16515	Rev BB FP	141426.00	862.00	878.00	873.72	878.88	0.007623	7.94	19233.76	1934.26	0.41
SCR	16305	Rev BB FP	141426.00	860.00	876.79	871.44	877.46	0.005570	7.17	22049.88	2111.77	0.36
SCR	16130	Rev BB FP	141426.00	860.00	875.68	870.71	876.37	0.006258	7.02	21366.03	2125.00	0.38
SCR	15960	Rev BB FP	141426.00	859.00	874.73	869.21	875.30	0.005341	6.12	23312.65	2250.07	0.33
SCR	15745	Rev BB FP	141426.00	858.00	873.76	867.77	874.26	0.004319	5.66	24841.35	2297.25	0.31
SCR	15540	Rev BB FP	141426.00	857.50	872.83	867.17	873.34	0.004545	5.91	24661.45	2348.37	0.32
SCR	15335	Rev BB FP	141426.00	856.00	871.75	866.50	872.32	0.005341	6.09	23340.41	2337.46	0.34
SCR	15125	Rev BB FP	142475.00	854.00	870.49	864.50	871.17	0.005517	6.68	21922.78	2195.20	0.35
SCR	14900	Rev BB FP	142475.00	853.00	869.11	863.42	869.84	0.006090	7.34	21835.14	2363.67	0.37
SCR	14720	Rev BB FP	142475.00	852.00	868.11	862.17	868.79	0.005661	7.00	22080.85	2123.96	0.35
SCR	14480	Rev BB FP	142475.00	850.50	866.84	860.73	867.50	0.005032	6.80	22113.92	1903.92	0.33
SCR	14315	Rev BB FP	142475.00	850.00	866.05	859.82	866.68	0.004845	6.37	22413.72	1938.14	0.33
SCR	14090	Rev BB FP	142475.00	849.71	864.84	858.67	865.53	0.005192	6.69	21422.24	1813.83	0.34
SCR	13850	Rev BB FP	142475.00	848.00	863.69	857.11	864.36	0.004758	6.57	21800.31	1769.55	0.33
SCR	13635	Rev BB FP	142475.00	846.00	862.65	856.32	863.33	0.004705	7.28	21990.27	1806.91	0.33
SCR	13425	Rev BB FP	142475.00	845.00	861.91	854.58	862.43	0.003526	5.80	24660.66	1936.16	0.28
SCR	13190	Rev BB FP	142475.00	844.00	861.23	852.81	861.68	0.002766	5.48	26772.91	2028.03	0.25
SCR	13030	Rev BB FP	142475.00	843.00	860.75	852.27	861.22	0.002892	6.09	26656.37	2060.86	0.26
SCR	12835	Rev BB FP	142475.00	842.00	860.14	851.23	860.64	0.002947	6.23	26293.16	2064.81	0.27
SCR	12615	Rev BB FP	142475.00	841.00	859.40	850.08	859.97	0.003127	6.72	24621.62	1866.17	0.28
SCR	12395	Rev BB FP	142475.00	840.00	858.68	849.52	859.30	0.003225	6.93	23816.79	1753.66	0.28
SCR	12195	Rev BB FP	142475.00	838.98	858.07	848.24	858.68	0.002883	6.53	23531.59	1569.29	0.27

HEC-RAS Plan: Exist085 River: Reach #1 Reach: SCR Profile: Rev BB FP (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SCR	11995	Rev BB FP	142475.00	837.00	857.33	848.45	858.03	0.003457	7.35	21781.52	1445.69	0.30
SCR	11780	Rev BB FP	142475.00	836.00	856.60	848.15	857.30	0.003393	7.35	22101.86	1459.15	0.29
SCR	11605	Rev BB FP	142475.00	835.50	855.77	847.41	856.63	0.004096	8.01	20215.42	1423.31	0.32
SCR	11405	Rev BB FP	142475.00	834.00	854.64	846.17	855.71	0.004789	8.61	17818.79	1156.11	0.35
SCR	11180	Rev BB FP	142475.00	833.00	852.65	845.62	854.33	0.007767	10.74	14423.92	1022.07	0.44
SCR	11015	Rev BB FP	142475.00	831.50	850.24	844.78	852.64	0.011974	12.57	11808.85	850.99	0.54
SCR	10835	Rev BB FP	142475.00	831.00	848.06	843.71	850.34	0.013460	12.24	12146.95	1068.77	0.57
SCR	10575	Rev BB FP	142475.00	830.00	846.12	840.16	847.40	0.007982	9.13	15863.63	1311.49	0.43
SCR	10390	Rev BB FP	142475.00	828.00	845.08	839.07	846.06	0.005761	8.70	18840.71	1492.14	0.37
SCR	10225	Rev BB FP	142475.00	827.50	844.10	838.16	845.05	0.006398	7.95	18566.19	1545.15	0.38
SCR	10000	Rev BB FP	142475.00	826.00	842.55	837.14	843.54	0.006984	8.14	18351.28	1626.01	0.40
SCR	9820	Rev BB FP	142475.00	824.00	841.35	835.33	842.31	0.006527	7.91	18387.28	1648.84	0.39
SCR	9595	Rev BB FP	142475.00	823.80	839.87	834.13	840.80	0.006938	7.76	18438.71	1719.61	0.39
SCR	9385	Rev BB FP	142475.00	823.00	838.58	833.19	839.36	0.006233	7.21	20157.16	1799.30	0.37
SCR	9220	Rev BB FP	142475.00	822.00	837.62	831.80	838.34	0.005586	6.82	21094.14	1853.43	0.35
SCR	9025	Rev BB FP	142475.00	821.00	836.62	830.57	837.33	0.005004	7.02	21529.03	1822.90	0.34

Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.2

Proposed Condition HEC-RAS Output

Plan	***Description***
FinalProp025	***Fluvial Model, Proposed Conditions, n=0.025, subcritical flow***
FinalProp085	***Fluvial Model, Proposed Conditions, n=0.085, subcritical flow***
Pr025LevCode	***Approved Model, Proposed Conditions, n=0.025, mixed flow***
Pr085LevCode	***Approved Model, Proposed Conditions, n=0.085, mixed flow***
FinalPr085Q2	***Approved Model, Proposed Conditions, n=0.085, mixed flow***

HEC-RAS model modified for fluvial use. See section 4.1.1B for model assembly. For unmodified, mixed flow regimes used in report, refer also to HEC-RAS Modeling Report prepared by PACE, concurrently submitted to LACDPW.

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

HEC-RAS Plan: FinalProp025 River: SCR Reach: Project Profile: Rev BB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	46195	Rev BB	115111.00	1035.00	1054.30	1054.30	1060.32	0.004006	19.69	5847.54	483.37	1.00
Project	46020	Rev BB	115111.00	1032.00	1052.44	1052.44	1058.13	0.004154	19.14	6013.48	531.51	1.00
Project	45545	Rev BB	115111.00	1030.00	1049.24	1049.24	1055.65	0.004022	20.32	5664.17	446.75	1.01
Project	45030	Rev BB	115111.00	1025.00	1045.55	1044.56	1050.46	0.003177	17.78	6472.44	521.46	0.89
Project	44585	Rev BB	115111.00	1022.00	1043.05	1043.05	1048.75	0.004190	19.17	6004.20	531.91	1.01
Project	44210	Rev BB	115111.00	1020.00	1041.58	1038.72	1044.97	0.001990	14.77	7793.25	585.85	0.71
Project	43820	Rev BB	115111.00	1018.00	1037.47	1037.47	1043.62	0.004072	19.90	5785.10	476.52	1.01
Project	43610	Rev BB	115111.00	1017.00	1034.08	1034.08	1040.13	0.004047	19.74	5832.04	483.67	1.00
Project	43410	Rev BB	115111.00	1016.00	1030.73	1030.73	1035.85	0.004279	18.14	6344.39	623.58	1.00
Project	43200	Rev BB	115111.00	1014.00	1029.33	1029.33	1033.92	0.004457	17.19	6697.33	738.00	1.01
Project	42975	Rev BB	115111.00	1012.00	1026.13	1026.13	1030.25	0.004579	16.29	7064.89	860.57	1.00
Project	42815	Rev BB	115111.00	1011.00	1024.36	1024.36	1028.02	0.004808	15.35	7496.97	1037.15	1.01
Project	42590	Rev BB	115111.00	1010.00	1021.50	1021.50	1025.01	0.004851	15.05	7649.36	1098.81	1.01
Project	42430	Rev BB	115111.00	1008.00	1020.26	1020.26	1024.03	0.004681	15.58	7396.51	1011.86	1.00
Project	42215	Rev BB	115111.00	1006.00	1019.73	1018.65	1022.25	0.003063	12.73	9040.32	1182.74	0.81
Project	41940	Rev BB	115111.00	1005.00	1019.28	1017.68	1021.36	0.002488	11.57	9945.28	1284.28	0.73
Project	41730	Rev BB	115111.00	1004.00	1018.65	1016.46	1020.82	0.002417	11.83	9727.36	1189.05	0.73
Project	41460	Rev BB	115111.00	1002.00	1018.12	1015.18	1020.22	0.001971	11.65	9876.94	1057.29	0.67
Project	41280	Rev BB	115111.00	1001.00	1015.34	1015.34	1019.50	0.004582	16.37	7032.47	852.22	1.00
Project	41080	Rev BB	115111.00	1000.00	1013.58	1013.58	1017.58	0.004593	16.04	7175.77	899.51	1.00
Project	40825	Rev BB	115111.00	999.50	1012.10	1012.10	1015.60	0.004938	15.00	7673.93	1122.98	1.01
Project	40585	Rev BB	115111.00	998.00	1010.59	1010.59	1014.03	0.004892	14.87	7741.09	1139.82	1.01
Project	40335	Rev BB	115111.00	996.00	1010.95	1008.70	1012.73	0.001840	10.69	10770.98	1248.81	0.64
Project	40130	Rev BB	115111.00	995.00	1010.41	1008.27	1012.32	0.001960	11.09	10380.24	1194.95	0.66
Project	39945	Rev BB	115111.00	994.00	1010.17	1007.59	1011.94	0.001684	10.67	10785.01	1172.47	0.62
Project	39755	Rev BB	115111.00	994.00	1007.18	1007.18	1011.21	0.004631	16.12	7140.66	893.31	1.00
Project	39605	Rev BB	115111.00	993.00	1005.78	1005.78	1009.87	0.004594	16.23	7091.77	873.24	1.00
Project	39310	Rev BB	115111.00	992.00	1004.36	1004.36	1008.29	0.004683	15.92	7232.22	929.34	1.01
Project	39100	Rev BB	115111.00	990.00	1003.74	1002.09	1006.89	0.002587	14.23	8088.07	788.26	0.78
Project	38925	Rev BB	115111.00	989.50	1003.74	1001.54	1006.30	0.002114	12.85	8958.42	873.34	0.71
Project	38710	Rev BB	115111.00	988.00	1003.55	1000.32	1005.82	0.001584	12.07	9534.83	820.16	0.62
Project	38475	Rev BB	115111.00	986.00	1000.04	1000.04	1004.98	0.004338	17.83	6455.50	659.76	1.00
Project	38300	Rev BB	115111.00	985.50	997.87	997.87	1002.71	0.004334	17.65	6520.77	677.19	1.00
Project	38065	Rev BB	115111.00	984.00	998.04	995.74	1001.32	0.002212	14.54	7917.91	658.42	0.74
Project	37810	Rev BB	115111.00	983.00	995.22	995.22	1000.37	0.004276	18.21	6321.28	618.24	1.00
Project	37655	Rev BB	115111.00	982.00	994.10	994.10	998.80	0.004442	17.39	6619.75	713.56	1.01
Project	37390	Rev BB	115111.00	981.00	991.46	990.10	994.58	0.002779	14.17	8124.66	840.59	0.80
Project	37135	Rev BB	115111.00	980.00	989.31	989.31	993.58	0.004549	16.58	6941.62	821.44	1.01
Project	36930	Rev BB	115111.00	978.00	987.92	987.46	991.71	0.003820	15.63	7364.69	834.69	0.93
Project	36735	Rev BB	115111.00	977.00	986.85	986.85	990.85	0.004582	16.06	7167.57	896.97	1.00
Project	36515	Rev BB	115111.00	975.00	987.04	985.39	989.58	0.002466	12.79	8997.40	994.80	0.75
Project	36265	Rev BB	115111.00	974.00	986.48	985.22	988.84	0.003073	12.33	9335.36	1176.00	0.77
Project	36080	Rev BB	116236.00	973.00	984.63	984.63	987.98	0.005710	14.69	7914.07	1176.00	1.00
Project	35845	Rev BB	116236.00	971.00	984.09	982.87	986.24	0.002731	11.74	9897.11	1385.15	0.76
Project	35725	Rev BB	116236.00	970.00	982.61	982.61	985.70	0.004997	14.11	8236.80	1374.87	1.00
Project	35515	Rev BB	116236.00	969.00	981.34	981.34	984.38	0.003984	14.00	8305.35	1363.56	1.00
Project	35245	Rev BB	116236.00	968.00	980.17	980.17	983.10	0.005053	13.71	8476.11	1553.65	1.00
Project	35040	Rev BB	116236.00	967.00	978.33	978.33	981.35	0.005109	13.94	8335.53	1400.46	1.01
Project	34860	Rev BB	116236.00	966.00	977.40	977.40	980.48	0.004124	14.07	8261.68	1362.38	1.01
Project	34720	Rev BB	116236.00	965.50	976.17	976.17	979.16	0.004168	13.87	8382.56	1419.56	1.01
Project	34495	Rev BB	116236.00	964.00	974.28	974.28	977.32	0.004209	13.98	8314.11	1380.43	1.00
Project	34310	Rev BB	116236.00	963.00	972.64	972.64	975.81	0.005099	14.28	8141.11	1311.42	1.01
Project	34090	Rev BB	116236.00	962.00	971.59	971.59	974.73	0.004069	14.21	8178.26	1312.61	1.00
Project	33880	Rev BB	116236.00	960.00	970.25	970.25	973.34	0.004192	14.12	8232.70	1343.51	1.01
Project	33710	Rev BB	116236.00	959.00	969.25	969.25	972.29	0.004184	14.00	8301.62	1377.88	1.01
Project	33500	Rev BB	116236.00	958.00	968.06	968.06	970.72	0.005489	13.08	8884.50	1720.67	1.01
Project	33310	Rev BB	116236.00	957.00	966.96	966.96	969.53	0.003818	12.88	9026.38	1780.29	1.01
Project	33115	Rev BB	116236.00	956.00	966.60	965.32	968.27	0.002770	10.36	11217.64	1847.27	0.74
Project	32795	Rev BB	116236.00	954.00	964.56	964.56	967.18	0.003570	12.99	8949.41	1735.59	1.01
Project	32605	Rev BB	116236.00	952.00	963.61	963.61	966.27	0.003728	13.08	8889.37	1766.10	1.00
Project	32265	Rev BB	140776.00	950.00	961.33	961.33	964.12	0.004082	13.40	10505.64	1941.10	1.02
Project	31875	Rev BB	140776.00	949.00	959.38	959.38	961.76	0.005507	12.38	11368.08	2409.14	1.00
Project	31585	Rev BB	140776.00	946.00	957.27	956.99	959.54	0.004462	12.10	11630.56	2178.50	0.92
Project	31360	Rev BB	140776.00	944.00	956.57	955.40	958.64	0.003098	11.54	12197.85	1866.19	0.80
Project	31060	Rev BB	140776.00	942.00	956.59	953.29	957.85	0.001200	9.01	15628.46	1701.29	0.52
Project	30720	Rev BB	140776.00	940.00	956.60	951.33	957.42	0.000665	7.25	19427.36	1882.31	0.40
Project	30445	Rev BB	140776.00	938.00	956.52	949.57	957.23	0.000483	6.75	20869.51	1771.80	0.35
Project	30095	Rev BB	140776.00	936.00	956.31	947.93	957.06	0.000474	6.95	20255.18	1619.47	0.35
Project	29815	Rev BB	140776.00	935.00	955.93	948.10	956.89	0.000611	7.87	17894.76	1430.05	0.39
Project	29565	Rev BB	140776.00	934.00	955.81	947.31	956.74	0.000520	7.74	18197.69	1320.30	0.37
Project	29385	Rev BB	140776.00	933.00	955.46	949.39	956.61	0.000672	8.60	16378.75	1233.03	0.42
Project	29140	Rev BB	140776.00	932.00	954.76	949.95	956.37	0.000994	10.18	13831.13	1082.52	0.50
Project	28895	Rev BB	140776.00	930.00	951.29	951.29	955.65	0.004486	16.75	8406.99	966.73	1.00
Project	28695	Rev BB	140776.00	928.00	948.27	945.72	951.01	0.001962	13.28	10604.18	929.93	0.69

HEC-RAS Plan: FinalProp025 River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	28500	Rev BB	140776.00	927.50	945.99	945.99	950.30	0.004557	16.65	8456.66	998.18	1.01
Project	28280	Rev BB	140776.00	926.00	943.37	939.86	945.58	0.001474	11.94	11789.80	976.23	0.61
Project	28080	Rev BB	140776.00	925.00	943.39	938.17	945.23	0.001004	10.88	12937.54	923.44	0.51
Project	27925	Rev BB	140776.00	924.00	942.60	938.71	944.99	0.001424	12.41	11347.95	863.96	0.60
Project	27725	Rev BB	140776.00	923.00	939.26	939.26	944.27	0.004292	17.96	7836.66	784.78	1.00
Project	27545	Rev BB	140776.00	922.00	937.62	937.62	943.27	0.004131	19.08	7378.13	656.25	1.00
Project	27335	Rev BB	140776.00	921.00	936.15	936.15	940.86	0.004392	17.42	8079.14	865.36	1.00
Project	27155	Rev BB	140776.00	920.50	935.27	935.27	939.88	0.004380	17.23	8170.77	888.23	1.00
Project	26990	Rev BB	140776.00	920.00	933.70	933.70	938.05	0.004510	16.73	8413.85	976.89	1.00
Project	26780	Rev BB	140776.00	918.00	931.32	931.32	935.44	0.004591	16.27	8650.56	1062.31	1.00
Project	26575	Rev BB	140776.00	917.00	930.42	929.95	933.79	0.003886	14.72	9560.94	1203.73	0.92
Project	26355	Rev BB	140776.00	916.00	929.13	929.13	932.81	0.004778	15.40	9144.23	1256.77	1.01
Project	26170	Rev BB	140776.00	915.00	928.17	928.16	931.80	0.004729	15.28	9212.38	1267.86	1.00
Project	25965	Rev BB	140776.00	914.00	927.26	927.21	930.82	0.004663	15.15	9292.56	1281.80	0.99
Project	25785	Rev BB	140776.00	913.50	926.78	926.18	929.97	0.003660	14.35	9809.35	1224.04	0.89
Project	25600	Rev BB	140776.00	912.50	925.76	925.21	929.25	0.003734	15.00	9384.78	1112.87	0.91
Project	25425	Rev BB	140776.00	911.00	925.28	924.40	928.57	0.003288	14.56	9667.52	1090.05	0.86
Project	25215	Rev BB	140776.00	910.00	924.72	923.65	927.87	0.003073	14.23	9894.10	1097.30	0.84
Project	25000	Rev BB	140776.00	909.00	924.47	922.49	927.15	0.002252	13.13	10725.52	1062.40	0.73
Project	24795	Rev BB	140776.00	908.00	923.60	921.79	926.64	0.002430	13.99	10061.45	957.43	0.76
Project	24550	Rev BB	140776.00	906.00	922.49	920.91	925.97	0.002629	14.97	9403.51	856.09	0.80
Project	24335	Rev BB	140776.00	905.00	920.03	920.03	925.11	0.004254	18.10	7779.37	764.96	1.00
Project	24115	Rev BB	140776.00	904.00	918.66	918.66	923.80	0.004273	18.20	7736.79	757.86	1.00
Project	23975	Rev BB	140776.00	903.50	917.68	917.68	922.69	0.004306	17.96	7837.58	789.45	1.00
Project	23755	Rev BB	140776.00	902.00	916.75	916.75	921.65	0.004327	17.75	7930.29	816.51	1.00
Project	23565	Rev BB	140776.00	900.00	915.57	915.57	920.26	0.004363	17.38	8100.02	867.04	1.00
Project	23365	Rev BB	140776.00	900.00	914.40	914.40	918.85	0.004458	16.92	8320.34	939.52	1.00
Project	23180	Rev BB	140776.00	899.00	913.20	912.61	917.17	0.003607	15.99	8806.14	926.00	0.91
Project	23000	Rev BB	140776.00	898.00	912.81	911.12	916.46	0.003290	15.34	9177.96	784.00	0.79
Project	22790	Rev BB	140776.00	897.50	910.47	910.47	915.48	0.005111	17.96	7838.51	784.00	1.00
Project	22600	Rev BB	140776.00	896.00	909.60	909.60	913.89	0.004591	16.62	8469.77	1007.62	1.01
Project	22415	Rev BB	140776.00	895.50	907.97	907.97	912.10	0.004576	16.31	8630.14	1052.83	1.00
Project	22195	Rev BB	141426.00	894.00	907.47	906.87	910.61	0.003724	14.21	9951.36	1281.58	0.90
Project	22010	Rev BB	141426.00	892.00	906.10	906.10	909.78	0.004698	15.38	9195.89	1252.29	1.00
Project	21790	Rev BB	141426.00	891.50	904.77	904.77	908.11	0.004855	14.67	9642.87	1507.80	1.00
Project	21615	Rev BB	141426.00	892.00	902.80	902.80	906.20	0.004803	14.80	9557.40	1401.11	1.00
Project	21440	Rev BB	141426.00	890.00	901.57	901.57	905.07	0.004769	15.01	9424.54	1342.59	1.00
Project	21225	Rev BB	141426.00	888.00	900.52	900.52	903.69	0.004968	14.30	9886.64	1563.91	1.00
Project	21020	Rev BB	141426.00	887.00	899.97	898.94	902.33	0.003046	12.34	11464.58	1568.45	0.80
Project	20845	Rev BB	141426.00	886.00	898.39	898.39	901.57	0.004961	14.31	9883.42	1561.02	1.00
Project	20595	Rev BB	141426.00	885.00	898.33	896.46	900.25	0.002128	11.13	12703.95	1548.09	0.68
Project	20435	Rev BB	141426.00	884.00	898.08	895.80	899.89	0.001872	10.78	13124.39	1524.83	0.65
Project	20280	Rev BB	141426.00	883.70	896.01	896.01	899.29	0.005069	14.53	9735.55	1527.35	1.01
Project	20070	Rev BB	141426.00	882.00	894.29	894.29	897.53	0.005010	14.44	9793.63	1537.65	1.01
Project	19855	Rev BB	141426.00	880.50	892.65	892.65	895.81	0.005043	14.26	9916.93	1593.11	1.01
Project	19630	Rev BB	141426.00	880.00	891.48	890.46	894.67	0.003143	14.35	9854.55	1098.59	0.84
Project	19440	Rev BB	141426.00	878.00	891.37	889.68	893.96	0.002469	12.92	10950.06	1194.62	0.75
Project	19240	Rev BB	141426.00	877.50	889.40	889.40	893.18	0.004749	15.60	9068.42	1219.41	1.01
Project	19050	Rev BB	141426.00	876.00	889.38	887.89	891.70	0.002632	12.21	11580.60	1442.64	0.76
Project	18830	Rev BB	141426.00	874.00	888.82	887.50	891.10	0.002798	12.12	11667.44	1538.23	0.78
Project	18650	Rev BB	141426.00	873.50	888.72	886.68	890.53	0.002006	10.78	13119.62	1607.26	0.66
Project	18475	Rev BB	141426.00	872.00	888.91	885.02	890.10	0.001016	8.76	16151.21	1621.67	0.49
Project	18290	Rev BB	141426.00	871.50	888.50	885.07	889.87	0.001262	9.40	15041.49	1594.70	0.54
Project	18025	Rev BB	141426.00	870.00	888.57	882.91	889.51	0.000633	7.79	18154.44	1520.48	0.40
Project	17785	Rev BB	141426.00	868.00	888.25	882.79	889.34	0.000722	8.38	16870.97	1398.41	0.43
Project	17510	Rev BB	141426.00	868.00	887.46	883.42	889.03	0.001273	10.07	14045.60	1353.64	0.55
Project	17360	Rev BB	141426.00	868.00	883.98	883.98	888.42	0.004472	16.91	8364.98	944.54	1.00
Project	17110	Rev BB	141426.00	864.00	881.08	881.08	884.88	0.004682	15.65	9039.19	1191.88	1.00
Project	16970	Rev BB	141426.00	863.70	879.57	879.57	883.40	0.004698	15.72	8997.01	1180.24	1.00
Project	16720	Rev BB	141426.00	863.50	875.41	875.41	879.35	0.004709	15.94	8873.56	1146.54	1.01
Project	16515	Rev BB	141426.00	862.00	873.88	873.85	877.54	0.004720	15.36	9209.61	1259.97	1.00
Project	16305	Rev BB	141426.00	860.00	874.53	872.03	876.44	0.001769	11.08	12765.90	1360.42	0.64
Project	16130	Rev BB	141426.00	860.00	872.23	872.23	875.79	0.004840	15.15	9332.88	1325.97	1.01
Project	15960	Rev BB	141426.00	859.00	871.57	870.96	874.47	0.003673	13.67	10347.30	1395.60	0.88
Project	15745	Rev BB	141426.00	858.00	871.32	869.77	873.67	0.002505	12.30	11500.92	1363.87	0.75
Project	15540	Rev BB	141426.00	857.50	871.22	868.50	872.95	0.001594	10.54	13415.28	1426.97	0.61
Project	15335	Rev BB	141426.00	856.00	868.08	868.08	872.16	0.005518	16.21	8723.27	1064.14	1.00
Project	15125	Rev BB	142475.00	854.00	866.25	866.25	870.52	0.005571	16.58	8594.49	1005.21	1.00
Project	14900	Rev BB	142475.00	853.00	864.18	864.18	868.31	0.004518	16.29	8744.60	1681.96	1.00
Project	14720	Rev BB	142475.00	852.00	863.25	863.25	867.16	0.004589	15.87	8988.33	1754.84	1.00
Project	14480	Rev BB	142475.00	850.50	860.78	860.75	864.04	0.004765	14.50	9824.86	1761.86	0.99
Project	14315	Rev BB	142475.00	850.00	860.12	860.12	863.17	0.004972	14.01	10170.99	1883.64	1.00
Project	14090	Rev BB	142475.00	850.00	858.71	858.71	861.64	0.005088	13.74	10369.15	1774.74	1.00
Project	13850	Rev BB	142475.00	848.00	857.10	857.10	860.08	0.005085	13.85	10284.52	1738.35	1.00

HEC-RAS Plan: FinalProp025 River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	13635	Rev BB	142475.00	846.00	855.96	855.96	858.98	0.004582	13.95	10211.78	1703.12	1.00
Project	13425	Rev BB	142475.00	845.00	854.24	854.24	857.06	0.004529	13.47	10578.16	1897.18	1.01
Project	13190	Rev BB	142475.00	844.00	853.32	852.74	855.68	0.003742	12.34	11549.85	1846.11	0.87
Project	13030	Rev BB	142475.00	843.00	852.86	851.95	855.08	0.003185	11.96	11909.27	1766.79	0.81
Project	12835	Rev BB	142475.00	842.00	852.34	851.01	854.49	0.002668	11.77	12100.72	1610.12	0.76
Project	12615	Rev BB	142475.00	841.00	852.03	849.82	853.92	0.001904	11.02	12926.14	1472.31	0.66
Project	12395	Rev BB	142475.00	840.00	851.67	849.16	853.50	0.001752	10.85	13135.39	1440.65	0.63
Project	12195	Rev BB	142475.00	838.98	851.58	848.08	853.12	0.001248	9.95	14313.41	1384.21	0.55
Project	11995	Rev BB	142475.00	837.00	850.88	848.04	852.79	0.001627	11.11	12823.25	1283.08	0.62
Project	11780	Rev BB	142475.00	836.00	850.70	847.66	852.39	0.001520	10.44	13642.49	1424.15	0.59
Project	11605	Rev BB	142475.00	835.50	849.96	847.34	852.05	0.001993	11.60	12285.52	1341.91	0.68
Project	11405	Rev BB	142475.00	834.00	849.37	846.23	851.65	0.001801	12.11	11766.04	1116.35	0.66
Project	11180	Rev BB	142475.00	833.00	847.48	845.64	851.07	0.002263	15.22	9359.01	861.14	0.81
Project	11015	Rev BB	142475.00	831.50	844.86	844.86	850.40	0.003816	18.88	7546.81	680.73	1.00
Project	10835	Rev BB	142475.00	831.00	843.79	843.79	848.64	0.003827	17.68	8059.51	834.48	1.00
Project	10575	Rev BB	142475.00	830.00	840.16	840.16	844.13	0.004323	15.99	8907.77	1127.45	1.00
Project	10390	Rev BB	142475.00	828.00	839.75	838.53	842.26	0.002882	12.70	11218.28	1408.98	0.79
Project	10225	Rev BB	142475.00	827.50	838.21	838.21	841.57	0.004878	14.72	9676.62	1447.21	1.00
Project	10000	Rev BB	142475.00	826.00	837.14	837.14	840.43	0.003961	14.56	9788.33	1488.06	1.00
Project	9820	Rev BB	142475.00	824.00	835.36	835.36	838.82	0.004314	14.94	9537.68	1450.92	1.00
Project	9595	Rev BB	142475.00	823.80	834.15	834.15	837.42	0.004846	14.53	9808.52	1620.11	1.00
Project	9385	Rev BB	142475.00	823.00	833.09	833.09	836.04	0.005132	13.78	10337.67	1773.60	1.01
Project	9220	Rev BB	142475.00	822.00	831.82	831.82	834.72	0.004516	13.66	10429.99	1814.14	1.00
Project	9025	Rev BB	142475.00	821.00	830.39	830.39	833.36	0.004263	13.82	10307.78	1751.03	1.00

HEC-RAS Plan: FinalProp085 River: SCR Reach: Project Profile: Rev BB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	46195	Rev BB	115111.00	1035.00	1063.47	1054.30	1064.87	0.007341	9.49	12131.56	752.82	0.42
Project	46020	Rev BB	115111.00	1032.00	1062.02	1052.44	1063.64	0.006543	10.21	11278.49	570.25	0.40
Project	45545	Rev BB	115111.00	1030.00	1057.85	1049.24	1059.95	0.008978	11.63	9901.38	524.22	0.47
Project	45030	Rev BB	115111.00	1025.00	1054.23	1044.56	1055.89	0.006624	10.33	11148.02	558.00	0.41
Project	44585	Rev BB	115111.00	1022.00	1050.61	1043.05	1052.40	0.009260	10.73	10726.47	654.45	0.47
Project	44210	Rev BB	115111.00	1020.00	1047.85	1038.72	1049.39	0.006689	9.95	11564.12	620.11	0.41
Project	43820	Rev BB	115111.00	1018.00	1042.18	1037.47	1045.27	0.017205	14.10	8166.67	530.01	0.63
Project	43610	Rev BB	115111.00	1017.00	1038.67	1034.08	1041.71	0.017230	13.99	8227.50	539.45	0.63
Project	43410	Rev BB	115111.00	1016.00	1036.61	1030.73	1038.51	0.011821	11.06	10407.01	734.51	0.52
Project	43200	Rev BB	115111.00	1014.00	1033.78	1029.33	1035.80	0.014294	11.41	10091.65	785.15	0.56
Project	42975	Rev BB	115111.00	1012.00	1031.27	1026.13	1032.77	0.011383	9.83	11714.26	961.37	0.50
Project	42815	Rev BB	115111.00	1011.00	1029.95	1024.36	1031.07	0.008590	8.49	13555.60	1123.09	0.43
Project	42590	Rev BB	115111.00	1010.00	1028.69	1021.50	1029.49	0.005332	7.17	16066.51	1248.66	0.35
Project	42430	Rev BB	115111.00	1008.00	1027.84	1020.26	1028.57	0.005587	6.91	17118.29	1596.16	0.35
Project	42215	Rev BB	115111.00	1006.00	1026.89	1018.65	1027.51	0.004188	6.31	18233.84	1375.77	0.31
Project	41940	Rev BB	115111.00	1005.00	1025.82	1017.68	1026.42	0.003813	6.23	18490.49	1328.21	0.29
Project	41730	Rev BB	115111.00	1004.00	1024.84	1016.46	1025.54	0.004347	6.69	17201.33	1222.58	0.31
Project	41460	Rev BB	115111.00	1002.00	1023.44	1015.18	1024.26	0.005190	7.30	15773.56	1122.33	0.34
Project	41280	Rev BB	115111.00	1001.00	1022.21	1015.34	1023.16	0.007140	7.84	14689.39	1195.76	0.39
Project	41080	Rev BB	115111.00	1000.00	1020.85	1013.58	1021.79	0.006509	7.77	14810.43	1139.40	0.38
Project	40825	Rev BB	115111.00	999.50	1019.54	1012.10	1020.30	0.004962	6.98	16487.71	1214.08	0.33
Project	40585	Rev BB	115111.00	998.00	1018.42	1010.59	1019.12	0.004550	6.73	17110.93	1249.11	0.32
Project	40335	Rev BB	115111.00	996.00	1017.57	1008.70	1018.14	0.003259	6.01	19166.52	1289.69	0.27
Project	40130	Rev BB	115111.00	995.00	1016.78	1008.27	1017.40	0.003782	6.33	18185.41	1266.60	0.29
Project	39945	Rev BB	115111.00	994.00	1016.05	1007.59	1016.70	0.003847	6.47	17791.94	1214.29	0.30
Project	39755	Rev BB	115111.00	994.00	1014.76	1007.18	1015.73	0.006323	7.91	14562.19	1096.92	0.38
Project	39605	Rev BB	115111.00	993.00	1013.91	1005.78	1014.86	0.005477	7.85	14763.11	1083.20	0.36
Project	39310	Rev BB	115111.00	992.00	1012.32	1004.36	1013.25	0.005319	7.77	14818.98	977.78	0.35
Project	39100	Rev BB	115111.00	990.00	1011.14	1002.09	1012.17	0.005052	8.16	14158.82	850.63	0.35
Project	38925	Rev BB	115111.00	989.50	1010.35	1001.54	1011.28	0.004789	7.75	14843.71	906.85	0.34
Project	38710	Rev BB	115111.00	988.00	1009.19	1000.32	1010.20	0.005036	8.09	14224.74	844.23	0.35
Project	38475	Rev BB	115111.00	986.00	1006.99	1000.04	1008.64	0.008697	10.31	11167.84	695.45	0.45
Project	38300	Rev BB	115111.00	985.50	1005.78	997.87	1007.19	0.007044	9.56	12043.94	716.83	0.41
Project	38065	Rev BB	115111.00	984.00	1004.14	995.74	1005.56	0.006775	9.56	12036.74	691.32	0.40
Project	37810	Rev BB	115111.00	983.00	1001.39	995.22	1003.36	0.010602	11.26	10228.44	648.53	0.50
Project	37655	Rev BB	115111.00	982.00	999.90	994.10	1001.66	0.010464	10.62	10834.10	739.02	0.49
Project	37390	Rev BB	115111.00	981.00	998.49	990.10	999.52	0.005339	8.15	14131.07	869.25	0.36
Project	37135	Rev BB	115111.00	980.00	996.84	989.31	998.01	0.006512	8.67	13273.15	864.25	0.39
Project	36930	Rev BB	115111.00	978.00	995.75	987.46	996.75	0.005471	8.01	14378.93	926.41	0.36
Project	36735	Rev BB	115111.00	977.00	994.66	986.85	995.64	0.005652	7.97	14443.30	963.48	0.36
Project	36515	Rev BB	115111.00	975.00	993.64	985.37	994.48	0.004699	7.33	15700.20	1032.84	0.33
Project	36265	Rev BB	115111.00	974.00	992.27	985.22	993.06	0.006888	7.13	16149.47	1176.00	0.34
Project	36080	Rev BB	116236.00	973.00	990.65	984.63	991.59	0.008983	7.75	14999.86	1176.00	0.38
Project	35845	Rev BB	116236.00	971.00	989.14	982.87	989.89	0.005586	6.95	16718.71	1512.86	0.35
Project	35725	Rev BB	116236.00	970.00	988.33	982.61	989.15	0.006539	7.30	15919.91	1489.98	0.38
Project	35515	Rev BB	116236.00	969.00	987.05	981.34	987.85	0.005995	7.20	16145.45	1503.16	0.37
Project	35245	Rev BB	116236.00	968.00	985.20	980.17	986.04	0.007449	7.36	15792.43	1581.24	0.39
Project	35040	Rev BB	116236.00	967.00	983.73	978.33	984.52	0.007010	7.17	16215.62	1493.00	0.38
Project	34860	Rev BB	116236.00	966.00	982.28	977.40	983.21	0.007849	7.71	15077.98	1431.69	0.42
Project	34720	Rev BB	116236.00	965.50	981.27	976.17	982.13	0.007059	7.40	15698.80	1450.12	0.40
Project	34495	Rev BB	116236.00	964.00	979.81	974.28	980.61	0.006440	7.20	16154.11	1462.52	0.38
Project	34310	Rev BB	116236.00	963.00	978.58	972.64	979.39	0.006581	7.21	16112.75	1388.30	0.37
Project	34090	Rev BB	116236.00	962.00	977.05	971.59	977.93	0.006750	7.49	15517.16	1371.20	0.39
Project	33880	Rev BB	116236.00	960.00	975.68	970.25	976.50	0.006734	7.27	15989.40	1483.22	0.39
Project	33710	Rev BB	116236.00	959.00	974.59	969.25	975.34	0.006419	6.93	16763.53	1638.24	0.38
Project	33500	Rev BB	116236.00	958.00	973.35	968.06	974.00	0.006109	6.43	18080.31	1755.79	0.35
Project	33310	Rev BB	116236.00	957.00	972.33	966.96	972.93	0.005176	6.21	18719.75	1828.22	0.34
Project	33115	Rev BB	116236.00	956.00	971.42	965.32	971.93	0.004618	5.75	20262.43	1927.27	0.31
Project	32795	Rev BB	116236.00	954.00	969.71	964.56	970.33	0.005520	6.33	18411.74	1921.08	0.36
Project	32605	Rev BB	116236.00	952.00	968.73	963.61	969.28	0.005123	6.04	20231.14	2407.57	0.34
Project	32265	Rev BB	140776.00	950.00	967.22	961.33	967.68	0.004388	5.45	25825.19	2840.45	0.32
Project	31875	Rev BB	140776.00	949.00	965.64	959.38	966.07	0.003807	5.22	27033.89	2594.16	0.28
Project	31585	Rev BB	140776.00	946.00	964.73	956.99	965.10	0.002884	4.92	28606.50	2377.72	0.25
Project	31360	Rev BB	140776.00	944.00	964.01	955.40	964.44	0.002856	5.30	26583.39	1959.81	0.25
Project	31060	Rev BB	140776.00	942.00	963.24	953.29	963.64	0.002469	5.05	27851.26	1976.23	0.24
Project	30720	Rev BB	140776.00	940.00	962.60	951.33	962.93	0.001689	4.57	30819.70	1911.83	0.20
Project	30445	Rev BB	140776.00	938.00	962.16	949.57	962.48	0.001559	4.53	31093.12	1842.15	0.19
Project	30095	Rev BB	140776.00	936.00	961.53	947.93	961.90	0.001737	4.90	28752.99	1637.52	0.21
Project	29815	Rev BB	140776.00	935.00	960.83	948.10	961.33	0.002377	5.64	24945.23	1445.25	0.24
Project	29565	Rev BB	140776.00	934.00	960.18	947.31	960.72	0.002432	5.87	24002.03	1334.60	0.24
Project	29385	Rev BB	140776.00	933.00	959.53	949.39	960.20	0.003234	6.57	21423.61	1248.62	0.28
Project	29140	Rev BB	140776.00	932.00	958.17	949.95	959.17	0.005290	8.02	17548.01	1094.18	0.35
Project	28895	Rev BB	140776.00	930.00	954.62	951.29	956.89	0.017865	12.08	11651.29	981.60	0.62
Project	28695	Rev BB	140776.00	928.00	953.10	945.72	954.44	0.007151	9.29	15147.15	952.31	0.41

HEC-RAS Plan: FinalProp085 River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	28500	Rev BB	140776.00	927.50	951.00	945.99	952.67	0.011472	10.35	13606.97	1041.16	0.50
Project	28280	Rev BB	140776.00	926.00	950.17	939.86	951.07	0.003943	7.60	18528.58	1005.15	0.31
Project	28080	Rev BB	140776.00	925.00	949.41	938.17	950.31	0.003613	7.58	18572.27	946.60	0.30
Project	27925	Rev BB	140776.00	924.00	948.51	938.71	949.63	0.004894	8.52	16518.98	886.47	0.35
Project	27725	Rev BB	140776.00	923.00	946.74	939.26	948.35	0.007913	10.18	13823.56	814.27	0.44
Project	27545	Rev BB	140776.00	922.00	944.98	937.62	946.75	0.009932	10.70	13156.60	854.99	0.48
Project	27335	Rev BB	140776.00	921.00	943.42	936.15	944.83	0.007683	9.56	14721.97	939.21	0.43
Project	27155	Rev BB	140776.00	920.50	941.86	935.27	943.34	0.008754	9.78	14398.34	980.49	0.45
Project	26990	Rev BB	140776.00	920.00	940.62	933.70	941.93	0.007507	9.18	15333.37	1021.74	0.42
Project	26780	Rev BB	140776.00	918.00	939.53	931.32	940.52	0.005306	8.01	17571.72	1107.51	0.35
Project	26575	Rev BB	140776.00	917.00	938.72	929.95	939.51	0.004216	7.14	19724.69	1244.26	0.32
Project	26355	Rev BB	140776.00	916.00	937.83	929.13	938.58	0.004073	6.95	20261.90	1295.29	0.31
Project	26170	Rev BB	140776.00	915.00	937.12	928.16	937.83	0.003833	6.80	20700.37	1301.90	0.30
Project	25965	Rev BB	140776.00	914.00	936.38	927.21	937.07	0.003632	6.67	21119.28	1313.87	0.29
Project	25785	Rev BB	140776.00	913.50	935.72	926.18	936.42	0.003567	6.74	20899.07	1257.60	0.29
Project	25600	Rev BB	140776.00	912.50	934.94	925.21	935.73	0.003778	7.12	19783.70	1150.59	0.30
Project	25425	Rev BB	140776.00	911.00	934.27	924.40	935.07	0.003763	7.16	19676.46	1139.17	0.30
Project	25215	Rev BB	140776.00	910.00	933.49	923.65	934.28	0.003774	7.15	19675.54	1134.33	0.30
Project	25000	Rev BB	140776.00	909.00	932.66	922.49	933.46	0.003681	7.20	19553.49	1094.28	0.30
Project	24795	Rev BB	140776.00	908.00	931.68	921.79	932.64	0.004300	7.85	17926.30	987.02	0.32
Project	24550	Rev BB	140776.00	906.00	930.28	920.91	931.46	0.005239	8.69	16197.81	887.76	0.36
Project	24335	Rev BB	140776.00	905.00	928.76	920.03	930.20	0.006433	9.63	14619.51	801.23	0.40
Project	24115	Rev BB	140776.00	904.00	927.27	918.66	928.75	0.006654	9.77	14414.92	794.39	0.40
Project	23975	Rev BB	140776.00	903.50	926.43	917.68	927.81	0.006247	9.43	14928.26	829.53	0.39
Project	23755	Rev BB	140776.00	902.00	925.02	916.75	926.36	0.006964	9.29	15158.33	941.12	0.41
Project	23565	Rev BB	140776.00	900.00	923.80	915.57	925.07	0.006358	9.02	15604.61	942.91	0.39
Project	23365	Rev BB	140776.00	900.00	922.66	914.40	923.82	0.005909	8.65	16278.47	988.72	0.38
Project	23180	Rev BB	140776.00	899.00	921.68	912.61	922.76	0.005147	8.35	16869.25	976.84	0.35
Project	23000	Rev BB	140776.00	898.00	920.17	911.12	921.55	0.008753	9.42	14947.76	784.00	0.38
Project	22790	Rev BB	140776.00	897.50	917.71	910.47	919.39	0.011776	10.42	13511.74	784.00	0.44
Project	22600	Rev BB	140776.00	896.00	916.14	909.60	917.47	0.008004	9.25	15211.94	1052.34	0.43
Project	22415	Rev BB	140776.00	895.50	914.82	907.97	916.03	0.007157	8.81	15982.03	1093.93	0.41
Project	22195	Rev BB	141426.00	894.00	913.51	906.87	914.43	0.006693	7.70	18363.87	1466.03	0.38
Project	22010	Rev BB	141426.00	892.00	911.96	906.10	913.01	0.008584	8.23	17188.55	1803.93	0.43
Project	21790	Rev BB	141426.00	891.50	910.41	904.77	911.26	0.006915	7.52	19320.02	1781.74	0.39
Project	21615	Rev BB	141426.00	892.00	909.33	902.80	910.10	0.006037	7.05	20056.92	1690.87	0.36
Project	21440	Rev BB	141426.00	890.00	908.27	901.57	909.05	0.005983	7.09	19960.76	1656.11	0.36
Project	21225	Rev BB	141426.00	888.00	907.08	900.52	907.83	0.005424	6.97	20279.11	1603.39	0.35
Project	21020	Rev BB	141426.00	887.00	906.08	898.94	906.78	0.004697	6.68	21188.20	1610.45	0.32
Project	20845	Rev BB	141426.00	886.00	905.18	898.39	905.90	0.005127	6.85	20644.44	1607.47	0.34
Project	20595	Rev BB	141426.00	885.00	904.07	896.46	904.73	0.004338	6.51	21721.47	1608.91	0.31
Project	20435	Rev BB	141426.00	884.00	903.31	895.80	903.99	0.004686	6.63	21321.67	1627.73	0.32
Project	20280	Rev BB	141426.00	883.70	902.35	896.01	903.15	0.006133	7.17	19767.98	1749.06	0.36
Project	20070	Rev BB	141426.00	882.00	901.17	894.29	901.87	0.005844	6.74	20986.95	1849.69	0.35
Project	19855	Rev BB	141426.00	880.50	900.16	892.65	900.78	0.004249	6.33	22462.36	1851.55	0.31
Project	19630	Rev BB	141426.00	880.00	899.23	890.46	899.83	0.004178	6.23	22797.11	1871.07	0.30
Project	19440	Rev BB	141426.00	878.00	898.40	889.68	898.98	0.004680	6.12	23122.45	2019.07	0.32
Project	19240	Rev BB	141426.00	877.50	897.28	889.40	897.97	0.005271	6.69	21152.97	1747.11	0.34
Project	19050	Rev BB	141426.00	876.00	896.50	887.89	897.09	0.003878	6.16	22999.78	1762.81	0.30
Project	18830	Rev BB	141426.00	874.00	895.62	887.50	896.22	0.004004	6.23	22683.43	1690.74	0.30
Project	18650	Rev BB	141426.00	873.50	894.96	886.68	895.53	0.003602	6.04	23403.52	1688.66	0.29
Project	18475	Rev BB	141426.00	872.00	894.47	885.02	894.95	0.002736	5.59	25295.13	1667.77	0.25
Project	18290	Rev BB	141426.00	871.50	893.84	885.07	894.40	0.003329	5.98	23665.47	1633.61	0.28
Project	18025	Rev BB	141426.00	870.00	893.11	882.91	893.60	0.002558	5.62	25143.79	1559.41	0.25
Project	17785	Rev BB	141426.00	868.00	892.29	882.79	892.90	0.003271	6.25	22632.10	1447.29	0.28
Project	17510	Rev BB	141426.00	868.00	890.81	883.42	891.70	0.005886	7.59	18654.98	1414.71	0.36
Project	17360	Rev BB	141426.00	868.00	888.82	883.98	890.35	0.013569	9.95	14215.52	1305.45	0.53
Project	17110	Rev BB	141426.00	864.00	885.85	881.08	887.26	0.010933	9.55	14814.13	1232.51	0.49
Project	16970	Rev BB	141426.00	863.70	884.19	879.57	885.67	0.011338	9.76	14491.26	1196.81	0.49
Project	16720	Rev BB	141426.00	863.50	882.37	875.41	883.44	0.006539	8.31	17010.13	1187.95	0.39
Project	16515	Rev BB	141426.00	862.00	881.31	873.85	882.19	0.005350	7.54	18766.93	1306.21	0.35
Project	16305	Rev BB	141426.00	860.00	880.45	872.03	881.16	0.004085	6.76	20922.92	1395.94	0.31
Project	16130	Rev BB	141426.00	860.00	879.49	872.23	880.34	0.005368	7.40	19112.35	1369.50	0.35
Project	15960	Rev BB	141426.00	859.00	878.70	870.96	879.45	0.004570	6.91	20452.81	1438.39	0.32
Project	15745	Rev BB	141426.00	858.00	877.73	869.77	878.48	0.004476	6.94	20373.34	1402.37	0.32
Project	15540	Rev BB	141426.00	857.50	876.91	868.50	877.56	0.004066	6.49	22408.43	2361.93	0.30
Project	15335	Rev BB	141426.00	856.00	875.11	868.08	876.29	0.009480	8.73	16198.42	1064.14	0.39
Project	15125	Rev BB	142475.00	854.00	872.68	866.25	874.03	0.011555	9.34	15249.43	1053.51	0.43
Project	14900	Rev BB	142475.00	853.00	870.38	864.18	871.63	0.009216	8.97	15881.59	2238.73	0.45
Project	14720	Rev BB	142475.00	852.00	868.64	863.25	869.90	0.010452	9.02	15810.26	2022.13	0.47
Project	14480	Rev BB	142475.00	850.50	867.05	860.75	867.91	0.006131	7.43	19187.13	1853.66	0.37
Project	14315	Rev BB	142475.00	850.00	866.10	860.12	866.88	0.005923	7.08	20111.41	1942.36	0.36
Project	14090	Rev BB	142475.00	850.00	864.88	858.71	865.56	0.005375	6.64	21464.46	1816.59	0.34
Project	13850	Rev BB	142475.00	848.00	863.69	857.10	864.35	0.004893	6.52	21855.87	1775.36	0.33

HEC-RAS Plan: FinalProp085 River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	13635	Rev BB	142475.00	846.00	862.66	855.96	863.31	0.004619	6.49	22131.17	1820.37	0.32
Project	13425	Rev BB	142475.00	845.00	861.97	854.24	862.46	0.003252	5.61	25397.52	1936.85	0.27
Project	13190	Rev BB	142475.00	844.00	861.29	852.74	861.74	0.002835	5.37	26541.57	1912.15	0.25
Project	13030	Rev BB	142475.00	843.00	860.83	851.95	861.29	0.002789	5.40	26405.92	1864.73	0.25
Project	12835	Rev BB	142475.00	842.00	860.25	851.01	860.73	0.002859	5.54	25707.76	1777.11	0.26
Project	12615	Rev BB	142475.00	841.00	859.56	849.82	860.09	0.002907	5.85	24347.79	1569.00	0.26
Project	12395	Rev BB	142475.00	840.00	858.89	849.16	859.44	0.003000	5.97	23856.91	1549.44	0.27
Project	12195	Rev BB	142475.00	838.98	858.30	848.08	858.85	0.002869	5.98	23808.84	1469.16	0.26
Project	11995	Rev BB	142475.00	837.00	857.55	848.04	858.19	0.003608	6.44	22107.60	1450.22	0.29
Project	11780	Rev BB	142475.00	836.00	856.80	847.66	857.43	0.003467	6.35	22449.24	1462.33	0.29
Project	11605	Rev BB	142475.00	835.50	856.01	847.34	856.75	0.004360	6.88	20711.16	1419.08	0.32
Project	11405	Rev BB	142475.00	834.00	854.76	846.23	855.75	0.005373	7.98	17861.03	1145.60	0.36
Project	11180	Rev BB	142475.00	833.00	852.84	845.64	854.31	0.007515	9.72	14662.38	1010.63	0.45
Project	11015	Rev BB	142475.00	831.50	850.47	844.86	852.66	0.011939	11.87	12004.65	852.64	0.56
Project	10835	Rev BB	142475.00	831.00	848.29	843.79	850.42	0.013047	11.76	12400.58	1074.47	0.57
Project	10575	Rev BB	142475.00	830.00	846.33	840.16	847.54	0.007986	8.84	16140.29	1323.35	0.43
Project	10390	Rev BB	142475.00	828.00	845.30	838.53	846.14	0.005968	7.35	19375.22	1517.90	0.36
Project	10225	Rev BB	142475.00	827.50	844.20	838.21	845.10	0.006835	7.61	18716.44	1545.61	0.39
Project	10000	Rev BB	142475.00	826.00	842.62	837.11	843.54	0.006877	7.72	18453.52	1626.59	0.40
Project	9820	Rev BB	142475.00	824.00	841.41	835.36	842.34	0.006465	7.71	18478.98	1650.05	0.39
Project	9595	Rev BB	142475.00	823.80	839.92	834.15	840.84	0.006985	7.70	18513.50	1720.36	0.39
Project	9385	Rev BB	142475.00	823.00	838.61	833.09	839.38	0.006487	7.05	20207.47	1799.40	0.37
Project	9220	Rev BB	142475.00	822.00	837.64	831.82	838.35	0.005584	6.74	21127.86	1853.53	0.35
Project	9025	Rev BB	142475.00	821.00	836.65	830.39	837.32	0.005004	6.60	21582.88	1823.02	0.34

HEC-RAS Plan: Pr025LevCode River: SCR Reach: Project Profile: Rev BB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	46195	Rev BB	115111.00	1035.00	1053.14	1054.04	1060.43	0.005006	21.67	5313.11	452.97	1.11
Project	46020	Rev BB	115111.00	1032.00	1050.08	1052.47	1059.13	0.008742	24.14	4768.34	520.89	1.41
Project	45545	Rev BB	115111.00	1030.00	1049.23	1049.27	1055.65	0.004027	20.33	5661.39	446.68	1.01
Project	45030	Rev BB	115111.00	1025.00	1041.51	1044.56	1052.09	0.010535	26.10	4410.21	492.54	1.54
Project	44585	Rev BB	115111.00	1022.00	1043.05	1043.07	1048.75	0.004190	19.17	6004.20	531.91	1.01
Project	44210	Rev BB	115111.00	1020.00	1035.36	1038.72	1045.99	0.009463	26.16	4399.47	452.62	1.48
Project	43820	Rev BB	115111.00	1018.00	1037.47	1037.48	1043.62	0.004072	19.90	5785.33	476.53	1.01
Project	43610	Rev BB	115111.00	1017.00	1030.80	1034.06	1041.87	0.010066	26.70	4311.38	450.58	1.52
Project	43410	Rev BB	115111.00	1016.00	1027.33	1031.12	1039.61	0.011140	28.76	4308.81	583.44	1.61
Project	43200	Rev BB	115111.00	1014.00	1026.42	1029.64	1036.81	0.010596	26.11	4615.62	689.16	1.54
Project	42975	Rev BB	115111.00	1012.00	1022.84	1026.28	1033.82	0.016327	26.63	4368.54	735.12	1.82
Project	42815	Rev BB	115111.00	1011.00	1021.72	1024.45	1030.58	0.015830	23.92	4840.30	864.26	1.76
Project	42590	Rev BB	115111.00	1010.00	1019.24	1021.61	1026.97	0.013663	22.43	5239.45	1013.12	1.64
Project	42430	Rev BB	115111.00	1008.00	1018.67	1020.25	1024.62	0.009146	19.57	5880.86	915.78	1.36
Project	42215	Rev BB	115111.00	1006.00	1017.22	1018.65	1022.53	0.008689	18.48	6228.87	1018.99	1.32
Project	41940	Rev BB	115111.00	1005.00	1019.27	1017.69	1021.36	0.002429	11.60	9938.85	1284.24	0.73
Project	41730	Rev BB	115111.00	1004.00	1018.69	1016.46	1020.85	0.002298	11.79	9782.67	1190.92	0.71
Project	41460	Rev BB	115111.00	1002.00	1018.18	1015.18	1020.26	0.002007	11.56	9955.93	1093.49	0.68
Project	41280	Rev BB	115111.00	1001.00	1015.35	1015.35	1019.53	0.004463	16.42	7036.47	852.28	1.00
Project	41080	Rev BB	115111.00	1000.00	1012.06	1013.54	1018.19	0.007501	19.93	5822.75	874.06	1.27
Project	40825	Rev BB	115111.00	999.50	1010.97	1012.14	1016.00	0.007233	18.02	6444.40	1040.35	1.22
Project	40585	Rev BB	115111.00	998.00	1009.70	1010.42	1014.18	0.006378	16.98	6785.22	1005.81	1.15
Project	40335	Rev BB	115111.00	996.00	1011.09	1008.70	1012.81	0.001736	10.54	10937.81	1249.57	0.63
Project	40130	Rev BB	115111.00	995.00	1010.49	1008.34	1012.42	0.001793	11.30	10477.71	1195.64	0.64
Project	39945	Rev BB	115111.00	994.00	1010.29	1007.73	1012.07	0.001542	11.00	10919.88	1173.27	0.60
Project	39755	Rev BB	115111.00	994.00	1007.28	1007.28	1011.39	0.004003	16.46	7234.94	894.45	0.96
Project	39605	Rev BB	115111.00	993.00	1004.51	1005.87	1010.45	0.006872	19.70	6001.74	849.68	1.23
Project	39310	Rev BB	115111.00	992.00	1004.65	1004.65	1008.62	0.003630	16.53	7501.51	931.10	0.92
Project	39100	Rev BB	115111.00	990.00	1000.40	1002.12	1007.21	0.008939	20.94	5496.16	761.14	1.37
Project	38925	Rev BB	115111.00	989.50	1003.76	1001.55	1006.31	0.002096	12.82	8981.87	873.49	0.70
Project	38710	Rev BB	115111.00	988.00	1003.58	1000.32	1005.83	0.001571	12.04	9558.11	820.29	0.62
Project	38475	Rev BB	115111.00	986.00	1000.04	1000.04	1005.00	0.004280	17.89	6451.15	659.72	1.00
Project	38300	Rev BB	115111.00	985.50	995.78	997.87	1003.64	0.009518	22.51	5114.38	666.28	1.43
Project	38065	Rev BB	115111.00	984.00	998.04	995.74	1001.32	0.002214	14.54	7914.65	658.41	0.74
Project	37810	Rev BB	115111.00	983.00	995.22	995.22	1000.37	0.004276	18.21	6321.20	618.24	1.00
Project	37655	Rev BB	115111.00	982.00	992.54	994.10	999.31	0.008065	20.88	5511.72	706.72	1.32
Project	37390	Rev BB	115111.00	981.00	987.53	990.11	996.27	0.015047	23.73	4850.91	823.78	1.72
Project	37135	Rev BB	115111.00	980.00	989.30	989.33	993.58	0.004550	16.58	6941.42	821.44	1.01
Project	36930	Rev BB	115111.00	978.00	986.10	987.49	992.18	0.008097	19.79	5815.33	812.44	1.30
Project	36735	Rev BB	115111.00	977.00	986.84	986.84	990.86	0.004540	16.10	7161.17	896.91	1.00
Project	36515	Rev BB	115111.00	975.00	987.02	985.36	989.58	0.002443	12.85	8981.37	994.69	0.75
Project	36265	Rev BB	115111.00	974.00	986.48	985.22	988.84	0.003072	12.33	9335.94	1176.00	0.77
Project	36080	Rev BB	116236.00	973.00	984.63	984.63	987.98	0.005713	14.69	7912.71	1176.00	1.00
Project	35845	Rev BB	116236.00	971.00	984.64	982.88	986.50	0.002139	10.95	10632.07	1401.71	0.68
Project	35725	Rev BB	116236.00	970.00	982.95	982.95	986.05	0.003627	14.96	8689.93	1377.89	0.90
Project	35515	Rev BB	116236.00	969.00	981.00	981.77	985.11	0.004566	17.10	7670.88	1354.77	1.04
Project	35245	Rev BB	116236.00	968.00	979.34	980.44	983.69	0.005894	17.32	7329.53	1328.31	1.12
Project	35040	Rev BB	116236.00	967.00	977.65	978.97	982.46	0.005549	19.57	7402.76	1354.78	1.13
Project	34860	Rev BB	116236.00	966.00	975.96	977.40	981.22	0.008614	18.40	6315.84	1285.71	1.46
Project	34720	Rev BB	116236.00	965.50	974.72	976.17	979.96	0.009180	18.37	6328.08	1411.20	1.53
Project	34495	Rev BB	116236.00	964.00	973.04	974.28	977.75	0.009172	17.42	6673.93	1283.85	1.35
Project	34310	Rev BB	116236.00	963.00	972.28	973.00	976.33	0.004852	16.76	7668.82	1308.50	1.03
Project	34090	Rev BB	116236.00	962.00	970.57	971.59	975.05	0.006730	16.98	6843.72	1295.50	1.30
Project	33880	Rev BB	116236.00	960.00	969.33	970.25	973.60	0.006606	16.57	7013.99	1318.43	1.27
Project	33710	Rev BB	116236.00	959.00	968.71	969.25	972.38	0.005499	15.39	7555.15	1372.11	1.16
Project	33500	Rev BB	116236.00	958.00	967.26	967.96	971.11	0.006549	16.18	7665.86	1495.98	1.14
Project	33310	Rev BB	116236.00	957.00	966.03	966.96	969.89	0.006423	15.77	7371.77	1770.35	1.36
Project	33115	Rev BB	116236.00	956.00	966.60	965.32	968.27	0.002770	10.36	11217.41	1847.27	0.74
Project	32795	Rev BB	116236.00	954.00	964.56	964.56	967.18	0.003570	12.99	8949.52	1735.59	1.01
Project	32605	Rev BB	116236.00	952.00	963.12	963.61	966.33	0.004754	14.38	8080.57	1699.92	1.13
Project	32265	Rev BB	140776.00	950.00	960.46	961.32	964.38	0.006433	15.88	8862.89	1853.19	1.28
Project	31875	Rev BB	140776.00	949.00	959.38	959.38	961.76	0.005505	12.38	11368.96	2409.15	1.00
Project	31585	Rev BB	140776.00	946.00	957.85	956.96	959.70	0.003160	10.91	12900.93	2182.22	0.79
Project	31360	Rev BB	140776.00	944.00	957.45	955.41	959.09	0.001898	10.28	13848.11	1878.67	0.64
Project	31060	Rev BB	140776.00	942.00	957.49	953.29	958.54	0.000883	8.20	17165.15	1708.18	0.46
Project	30720	Rev BB	140776.00	940.00	957.52	951.33	958.21	0.000503	6.65	21153.55	1888.61	0.35
Project	30445	Rev BB	140776.00	938.00	957.46	949.57	958.06	0.000373	6.25	22524.41	1779.71	0.31
Project	30095	Rev BB	140776.00	936.00	957.25	947.93	957.94	0.000304	6.72	21778.32	1622.72	0.29
Project	29815	Rev BB	140776.00	935.00	956.93	948.10	957.82	0.000390	7.74	19323.91	1433.15	0.33
Project	29565	Rev BB	140776.00	934.00	956.88	947.30	957.70	0.000380	7.40	19609.21	1323.79	0.32
Project	29385	Rev BB	140776.00	933.00	956.59	949.37	957.61	0.000483	8.28	17777.02	1237.37	0.36
Project	29140	Rev BB	140776.00	932.00	956.13	949.97	957.44	0.000712	9.19	15319.17	1087.20	0.43
Project	28895	Rev BB	140776.00	930.00	952.50	952.50	956.86	0.002171	18.80	9575.46	972.12	0.78
Project	28695	Rev BB	140776.00	928.00	942.01	945.73	954.96	0.024913	28.87	4876.24	899.40	2.18

HEC-RAS Plan: Pr025LevCode River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	28500	Rev BB	140776.00	927.50	943.62	946.10	951.41	0.005568	22.39	6287.19	552.17	1.17
Project	28280	Rev BB	140776.00	926.00	936.76	940.42	949.18	0.012736	29.59	5431.96	944.52	1.71
Project	28080	Rev BB	140776.00	925.00	944.09	938.55	945.83	0.000816	11.26	13583.41	926.37	0.48
Project	27925	Rev BB	140776.00	924.00	943.26	939.25	945.62	0.001091	13.09	11919.32	866.57	0.55
Project	27725	Rev BB	140776.00	923.00	939.71	939.71	945.00	0.002680	19.03	8197.14	786.61	0.85
Project	27545	Rev BB	140776.00	922.00	936.05	937.70	944.07	0.005424	22.89	6357.92	643.23	1.16
Project	27335	Rev BB	140776.00	921.00	933.30	936.32	942.60	0.007749	24.55	5857.59	703.53	1.35
Project	27155	Rev BB	140776.00	920.50	935.29	935.76	940.56	0.003283	19.09	8183.45	888.43	0.92
Project	26990	Rev BB	140776.00	920.00	931.45	933.72	939.36	0.010995	22.60	6251.25	922.34	1.51
Project	26780	Rev BB	140776.00	918.00	929.28	931.66	937.27	0.009096	23.11	6501.43	1043.32	1.42
Project	26575	Rev BB	140776.00	917.00	928.11	929.98	934.77	0.011845	20.70	6801.06	1187.27	1.52
Project	26355	Rev BB	140776.00	916.00	929.39	929.39	933.05	0.003824	15.86	9475.99	1260.40	0.93
Project	26170	Rev BB	140776.00	915.00	928.48	928.73	932.37	0.003357	16.99	9605.44	1269.04	0.90
Project	25965	Rev BB	140776.00	914.00	926.88	927.72	931.53	0.004261	18.22	8811.74	1281.32	1.00
Project	25785	Rev BB	140776.00	913.50	925.60	926.63	930.65	0.004882	18.93	8376.91	1219.65	1.07
Project	25600	Rev BB	140776.00	912.50	924.93	925.64	929.69	0.004574	18.53	8467.08	1109.36	1.03
Project	25425	Rev BB	140776.00	911.00	923.47	924.43	928.67	0.006886	18.30	7702.49	1082.21	1.20
Project	25215	Rev BB	140776.00	910.00	924.72	923.68	927.87	0.003051	14.27	9886.47	1097.27	0.83
Project	25000	Rev BB	140776.00	909.00	924.48	922.49	927.16	0.002226	13.17	10726.62	1062.41	0.73
Project	24795	Rev BB	140776.00	908.00	923.60	921.80	926.66	0.002399	14.05	10060.99	957.43	0.76
Project	24550	Rev BB	140776.00	906.00	922.50	920.91	926.00	0.002585	15.05	9407.90	856.12	0.79
Project	24335	Rev BB	140776.00	905.00	920.00	920.00	925.14	0.004222	18.23	7758.55	764.84	1.00
Project	24115	Rev BB	140776.00	904.00	917.79	918.66	923.97	0.005627	19.97	7075.98	754.15	1.14
Project	23975	Rev BB	140776.00	903.50	916.36	917.71	923.05	0.006734	20.79	6802.82	783.24	1.23
Project	23755	Rev BB	140776.00	902.00	916.70	916.70	921.73	0.004144	18.07	7883.57	815.66	0.99
Project	23565	Rev BB	140776.00	900.00	914.30	915.55	920.61	0.006682	20.21	7009.72	850.93	1.22
Project	23365	Rev BB	140776.00	900.00	914.27	914.69	919.18	0.004225	18.44	8193.99	939.03	1.00
Project	23180	Rev BB	140776.00	899.00	911.64	913.14	918.15	0.005198	21.91	7362.50	916.60	1.13
Project	23000	Rev BB	140776.00	898.00	909.26	911.13	916.78	0.010007	22.01	6396.83	784.00	1.36
Project	22790	Rev BB	140776.00	897.50	910.49	910.49	915.48	0.005082	17.93	7853.44	784.00	1.00
Project	22600	Rev BB	140776.00	896.00	908.75	909.83	914.38	0.005814	19.84	7611.16	998.99	1.15
Project	22415	Rev BB	140776.00	895.50	906.26	907.97	912.91	0.009659	21.28	6839.61	1039.08	1.42
Project	22195	Rev BB	141426.00	894.00	907.98	906.82	910.85	0.002733	13.64	10506.24	1309.62	0.79
Project	22010	Rev BB	141426.00	892.00	906.34	906.34	910.19	0.003231	16.12	9490.52	1254.05	0.88
Project	21790	Rev BB	141426.00	891.50	903.06	904.80	909.04	0.005997	19.71	7416.01	1144.54	1.16
Project	21615	Rev BB	141426.00	892.00	900.54	902.67	907.53	0.011263	21.25	6724.20	1162.96	1.50
Project	21440	Rev BB	141426.00	890.00	900.97	901.64	905.59	0.004781	17.47	8486.12	1286.09	1.04
Project	21225	Rev BB	141426.00	888.00	899.73	900.84	904.50	0.005437	18.05	8659.23	1558.99	1.10
Project	21020	Rev BB	141426.00	887.00	896.71	898.87	903.05	0.007282	20.26	7028.37	902.97	1.26
Project	20845	Rev BB	141426.00	886.00	898.73	898.73	902.00	0.003234	15.09	10415.32	1563.68	0.87
Project	20595	Rev BB	141426.00	885.00	898.44	896.85	900.55	0.001741	12.43	12879.93	1548.78	0.65
Project	20435	Rev BB	141426.00	884.00	898.29	896.35	900.24	0.001485	12.07	13441.56	1528.26	0.61
Project	20280	Rev BB	141426.00	883.70	896.49	896.49	899.77	0.003240	15.58	10469.12	1531.27	0.87
Project	20070	Rev BB	141426.00	882.00	893.08	894.65	898.66	0.006088	19.34	7950.22	1526.62	1.17
Project	19855	Rev BB	141426.00	880.50	890.72	892.94	897.11	0.007654	20.60	7256.29	1205.44	1.29
Project	19630	Rev BB	141426.00	880.00	888.85	890.50	895.26	0.008984	20.59	7022.63	1060.31	1.37
Project	19440	Rev BB	141426.00	878.00	891.37	889.70	894.01	0.002361	13.14	10944.01	1194.54	0.74
Project	19240	Rev BB	141426.00	877.50	889.35	889.35	893.26	0.004288	15.89	9009.98	1216.93	0.97
Project	19050	Rev BB	141426.00	876.00	886.51	887.89	891.96	0.009085	18.83	7609.36	1321.43	1.35
Project	18830	Rev BB	141426.00	874.00	888.57	887.55	891.15	0.002730	13.26	11286.43	1531.54	0.79
Project	18650	Rev BB	141426.00	873.50	888.51	886.84	890.60	0.001837	12.07	12773.93	1604.48	0.66
Project	18475	Rev BB	141426.00	872.00	888.89	885.04	890.10	0.001001	8.89	16125.18	1621.53	0.49
Project	18290	Rev BB	141426.00	871.50	888.43	885.13	889.87	0.001213	9.80	14922.77	1594.15	0.54
Project	18025	Rev BB	141426.00	870.00	888.54	882.94	889.50	0.000621	7.92	18109.90	1520.22	0.40
Project	17785	Rev BB	141426.00	868.00	888.22	882.78	889.33	0.000704	8.45	16839.22	1398.14	0.42
Project	17510	Rev BB	141426.00	868.00	887.23	883.27	889.02	0.001136	10.97	13735.28	1350.70	0.54
Project	17360	Rev BB	141426.00	868.00	883.91	883.91	888.45	0.004427	17.10	8296.49	943.23	1.00
Project	17110	Rev BB	141426.00	864.00	879.19	881.42	886.72	0.007499	22.29	6796.11	1175.37	1.30
Project	16970	Rev BB	141426.00	863.70	877.25	879.83	885.42	0.010272	23.07	6337.44	1066.97	1.48
Project	16720	Rev BB	141426.00	863.50	872.70	875.43	881.94	0.018711	24.39	5801.39	1122.93	1.88
Project	16515	Rev BB	141426.00	862.00	872.36	873.86	878.20	0.010048	19.44	7302.33	1249.88	1.41
Project	16305	Rev BB	141426.00	860.00	874.55	872.14	876.49	0.001716	11.59	12787.87	1360.53	0.64
Project	16130	Rev BB	141426.00	860.00	872.31	872.31	875.86	0.004579	15.67	9439.97	1326.45	0.99
Project	15960	Rev BB	141426.00	859.00	869.97	870.98	874.69	0.008166	17.65	8113.94	1385.96	1.27
Project	15745	Rev BB	141426.00	858.00	871.32	869.77	873.67	0.002505	12.30	11500.58	1363.87	0.75
Project	15540	Rev BB	141426.00	857.50	871.22	868.50	872.95	0.001597	10.55	13406.47	1426.61	0.61
Project	15335	Rev BB	141426.00	856.00	868.08	868.08	872.16	0.005521	16.21	8721.97	1064.14	1.00
Project	15125	Rev BB	142475.00	854.00	865.62	866.25	870.59	0.007031	17.89	7966.16	1000.47	1.12
Project	14900	Rev BB	142475.00	853.00	862.77	864.23	868.54	0.008996	19.28	7389.85	1626.46	1.35
Project	14720	Rev BB	142475.00	852.00	861.80	862.97	866.83	0.007951	18.07	7995.80	1722.27	1.27
Project	14480	Rev BB	142475.00	850.50	859.35	860.83	864.69	0.009831	19.03	7857.43	1726.69	1.39
Project	14315	Rev BB	142475.00	850.00	859.90	859.99	862.93	0.005287	13.99	10186.13	1880.98	1.02
Project	14090	Rev BB	142475.00	850.00	858.47	858.71	861.66	0.005810	14.34	9937.41	1772.81	1.06
Project	13850	Rev BB	142475.00	848.00	857.69	857.10	860.17	0.003694	12.62	11299.46	1741.62	0.87

HEC-RAS Plan: Pr025LevCode River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	13635	Rev BB	142475.00	846.00	856.29	856.29	859.29	0.003837	15.47	10777.84	1705.84	0.93
Project	13425	Rev BB	142475.00	845.00	852.82	854.24	857.85	0.010659	18.00	7915.99	1850.66	1.53
Project	13190	Rev BB	142475.00	844.00	853.52	852.80	855.78	0.003254	12.17	11923.29	1847.43	0.82
Project	13030	Rev BB	142475.00	843.00	852.58	852.23	855.21	0.003379	14.20	11406.11	1762.99	0.87
Project	12835	Rev BB	142475.00	842.00	852.13	851.20	854.54	0.002769	13.31	11761.95	1607.50	0.79
Project	12615	Rev BB	142475.00	841.00	851.86	850.10	853.94	0.001918	12.46	12681.30	1470.78	0.68
Project	12395	Rev BB	142475.00	840.00	851.49	849.52	853.55	0.001708	12.32	12873.68	1438.10	0.65
Project	12195	Rev BB	142475.00	838.98	851.49	848.24	853.14	0.001192	10.62	14191.69	1383.66	0.55
Project	11995	Rev BB	142475.00	837.00	850.60	848.45	852.80	0.001625	12.80	12474.09	1280.52	0.64
Project	11780	Rev BB	142475.00	836.00	850.37	848.11	852.44	0.001447	12.59	13173.69	1422.19	0.61
Project	11605	Rev BB	142475.00	835.50	849.29	847.46	852.08	0.001869	13.90	11381.14	1325.50	0.69
Project	11405	Rev BB	142475.00	834.00	849.07	846.17	851.69	0.001519	13.18	11428.21	1114.61	0.64
Project	11180	Rev BB	142475.00	833.00	846.89	845.65	851.10	0.002564	16.60	8864.64	835.68	0.82
Project	11015	Rev BB	142475.00	831.50	844.78	844.78	850.43	0.003842	19.08	7493.10	679.39	0.99
Project	10835	Rev BB	142475.00	831.00	841.87	843.71	849.32	0.007252	21.91	6502.00	790.38	1.35
Project	10575	Rev BB	142475.00	830.00	837.47	840.16	846.52	0.015567	24.13	5903.48	1108.84	1.84
Project	10390	Rev BB	142475.00	828.00	836.77	839.04	843.84	0.008452	22.72	7220.95	1247.02	1.37
Project	10225	Rev BB	142475.00	827.50	837.05	838.17	841.96	0.006830	17.80	8061.12	1374.14	1.26
Project	10000	Rev BB	142475.00	826.00	837.14	837.14	840.54	0.003942	14.90	9785.79	1488.00	0.96
Project	9820	Rev BB	142475.00	824.00	833.98	835.33	839.33	0.008466	18.57	7671.79	1402.32	1.37
Project	9595	Rev BB	142475.00	823.80	834.12	834.12	837.42	0.004905	14.58	9770.14	1619.46	1.00
Project	9385	Rev BB	142475.00	823.00	832.49	833.15	836.23	0.006101	15.78	9289.78	1770.37	1.19
Project	9220	Rev BB	142475.00	822.00	830.86	831.81	835.03	0.007824	16.39	8704.29	1771.41	1.29
Project	9025	Rev BB	142475.00	821.00	829.91	830.56	833.69	0.005307	15.90	9468.91	1736.86	1.09

HEC-RAS Plan: Pr085LevCode River: SCR Reach: Project Profile: Rev BB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	46195	Rev BB	115111.00	1035.00	1063.12	1054.04	1064.77	0.006261	10.67	11871.29	750.83	0.40
Project	46020	Rev BB	115111.00	1032.00	1062.02	1052.44	1063.64	0.006544	10.21	11277.79	570.22	0.40
Project	45545	Rev BB	115111.00	1030.00	1057.85	1049.24	1059.95	0.008982	11.63	9900.10	524.21	0.47
Project	45030	Rev BB	115111.00	1025.00	1054.23	1044.56	1055.89	0.006629	10.33	11145.16	557.97	0.41
Project	44585	Rev BB	115111.00	1022.00	1050.60	1043.05	1052.39	0.009283	10.74	10717.92	654.38	0.47
Project	44210	Rev BB	115111.00	1020.00	1047.83	1038.72	1049.37	0.006714	9.97	11549.74	619.95	0.41
Project	43820	Rev BB	115111.00	1018.00	1042.08	1037.47	1045.21	0.017534	14.19	8112.26	528.70	0.64
Project	43610	Rev BB	115111.00	1017.00	1038.25	1034.06	1041.46	0.018806	14.39	7998.42	536.89	0.66
Project	43410	Rev BB	115111.00	1016.00	1035.83	1031.12	1038.22	0.011970	13.25	9837.37	729.14	0.54
Project	43200	Rev BB	115111.00	1014.00	1033.24	1029.61	1035.63	0.014478	12.98	9662.58	779.49	0.58
Project	42975	Rev BB	115111.00	1012.00	1030.98	1026.26	1032.66	0.010954	10.71	11432.61	955.76	0.50
Project	42815	Rev BB	115111.00	1011.00	1029.67	1024.43	1030.90	0.008589	9.10	13242.80	1120.79	0.44
Project	42590	Rev BB	115111.00	1010.00	1028.42	1021.61	1029.28	0.005536	7.65	15735.26	1230.66	0.36
Project	42430	Rev BB	115111.00	1008.00	1027.53	1020.25	1028.39	0.005373	7.55	15955.86	1334.91	0.35
Project	42215	Rev BB	115111.00	1006.00	1026.68	1018.65	1027.34	0.004067	6.60	17936.38	1374.62	0.31
Project	41940	Rev BB	115111.00	1005.00	1025.62	1017.69	1026.25	0.003871	6.38	18230.06	1327.03	0.30
Project	41730	Rev BB	115111.00	1004.00	1024.63	1016.46	1025.35	0.004429	6.86	16939.62	1221.47	0.32
Project	41460	Rev BB	115111.00	1002.00	1023.17	1015.18	1024.03	0.005512	7.43	15483.49	1120.97	0.35
Project	41280	Rev BB	115111.00	1001.00	1021.79	1015.35	1022.90	0.006803	8.69	14194.24	1193.24	0.40
Project	41080	Rev BB	115111.00	1000.00	1020.52	1013.58	1021.61	0.006027	8.64	14443.03	1136.84	0.38
Project	40825	Rev BB	115111.00	999.50	1019.34	1012.13	1020.15	0.004966	7.34	16245.37	1212.96	0.34
Project	40585	Rev BB	115111.00	998.00	1018.25	1010.42	1018.99	0.004404	7.05	16893.35	1247.23	0.32
Project	40335	Rev BB	115111.00	996.00	1017.43	1008.70	1018.01	0.003313	6.09	18980.28	1288.56	0.28
Project	40130	Rev BB	115111.00	995.00	1016.61	1008.34	1017.27	0.003693	6.64	17974.92	1264.54	0.30
Project	39945	Rev BB	115111.00	994.00	1015.89	1007.73	1016.57	0.003832	6.82	17605.07	1212.34	0.30
Project	39755	Rev BB	115111.00	994.00	1014.56	1007.28	1015.64	0.005781	8.58	14340.28	1088.09	0.37
Project	39605	Rev BB	115111.00	993.00	1013.74	1005.87	1014.80	0.005317	8.49	14586.36	1074.69	0.36
Project	39310	Rev BB	115111.00	992.00	1012.22	1004.65	1013.22	0.005130	8.42	14723.69	977.30	0.35
Project	39100	Rev BB	115111.00	990.00	1011.11	1002.09	1012.15	0.005092	8.18	14069.44	831.46	0.35
Project	38925	Rev BB	115111.00	989.50	1010.31	1001.54	1011.25	0.004818	7.77	14815.54	906.70	0.34
Project	38710	Rev BB	115111.00	988.00	1009.15	1000.32	1010.17	0.005022	8.12	14194.81	844.08	0.35
Project	38475	Rev BB	115111.00	986.00	1006.95	1000.04	1008.63	0.008448	10.43	11138.93	695.26	0.45
Project	38300	Rev BB	115111.00	985.50	1005.77	997.87	1007.19	0.007052	9.56	12039.52	716.81	0.41
Project	38065	Rev BB	115111.00	984.00	1004.13	995.74	1005.55	0.006785	9.57	12028.87	691.25	0.40
Project	37810	Rev BB	115111.00	983.00	1001.38	995.22	1003.35	0.010638	11.27	10217.52	648.42	0.50
Project	37655	Rev BB	115111.00	982.00	999.88	994.10	1001.64	0.010523	10.64	10815.11	738.91	0.49
Project	37390	Rev BB	115111.00	981.00	998.45	990.10	999.49	0.005379	8.16	14098.28	869.10	0.36
Project	37135	Rev BB	115111.00	980.00	996.79	989.31	997.96	0.006585	8.70	13225.00	863.67	0.39
Project	36930	Rev BB	115111.00	978.00	995.67	987.49	996.71	0.005428	8.25	14200.96	923.68	0.36
Project	36735	Rev BB	115111.00	977.00	994.61	986.84	995.61	0.005534	8.08	14397.32	963.18	0.36
Project	36515	Rev BB	115111.00	975.00	993.62	985.36	994.47	0.004637	7.39	15678.21	1032.73	0.33
Project	36265	Rev BB	115111.00	974.00	992.27	985.22	993.06	0.006897	7.13	16142.37	1176.00	0.34
Project	36080	Rev BB	116236.00	973.00	990.64	984.63	991.58	0.009003	7.75	14989.02	1176.00	0.38
Project	35845	Rev BB	116236.00	971.00	989.14	982.87	989.89	0.005531	6.98	16713.90	1512.83	0.35
Project	35725	Rev BB	116236.00	970.00	988.29	982.95	989.16	0.006293	8.01	15871.91	1488.92	0.38
Project	35515	Rev BB	116236.00	969.00	986.85	981.77	987.82	0.006633	8.45	15243.73	1501.04	0.39
Project	35245	Rev BB	116236.00	968.00	984.99	980.44	985.93	0.007356	8.26	15487.04	1580.25	0.40
Project	35040	Rev BB	116236.00	967.00	983.55	978.97	984.46	0.006763	8.81	15947.66	1491.55	0.40
Project	34860	Rev BB	116236.00	966.00	982.27	977.40	983.19	0.007889	7.72	15053.43	1431.50	0.42
Project	34720	Rev BB	116236.00	965.50	981.25	976.17	982.11	0.007109	7.42	15663.31	1449.93	0.40
Project	34495	Rev BB	116236.00	964.00	979.74	974.28	980.55	0.006712	7.24	16056.04	1461.49	0.38
Project	34310	Rev BB	116236.00	963.00	978.44	973.00	979.33	0.006216	8.12	15915.74	1384.94	0.38
Project	34090	Rev BB	116236.00	962.00	977.04	971.59	977.91	0.006781	7.50	15494.22	1371.03	0.39
Project	33880	Rev BB	116236.00	960.00	975.66	970.25	976.48	0.006784	7.29	15950.57	1482.88	0.39
Project	33710	Rev BB	116236.00	959.00	974.55	969.25	975.30	0.006495	6.96	16700.10	1637.90	0.38
Project	33500	Rev BB	116236.00	958.00	973.31	967.96	973.99	0.005863	6.99	17999.09	1755.45	0.35
Project	33310	Rev BB	116236.00	957.00	972.33	966.96	972.92	0.005184	6.21	18709.82	1828.18	0.34
Project	33115	Rev BB	116236.00	956.00	971.41	965.32	971.93	0.004628	5.75	20248.08	1927.09	0.31
Project	32795	Rev BB	116236.00	954.00	969.69	964.56	970.32	0.005544	6.34	18385.59	1920.75	0.36
Project	32605	Rev BB	116236.00	952.00	968.71	963.61	969.26	0.005158	6.06	20182.80	2407.42	0.34
Project	32265	Rev BB	140776.00	950.00	967.18	961.33	967.65	0.004429	5.48	25728.28	2840.18	0.32
Project	31875	Rev BB	140776.00	949.00	965.59	959.38	966.01	0.003875	5.25	26887.78	2593.08	0.28
Project	31585	Rev BB	140776.00	946.00	964.66	956.96	965.04	0.002932	4.96	28433.09	2377.46	0.25
Project	31360	Rev BB	140776.00	944.00	963.92	955.41	964.37	0.002797	5.46	26418.22	1959.45	0.25
Project	31060	Rev BB	140776.00	942.00	963.17	953.29	963.57	0.002504	5.08	27711.47	1975.93	0.24
Project	30720	Rev BB	140776.00	940.00	962.52	951.33	962.85	0.001709	4.59	30668.14	1911.53	0.20
Project	30445	Rev BB	140776.00	938.00	962.08	949.57	962.41	0.001527	4.58	30947.53	1841.84	0.19
Project	30095	Rev BB	140776.00	936.00	961.46	947.93	961.86	0.001543	5.18	28649.25	1637.30	0.20
Project	29815	Rev BB	140776.00	935.00	960.83	948.10	961.36	0.002089	6.05	24935.54	1445.23	0.23
Project	29565	Rev BB	140776.00	934.00	960.26	947.30	960.81	0.002264	6.03	24109.24	1334.86	0.24
Project	29385	Rev BB	140776.00	933.00	959.64	949.37	960.33	0.003009	6.82	21565.54	1249.05	0.28
Project	29140	Rev BB	140776.00	932.00	958.42	949.97	959.39	0.005030	7.90	17821.87	1095.03	0.35
Project	28895	Rev BB	140776.00	930.00	953.81	952.50	957.09	0.017778	16.50	10852.34	977.96	0.66
Project	28695	Rev BB	140776.00	928.00	952.93	945.73	954.30	0.007405	9.39	14984.17	951.56	0.42

HEC-RAS Plan: Pr085LevCode River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	28500	Rev BB	140776.00	927.50	950.46	946.10	952.50	0.010938	11.99	13039.30	1039.52	0.51
Project	28280	Rev BB	140776.00	926.00	949.82	940.43	950.81	0.003962	8.71	18177.10	1003.89	0.32
Project	28080	Rev BB	140776.00	925.00	949.08	938.55	950.03	0.003667	8.32	18252.46	945.35	0.31
Project	27925	Rev BB	140776.00	924.00	948.08	939.25	949.34	0.004899	9.61	16137.12	884.88	0.36
Project	27725	Rev BB	140776.00	923.00	946.11	939.71	948.04	0.007805	11.87	13307.67	811.81	0.45
Project	27545	Rev BB	140776.00	922.00	944.30	937.76	946.51	0.009174	12.41	12580.74	852.53	0.49
Project	27335	Rev BB	140776.00	921.00	943.00	936.32	944.66	0.007204	10.87	14331.54	937.22	0.43
Project	27155	Rev BB	140776.00	920.50	941.47	935.68	943.23	0.008132	11.39	14013.66	978.05	0.45
Project	26990	Rev BB	140776.00	920.00	940.42	933.69	941.79	0.007553	9.43	15133.02	1020.89	0.42
Project	26780	Rev BB	140776.00	918.00	939.32	931.66	940.39	0.005229	8.76	17337.33	1106.54	0.36
Project	26575	Rev BB	140776.00	917.00	938.54	929.98	939.36	0.004267	7.26	19508.54	1243.55	0.32
Project	26355	Rev BB	140776.00	916.00	937.64	929.39	938.43	0.004072	7.43	20021.06	1294.51	0.32
Project	26170	Rev BB	140776.00	915.00	936.93	928.73	937.71	0.003759	7.69	20464.75	1301.20	0.31
Project	25965	Rev BB	140776.00	914.00	936.21	927.72	936.96	0.003524	7.51	20897.77	1313.23	0.30
Project	25785	Rev BB	140776.00	913.50	935.53	926.61	936.29	0.003475	7.49	20670.97	1256.91	0.30
Project	25600	Rev BB	140776.00	912.50	934.78	925.61	935.61	0.003744	7.77	19592.25	1149.92	0.31
Project	25425	Rev BB	140776.00	911.00	934.12	924.40	934.93	0.003804	7.28	19499.23	1138.28	0.31
Project	25215	Rev BB	140776.00	910.00	933.33	923.65	934.14	0.003786	7.28	19489.43	1133.64	0.31
Project	25000	Rev BB	140776.00	909.00	932.49	922.49	933.32	0.003701	7.33	19370.94	1093.78	0.30
Project	24795	Rev BB	140776.00	908.00	931.50	921.80	932.49	0.004350	8.01	17745.99	986.47	0.33
Project	24550	Rev BB	140776.00	906.00	930.07	920.91	931.29	0.005312	8.89	16012.83	887.13	0.36
Project	24335	Rev BB	140776.00	905.00	928.51	920.00	930.01	0.006539	9.87	14423.97	800.25	0.40
Project	24115	Rev BB	140776.00	904.00	927.00	918.67	928.55	0.006726	10.04	14198.88	793.23	0.41
Project	23975	Rev BB	140776.00	903.50	926.14	917.71	927.59	0.006337	9.71	14687.95	828.21	0.40
Project	23755	Rev BB	140776.00	902.00	924.71	916.73	926.18	0.006617	9.86	14864.52	939.24	0.41
Project	23565	Rev BB	140776.00	900.00	923.57	915.55	924.91	0.006257	9.40	15381.71	941.49	0.39
Project	23365	Rev BB	140776.00	900.00	922.44	914.69	923.69	0.005846	9.37	16064.14	987.42	0.38
Project	23180	Rev BB	140776.00	899.00	921.46	913.15	922.64	0.005042	9.55	16653.38	975.52	0.36
Project	23000	Rev BB	140776.00	898.00	920.04	911.13	921.44	0.008933	9.48	14845.64	784.00	0.38
Project	22790	Rev BB	140776.00	897.50	917.49	910.49	919.22	0.012226	10.55	13340.82	784.00	0.45
Project	22600	Rev BB	140776.00	896.00	915.78	909.80	917.24	0.008268	10.17	14841.19	1050.23	0.45
Project	22415	Rev BB	140776.00	895.50	914.43	908.00	915.72	0.007649	9.33	15555.24	1091.58	0.42
Project	22195	Rev BB	141426.00	894.00	913.05	906.82	914.10	0.006704	8.42	17691.91	1463.96	0.39
Project	22010	Rev BB	141426.00	892.00	911.36	906.34	912.70	0.008118	9.77	15883.23	1735.05	0.44
Project	21790	Rev BB	141426.00	891.50	909.92	904.80	911.00	0.006786	9.03	18446.60	1778.41	0.40
Project	21615	Rev BB	141426.00	892.00	908.91	902.67	909.82	0.005937	7.96	19349.10	1687.67	0.37
Project	21440	Rev BB	141426.00	890.00	907.84	901.64	908.76	0.005947	8.18	19246.72	1652.97	0.37
Project	21225	Rev BB	141426.00	888.00	906.65	900.86	907.52	0.005590	8.04	19593.15	1600.82	0.36
Project	21020	Rev BB	141426.00	887.00	905.64	898.87	906.47	0.004588	7.78	20476.53	1607.44	0.33
Project	20845	Rev BB	141426.00	886.00	904.74	898.73	905.59	0.005266	7.87	19957.19	1605.07	0.35
Project	20595	Rev BB	141426.00	885.00	903.62	896.85	904.38	0.004470	7.54	20997.42	1600.38	0.33
Project	20435	Rev BB	141426.00	884.00	902.82	896.35	903.63	0.004789	7.88	20533.92	1613.47	0.34
Project	20280	Rev BB	141426.00	883.70	901.75	896.49	902.72	0.006590	8.68	18742.02	1636.29	0.39
Project	20070	Rev BB	141426.00	882.00	900.58	894.65	901.48	0.005609	8.31	19907.01	1797.75	0.37
Project	19855	Rev BB	141426.00	880.50	899.60	892.94	900.37	0.004492	7.67	21440.38	1809.58	0.33
Project	19630	Rev BB	141426.00	880.00	898.64	890.50	899.40	0.004164	7.38	21715.34	1833.73	0.32
Project	19440	Rev BB	141426.00	878.00	897.86	889.68	898.60	0.004126	7.19	22046.05	1986.11	0.31
Project	19240	Rev BB	141426.00	877.50	896.87	889.35	897.70	0.004758	7.58	20444.11	1737.98	0.34
Project	19050	Rev BB	141426.00	876.00	896.19	887.89	896.86	0.003748	6.72	22459.06	1753.41	0.30
Project	18830	Rev BB	141426.00	874.00	895.35	887.44	896.02	0.003931	6.84	22235.02	1684.04	0.31
Project	18650	Rev BB	141426.00	873.50	894.72	886.84	895.34	0.003526	6.73	22990.32	1686.19	0.29
Project	18475	Rev BB	141426.00	872.00	894.25	885.04	894.75	0.002797	5.78	24928.99	1665.89	0.26
Project	18290	Rev BB	141426.00	871.50	893.60	885.13	894.19	0.003383	6.31	23260.68	1631.88	0.28
Project	18025	Rev BB	141426.00	870.00	892.85	882.94	893.37	0.002605	5.82	24748.10	1557.41	0.25
Project	17785	Rev BB	141426.00	868.00	892.02	882.78	892.66	0.003309	6.43	22237.59	1444.07	0.28
Project	17510	Rev BB	141426.00	868.00	890.43	883.27	891.45	0.005785	8.40	18121.15	1398.94	0.37
Project	17360	Rev BB	141426.00	868.00	888.28	883.91	890.13	0.012863	11.10	13512.13	1303.31	0.53
Project	17110	Rev BB	141426.00	864.00	885.50	881.46	887.17	0.010479	11.03	14389.15	1229.58	0.50
Project	16970	Rev BB	141426.00	863.70	883.96	879.78	885.60	0.010995	10.74	14212.17	1195.98	0.50
Project	16720	Rev BB	141426.00	863.50	882.28	875.41	883.38	0.006484	8.47	16891.55	1182.04	0.39
Project	16515	Rev BB	141426.00	862.00	881.23	873.86	882.13	0.005324	7.67	18660.39	1303.83	0.35
Project	16305	Rev BB	141426.00	860.00	880.38	872.14	881.10	0.004083	7.10	20814.07	1395.48	0.31
Project	16130	Rev BB	141426.00	860.00	879.38	872.31	880.25	0.005470	7.68	18966.94	1368.87	0.35
Project	15960	Rev BB	141426.00	859.00	878.56	870.96	879.32	0.004714	7.06	20250.69	1437.55	0.33
Project	15745	Rev BB	141426.00	858.00	877.56	869.77	878.32	0.004657	7.03	20125.55	1401.31	0.33
Project	15540	Rev BB	141426.00	857.50	876.69	868.51	877.36	0.004308	6.61	21873.23	2361.20	0.31
Project	15335	Rev BB	141426.00	856.00	874.77	868.08	876.01	0.010129	8.92	15846.59	1064.14	0.41
Project	15125	Rev BB	142475.00	854.00	871.99	866.25	873.49	0.013374	9.80	14531.32	1053.51	0.47
Project	14900	Rev BB	142475.00	853.00	869.74	864.23	870.94	0.008488	8.83	16644.53	2233.10	0.43
Project	14720	Rev BB	142475.00	852.00	868.35	862.97	869.45	0.008069	8.54	17440.60	2020.85	0.42
Project	14480	Rev BB	142475.00	850.50	866.91	860.83	867.72	0.005898	7.39	19912.22	1851.81	0.36
Project	14315	Rev BB	142475.00	850.00	866.04	859.99	866.75	0.005537	6.77	21071.02	1944.13	0.35
Project	14090	Rev BB	142475.00	850.00	864.80	858.71	865.50	0.005413	6.72	21309.57	1816.18	0.34
Project	13850	Rev BB	142475.00	848.00	863.60	857.10	864.27	0.004956	6.60	21684.38	1774.85	0.33

HEC-RAS Plan: Pr085LevCode River: SCR Reach: Project Profile: Rev BB (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	13635	Rev BB	142475.00	846.00	862.52	856.29	863.21	0.004839	7.34	21858.75	1817.99	0.34
Project	13425	Rev BB	142475.00	845.00	861.81	854.24	862.31	0.003346	5.70	25084.97	1936.05	0.28
Project	13190	Rev BB	142475.00	844.00	861.11	852.80	861.58	0.002886	5.56	26195.39	1911.13	0.26
Project	13030	Rev BB	142475.00	843.00	860.64	852.23	861.12	0.002842	6.01	26034.42	1863.68	0.26
Project	12835	Rev BB	142475.00	842.00	860.03	851.20	860.54	0.002909	6.16	25313.27	1775.13	0.27
Project	12615	Rev BB	142475.00	841.00	859.33	850.10	859.90	0.002952	6.51	23997.77	1566.52	0.27
Project	12395	Rev BB	142475.00	840.00	858.66	849.52	859.26	0.003032	6.71	23513.12	1542.96	0.28
Project	12195	Rev BB	142475.00	838.98	858.07	848.24	858.67	0.002825	6.46	23478.39	1463.74	0.27
Project	11995	Rev BB	142475.00	837.00	857.31	848.45	858.03	0.003521	7.40	21763.81	1448.52	0.30
Project	11780	Rev BB	142475.00	836.00	856.59	848.11	857.28	0.003385	7.33	22140.13	1460.82	0.29
Project	11605	Rev BB	142475.00	835.50	855.78	847.45	856.62	0.004035	7.93	20373.82	1417.47	0.32
Project	11405	Rev BB	142475.00	834.00	854.62	846.17	855.70	0.004843	8.65	17696.63	1144.88	0.35
Project	11180	Rev BB	142475.00	833.00	852.66	845.62	854.32	0.007682	10.68	14475.94	1009.18	0.44
Project	11015	Rev BB	142475.00	831.50	850.24	844.78	852.64	0.011984	12.57	11805.37	850.96	0.54
Project	10835	Rev BB	142475.00	831.00	848.05	843.71	850.33	0.013479	12.24	12146.77	1072.95	0.57
Project	10575	Rev BB	142475.00	830.00	846.10	840.15	847.39	0.008015	9.14	15843.91	1322.18	0.43
Project	10390	Rev BB	142475.00	828.00	845.09	839.04	846.04	0.005680	8.63	19054.95	1516.98	0.37
Project	10225	Rev BB	142475.00	827.50	844.10	838.16	845.05	0.006403	7.96	18553.74	1543.40	0.39
Project	10000	Rev BB	142475.00	826.00	842.55	837.14	843.54	0.006984	8.14	18351.48	1626.01	0.40
Project	9820	Rev BB	142475.00	824.00	841.35	835.33	842.31	0.006527	7.91	18387.37	1648.84	0.39
Project	9595	Rev BB	142475.00	823.80	839.87	834.12	840.80	0.006938	7.76	18438.52	1719.61	0.39
Project	9385	Rev BB	142475.00	823.00	838.58	833.15	839.36	0.006233	7.21	20157.06	1799.30	0.37
Project	9220	Rev BB	142475.00	822.00	837.62	831.81	838.34	0.005586	6.82	21094.14	1853.43	0.35
Project	9025	Rev BB	142475.00	821.00	836.62	830.56	837.33	0.005004	7.02	21529.03	1822.90	0.34

HEC-RAS Plan: FinalPr085Q2 River: SCR Reach: Project Profile: Old 2-Year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	46195	Old 2-Year	1890.00	1035.00	1037.91	1036.89	1038.13	0.015238	3.78	500.66	215.66	0.44
Project	46020	Old 2-Year	1890.00	1032.00	1036.93		1037.04	0.003252	2.65	712.22	162.70	0.22
Project	45545	Old 2-Year	1890.00	1030.00	1033.60		1033.93	0.018551	4.61	409.79	151.31	0.49
Project	45030	Old 2-Year	1890.00	1025.00	1029.15		1029.27	0.005278	2.71	696.88	222.55	0.27
Project	44585	Old 2-Year	1890.00	1022.00	1026.44		1026.61	0.006748	3.30	573.02	163.72	0.31
Project	44210	Old 2-Year	1890.00	1020.00	1024.34		1024.46	0.004860	2.74	690.38	204.32	0.26
Project	43820	Old 2-Year	1890.00	1018.00	1022.15		1022.28	0.006434	2.95	639.61	207.81	0.30
Project	43610	Old 2-Year	1890.00	1017.00	1020.53		1020.69	0.009508	3.13	604.25	242.11	0.35
Project	43410	Old 2-Year	1890.00	1016.00	1018.91		1019.01	0.007189	2.60	728.11	312.76	0.30
Project	43200	Old 2-Year	1890.00	1014.00	1017.48		1017.58	0.006627	2.55	741.60	308.38	0.29
Project	42975	Old 2-Year	1890.00	1012.00	1016.15		1016.22	0.005389	2.14	885.14	410.54	0.26
Project	42815	Old 2-Year	1890.00	1011.00	1014.97		1015.07	0.009716	2.63	718.89	380.39	0.34
Project	42590	Old 2-Year	1890.00	1010.00	1012.84		1012.93	0.009456	2.44	776.10	451.85	0.33
Project	42430	Old 2-Year	1890.00	1008.00	1011.51		1011.59	0.007090	2.25	841.78	445.90	0.29
Project	42215	Old 2-Year	1890.00	1006.00	1010.16		1010.23	0.005773	2.03	931.90	493.19	0.26
Project	41940	Old 2-Year	1890.00	1005.00	1008.54		1008.61	0.006087	2.13	887.58	454.20	0.27
Project	41730	Old 2-Year	1890.00	1004.00	1007.19		1007.27	0.006523	2.28	829.64	404.14	0.28
Project	41460	Old 2-Year	1890.00	1002.00	1005.76		1005.83	0.004561	2.13	887.64	365.67	0.24
Project	41280	Old 2-Year	1890.00	1001.00	1005.01		1005.07	0.003862	2.08	909.07	342.38	0.22
Project	41080	Old 2-Year	1890.00	1000.00	1004.20		1004.26	0.004239	1.95	967.43	429.50	0.23
Project	40825	Old 2-Year	1890.00	999.50	1003.20		1003.25	0.003716	1.88	1004.29	426.62	0.22
Project	40585	Old 2-Year	1890.00	998.00	1001.67		1001.78	0.011310	2.69	703.54	404.25	0.36
Project	40335	Old 2-Year	1890.00	996.00	1000.27		1000.32	0.003588	1.92	986.15	397.20	0.21
Project	40130	Old 2-Year	1890.00	995.00	999.43		999.51	0.004294	2.23	848.05	311.26	0.24
Project	39945	Old 2-Year	1890.00	994.00	998.41		998.51	0.006997	2.64	715.84	293.75	0.30
Project	39755	Old 2-Year	1890.00	994.00	997.40		997.48	0.004217	2.26	836.14	296.67	0.24
Project	39605	Old 2-Year	1890.00	993.00	996.67		996.75	0.005898	2.34	806.62	348.84	0.27
Project	39310	Old 2-Year	1890.00	992.00	994.61		994.72	0.007964	2.64	715.15	323.42	0.31
Project	39100	Old 2-Year	1890.00	990.00	993.54		993.60	0.003849	1.89	1002.44	436.50	0.22
Project	38925	Old 2-Year	1890.00	989.50	992.72		992.79	0.005552	2.13	886.43	422.32	0.26
Project	38710	Old 2-Year	1890.00	988.00	991.78		991.83	0.003563	1.92	986.07	394.93	0.21
Project	38475	Old 2-Year	1890.00	986.00	990.40		990.51	0.010472	2.70	698.92	375.05	0.35
Project	38300	Old 2-Year	1890.00	985.50	988.59		988.70	0.010144	2.59	729.16	407.55	0.34
Project	38065	Old 2-Year	1890.00	984.00	987.34		987.38	0.003437	1.64	1152.45	569.04	0.20
Project	37810	Old 2-Year	1890.00	983.00	986.36		986.41	0.004187	1.77	1069.34	546.75	0.22
Project	37655	Old 2-Year	1890.00	982.00	984.96		985.14	0.020993	3.43	551.19	348.91	0.48
Project	37390	Old 2-Year	1890.00	981.00	983.18		983.21	0.003538	1.44	1311.43	803.34	0.20
Project	37135	Old 2-Year	1890.00	980.00	981.39		981.50	0.017325	2.67	706.87	564.00	0.42
Project	36930	Old 2-Year	1890.00	978.00	980.01		980.05	0.003777	1.55	1222.97	708.31	0.21
Project	36735	Old 2-Year	1890.00	977.00	978.86		978.93	0.009234	2.11	894.38	633.76	0.31
Project	36515	Old 2-Year	1890.00	975.00	977.99		978.03	0.002321	1.50	1262.13	532.09	0.17
Project	36265	Old 2-Year	1890.00	974.00	977.31	975.21	977.36	0.003084	1.87	1012.76	358.97	0.20
Project	36080	Old 2-Year	2560.00	973.00	976.09	974.81	976.25	0.011403	3.25	786.96	326.32	0.37
Project	35845	Old 2-Year	2560.00	971.00	974.77	972.71	974.85	0.003562	2.21	1159.46	376.20	0.22
Project	35725	Old 2-Year	2560.00	970.00	974.29	972.29	974.37	0.004300	2.33	1098.42	378.19	0.24
Project	35515	Old 2-Year	2560.00	969.00	973.38	971.33	973.47	0.004507	2.37	1080.19	379.27	0.25
Project	35245	Old 2-Year	2560.00	968.00	971.89	970.49	971.99	0.006692	2.57	997.32	414.32	0.29
Project	35040	Old 2-Year	2560.00	967.00	970.93		970.99	0.003523	2.07	1239.42	440.94	0.22
Project	34860	Old 2-Year	2560.00	966.00	969.93		970.05	0.009090	2.76	926.06	432.92	0.33
Project	34720	Old 2-Year	2560.00	965.50	968.74		968.83	0.007930	2.47	1036.23	545.61	0.32
Project	34495	Old 2-Year	2560.00	964.00	966.78		966.89	0.009606	2.75	931.32	504.60	0.36
Project	34310	Old 2-Year	2560.00	963.00	965.77		965.81	0.003675	1.75	1458.94	684.48	0.21
Project	34090	Old 2-Year	2560.00	962.00	964.74		964.80	0.006084	1.93	1325.42	787.51	0.26
Project	33880	Old 2-Year	2560.00	960.00	963.55		963.61	0.005405	1.89	1354.42	761.04	0.25
Project	33710	Old 2-Year	2560.00	959.00	962.24		962.33	0.010559	2.36	1084.35	719.21	0.34
Project	33500	Old 2-Year	2560.00	958.00	960.64		960.70	0.005886	2.04	1255.57	666.42	0.26
Project	33310	Old 2-Year	2560.00	957.00	959.35		959.43	0.007811	2.31	1108.79	609.86	0.30
Project	33115	Old 2-Year	2560.00	956.00	958.44		958.48	0.003169	1.69	1512.33	667.75	0.20
Project	32795	Old 2-Year	2560.00	954.00	957.22		957.27	0.004740	1.88	1359.22	697.56	0.24
Project	32605	Old 2-Year	2560.00	952.00	956.11	954.72	956.18	0.006829	2.15	1189.09	652.84	0.28
Project	32265	Old 2-Year	2579.00	950.00	953.86		953.93	0.006524	2.14	1205.44	650.99	0.28
Project	31875	Old 2-Year	2579.00	949.00	951.51		951.58	0.005551	2.15	1196.97	562.04	0.26
Project	31585	Old 2-Year	2579.00	946.00	949.72		949.80	0.006960	2.22	1162.94	619.45	0.29
Project	31360	Old 2-Year	2579.00	944.00	948.39		948.45	0.005040	1.95	1324.53	672.21	0.24
Project	31060	Old 2-Year	2579.00	942.00	946.38		946.44	0.009465	2.04	1261.20	954.95	0.31
Project	30720	Old 2-Year	2579.00	940.00	944.28		944.33	0.004358	1.76	1462.57	772.68	0.23
Project	30445	Old 2-Year	2579.00	938.00	942.33		942.43	0.012745	2.53	1019.12	700.89	0.37
Project	30095	Old 2-Year	2579.00	936.00	940.09		940.14	0.003925	1.87	1379.29	617.14	0.22
Project	29815	Old 2-Year	2579.00	935.00	938.67		938.75	0.006532	2.28	1131.43	551.12	0.28
Project	29565	Old 2-Year	2579.00	934.00	937.89		937.94	0.001867	1.68	1535.99	461.78	0.16
Project	29385	Old 2-Year	2579.00	933.00	937.50		937.56	0.002342	1.94	1329.77	381.52	0.18
Project	29140	Old 2-Year	2579.00	932.00	936.43		936.61	0.007369	3.43	752.83	217.19	0.32
Project	28895	Old 2-Year	2579.00	930.00	934.06		934.32	0.012370	4.12	625.43	201.92	0.41
Project	28695	Old 2-Year	2579.00	928.00	932.41		932.55	0.006312	3.00	858.70	269.57	0.30

HEC-RAS Plan: FinalPr085Q2 River: SCR Reach: Project Profile: Old 2-Year (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	28500	Old 2-Year	2579.00	927.50	930.64		930.83	0.013053	3.46	744.75	326.01	0.40
Project	28280	Old 2-Year	2579.00	926.00	929.34		929.42	0.003716	2.24	1153.51	379.14	0.23
Project	28080	Old 2-Year	2579.00	925.00	928.39		928.49	0.005850	2.47	1045.43	416.63	0.27
Project	27925	Old 2-Year	2579.00	924.00	927.29		927.41	0.008266	2.78	929.01	401.99	0.32
Project	27725	Old 2-Year	2579.00	923.00	926.41		926.48	0.002905	2.06	1251.38	386.18	0.20
Project	27545	Old 2-Year	2579.00	922.00	925.57		925.68	0.007542	2.68	962.13	409.60	0.31
Project	27335	Old 2-Year	2579.00	921.00	924.70		924.76	0.002863	1.98	1303.00	422.52	0.20
Project	27155	Old 2-Year	2579.00	920.50	924.11		924.18	0.003567	2.06	1253.19	452.43	0.22
Project	26990	Old 2-Year	2579.00	920.00	923.23		923.34	0.007365	2.58	998.42	440.86	0.30
Project	26780	Old 2-Year	2579.00	918.00	922.06		922.12	0.004625	2.09	1232.77	527.47	0.24
Project	26575	Old 2-Year	2579.00	917.00	921.36		921.41	0.002731	1.80	1428.90	513.48	0.19
Project	26355	Old 2-Year	2579.00	916.00	920.25		920.35	0.010678	2.55	1010.81	601.37	0.35
Project	26170	Old 2-Year	2579.00	915.00	918.95		919.03	0.004998	2.26	1138.73	457.77	0.25
Project	25965	Old 2-Year	2579.00	914.00	917.91		917.98	0.005300	2.11	1219.50	568.37	0.25
Project	25785	Old 2-Year	2579.00	913.50	916.92		916.99	0.005668	2.19	1180.20	550.88	0.26
Project	25600	Old 2-Year	2579.00	912.50	915.89		915.97	0.005355	2.27	1134.24	478.13	0.26
Project	25425	Old 2-Year	2579.00	911.00	915.17		915.24	0.003240	2.10	1227.81	399.76	0.21
Project	25215	Old 2-Year	2579.00	910.00	914.27		914.36	0.005813	2.40	1074.83	444.58	0.27
Project	25000	Old 2-Year	2579.00	909.00	912.98		913.07	0.005874	2.39	1079.92	453.08	0.27
Project	24795	Old 2-Year	2579.00	908.00	911.61		911.73	0.007563	2.73	944.18	391.43	0.31
Project	24550	Old 2-Year	2579.00	906.00	910.48		910.55	0.003221	2.25	1145.29	334.03	0.21
Project	24335	Old 2-Year	2579.00	905.00	909.47		909.59	0.006748	2.80	921.17	337.18	0.30
Project	24115	Old 2-Year	2579.00	904.00	908.17		908.26	0.005327	2.38	1081.54	422.65	0.26
Project	23975	Old 2-Year	2579.00	903.50	907.53		907.62	0.004000	2.35	1097.95	354.12	0.24
Project	23755	Old 2-Year	2579.00	902.00	906.40		906.52	0.006481	2.78	927.91	333.89	0.29
Project	23565	Old 2-Year	2579.00	900.00	905.26		905.37	0.005523	2.69	959.86	322.21	0.27
Project	23365	Old 2-Year	2579.00	900.00	903.62		903.79	0.012255	3.38	762.28	329.38	0.39
Project	23180	Old 2-Year	2579.00	899.00	902.44		902.52	0.004160	2.26	1140.20	400.70	0.24
Project	23000	Old 2-Year	2579.00	898.00	901.59	899.90	901.68	0.005269	2.36	1092.83	407.55	0.25
Project	22790	Old 2-Year	2579.00	897.50	900.64	898.70	900.71	0.004049	2.14	1205.95	425.48	0.22
Project	22600	Old 2-Year	2579.00	896.00	899.82		899.90	0.004491	2.35	1098.28	386.74	0.25
Project	22415	Old 2-Year	2579.00	895.50	898.79		898.89	0.006713	2.56	1008.46	422.32	0.29
Project	22195	Old 2-Year	2615.00	894.00	897.39	895.49	897.50	0.006042	2.62	997.20	371.33	0.28
Project	22010	Old 2-Year	2615.00	892.00	896.38	894.30	896.46	0.005123	2.27	1152.71	471.79	0.26
Project	21790	Old 2-Year	2615.00	891.50	895.21	893.51	895.28	0.005615	2.19	1192.80	549.87	0.26
Project	21615	Old 2-Year	2615.00	892.00	894.04	892.93	894.13	0.007898	2.41	1086.74	563.09	0.31
Project	21440	Old 2-Year	2615.00	890.00	893.15	891.46	893.20	0.003663	1.81	1441.09	638.87	0.21
Project	21225	Old 2-Year	2615.00	888.00	891.23		891.51	0.028226	4.25	615.04	352.44	0.57
Project	21020	Old 2-Year	2615.00	887.00	890.38		890.41	0.001985	1.48	1767.94	674.99	0.16
Project	20845	Old 2-Year	2615.00	886.00	889.71		889.79	0.007590	2.30	1137.99	613.69	0.30
Project	20595	Old 2-Year	2615.00	885.00	888.64		888.68	0.002939	1.60	1635.44	744.48	0.19
Project	20435	Old 2-Year	2615.00	884.00	888.20		888.24	0.002508	1.55	1694.90	765.16	0.18
Project	20280	Old 2-Year	2615.00	883.70	887.45		887.56	0.008806	2.74	953.06	439.60	0.33
Project	20070	Old 2-Year	2615.00	882.00	885.67		885.76	0.008458	2.39	1093.59	602.40	0.31
Project	19855	Old 2-Year	2615.00	880.50	883.89		883.98	0.008030	2.38	1098.93	585.89	0.31
Project	19630	Old 2-Year	2615.00	880.00	882.69		882.75	0.003932	1.86	1405.32	634.15	0.22
Project	19440	Old 2-Year	2615.00	878.00	881.58		881.67	0.008585	2.52	1038.97	536.33	0.32
Project	19240	Old 2-Year	2615.00	877.50	880.22		880.31	0.005501	2.37	1102.54	445.37	0.27
Project	19050	Old 2-Year	2615.00	876.00	879.24		879.32	0.004990	2.36	1106.97	418.07	0.26
Project	18830	Old 2-Year	2615.00	874.00	878.02		878.13	0.005974	2.71	964.36	338.85	0.28
Project	18650	Old 2-Year	2615.00	873.50	877.00		877.11	0.005378	2.62	996.29	339.65	0.27
Project	18475	Old 2-Year	2615.00	872.00	876.05		876.16	0.005337	2.63	995.12	336.63	0.27
Project	18290	Old 2-Year	2615.00	871.50	874.69		874.84	0.010316	3.10	843.58	365.13	0.36
Project	18025	Old 2-Year	2615.00	870.00	873.68		873.73	0.002122	1.89	1380.64	380.36	0.18
Project	17785	Old 2-Year	2615.00	868.00	872.98		873.06	0.003941	2.26	1154.93	389.34	0.23
Project	17510	Old 2-Year	2615.00	868.00	872.05		872.13	0.002996	2.24	1169.03	326.32	0.21
Project	17360	Old 2-Year	2615.00	868.00	871.07		871.31	0.012005	3.93	665.30	223.64	0.40
Project	17110	Old 2-Year	2615.00	864.00	868.91		869.08	0.006728	3.29	795.78	228.67	0.31
Project	16970	Old 2-Year	2615.00	863.70	868.19		868.31	0.004247	2.83	925.23	235.74	0.25
Project	16720	Old 2-Year	2615.00	863.50	866.70		866.87	0.008244	3.32	788.14	259.99	0.34
Project	16515	Old 2-Year	2615.00	862.00	865.03		865.19	0.008355	3.16	827.01	296.50	0.33
Project	16305	Old 2-Year	2615.00	860.00	864.16		864.24	0.002729	2.23	1170.34	304.58	0.20
Project	16130	Old 2-Year	2615.00	860.00	863.65		863.73	0.003146	2.28	1149.27	323.40	0.21
Project	15960	Old 2-Year	2615.00	859.00	862.83		862.96	0.006569	2.95	886.96	294.64	0.30
Project	15745	Old 2-Year	2615.00	858.00	861.57		861.69	0.005376	2.77	942.80	295.79	0.27
Project	15540	Old 2-Year	2615.00	857.50	860.42		860.54	0.005933	2.69	973.68	344.87	0.28
Project	15335	Old 2-Year	2615.00	856.00	858.93	857.51	859.06	0.008876	2.96	883.23	348.62	0.33
Project	15125	Old 2-Year	2860.00	854.00	857.46	855.66	857.55	0.005871	2.47	1157.62	437.27	0.27
Project	14900	Old 2-Year	2860.00	853.00	856.46	854.54	856.52	0.003502	1.93	1485.15	584.08	0.21
Project	14720	Old 2-Year	2860.00	852.00	855.59	853.72	855.68	0.006668	2.42	1180.14	532.85	0.29
Project	14480	Old 2-Year	2860.00	850.50	854.75	852.03	854.79	0.002326	1.49	1922.76	819.84	0.17
Project	14315	Old 2-Year	2860.00	850.00	854.21	851.61	854.25	0.004653	1.68	1700.67	1014.44	0.23
Project	14090	Old 2-Year	2860.00	850.00	852.66		852.75	0.010069	2.35	1218.98	787.44	0.33
Project	13850	Old 2-Year	2860.00	848.00	850.86		850.94	0.006075	2.27	1257.27	582.65	0.27

HEC-RAS Plan: FinalPr085Q2 River: SCR Reach: Project Profile: Old 2-Year (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Project	13635	Old 2-Year	2860.00	846.00	849.24		849.34	0.009079	2.49	1150.83	631.20	0.32
Project	13425	Old 2-Year	2860.00	845.00	847.99		848.06	0.004376	2.08	1376.44	576.31	0.24
Project	13190	Old 2-Year	2860.00	844.00	846.80		846.87	0.005939	2.08	1372.94	713.93	0.26
Project	13030	Old 2-Year	2860.00	843.00	845.94		846.00	0.004971	1.98	1447.37	712.89	0.24
Project	12835	Old 2-Year	2860.00	842.00	844.65		844.73	0.008829	2.24	1275.31	799.35	0.31
Project	12615	Old 2-Year	2860.00	841.00	843.18		843.24	0.005214	2.01	1441.76	741.83	0.25
Project	12395	Old 2-Year	2860.00	840.00	842.18		842.23	0.004143	1.84	1550.30	738.12	0.22
Project	12195	Old 2-Year	2860.00	838.98	841.22		841.27	0.005672	1.80	1586.99	990.77	0.25
Project	11995	Old 2-Year	2860.00	837.00	840.22		840.29	0.004132	2.02	1417.82	589.38	0.23
Project	11780	Old 2-Year	2860.00	836.00	839.08		839.17	0.006773	2.34	1223.34	590.36	0.29
Project	11605	Old 2-Year	2860.00	835.50	837.77		837.86	0.008568	2.51	1137.88	587.56	0.32
Project	11405	Old 2-Year	2860.00	834.00	836.57		836.64	0.004482	2.08	1372.55	579.74	0.24
Project	11180	Old 2-Year	2860.00	833.00	835.42		835.50	0.006001	2.27	1257.17	580.18	0.27
Project	11015	Old 2-Year	2860.00	831.50	834.75		834.81	0.002883	1.91	1494.85	519.83	0.20
Project	10835	Old 2-Year	2860.00	831.00	834.02		834.10	0.005665	2.35	1216.98	510.40	0.27
Project	10575	Old 2-Year	2860.00	830.00	831.82		831.96	0.013152	2.97	962.14	534.53	0.39
Project	10390	Old 2-Year	2860.00	828.00	831.18		831.22	0.001762	1.55	1842.61	598.09	0.16
Project	10225	Old 2-Year	2860.00	827.50	830.73		830.80	0.004206	2.00	1427.18	606.87	0.23
Project	10000	Old 2-Year	2860.00	826.00	829.55		829.62	0.006592	2.18	1309.06	685.26	0.28
Project	9820	Old 2-Year	2860.00	824.00	828.47	826.85	828.53	0.005488	1.97	1449.29	773.35	0.25
Project	9595	Old 2-Year	2860.00	823.80	827.53	825.68	827.58	0.003431	1.78	1604.52	698.10	0.21
Project	9385	Old 2-Year	2860.00	823.00	826.62		826.68	0.005423	2.05	1395.31	693.99	0.25
Project	9220	Old 2-Year	2860.00	822.00	825.09		825.22	0.015979	2.92	979.72	645.06	0.42
Project	9025	Old 2-Year	2860.00	821.00	823.54	822.03	823.62	0.005003	2.22	1290.81	537.58	0.25

Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.3

Modeling CD-ROM

1) HEC-RAS Existing Conditions In/Out File
2) HEC-RAS Proposed Conditions In/Out File
3) HEC-2 Existing Conditions In/Out File
4) HEC-2 Proposed Conditions In/Out File
5) SAM Existing Conditions In/Out File
10) SAM Proposed Conditions In/Out File
11) WSE at Santa Clara River Confluence Existing
12) WSE at Santa Clara River Confluence Proposed

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.4

Existing & Proposed Conditions HEC-RAS Velocity And Water Surface Elevation

Proposed Conditions HEC-RAS To SAM Conversion Analysis

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

It has been noted in the text that the conversion process from HEC-RAS to SAM is a powerful tool for fluvial analysis. This appendix presents, in part, the proposed conditions HEC-RAS to SAM conversion analysis in table format (Table A4.4B1-2). The tables compare the velocity and water surface elevation for the HEC-RAS mixed flow model, the HEC-RAS subcritical flow model, the HEC-RAS model processed for HEC-2 conversion, the HEC-2 model, and the HEC-2 model imported into HEC-RAS. At most sections the differences between steps in the conversion process is only a few percent. The few locations where the difference between steps is high generally result from the supercritical nature of the flow in the HEC-RAS mixed flow model. Several pertinent points should be addressed here. First, the observed differences are a result of the conversion process itself. The most appropriate use of SAM is to include the available data from the hydraulic modeling. As noted in Section 4.1.1, the T95 file produced by HEC-2 is read directly into the SAM model. This is preferable to attempting to consider each section as hydraulically independent from others in the system. A T95 file is not produced in HEC-RAS so the RAS model that is used for hydraulic analysis is down converted to HEC-2 format, as described above. Second, the supercritical nature of the model is the result of the low Manning's number (n=0.025) used, as required by LACDPW criteria. In the River during an actual event a Manning's number this low is not expected for an entire cross-section or an entire reach. In instances where the Manning's number exceeds approximately n=0.035 supercritical flow does not occur in the River for the Q_{CAP} discharge, and Manning's values in the River are expected to be at least n=0.035 or higher during an actual event. Finally, in the final phase of the analysis HEC-6 numerical modeling will be employed to analyze the fluvial mechanics of the River system. The affect of this modeling is to fine tune the SAM analysis presented in the present phase, and HEC-6 modeling will use expected Manning's values as parameters. For these reasons, any differences in water surface elevation or velocity resulting from modeled flow regime presented in Table A4.4B1-2 are not expected to impact analysis or final design.

Table A4.4A: Santa Clara River Existing & Proposed Conditions HEC-RAS Velocity & WSE [1]					
Subreach	HEC-RAS Station	Existing (QCAP) Velocity (fps)	Existing (QCAP) WSE (ft)	Proposed (QCAP) Velocity (fps)	Proposed (QCAP) WSE (ft)
SRA1	46195	19.7	1054.3	19.7	1054.3
	46020	19.1	1052.4	19.1	1052.4
	45545	20.3	1049.2	20.3	1049.2
	45030	17.8	1045.6	17.8	1045.6
	44585	19.2	1043.1	19.2	1043.1
	44210	14.8	1041.6	14.8	1041.6
SRA2	43820	19.9	1037.5	19.9	1037.5
	43610	19.7	1034.1	19.7	1034.1
	43410	18.2	1030.7	18.1	1030.7
	43200	17.3	1029.3	17.2	1029.3
	42975	16.3	1026.1	16.3	1026.1
	42815	15.3	1024.3	15.4	1024.4
	42590	15.0	1021.3	15.1	1021.5
	42430	15.5	1019.6	15.6	1020.3
	42215	10.2	1020.4	12.7	1019.7
	41940	11.2	1019.5	11.6	1019.3
	41730	11.4	1018.9	11.8	1018.7
	41460	11.3	1018.3	11.7	1018.1
SRA3	41280	16.4	1015.3	16.4	1015.3
	41080	16.1	1013.6	16.0	1013.6
	40825	14.8	1012.2	15.0	1012.1
	40585	14.8	1010.6	14.9	1010.6
	40335	11.0	1010.4	10.7	1011.0
	40130	10.4	1010.0	11.1	1010.4
	39945	9.5	1009.8	10.7	1010.2
	39755	14.4	1007.3	16.1	1007.2
	39605	14.7	1005.7	16.2	1005.8
	39310	14.7	1004.1	15.9	1004.4
	39100	11.2	1004.2	14.2	1003.7
	38925	10.9	1003.9	12.9	1003.7
SRA4	38710	10.4	1003.7	12.1	1003.6
	38475	16.7	1000.2	17.8	1000.0
	38300	16.5	998.1	17.7	997.9
	38065	14.1	998.2	14.5	998.0
	37810	18.2	995.2	18.2	995.2
	37655	16.8	994.2	17.4	994.1
	37390	15.7	989.9	14.2	991.5
	37135	15.1	988.6	16.6	989.3
	36930	13.3	987.7	15.6	987.9
	36735	14.6	986.4	16.1	986.9
	36515	12.1	986.3	12.8	987.0
	36265	13.1	985.2	12.3	986.5
SRB1	36080	13.7	984.1	14.7	984.6
	35845	11.6	983.9	11.7	984.1
	35725	13.8	982.6	14.1	982.6
	35515	14.0	981.3	14.0	981.3
	35245	13.8	980.1	13.7	980.2
	35040	13.8	978.4	13.9	978.3
	34860	14.0	977.4	14.1	977.4
	34720	13.9	976.2	13.9	976.2
	34495	14.0	974.3	14.0	974.3
	34310	14.3	972.7	14.3	972.6
	34090	14.3	971.6	14.2	971.6
SRB2	33880	14.2	970.5	14.1	970.3
	33710	14.1	969.3	14.0	969.3
	33500	13.1	968.2	13.1	968.1
	33310	12.9	967.0	12.9	967.0

1 - Velocities & WSEs reflect HEC-RAS model modified for fluvial purposes at subcritical flow

Table A4.4A: Santa Clara River Existing & Proposed Conditions HEC-RAS Velocity & WSE [1] (ctd)					
	33115	11.3	966.4	10.4	966.6
	32795	12.2	965.0	13.0	964.6
	32605	14.1	963.5	13.1	963.6
SRC1	32265	13.3	961.4	13.4	961.3
	31875	10.9	960.0	12.4	959.4
	31585	11.3	957.7	12.1	957.3
	31360	10.5	957.2	11.5	956.6
	31060	8.4	957.2	9.0	956.6
	30720	6.8	957.3	7.3	956.6
	30445	6.4	957.2	6.8	956.5
	30095	6.8	957.0	7.0	956.3
	29815	7.7	956.6	7.9	955.9
	29565	7.5	956.5	7.7	955.8
	29385	8.5	956.1	8.6	955.5
SRC2	29140	11.5	954.7	10.2	954.8
	28895	16.8	951.6	16.8	951.3
	28695	18.8	947.9	13.3	948.3
	28500	19.8	945.1	16.7	946.0
	28280	20.1	941.7	11.9	943.4
	28080	16.7	942.3	10.9	943.4
	27925	19.1	940.4	12.4	942.6
	27725	19.8	939.3	18.0	939.3
	27545	19.0	937.7	19.1	937.6
	27335	17.3	936.2	17.4	936.2
	27155	16.4	935.4	17.2	935.3
SRC3	26990	15.8	933.7	16.7	933.7
	26780	15.5	931.4	16.3	931.3
	26575	14.2	930.6	14.7	930.4
	26355	15.2	929.2	15.4	929.1
	26170	13.5	928.9	15.3	928.2
	25965	15.2	927.2	15.2	927.3
	25785	15.0	926.1	14.4	926.8
	25600	13.9	924.9	15.0	925.8
	25425	10.3	925.4	14.6	925.3
	25215	13.8	923.3	14.2	924.7
	25000	12.6	922.1	13.1	924.5
SRC4	24795	12.6	920.4	14.0	923.6
	24550	9.7	919.5	15.0	922.5
	24335	13.0	917.6	18.1	920.0
	24115	13.1	915.9	18.2	918.7
	23975	13.3	914.6	18.0	917.7
	23755	13.3	913.3	17.8	916.8
	23565	13.2	912.4	17.4	915.6
	23365	13.6	911.1	16.9	914.4
	23180	10.1	911.0	16.0	913.2
	23000	9.0	910.9	15.3	912.8
	22790	9.5	910.4	18.0	910.5
	22600	9.5	910.1	16.6	909.6
	22415	10.1	909.7	16.3	908.0
SRD1	22195	15.4	906.9	14.2	907.5
	22010	15.1	906.2	15.4	906.1
	21790	14.4	904.9	14.7	904.8
	21615	13.7	903.1	14.8	902.8
	21440	14.6	901.2	15.0	901.6
	21225	12.6	899.8	14.3	900.5
	21020	13.8	897.4	12.3	900.0
	20845	12.5	897.0	14.3	898.4
	20595	11.0	896.4	11.1	898.3

1 - Velocities & WSEs reflect HEC-RAS model modified for fluvial purposes at subcritical flow

Table A4.4A: Santa Clara River Existing & Proposed Conditions HEC-RAS Velocity & WSE [1] (ctd)					
	20435	10.3	896.2	10.8	898.1
	20280	12.1	895.0	14.5	896.0
	20070	12.4	892.7	14.4	894.3
SRD2	19855	13.1	891.1	14.3	892.7
	19630	13.2	889.8	14.4	891.5
	19440	10.8	889.9	12.9	891.4
	19240	12.1	888.9	15.6	889.4
	19050	9.6	889.0	12.2	889.4
	18830	9.3	888.7	12.1	888.8
	18650	8.5	888.7	10.8	888.7
	18475	7.7	888.7	8.8	888.9
	18290	8.1	888.4	9.4	888.5
	18025	7.6	888.3	7.8	888.6
	17785	8.5	887.9	8.4	888.3
SRD3	17510	12.3	886.2	10.1	887.5
	17360	16.9	883.4	16.9	884.0
	17110	15.0	881.1	15.7	881.1
	16970	14.4	879.7	15.7	879.6
	16720	14.2	875.3	15.9	875.4
	16515	13.4	873.5	15.4	873.9
	16305	12.6	871.6	11.1	874.5
	16130	13.3	870.5	15.2	872.2
	15960	12.8	869.2	13.7	871.6
	15745	10.9	868.6	12.3	871.3
	15540	10.4	868.1	10.5	871.2
	15335	12.6	866.5	16.2	868.1
SRE1	15125	13.7	864.5	16.6	866.3
	14900	14.0	863.3	16.3	864.2
	14720	13.7	862.1	15.9	863.3
	14480	13.7	860.5	14.5	860.8
	14315	13.5	859.9	14.0	860.1
	14090	13.7	858.7	13.7	858.7
	13850	13.8	857.1	13.9	857.1
	13635	14.0	856.0	14.0	856.0
	13425	13.4	854.6	13.5	854.2
	13190	12.7	853.1	12.3	853.3
SRE2	13030	12.3	852.7	12.0	852.9
	12835	12.1	852.1	11.8	852.3
	12615	11.3	851.8	11.0	852.0
	12395	11.1	851.5	10.9	851.7
	12195	10.1	851.4	10.0	851.6
	11995	11.3	850.7	11.1	850.9
	11780	10.7	850.5	10.4	850.7
	11605	12.0	849.7	11.6	850.0
	11405	12.0	849.4	12.1	849.4
	11180	15.0	847.6	15.2	847.5
SRE3	11015	18.9	844.8	18.9	844.9
	10835	17.7	843.8	17.7	843.8
	10575	16.0	840.2	16.0	840.2
	10390	13.2	839.5	12.7	839.8
	10225	14.7	838.2	14.7	838.2
	10000	14.6	837.1	14.6	837.1
	9820	15.0	835.4	14.9	835.4
	9595	14.6	834.1	14.5	834.2
	9385	13.7	833.1	13.8	833.1
	9220	13.7	831.8	13.7	831.8
	9025	13.8	830.4	13.8	830.4

1 - Velocities & WSEs reflect HEC-RAS model modified for fluvial purposes at subcritical flow

Table A4.4B1 Santa Clara River Proposed Condition HEC-RAS to HEC-2 Conversion n=0.025

		HEC-RAS Mixed	HEC-RAS Subcritical	Fluvial HEC-RAS Subcritical	Δ (%)	Fluvial HEC2	Δ (%)	Fluvial HEC2 IMPORT Subcritical	Δ (%)
	HEC-RAS Station	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft %)	Depth (ft)	Depth (ft %)	Depth (ft)	Depth (ft %)
SRA1	46195	18.1	19.0	19.3	-1%	19.3	0%	19.3	0%
	46020	18.1	20.4	20.4	0%	20.3	1%	20.4	-1%
	45545	19.2	19.2	19.2	0%	19.2	0%	19.2	0%
	45030	16.5	20.6	20.6	0%	20.3	1%	20.5	-1%
	44585	21.1	21.1	21.1	0%	21.1	0%	21.1	0%
	44210	15.4	21.6	21.6	0%	21.1	2%	21.6	-2%
SRA2	43820	19.5	19.5	19.5	0%	19.5	0%	19.5	0%
	43610	13.8	17.1	17.1	0%	17.1	0%	17.1	0%
	43410	11.3	15.1	14.7	3%	14.8	0%	14.7	0%
	43200	12.4	15.6	15.3	2%	15.3	0%	15.3	0%
	42975	10.8	14.3	14.1	1%	14.1	1%	14.1	-1%
	42815	10.7	13.4	13.4	1%	13.3	0%	13.4	0%
	42590	9.2	11.6	11.5	1%	11.5	0%	11.5	0%
	42430	10.7	12.3	12.3	0%	12.3	0%	12.3	0%
	42215	11.2	13.7	13.7	0%	13.3	3%	13.7	-3%
	41940	14.3	14.3	14.3	0%	14.0	2%	14.3	-2%
	41730	14.7	14.7	14.7	0%	14.3	3%	14.7	-3%
	41460	16.2	16.2	16.1	0%	15.8	2%	16.1	-2%
SRA3	41280	14.4	14.4	14.3	0%	14.3	1%	14.3	-1%
	41080	12.1	13.6	13.6	0%	13.5	1%	13.6	-1%
	40825	11.5	12.6	12.6	0%	12.6	0%	12.6	0%
	40585	11.7	12.4	12.6	-1%	12.6	0%	12.6	0%
	40335	15.1	15.1	15.0	1%	14.7	2%	15.0	-2%
	40130	15.5	15.5	15.4	1%	15.1	2%	15.4	-2%
	39945	16.3	16.3	16.2	1%	15.9	2%	16.2	-2%
	39755	13.3	13.3	13.2	1%	13.1	0%	13.2	0%
	39605	11.5	12.9	12.8	1%	12.7	0%	12.8	0%
	39310	12.7	12.7	12.4	2%	12.4	0%	12.4	0%
	39100	10.4	13.8	13.7	0%	12.6	8%	13.7	-9%
	38925	14.3	14.3	14.2	0%	13.7	4%	14.2	-4%
SRA4	38710	15.6	15.6	15.6	0%	15.2	2%	15.6	-3%
	38475	14.0	14.0	14.0	0%	14.1	0%	14.0	0%
	38300	10.3	12.4	12.4	0%	12.3	0%	12.4	0%
	38065	14.0	14.0	14.0	0%	13.7	2%	14.0	-2%
	37810	12.2	12.2	12.2	0%	12.2	0%	12.2	0%
	37655	10.5	12.1	12.1	0%	12.1	0%	12.1	0%
	37390	6.5	10.5	10.5	0%	10.2	2%	10.5	-2%
	37135	9.3	9.3	9.3	0%	9.3	0%	9.3	0%
	36930	8.1	9.7	9.9	-3%	9.9	1%	9.9	0%
	36735	9.8	9.8	9.9	0%	9.8	0%	9.9	0%
	36515	12.0	12.0	12.0	0%	11.5	5%	11.7	-2%
	36265	12.5	12.5	12.5	0%	12.1	3%	12.2	-1%
SRB1	36080	11.6	11.6	11.6	0%	11.5	2%	11.5	-1%
	35845	13.6	13.6	13.1	4%	12.9	1%	13.1	-1%
	35725	13.0	13.0	12.6	3%	12.5	1%	12.6	-1%
	35515	12.0	12.8	12.3	3%	12.6	-2%	12.5	1%
	35245	11.3	12.4	12.2	2%	12.1	1%	12.2	-1%
	35040	10.7	12.0	11.3	5%	11.5	-2%	11.5	0%
	34860	10.0	11.4	11.4	0%	11.4	0%	11.4	0%
	34720	9.2	10.7	10.7	0%	10.6	0%	10.7	0%
	34495	9.0	10.3	10.3	0%	10.2	0%	10.3	0%
	34310	9.3	10.0	9.6	4%	9.8	-1%	9.7	0%
	34090	8.6	9.6	9.6	0%	9.5	0%	9.6	0%
SRB2	33880	9.3	10.3	10.3	0%	10.2	0%	10.2	0%
	33710	9.7	10.3	10.3	0%	10.3	0%	10.2	0%
	33500	9.3	10.0	10.1	-1%	10.1	0%	10.1	0%
	33310	9.0	10.0	10.0	0%	10.0	0%	10.0	0%
	33115	10.6	10.6	10.6	0%	10.6	0%	10.7	-1%
	32795	10.6	10.6	10.6	0%	10.9	-3%	11.0	-1%
	32605	11.1	11.6	11.6	0%	11.6	0%	11.6	0%
SRC1	32265	10.5	11.3	11.3	0%	11.2	1%	11.3	-1%
	31875	10.4	10.4	10.4	0%	10.3	1%	10.4	-1%
	31585	11.9	11.9	11.3	5%	11.2	1%	11.3	-1%
	31360	13.5	13.5	12.6	7%	11.4	9%	12.6	-10%
	31060	15.5	15.5	14.6	6%	14.1	4%	14.6	-4%
	30720	17.5	17.5	16.6	5%	16.3	2%	16.6	-2%
	30445	19.5	19.5	18.5	5%	18.2	2%	18.5	-2%
	30095	21.3	21.3	20.3	4%	20.0	2%	20.3	-2%
	29815	21.9	21.9	20.9	5%	20.6	2%	20.9	-2%
	29565	22.9	22.9	21.8	5%	21.5	1%	21.8	-1%
	29385	23.6	23.6	22.5	5%	22.2	1%	22.5	-1%
SRC2	29140	24.1	24.1	22.8	6%	22.4	1%	22.8	-1%
	28895	22.5	22.5	21.3	5%	21.1	1%	21.3	-1%
	28695	14.0	21.1	20.3	4%	20.0	1%	20.3	-1%
	28500	16.1	18.6	18.5	1%	18.5	0%	18.5	0%
	28280	10.8	18.0	17.4	3%	16.8	3%	17.4	-3%
	28080	19.1	19.1	18.4	4%	18.0	2%	18.4	-2%
	27925	19.3	19.3	18.6	3%	18.2	2%	18.6	-2%
	27725	16.7	16.7	16.3	3%	16.2	1%	16.3	-1%
	27545	14.1	15.8	15.6	1%	15.5	1%	15.6	-1%
	27335	12.3	15.3	15.2	1%	15.1	0%	15.2	0%
	27155	14.8	15.2	14.8	3%	14.7	0%	14.8	0%
SRC3	26990	11.5	13.7	13.7	0%	13.7	0%	13.7	0%
	26780	11.3	13.7	13.3	2%	13.3	0%	13.3	0%
	26575	11.1	13.9	13.4	3%	13.4	0%	13.4	0%
	26355	13.4	13.4	13.1	2%	13.1	0%	13.1	0%
	26170	13.5	13.7	13.2	4%	13.2	0%	13.2	0%
	25965	12.9	13.7	13.3	3%	13.2	1%	13.3	-1%
	25785	12.1	13.1	13.3	-1%	13.2	1%	13.3	-1%
	25600	12.4	13.1	13.3	-1%	12.9	3%	13.3	-3%
	25425	12.5	14.3	14.3	0%	14.0	2%	14.3	-2%
	25215	14.7	14.7	14.7	0%	14.1	4%	14.7	-5%
	25000	15.5	15.5	15.5	0%	15.3	1%	15.5	-2%

Table A4.4B1 HEC-RAS to HEC-2 Conversion SCR Proposed n=0.025 continued									
		HEC-RAS Mixed	HEC-RAS Subcritical	Fluvial HEC-RAS Subcritical	Δ (%)	Fluvial HEC2	Δ (%)	Fluvial HEC2 IMPORT Subcritical	Δ (%)
Subreach	HEC-RAS Station	Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft %)	Depth (ft)	Depth (ft %)	Depth (ft)	Depth (ft %)
SRC4	24795	15.6	15.6	15.6	0%	15.4	2%	15.6	-2%
	24550	16.5	16.5	16.5	0%	16.2	2%	16.5	-2%
	24335	15.0	15.0	15.0	0%	15.0	1%	15.0	-1%
	24115	13.8	14.7	14.7	0%	14.6	0%	14.7	0%
	23975	12.9	14.2	14.2	0%	14.2	0%	14.2	0%
	23755	14.7	14.7	14.8	0%	14.7	0%	14.8	0%
	23565	14.3	15.6	15.6	0%	15.5	0%	15.6	0%
	23365	14.3	14.7	14.4	2%	14.3	1%	14.4	-1%
	23180	12.6	14.1	14.2	0%	13.6	4%	13.6	0%
	23000	11.3	14.8	14.8	0%	14.0	5%	14.2	-2%
	22790	13.0	13.0	13.0	0%	12.8	1%	12.9	-1%
	22600	12.8	13.8	13.6	1%	13.6	0%	13.6	0%
	22415	10.8	12.5	12.5	0%	12.4	0%	12.5	0%
SRD1	22195	14.0	14.0	13.5	4%	13.3	1%	13.5	-1%
	22010	14.3	14.3	14.1	2%	14.0	1%	14.1	-1%
	21790	11.6	13.3	13.3	0%	13.2	1%	13.3	-1%
	21615	8.5	10.7	10.8	-1%	10.8	0%	10.8	0%
	21440	11.0	11.6	11.6	1%	11.5	1%	11.6	-1%
	21225	11.7	12.9	12.5	3%	12.5	0%	12.5	0%
	21020	9.7	12.2	13.0	-6%	12.8	1%	13.0	-1%
	20845	12.7	12.7	12.4	3%	12.3	1%	12.3	0%
	20595	13.4	13.4	13.3	1%	13.1	2%	13.3	-2%
	20435	14.3	14.3	14.1	1%	13.9	2%	14.1	-2%
	20280	12.8	12.8	12.3	4%	12.3	0%	12.3	0%
	20070	11.1	12.7	12.3	3%	12.3	0%	12.3	0%
SRD2	19855	10.2	12.4	12.2	2%	12.1	0%	12.2	0%
	19630	8.9	11.4	11.5	-1%	10.6	8%	11.5	-8%
	19440	13.4	13.4	13.4	0%	13.2	2%	13.4	-2%
	19240	11.9	11.9	11.9	0%	11.9	0%	11.9	0%
	19050	10.5	13.3	13.4	-1%	13.2	1%	13.4	-1%
	18830	14.6	14.6	14.8	-2%	13.4	10%	14.8	-11%
	18650	15.0	15.0	15.2	-1%	14.2	7%	15.2	-7%
	18475	16.9	16.9	16.9	0%	16.4	3%	16.9	-3%
	18290	16.9	16.9	17.0	0%	16.5	3%	17.0	-3%
	18025	18.5	18.5	18.6	0%	18.2	2%	18.6	-2%
	17785	20.2	20.2	20.3	0%	19.9	2%	20.3	-2%
SRD3	17510	19.2	19.2	19.5	-1%	19.1	2%	19.5	-2%
	17360	15.9	15.9	16.0	0%	16.0	0%	16.0	0%
	17110	15.2	17.5	17.1	2%	17.0	1%	17.1	-1%
	16970	13.6	16.1	15.9	1%	15.8	1%	15.9	-1%
	16720	9.2	11.9	11.9	0%	11.9	0%	11.9	0%
	16515	10.4	11.9	11.9	0%	11.8	1%	11.9	-1%
	16305	14.6	14.6	14.5	0%	14.3	2%	14.5	-2%
	16130	12.3	12.3	12.2	1%	12.3	0%	12.2	0%
	15960	11.0	12.6	12.6	0%	12.0	5%	12.1	-1%
	15745	13.3	13.3	13.3	0%	11.7	12%	12.6	-8%
	15540	13.7	13.7	13.7	0%	12.9	6%	13.2	-2%
	15335	12.1	12.1	12.1	0%	11.8	2%	11.9	-1%
SRE1	15125	11.6	12.3	12.3	0%	11.9	3%	12.0	0%
	14900	9.8	11.2	11.2	0%	11.1	0%	11.2	0%
	14720	9.8	11.0	11.3	-3%	11.2	1%	11.3	-1%
	14480	8.9	10.3	10.3	0%	10.1	1%	10.2	-1%
	14315	9.9	10.0	10.1	-1%	9.9	2%	9.9	0%
	14090	8.5	8.7	8.7	0%	8.7	0%	8.7	0%
	13850	9.7	9.7	9.1	6%	9.2	-1%	9.1	0%
	13635	10.3	10.3	10.0	3%	9.9	0%	10.0	0%
	13425	7.8	9.2	9.2	0%	9.3	0%	9.2	0%
	13190	9.5	9.5	9.3	2%	9.1	3%	9.3	-3%
SRE2	13030	9.6	9.6	9.9	-3%	9.6	3%	9.9	-3%
	12835	10.1	10.1	10.3	-2%	9.9	5%	10.4	-5%
	12615	10.9	10.9	11.0	-2%	10.7	3%	11.1	-4%
	12395	11.5	11.5	11.7	-2%	11.3	4%	11.7	-4%
	12195	12.5	12.5	12.6	-1%	12.3	2%	12.7	-3%
	11995	13.6	13.6	13.9	-2%	13.6	2%	14.0	-3%
	11780	14.4	14.4	14.7	-2%	14.5	1%	14.8	-2%
	11605	13.8	13.8	14.5	-5%	14.2	2%	14.6	-3%
	11405	15.1	15.1	15.4	-2%	15.1	2%	15.5	-3%
	11180	13.9	13.9	14.5	-4%	14.2	2%	14.7	-3%
SRE3	11015	13.3	13.3	13.4	-1%	13.2	1%	13.4	-1%
	10835	10.9	12.7	12.8	-1%	12.8	0%	12.8	0%
	10575	7.5	10.2	10.2	0%	10.2	0%	10.2	0%
	10390	8.8	11.0	11.8	-6%	11.6	1%	11.8	-1%
	10225	9.5	10.7	10.7	0%	10.7	0%	10.7	0%
	10000	11.1	11.1	11.1	0%	11.2	0%	11.1	0%
	9820	10.0	11.3	11.4	0%	11.3	1%	11.4	-1%
	9595	10.3	10.3	10.4	0%	10.3	1%	10.4	-1%
	9385	9.5	10.2	10.1	1%	10.0	0%	10.1	0%
	9220	8.9	9.8	9.8	0%	9.8	0%	9.8	0%
	9025	8.9	9.6	9.4	2%	9.4	0%	9.4	0%

Table A4.4B2 Santa Clara River Proposed Condition HEC-RAS to HEC-2 Conversion n=0.025

		HEC-RAS Mixed	HEC-RAS Subcritical	Fluvial HEC-RAS Subcritical	Δ (%)	Fluvial HEC2	Δ (%)	Fluvial HEC2 IMPORT Subcritical	Δ (%)
	HEC-RAS Station	Vel Chnl (ft/s)	Vel Chnl (ft/s)	Vel Chnl (ft/s)	Vel Chnl (ft/s %)	Vel Chnl (ft/s)	Vel Chnl (ft/s %)	Vel Chnl (ft/s)	Vel Chnl (ft/s %)
SRA1	46195	21.7	20.1	19.7	2%	19.6	0%	19.7	0%
	46020	24.1	19.1	19.1	0%	19.3	-1%	19.1	1%
	45545	20.3	20.3	20.3	0%	20.4	0%	20.3	0%
	45030	26.1	17.8	17.8	0%	18.1	-2%	17.8	1%
	44585	19.2	19.2	19.2	0%	19.1	0%	19.1	0%
	44210	26.2	14.8	14.8	0%	15.3	-4%	14.8	3%
SRA2	43820	19.9	19.9	19.9	0%	19.9	0%	19.9	0%
	43610	26.7	19.8	19.7	0%	19.7	0%	19.7	0%
	43410	28.8	19.2	18.1	6%	18.1	0%	18.1	0%
	43200	26.1	18.0	17.2	4%	17.2	0%	17.2	0%
	42975	26.6	16.7	16.3	2%	16.5	-1%	16.3	1%
	42815	23.9	15.7	15.4	2%	15.5	-1%	15.4	1%
	42590	22.4	15.3	15.1	2%	15.2	-1%	15.1	1%
	42430	19.6	15.6	15.6	0%	15.6	0%	15.6	0%
	42215	18.5	12.9	12.7	1%	13.5	-6%	12.7	6%
	41940	11.6	11.6	11.6	0%	12.0	-3%	11.6	3%
	41730	11.8	11.8	11.8	0%	12.4	-5%	11.8	5%
	41460	11.6	11.6	11.7	-1%	12.1	-4%	11.7	3%
SRA3	41280	16.4	16.4	16.4	0%	16.6	-1%	16.4	1%
	41080	19.9	16.5	16.0	3%	16.2	-1%	16.0	1%
	40825	18.0	15.3	15.0	2%	15.0	0%	15.0	0%
	40585	17.0	15.3	14.9	3%	15.0	-1%	14.8	1%
	40335	10.5	10.5	10.7	-1%	11.0	-3%	10.7	3%
	40130	11.3	11.3	11.1	2%	11.5	-4%	11.1	4%
	39945	11.0	11.0	10.7	3%	11.1	-4%	10.7	3%
	39755	16.5	16.5	16.1	2%	16.2	-1%	16.1	1%
	39605	19.7	16.6	16.2	2%	16.3	-1%	16.2	1%
	39310	16.5	16.5	15.9	4%	15.9	0%	15.9	0%
	39100	20.9	14.2	14.2	0%	16.0	-12%	14.2	11%
	38925	12.8	12.8	12.9	0%	13.6	-6%	12.9	5%
SRA4	38710	12.0	12.0	12.1	0%	12.5	-3%	12.1	3%
	38475	17.9	17.9	17.8	0%	17.8	0%	17.8	0%
	38300	22.5	17.7	17.7	0%	17.7	0%	17.7	0%
	38065	14.5	14.5	14.5	0%	15.0	-3%	14.5	3%
	37810	18.2	18.2	18.2	0%	18.2	0%	18.2	0%
	37655	20.9	17.4	17.4	0%	17.4	0%	17.4	0%
	37390	23.7	14.2	14.2	0%	14.5	-3%	14.2	3%
	37135	16.6	16.6	16.6	0%	16.6	0%	16.6	0%
	36930	19.8	16.3	15.6	4%	15.7	-1%	15.7	0%
	36735	16.1	16.1	16.1	0%	16.1	0%	16.1	1%
	36515	12.9	12.9	12.8	0%	13.7	-7%	13.3	3%
	36265	12.3	12.3	12.3	0%	12.8	-3%	12.5	2%
SRB1	36080	14.7	14.7	14.7	0%	14.8	-1%	14.6	1%
	35845	11.0	11.0	11.7	-7%	12.0	-2%	11.7	2%
	35725	15.0	15.0	14.1	6%	14.3	-1%	14.1	1%
	35515	17.1	15.2	14.0	8%	13.4	4%	13.6	-1%
	35245	17.3	14.5	13.7	6%	13.9	-1%	13.7	1%
	35040	19.6	15.6	13.9	11%	13.5	3%	13.6	0%
	34860	18.4	14.1	14.1	0%	14.2	-1%	14.1	1%
	34720	18.4	13.9	13.9	0%	14.0	-1%	13.9	1%
	34495	17.4	14.0	14.0	0%	14.1	-1%	14.0	1%
	34310	16.8	15.0	14.3	5%	14.0	2%	14.1	-1%
	34090	17.0	14.2	14.2	0%	14.3	-1%	14.2	1%
SRB2	33880	16.6	14.1	14.1	0%	14.2	-1%	14.1	0%
	33710	15.4	14.0	14.0	0%	14.0	0%	14.0	0%
	33500	16.2	14.3	13.1	8%	13.0	0%	13.1	0%
	33310	15.8	12.9	12.9	0%	12.8	1%	12.8	0%
	33115	10.4	10.4	10.4	0%	10.3	0%	10.2	1%
	32795	13.0	13.0	13.0	0%	12.2	6%	12.1	1%
	32605	14.4	13.1	13.1	0%	13.1	0%	13.1	0%
SRC1	32265	15.9	13.4	13.4	0%	13.7	-2%	13.4	2%
	31875	12.4	12.4	12.4	0%	12.6	-2%	12.4	2%
	31585	10.9	10.9	12.1	-11%	12.3	-1%	12.1	1%
	31360	10.3	10.3	11.5	-12%	13.9	-20%	11.5	17%
	31060	8.2	8.2	9.0	-10%	9.6	-6%	9.0	6%
	30720	6.7	6.7	7.3	-9%	7.5	-3%	7.3	3%
	30445	6.3	6.3	6.8	-8%	6.9	-3%	6.7	3%
	30095	6.7	6.7	7.0	-3%	7.1	-3%	7.0	3%
	29815	7.7	7.7	7.9	-2%	8.1	-3%	7.9	2%
	29565	7.4	7.4	7.7	-5%	7.9	-2%	7.7	2%
	29385	8.3	8.3	8.6	-4%	8.8	-2%	8.6	2%
SRC2	29140	9.2	9.2	10.2	-11%	10.4	-3%	10.2	2%
	28895	18.8	18.8	16.8	11%	17.1	-2%	16.8	2%
	28695	28.9	12.4	13.3	-7%	13.6	-2%	13.3	2%
	28500	22.4	17.7	16.7	6%	16.7	0%	16.6	1%
	28280	29.6	13.0	11.9	8%	12.5	-5%	11.9	5%
	28080	11.3	11.3	10.9	3%	11.2	-3%	10.9	3%
	27925	13.1	13.1	12.4	5%	12.8	-3%	12.4	3%
	27725	19.0	19.0	18.0	6%	18.1	-1%	18.0	1%
	27545	22.9	19.7	19.1	3%	19.2	-1%	19.1	1%
	27335	24.6	18.3	17.4	5%	17.5	-1%	17.4	1%
	27155	19.1	18.4	17.2	6%	17.4	-1%	17.2	1%
SRC3	26990	22.6	16.9	16.7	1%	16.8	-1%	16.7	1%
	26780	23.1	16.9	16.3	4%	16.4	-1%	16.3	1%
	26575	20.7	13.9	14.7	-6%	14.8	-1%	14.8	0%
	26355	15.9	15.9	15.4	3%	15.5	-1%	15.4	1%
	26170	17.0	16.5	15.3	7%	15.3	0%	15.3	0%
	25965	18.2	16.3	15.2	7%	15.4	-1%	15.2	1%
	25785	18.9	16.5	14.4	13%	14.6	-2%	14.4	1%
	25600	18.5	17.0	15.0	12%	15.7	-4%	15.0	4%
	25425	18.3	14.6	14.6	0%	15.1	-3%	14.6	3%
	25215	14.3	14.3	14.2	0%	15.3	-8%	14.2	7%
	25000	13.2	13.2	13.1	0%	13.4	-2%	13.1	2%

Table A4.4B2 HEC-RAS to HEC-2 Conversion SCR Proposed n=0.025 continued

Subreach	HEC-RAS Station	HEC-RAS Mixed Vel Chnl (ft/s)	HEC-RAS Subcritical Vel Chnl (ft/s)	Fluvial HEC-RAS Subcritical Vel Chnl (ft/s)	Δ (%) Vel Chnl (ft/s %)	Fluvial HEC2 Vel Chnl (ft/s)	Δ (%) Vel Chnl (ft/s %)	Fluvial HEC2 IMPORT Subcritical Vel Chnl (ft/s)	Δ (%) Vel Chnl (ft/s %)
SRC4	24795	14.1	14.1	14.0	0%	14.3	-2%	14.0	2%
	24550	15.1	15.1	15.0	1%	15.4	-3%	15.0	3%
	24335	18.2	18.2	18.1	1%	18.2	-1%	18.1	1%
	24115	20.0	18.3	18.2	0%	18.3	0%	18.2	0%
	23975	20.8	18.0	18.0	0%	17.9	0%	18.0	0%
	23755	18.1	18.0	17.8	1%	17.8	-1%	17.8	1%
	23565	20.2	17.6	17.4	1%	17.5	-1%	17.4	1%
	23365	18.4	17.6	16.9	4%	17.1	-1%	16.9	1%
	23180	21.9	18.5	16.0	13%	17.0	-6%	17.0	0%
	23000	22.0	15.4	15.3	0%	16.2	-5%	15.8	2%
	22790	17.9	17.9	18.0	0%	17.9	0%	17.8	1%
	22600	19.8	17.4	16.6	5%	16.6	0%	16.6	0%
	22415	21.3	16.8	16.3	3%	16.4	-1%	16.3	1%
SRD1	22195	13.6	13.6	14.2	-4%	14.5	-2%	14.2	2%
	22010	16.1	16.1	15.4	5%	15.6	-1%	15.4	1%
	21790	19.7	15.9	14.7	8%	14.9	-1%	14.7	1%
	21615	21.3	15.6	14.8	5%	14.9	-1%	14.8	1%
	21440	17.5	16.1	15.0	6%	15.1	-1%	15.0	1%
	21225	18.1	15.2	14.3	6%	14.3	0%	14.4	-1%
	21020	20.3	14.9	12.3	17%	12.6	-2%	12.3	2%
	20845	15.1	15.1	14.3	5%	14.5	-1%	14.4	1%
	20595	12.4	12.4	11.1	10%	11.5	-3%	11.1	3%
	20435	12.1	12.1	10.8	11%	11.1	-3%	10.8	3%
	20280	15.6	15.6	14.5	7%	14.5	0%	14.5	0%
	20070	19.3	15.4	14.4	6%	14.4	0%	14.5	0%
SRD2	19855	20.6	15.2	14.3	6%	14.3	0%	14.2	1%
	19630	20.6	14.8	14.4	3%	15.9	-11%	14.4	10%
	19440	13.1	13.1	12.9	2%	13.2	-2%	12.9	2%
	19240	15.9	15.9	15.6	2%	15.6	0%	15.6	0%
	19050	18.8	12.7	12.2	4%	12.5	-2%	12.2	2%
	18830	13.3	13.3	12.1	9%	14.8	-22%	12.1	18%
	18650	12.1	12.1	10.8	11%	12.3	-14%	10.8	12%
	18475	8.9	8.9	8.8	1%	9.2	-5%	8.8	5%
	18290	9.8	9.8	9.4	4%	10.0	-6%	9.4	6%
	18025	7.9	7.9	7.8	2%	8.0	-3%	7.8	3%
	17785	8.5	8.5	8.4	1%	8.6	-3%	8.4	3%
SRD3	17510	11.0	11.0	10.1	8%	10.5	-4%	10.1	4%
	17360	17.1	17.1	16.9	1%	16.9	0%	16.9	0%
	17110	22.3	16.6	15.7	6%	15.9	-1%	15.7	1%
	16970	23.1	16.4	15.7	4%	16.0	-2%	15.7	2%
	16720	24.4	16.0	15.9	0%	15.9	0%	15.9	0%
	16515	19.4	15.4	15.4	0%	15.5	-1%	15.4	1%
	16305	11.6	11.6	11.1	4%	11.4	-3%	11.1	3%
	16130	15.7	15.7	15.2	3%	15.1	0%	15.2	0%
	15960	17.7	13.8	13.7	1%	14.8	-9%	14.7	1%
	15745	12.3	12.3	12.3	0%	15.1	-23%	13.4	11%
	15540	10.6	10.6	10.5	0%	11.5	-9%	11.2	3%
	15335	16.2	16.2	16.2	0%	16.2	0%	16.0	1%
SRE1	15125	17.9	16.6	16.6	0%	16.5	1%	16.4	1%
	14900	19.3	15.6	16.3	-4%	16.4	-1%	16.3	1%
	14720	18.1	15.1	15.9	-5%	16.1	-1%	15.9	1%
	14480	19.0	14.7	14.5	1%	14.6	0%	14.5	1%
	14315	14.0	13.8	14.0	-2%	13.8	2%	13.8	0%
	14090	14.3	13.8	13.7	0%	13.8	-1%	13.7	1%
	13850	12.6	12.6	13.9	-10%	13.7	1%	13.8	0%
	13635	15.5	15.5	14.0	10%	14.0	-1%	14.0	1%
	13425	18.0	13.5	13.5	0%	13.4	0%	13.5	0%
	13190	12.2	12.2	12.3	-1%	12.9	-4%	12.3	4%
SRE2	13030	14.2	14.2	12.0	16%	12.5	-5%	11.9	5%
	12835	13.3	13.3	11.8	12%	12.6	-7%	11.7	7%
	12615	12.5	12.5	11.0	12%	11.5	-4%	11.0	5%
	12395	12.3	12.3	10.9	12%	11.4	-5%	10.8	5%
	12195	10.6	10.6	10.0	6%	10.2	-3%	9.9	3%
	11995	12.8	12.8	11.1	13%	11.4	-3%	11.0	4%
	11780	12.6	12.6	10.4	17%	10.7	-2%	10.4	3%
	11605	13.9	13.9	11.6	17%	11.9	-3%	11.4	4%
	11405	13.2	13.2	12.1	8%	12.4	-3%	11.9	4%
	11180	16.6	16.6	15.2	8%	15.6	-3%	14.9	4%
SRE3	11015	19.1	19.1	18.9	1%	19.1	-1%	18.9	1%
	10835	21.9	17.9	17.7	1%	17.8	0%	17.7	0%
	10575	24.1	16.0	16.0	0%	16.0	0%	16.0	0%
	10390	22.7	16.3	12.7	22%	13.0	-2%	12.7	2%
	10225	17.8	15.0	14.7	2%	14.8	-1%	14.7	1%
	10000	14.9	14.9	14.6	2%	14.4	1%	14.6	-1%
	9820	18.6	15.0	14.9	0%	15.1	-1%	14.9	1%
	9595	14.6	14.6	14.5	0%	14.7	-1%	14.5	1%
	9385	15.8	14.0	13.8	2%	13.9	-1%	13.8	1%
	9220	16.4	13.7	13.7	1%	13.8	-1%	13.7	1%
	9025	15.9	14.3	13.8	3%	13.8	0%	13.8	0%

Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.5

Existing & Proposed Conditions Hydraulic Subreach Analysis

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Table A4.5A1: Santa Clara River Existing Conditions Hec-Ras Output and Parameter Correlation: Reach A

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRA1	**46195**	115111	1035.0	1054.3	1054.3	1060.3	0.004	19.7	5847.5	483.4	1.00			
	46020	115111	1032.0	1052.4	1052.4	1058.1	0.004	19.1	6013.5	531.5	1.00	0.017		
	45545	115111	1030.0	1049.2	1049.2	1055.7	0.004	20.3	5664.1	446.8	1.01	0.004	0.008	
	45030	115111	1025.0	1045.6	1044.6	1050.5	0.003	17.8	6472.9	521.5	0.89	0.010	0.007	0.009
	44585	115111	1022.0	1043.1	1043.1	1048.8	0.004	19.2	6003.6	531.9	1.01	0.007	0.008	0.007
	44210	115111	1020.0	1041.6	1038.7	1045.0	0.002	14.8	7793.1	585.9	0.71	0.005	0.006	0.007
SRA2	**43820**	115111	1018.0	1037.5	1037.5	1043.6	0.004	19.9	5785.5	476.5	1.01	0.005	0.005	0.006
	43610	115111	1017.0	1034.1	1034.1	1040.1	0.004	19.7	5832.2	483.7	1.00	0.005	0.005	0.005
	43410	115111	1016.0	1030.7	1030.7	1035.9	0.004	18.2	6338.3	623.3	1.00	0.005	0.005	0.005
	43200	115111	1014.0	1029.3	1029.3	1033.9	0.004	17.3	6660.7	737.2	1.00	0.010	0.007	0.006
	42975	115111	1012.0	1026.1	1026.1	1030.3	0.005	16.3	7050.2	860.4	1.01	0.009	0.009	0.008
	42815	115111	1011.0	1024.3	1024.3	1027.9	0.005	15.3	7548.6	1051.0	1.00	0.006	0.008	0.008
	42590	115111	1010.0	1021.3	1021.3	1024.8	0.005	15.0	7695.7	1112.9	1.00	0.004	0.005	0.007
	42430	115111	1008.0	1019.6	1019.6	1023.3	0.005	15.5	7449.5	1001.0	1.00	0.013	0.008	0.007
	42215	115111	1006.0	1020.4	1017.7	1022.0	0.002	10.2	11269.5	1312.6	0.61	0.009	0.011	0.008
	41940	115111	1005.0	1019.5	1017.7	1021.5	0.002	11.2	10258.2	1332.5	0.71	0.004	0.006	0.008
	41730	115111	1004.0	1018.9	1016.5	1021.0	0.002	11.4	10078.8	1249.1	0.71	0.005	0.004	0.006
	41460	115111	1002.0	1018.3	1015.2	1020.3	0.002	11.3	10198.6	1335.2	0.72	0.007	0.006	0.005
SRA3	**41280**	115111	1001.0	1015.3	1015.3	1019.5	0.005	16.4	7014.3	851.9	1.01	0.006	0.007	0.006
	41080	115111	1000.0	1013.6	1013.6	1017.6	0.005	16.1	7149.5	899.0	1.01	0.005	0.005	0.006
	40825	115111	999.5	1012.2	1012.2	1015.6	0.005	14.8	7757.4	1146.8	1.01	0.002	0.003	0.004
	40585	115111	998.0	1010.6	1010.6	1014.0	0.005	14.8	7785.2	1161.4	1.01	0.006	0.004	0.004
	40335	115111	996.0	1010.4	1008.9	1012.2	0.003	11.0	10452.1	1494.5	0.73	0.008	0.007	0.005
	40130	115111	995.0	1010.0	1008.4	1011.7	0.002	10.4	11087.0	1631.3	0.70	0.005	0.007	0.006
	39945	115111	994.0	1009.8	1007.6	1011.2	0.002	9.5	12146.7	1639.3	0.61	0.005	0.005	0.006
	39755	115111	994.0	1007.3	1007.3	1010.5	0.005	14.4	7974.8	1238.0	1.00	0.000	0.003	0.003
	39605	115111	993.0	1005.7	1005.7	1009.0	0.005	14.7	7830.6	1171.1	1.00	0.007	0.003	0.004
	39310	115111	992.0	1004.1	1004.1	1007.5	0.005	14.7	7842.0	1184.1	1.01	0.003	0.004	0.003
	39100	115111	990.0	1004.2	1002.0	1006.1	0.002	11.2	10276.1	1302.0	0.70	0.010	0.006	0.006
	38925	115111	989.5	1003.9	1001.3	1005.8	0.002	10.9	10519.7	1177.1	0.65	0.003	0.006	0.005
SRA4	**38710**	115111	988.0	1003.7	1000.0	1005.4	0.001	10.4	11078.5	1039.0	0.56	0.007	0.005	0.007
	38475	115111	986.0	1000.2	1000.2	1004.6	0.005	16.7	6875.8	795.5	1.00	0.009	0.008	0.006
	38300	115111	985.5	998.1	997.5	1002.3	0.004	16.5	6965.9	701.8	0.92	0.003	0.006	0.006
	38065	115111	984.0	998.2	995.7	1001.3	0.002	14.1	8168.8	678.4	0.72	0.006	0.005	0.006
	37810	115111	983.0	995.2	995.2	1000.4	0.004	18.2	6319.8	622.1	1.01	0.004	0.005	0.005
	37655	115111	982.0	994.2	994.2	998.5	0.004	16.8	6851.1	789.4	1.01	0.006	0.005	0.005
	37390	115111	981.0	989.9	989.9	993.7	0.004	15.7	7414.9	986.7	0.98	0.004	0.005	0.004
	37135	115111	980.0	988.6	988.6	992.1	0.005	15.1	7645.5	1091.6	1.00	0.004	0.004	0.004
	36930	115111	978.0	987.7	986.9	990.5	0.003	13.3	8648.1	1125.5	0.85	0.010	0.007	0.006
	36735	115111	977.0	986.4	986.4	989.7	0.004	14.6	7881.5	1194.2	1.00	0.005	0.008	0.006
	36515	115111	975.0	986.3	985.3	988.6	0.003	12.1	9521.5	1325.6	0.79	0.009	0.007	0.008
	36265	115111	974.0	985.2	984.8	987.8	0.003	13.1	8807.0	1373.1	0.91	0.004	0.006	0.006

corr(x,v)=	0.486087
corr(x,a)=	-0.393283
corr(x,b)=	**-0.5195**
corr(x,m1)=	0.287884
corr(x,m2)=	0.270636
corr(x,m3)=	0.366906

Figure A4.5A1: Santa Clara River Existing Conditions HEC-RAS Reach A - Station vs Top Width

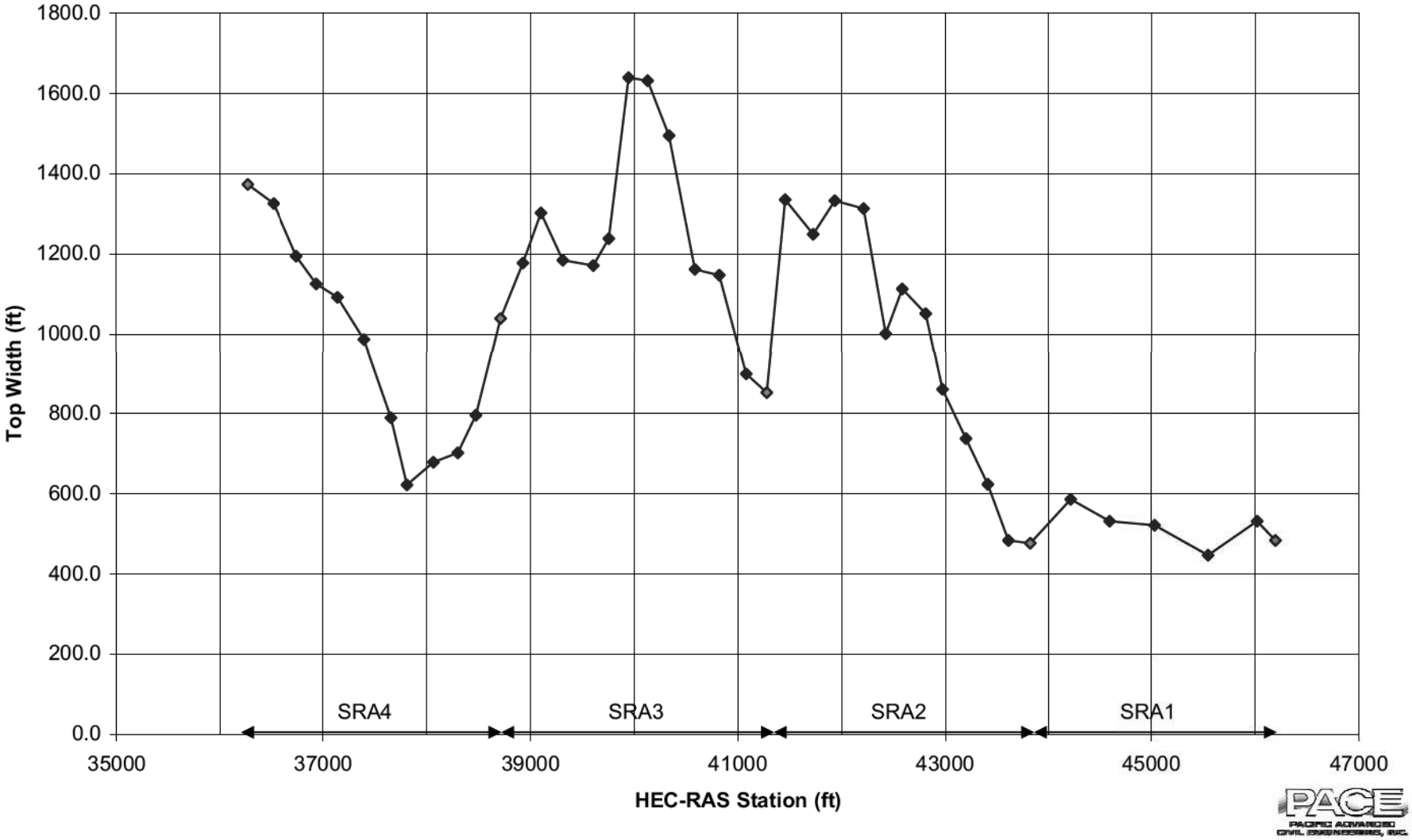


Table A4.5A2: Santa Clara River Existing Conditions Hec-Ras Output and Parameter Correlation: Reach B

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRB1	**36080**	116236	973.0	984.1	984.1	987.0	0.005	13.7	8492.5	1450.4	1.00			
	35845	116236	971.0	983.9	982.8	986.0	0.002	11.6	10013.5	1478.1	0.79	0.009		
	35725	116236	970.0	982.6	982.6	985.5	0.004	13.8	8438.9	1427.9	1.00	0.008	0.008	
	35515	116236	969.0	981.3	981.3	984.4	0.004	14.0	8309.5	1362.8	1.00	0.005	0.006	0.007
	35245	116236	968.0	980.1	980.1	983.1	0.005	13.8	8434.2	1553.4	0.99	0.004	0.004	0.005
	35040	116236	967.0	978.4	978.3	981.4	0.005	13.8	8428.2	1401.8	0.98	0.005	0.004	0.004
	34860	116236	966.0	977.4	977.4	980.5	0.005	14.0	8307.5	1363.0	1.00	0.006	0.005	0.005
	34720	116236	965.5	976.2	976.2	979.2	0.005	13.9	8382.5	1419.6	1.01	0.004	0.005	0.005
	34495	116236	964.0	974.3	974.3	977.3	0.004	14.0	8313.9	1380.4	1.00	0.007	0.005	0.006
	34310	116236	963.0	972.7	972.7	975.8	0.004	14.3	8114.6	1297.7	1.01	0.005	0.006	0.005
	34090	116236	962.0	971.6	971.6	974.8	0.004	14.3	8123.9	1281.0	1.00	0.005	0.005	0.006
SRB2	**33880**	116236	960.0	970.5	970.5	973.6	0.004	14.2	8188.0	1320.1	1.00	0.010	0.007	0.007
	33710	116236	959.0	969.3	969.3	972.4	0.004	14.1	8238.1	1363.2	1.01	0.006	0.008	0.007
	33500	116236	958.0	968.2	968.2	970.8	0.004	13.1	8872.2	1690.4	1.01	0.005	0.005	0.007
	33310	116236	957.0	967.0	967.0	969.6	0.004	12.9	8986.4	1751.5	1.01	0.005	0.005	0.005
	33115	116236	956.0	966.4	965.6	968.3	0.004	11.3	10261.8	1811.5	0.84	0.005	0.005	0.005
	32795	116236	954.0	965.0	964.6	967.3	0.003	12.2	9528.8	1732.9	0.92	0.006	0.006	0.006
	32605	116236	952.0	963.5	963.5	966.5	0.004	14.1	8272.7	1344.6	1.00	0.011	0.008	0.007

corr(x,v)=	0.186906
corr(x,a)=	-0.18573
corr(x,b)=	**-0.37919**
corr(x,m1)=	-0.14733
corr(x,m2)=	-0.13339
corr(x,m3)=	-0.33786

Figure A4.5A2: Santa Clara River Existing Conditions HEC-RAS Reach B - Station vs Top Width

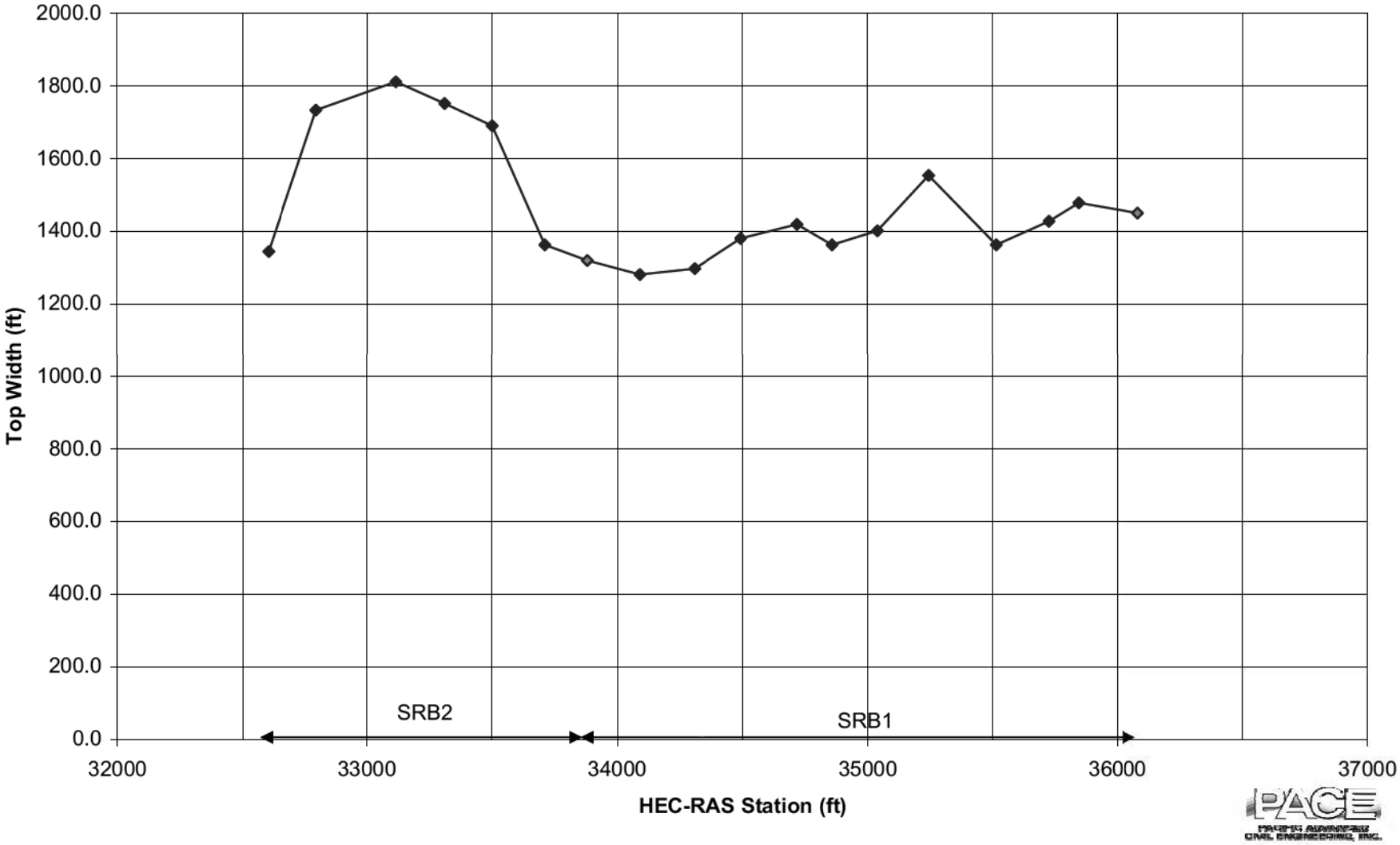


Table A4.5A3: Santa Clara River Existing Conditions Hec-Ras Output and Parameter Correlation: Reach C

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRC1	**32265**	140776	950.0	961.4	961.4	964.1	0.004	13.3	10579.2	1944.9	1.01			
	31875	140776	949.0	960.0	960.0	961.9	0.004	10.9	12908.1	2482.2	0.84	0.003		
	31585	140776	946.0	957.7	957.0	959.6	0.004	11.3	12511.1	2181.1	0.83	0.010	0.006	
	31360	140776	944.0	957.2	955.4	958.9	0.002	10.5	13391.5	1875.2	0.69	0.009	0.010	0.007
	31060	140776	942.0	957.2	953.3	958.3	0.001	8.4	16729.5	1706.2	0.47	0.007	0.008	0.009
	30720	140776	940.0	957.3	951.3	958.0	0.001	6.8	20683.4	1886.9	0.36	0.006	0.006	0.007
	30445	140776	938.0	957.2	949.6	957.8	0.000	6.4	22074.1	1777.6	0.32	0.007	0.007	0.007
	30095	140776	936.0	957.0	947.9	957.7	0.000	6.8	20641.0	1666.4	0.34	0.006	0.006	0.006
	29815	140776	935.0	956.6	948.1	957.5	0.001	7.7	18373.0	1573.0	0.40	0.004	0.005	0.006
	29565	140776	934.0	956.5	947.3	957.3	0.001	7.5	18750.2	1613.5	0.39	0.004	0.004	0.005
	29385	140776	933.0	956.1	949.0	957.2	0.001	8.5	16517.2	1577.6	0.46	0.006	0.005	0.004
SRC2	**29140**	140776	932.0	954.7	951.0	956.8	0.002	11.5	12276.2	1324.5	0.66	0.004	0.005	0.004
	28895	140776	930.0	951.6	951.6	956.0	0.003	16.8	8402.3	965.7	1.00	0.008	0.006	0.006
	28695	140776	928.0	947.9	947.9	953.3	0.004	18.8	7507.5	701.1	1.01	0.010	0.009	0.007
	28500	140776	927.5	945.1	945.1	951.2	0.004	19.8	7160.2	654.2	0.99	0.003	0.006	0.007
	28280	140776	926.0	941.7	941.7	947.9	0.004	20.1	7009.5	562.7	1.00	0.007	0.005	0.007
	28080	140776	925.0	942.3	940.1	946.6	0.002	16.7	8442.0	682.9	0.80	0.005	0.006	0.005
	27925	140776	924.0	940.4	939.5	946.0	0.003	19.1	7355.4	549.8	0.92	0.006	0.006	0.006
	27725	140776	923.0	939.3	939.3	945.4	0.003	19.8	7106.6	586.7	1.00	0.005	0.006	0.005
	27545	140776	922.0	937.7	937.7	943.3	0.003	19.0	7395.6	656.5	1.00	0.006	0.005	0.006
	27335	140776	921.0	936.2	936.2	940.8	0.003	17.3	8160.9	887.0	1.00	0.005	0.005	0.005
	27155	140776	920.5	935.4	935.4	939.6	0.003	16.4	8571.6	1033.5	1.01	0.003	0.004	0.004
SRC3	**26990**	140776	920.0	933.7	933.7	937.6	0.004	15.8	8895.8	1147.6	1.00	0.003	0.003	0.004
	26780	140776	918.0	931.4	931.4	935.1	0.004	15.5	9080.7	1213.5	1.00	0.010	0.007	0.005
	26575	140776	917.0	930.6	930.0	933.7	0.004	14.2	9923.8	1259.9	0.89	0.005	0.007	0.006
	26355	140776	916.0	929.2	929.2	932.8	0.005	15.2	9247.2	1278.4	1.00	0.005	0.005	0.006
	26170	140776	915.0	928.9	928.1	931.7	0.003	13.5	10408.5	1352.5	0.86	0.005	0.005	0.005
	25965	140776	914.0	927.2	927.2	930.8	0.005	15.2	9254.7	1290.2	1.00	0.005	0.005	0.005
	25785	140776	913.5	926.1	926.1	929.5	0.005	15.0	9402.3	1344.9	1.00	0.003	0.004	0.004
	25600	140776	912.5	924.9	924.9	927.9	0.005	13.9	10151.1	1661.6	0.99	0.005	0.004	0.004
	25425	140776	911.0	925.4	923.8	927.0	0.002	10.3	13664.5	2021.6	0.69	0.009	0.007	0.006
	25215	140776	910.0	923.3	923.3	926.3	0.005	13.8	10181.3	1732.2	1.01	0.005	0.006	0.006
	25000	140776	909.0	922.1	922.1	924.6	0.004	12.6	11135.5	2284.2	1.01	0.005	0.005	0.006
SRC4	**24795**	140776	908.0	920.4	920.4	922.8	0.004	12.6	11204.7	2315.5	1.01	0.005	0.005	0.005
	24550	140776	906.0	919.5	918.0	921.0	0.002	9.7	14446.3	2238.3	0.68	0.008	0.007	0.006
	24335	140776	905.0	917.6	917.6	920.3	0.004	13.0	10833.4	2087.5	1.01	0.005	0.007	0.006
	24115	140776	904.0	915.9	915.9	918.6	0.005	13.1	10751.3	2018.8	1.00	0.005	0.005	0.006
	23975	140776	903.5	914.6	914.6	917.4	0.005	13.3	10577.2	1919.3	1.00	0.004	0.004	0.004
	23755	140776	902.0	913.3	913.2	916.0	0.005	13.3	10567.8	1938.0	1.01	0.007	0.006	0.005
	23565	140776	900.0	912.4	912.4	915.1	0.005	13.2	10692.0	2036.3	1.01	0.011	0.009	0.007
	23365	140776	900.0	911.1	911.1	914.0	0.005	13.6	10329.9	1783.9	1.00	0.000	0.005	0.006
	23180	140776	899.0	911.0	909.4	912.5	0.002	10.1	14012.5	2086.5	0.68	0.005	0.003	0.005
	23000	140776	898.0	910.9	908.4	912.1	0.001	9.0	15727.7	2065.4	0.57	0.006	0.005	0.004
	22790	140776	897.5	910.4	908.2	911.8	0.001	9.5	14833.4	1946.2	0.61	0.002	0.004	0.004
	22600	140776	896.0	910.1	907.6	911.6	0.001	9.5	14788.1	1866.4	0.60	0.008	0.005	0.005
	22415	140776	895.5	909.7	906.9	911.3	0.002	10.1	13933.7	1712.9	0.62	0.003	0.005	0.004

corr(x,v)=	-0.05991
corr(x,a)=	0.2074
corr(x,b)=	-0.22352
corr(x,m1)=	0.195674
corr(x,m2)=	0.31057
corr(x,m3)=	**0.398648**

Figure A4.5A3: Santa Clara River Existing Conditions HEC-RAS Reach C - Station vs Bedslope 3

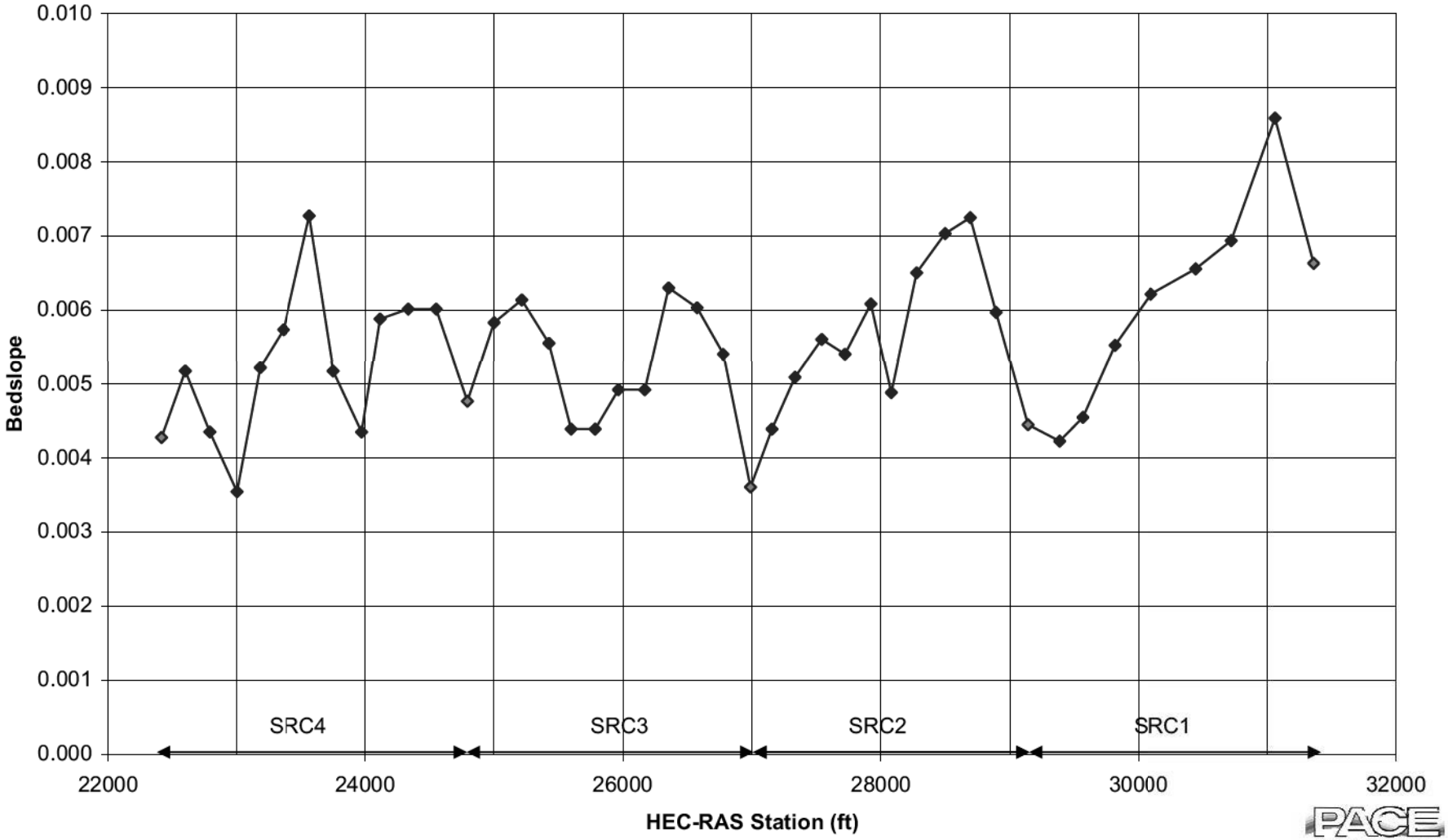


Table A4.5A4: Santa Clara River Existing Conditions Hec-Ras Output and Parameter Correlation: Reach D

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRD1	**22195**	141426	894.0	906.9	906.9	910.5	0.004	15.4	9204.5	1262.7	1.00			
	22010	141426	892.0	906.2	906.2	909.7	0.003	15.1	9380.5	1322.1	1.00	0.011		
	21790	141426	891.5	904.9	904.9	908.1	0.003	14.4	9826.5	1586.7	1.00	0.002	0.006	
	21615	141426	892.0	903.1	903.1	906.0	0.003	13.7	10342.2	1845.7	1.00	-0.003	0.000	0.003
	21440	141426	890.0	901.2	901.2	904.5	0.004	14.6	9680.3	1773.5	1.00	0.011	0.004	0.004
	21225	141426	888.0	899.8	899.8	902.3	0.004	12.6	11221.5	2263.5	1.00	0.009	0.010	0.006
	21020	141426	887.0	897.4	897.4	900.4	0.004	13.8	10350.8	1908.4	0.99	0.005	0.007	0.008
	20845	141426	886.0	897.0	897.0	899.4	0.004	12.5	11348.1	2407.3	1.01	0.006	0.005	0.007
	20595	141426	885.0	896.4	895.9	898.3	0.003	11.0	12863.1	2527.3	0.86	0.004	0.005	0.005
	20435	141426	884.0	896.2	895.3	897.8	0.002	10.3	13709.7	2581.1	0.79	0.006	0.005	0.005
	20280	141426	883.7	895.0	895.0	897.3	0.004	12.1	11653.2	2572.8	1.00	0.002	0.004	0.004
	20070	141426	882.0	892.7	892.7	895.1	0.004	12.4	11394.6	2436.1	1.01	0.008	0.005	0.006
SRD2	**19855**	141426	880.5	891.1	891.1	893.8	0.004	13.1	10778.8	2072.9	1.01	0.007	0.008	0.006
	19630	141426	880.0	889.8	889.7	892.5	0.004	13.2	10735.2	1915.0	0.98	0.002	0.005	0.006
	19440	141426	878.0	889.9	888.7	891.7	0.002	10.8	13151.5	2083.7	0.75	0.011	0.006	0.006
	19240	141426	877.5	888.9	888.5	891.1	0.003	12.1	11650.5	2090.1	0.91	0.003	0.006	0.005
	19050	141426	876.0	889.0	887.2	890.5	0.002	9.6	14759.7	2167.4	0.64	0.008	0.005	0.007
	18830	141426	874.0	888.7	886.5	890.1	0.001	9.3	15134.9	2098.9	0.61	0.009	0.009	0.007
	18650	141426	873.5	888.7	885.4	889.8	0.001	8.5	16644.3	2025.1	0.52	0.003	0.006	0.007
	18475	141426	872.0	888.7	884.6	889.6	0.001	7.7	18373.6	1945.0	0.44	0.009	0.006	0.007
	18290	141426	871.5	888.4	884.4	889.4	0.001	8.1	17448.5	1844.7	0.46	0.003	0.006	0.005
	18025	141426	870.0	888.3	882.8	889.2	0.001	7.6	18674.7	1611.8	0.39	0.006	0.004	0.006
	17785	141426	868.0	887.9	882.8	889.0	0.001	8.5	16558.7	1418.6	0.44	0.008	0.007	0.006
SRD3	**17510**	141426	867.5	886.2	883.7	888.6	0.002	12.3	11457.1	1289.7	0.73	0.002	0.005	0.005
	17360	141426	866.5	883.4	883.4	887.9	0.004	16.9	8357.4	937.1	1.00	0.007	0.004	0.005
	17110	141426	864.0	881.1	881.1	884.6	0.005	15.0	9425.5	1362.5	1.01	0.010	0.009	0.006
	16970	141426	863.7	879.7	879.7	883.0	0.005	14.4	9799.5	1514.8	1.00	0.002	0.007	0.007
	16720	141426	863.5	875.3	875.3	878.4	0.005	14.2	9981.9	1621.0	1.01	0.001	0.001	0.005
	16515	141426	862.0	873.5	873.5	876.3	0.005	13.4	10549.7	1886.9	1.00	0.007	0.004	0.003
	16305	141426	860.0	871.6	871.2	874.0	0.004	12.6	11236.9	1898.6	0.91	0.010	0.008	0.006
	16130	141426	860.0	870.5	870.5	873.2	0.004	13.3	10641.4	1965.0	1.01	0.000	0.005	0.006
	15960	141426	859.0	869.2	869.2	871.8	0.005	12.8	11034.6	2193.0	1.01	0.006	0.003	0.005
	15745	141426	858.0	868.6	867.8	870.4	0.003	10.9	12927.8	2278.9	0.81	0.005	0.005	0.004
	15540	141426	857.5	868.1	867.1	869.8	0.003	10.4	13602.2	2324.4	0.76	0.002	0.004	0.004
	15335	141426	856.0	866.5	866.5	869.0	0.005	12.6	11254.1	2302.4	1.00	0.007	0.005	0.005

corr(x,v)=	**0.170227**
corr(x,a)=	-0.15893
corr(x,b)=	0.035906
corr(x,m1)=	0.087873
corr(x,m2)=	0.094747
corr(x,m3)=	0.162424

Figure A4.5A4: Santa Clara River Existing Conditions HEC-RAS Reach D - Station vs Channel Velocity

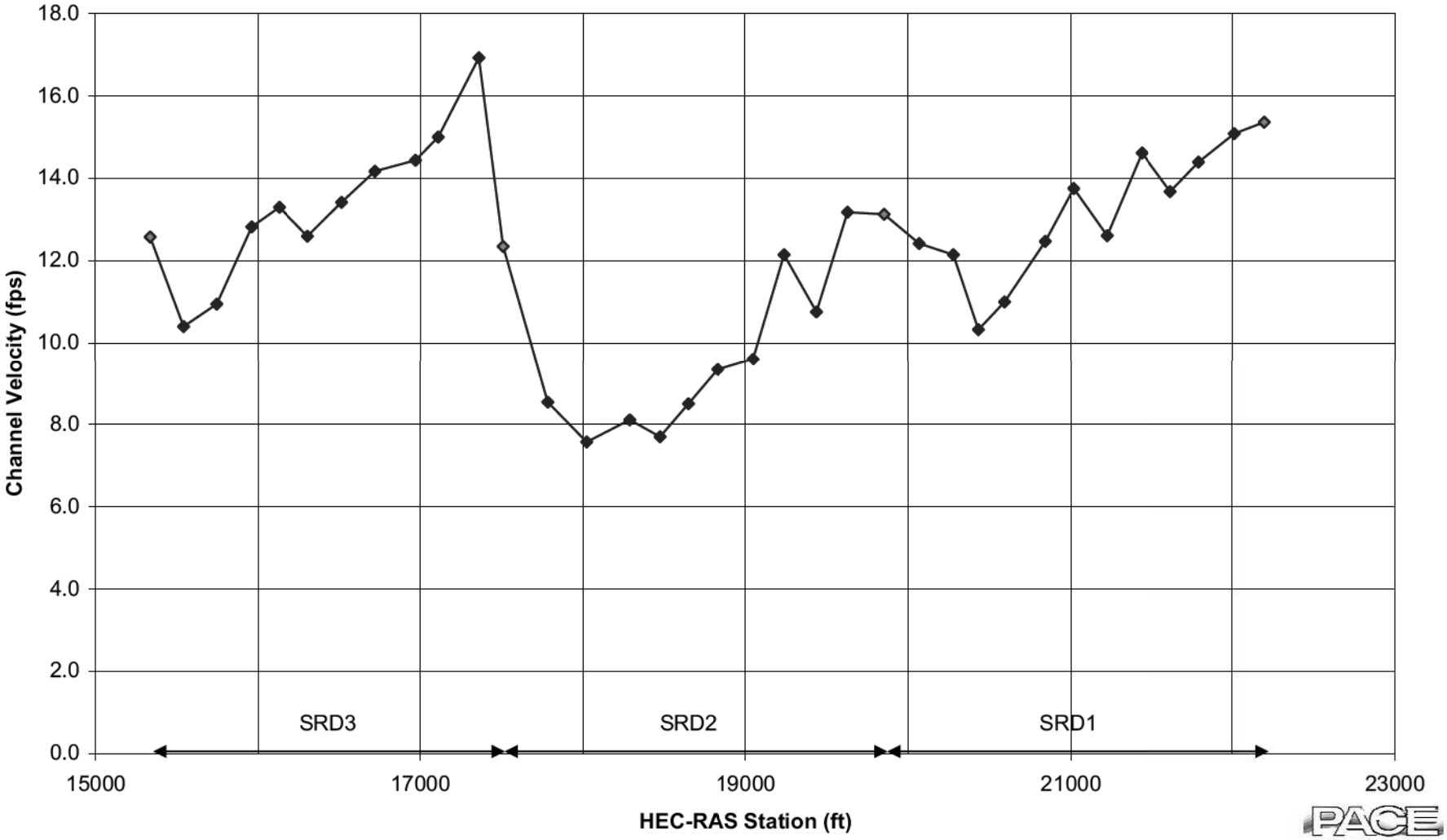


Table A4.5A5: Santa Clara River Existing Conditions Hec-Ras Output and Parameter Correlation: Reach E

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRE1	**15125**	142475	854.0	864.5	864.5	867.5	0.004	13.7	10371.5	1769.0	1.00			
	14900	142475	853.0	863.3	863.3	866.3	0.005	14.0	10205.6	1697.8	1.00	0.004		
	14720	142475	852.0	862.1	862.1	865.0	0.005	13.7	10381.9	1810.0	1.01	0.006	0.005	
	14480	142475	850.5	860.5	860.5	863.5	0.004	13.7	10409.0	1796.5	1.00	0.006	0.006	0.005
	14315	142475	850.0	859.9	859.8	862.7	0.005	13.5	10576.7	1874.0	1.00	0.003	0.005	0.005
	14090	142475	849.7	858.7	858.7	861.6	0.005	13.7	10387.9	1766.9	1.00	0.001	0.002	0.004
	13850	142475	848.0	857.1	857.1	860.1	0.005	13.8	10293.9	1731.4	1.00	0.007	0.004	0.004
	13635	142475	846.0	856.0	856.0	859.0	0.005	14.0	10182.3	1687.5	1.00	0.009	0.008	0.006
	13425	142475	845.0	854.6	854.6	857.4	0.004	13.4	10627.8	1893.5	1.00	0.005	0.007	0.007
	13190	142475	844.0	853.1	852.8	855.6	0.004	12.7	11213.3	1844.9	0.91	0.004	0.004	0.006
SRE2	**13030**	142475	843.0	852.7	852.0	855.0	0.003	12.3	11565.9	1764.2	0.85	0.006	0.005	0.005
	12835	142475	842.0	852.1	851.0	854.4	0.003	12.1	11770.0	1607.6	0.79	0.005	0.006	0.005
	12615	142475	841.0	851.8	849.8	853.8	0.002	11.3	12646.0	1470.5	0.68	0.005	0.005	0.005
	12395	142475	840.0	851.5	849.2	853.4	0.002	11.1	12874.2	1438.1	0.65	0.005	0.005	0.005
	12195	142475	839.0	851.4	848.1	853.0	0.001	10.1	14130.7	1388.8	0.56	0.005	0.005	0.005
	11995	142475	837.0	850.7	848.1	852.7	0.002	11.3	12590.6	1281.4	0.64	0.010	0.008	0.006
	11780	142475	836.0	850.5	847.7	852.3	0.001	10.7	13373.2	1402.9	0.61	0.005	0.007	0.007
	11605	142475	835.5	849.7	847.2	852.0	0.002	12.0	11833.0	1304.2	0.70	0.003	0.004	0.006
	11405	142475	834.0	849.4	846.2	851.7	0.001	12.0	11855.1	1132.2	0.65	0.008	0.005	0.005
	11180	142475	833.0	847.6	845.6	851.1	0.003	15.0	9504.9	868.5	0.80	0.004	0.006	0.005
SRE3	**11015**	142475	831.5	844.8	844.8	850.4	0.004	18.9	7530.6	680.3	1.00	0.009	0.006	0.007
	10835	142475	831.0	843.8	843.8	848.6	0.004	17.7	8059.6	834.5	1.00	0.003	0.006	0.005
	10575	142475	830.0	840.2	840.2	844.1	0.004	16.0	8918.2	1127.5	1.00	0.004	0.003	0.005
	10390	142475	828.0	839.5	838.6	842.2	0.003	13.2	10811.2	1390.1	0.83	0.011	0.007	0.006
	10225	142475	827.5	838.2	838.2	841.6	0.004	14.7	9676.6	1447.2	1.00	0.003	0.007	0.006
	10000	142475	826.0	837.1	837.1	840.4	0.004	14.6	9744.8	1487.1	1.01	0.007	0.005	0.007
	9820	142475	824.0	835.4	835.4	838.8	0.004	15.0	9530.3	1373.2	1.00	0.011	0.009	0.007
	9595	142475	823.8	834.1	834.1	837.4	0.005	14.6	9769.1	1619.4	1.00	0.001	0.005	0.006
	9385	142475	823.0	833.1	833.1	836.0	0.005	13.7	10378.5	1773.7	1.00	0.004	0.002	0.005
	9220	142475	822.0	831.8	831.8	834.7	0.005	13.7	10412.7	1813.7	1.01	0.006	0.005	0.003
	9025	142475	821.0	830.4	830.4	833.4	0.004	13.8	10348.0	1751.7	1.00	0.005	0.006	0.005

corr(x,v)=	-0.248811
corr(x,a)=	0.216874
corr(x,b)=	**0.4079725**
corr(x,m1)=	-0.076918
corr(x,m2)=	-0.084312
corr(x,m3)=	-0.104576

Figure A4.5A5: Santa Clara River Existing Conditions HEC-RAS Reach E - Station vs Top Width

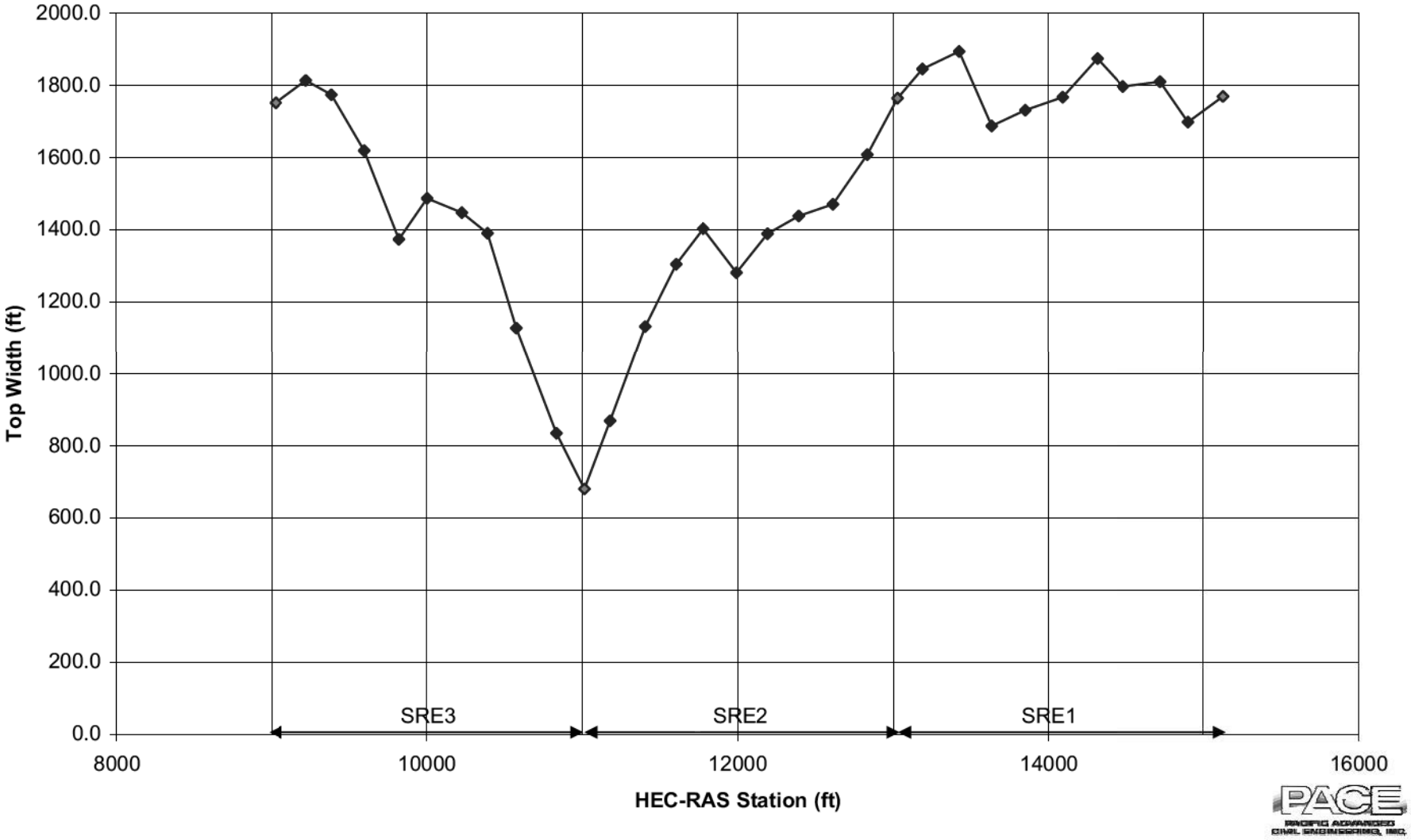


Table A4.5B1: Santa Clara River Proposed Conditions Hec-Ras Output and Parameter Correlation: Reach A

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRA1	**46195**	115111	1035.0	1054.3	1054.3	1060.3	0.004	19.7	5847.5	483.4	1.00			
	46020	115111	1032.0	1052.4	1052.4	1058.1	0.004	19.1	6013.5	531.5	1.00	0.017		
	45545	115111	1030.0	1049.2	1049.2	1055.7	0.004	20.3	5664.2	446.8	1.01	0.004	0.008	
	45030	115111	1025.0	1045.6	1044.6	1050.5	0.003	17.8	6472.4	521.5	0.89	0.010	0.007	0.009
	44585	115111	1022.0	1043.1	1043.1	1048.8	0.004	19.2	6004.2	531.9	1.01	0.007	0.008	0.007
	44210	115111	1020.0	1041.6	1038.7	1045.0	0.002	14.8	7793.3	585.9	0.71	0.005	0.006	0.007
SRA2	**43820**	115111	1018.0	1037.5	1037.5	1043.6	0.004	19.9	5785.1	476.5	1.01	0.005	0.005	0.006
	43610	115111	1017.0	1034.1	1034.1	1040.1	0.004	19.7	5832.0	483.7	1.00	0.005	0.005	0.005
	43410	115111	1016.0	1030.7	1030.7	1035.9	0.004	18.1	6344.4	623.6	1.00	0.005	0.005	0.005
	43200	115111	1014.0	1029.3	1029.3	1033.9	0.004	17.2	6697.3	738.0	1.01	0.010	0.007	0.006
	42975	115111	1012.0	1026.1	1026.1	1030.3	0.005	16.3	7064.9	860.6	1.00	0.009	0.009	0.008
	42815	115111	1011.0	1024.4	1024.4	1028.0	0.005	15.4	7497.0	1037.2	1.01	0.006	0.008	0.008
	42590	115111	1010.0	1021.5	1021.5	1025.0	0.005	15.1	7649.4	1098.8	1.01	0.004	0.005	0.007
	42430	115111	1008.0	1020.3	1020.3	1024.0	0.005	15.6	7396.5	1011.9	1.00	0.013	0.008	0.007
	42215	115111	1006.0	1019.7	1018.7	1022.3	0.003	12.7	9040.3	1182.7	0.81	0.009	0.011	0.008
	41940	115111	1005.0	1019.3	1017.7	1021.4	0.002	11.6	9945.3	1284.3	0.73	0.004	0.006	0.008
	41730	115111	1004.0	1018.7	1016.5	1020.8	0.002	11.8	9727.4	1189.1	0.73	0.005	0.004	0.006
	41460	115111	1002.0	1018.1	1015.2	1020.2	0.002	11.7	9876.9	1057.3	0.67	0.007	0.006	0.005
SRA3	**41280**	115111	1001.0	1015.3	1015.3	1019.5	0.005	16.4	7032.5	852.2	1.00	0.006	0.007	0.006
	41080	115111	1000.0	1013.6	1013.6	1017.6	0.005	16.0	7175.8	899.5	1.00	0.005	0.005	0.006
	40825	115111	999.5	1012.1	1012.1	1015.6	0.005	15.0	7673.9	1123.0	1.01	0.002	0.003	0.004
	40585	115111	998.0	1010.6	1010.6	1014.0	0.005	14.9	7741.1	1139.8	1.01	0.006	0.004	0.004
	40335	115111	996.0	1011.0	1008.7	1012.7	0.002	10.7	10771.0	1248.8	0.64	0.008	0.007	0.005
	40130	115111	995.0	1010.4	1008.3	1012.3	0.002	11.1	10380.2	1195.0	0.66	0.005	0.007	0.006
	39945	115111	994.0	1010.2	1007.6	1011.9	0.002	10.7	10785.0	1172.5	0.62	0.005	0.005	0.006
	39755	115111	994.0	1007.2	1007.2	1011.2	0.005	16.1	7140.7	893.3	1.00	0.000	0.003	0.003
	39605	115111	993.0	1005.8	1005.8	1009.9	0.005	16.2	7091.8	873.2	1.00	0.007	0.003	0.004
	39310	115111	992.0	1004.4	1004.4	1008.3	0.005	15.9	7232.2	929.3	1.01	0.003	0.004	0.003
	39100	115111	990.0	1003.7	1002.1	1006.9	0.003	14.2	8088.1	788.3	0.78	0.010	0.006	0.006
	38925	115111	989.5	1003.7	1001.5	1006.3	0.002	12.9	8958.4	873.3	0.71	0.003	0.006	0.005
SRA4	**38710**	115111	988.0	1003.6	1000.3	1005.8	0.002	12.1	9534.8	820.2	0.62	0.007	0.005	0.007
	38475	115111	986.0	1000.0	1000.0	1005.0	0.004	17.8	6455.5	659.8	1.00	0.009	0.008	0.006
	38300	115111	985.5	997.9	997.9	1002.7	0.004	17.7	6520.8	677.2	1.00	0.003	0.006	0.006
	38065	115111	984.0	998.0	995.7	1001.3	0.002	14.5	7917.9	658.4	0.74	0.006	0.005	0.006
	37810	115111	983.0	995.2	995.2	1000.4	0.004	18.2	6321.3	618.2	1.00	0.004	0.005	0.005
	37655	115111	982.0	994.1	994.1	998.8	0.004	17.4	6619.8	713.6	1.01	0.006	0.005	0.005
	37390	115111	981.0	991.5	990.1	994.6	0.003	14.2	8124.7	840.6	0.80	0.004	0.005	0.004
	37135	115111	980.0	989.3	989.3	993.6	0.005	16.6	6941.6	821.4	1.01	0.004	0.004	0.004
	36930	115111	978.0	987.9	987.5	991.7	0.004	15.6	7364.7	834.7	0.93	0.010	0.007	0.006
	36735	115111	977.0	986.9	986.9	990.9	0.005	16.1	7167.6	897.0	1.00	0.005	0.008	0.006
	36515	115111	975.0	987.0	985.4	989.6	0.002	12.8	8997.4	994.8	0.75	0.009	0.007	0.008
	36265	115111	974.0	986.5	985.2	988.8	0.003	12.3	9335.4	1176.0	0.77	0.004	0.006	0.006

corr(x,v)=	**0.420839**
corr(x,a)=	-0.34894
corr(x,b)=	-0.35235
corr(x,m1)=	0.287884
corr(x,m2)=	0.270636
corr(x,m3)=	0.366906

Figure A4.5B1: Santa Clara River Proposed Conditions HEC-RAS Reach A - Station vs Channel Velocity

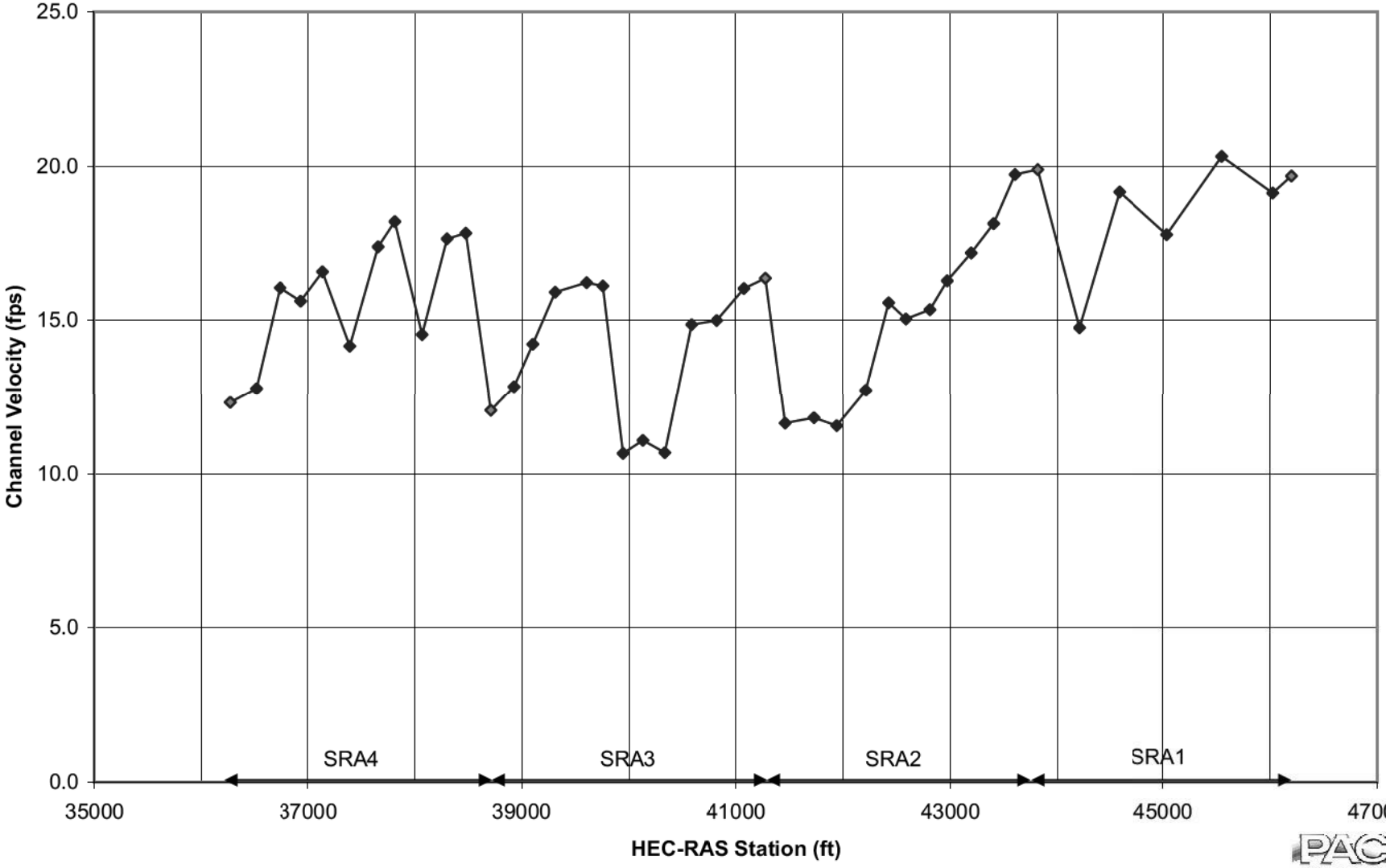


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Table A4.5B2: Santa Clara River Proposed Conditions Hec-Ras Output and Parameter Correlation: Reach B

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRB1	**36080**	116236	973.0	984.6	984.6	988.0	0.006	14.7	7914.1	1176.0	1.00			
	35845	116236	971.0	984.1	982.9	986.2	0.003	11.7	9897.1	1385.2	0.76	0.009		
	35725	116236	970.0	982.6	982.6	985.7	0.005	14.1	8236.8	1374.9	1.00	0.008	0.008	
	35515	116236	969.0	981.3	981.3	984.4	0.004	14.0	8305.4	1363.6	1.00	0.005	0.006	0.007
	35245	116236	968.0	980.2	980.2	983.1	0.005	13.7	8476.1	1553.7	1.00	0.004	0.004	0.005
	35040	116236	967.0	978.3	978.3	981.4	0.005	13.9	8335.5	1400.5	1.01	0.005	0.004	0.004
	34860	116236	966.0	977.4	977.4	980.5	0.004	14.1	8261.7	1362.4	1.01	0.006	0.005	0.005
	34720	116236	965.5	976.2	976.2	979.2	0.004	13.9	8382.6	1419.6	1.01	0.004	0.005	0.005
	34495	116236	964.0	974.3	974.3	977.3	0.004	14.0	8314.1	1380.4	1.00	0.007	0.005	0.006
	34310	116236	963.0	972.6	972.6	975.8	0.005	14.3	8141.1	1311.4	1.01	0.005	0.006	0.005
	34090	116236	962.0	971.6	971.6	974.7	0.004	14.2	8178.3	1312.6	1.00	0.005	0.005	0.006
SRB2	**33880**	116236	960.0	970.3	970.3	973.3	0.004	14.1	8232.7	1343.5	1.01	0.010	0.007	0.007
	33710	116236	959.0	969.3	969.3	972.3	0.004	14.0	8301.6	1377.9	1.01	0.006	0.008	0.007
	33500	116236	958.0	968.1	968.1	970.7	0.005	13.1	8884.5	1720.7	1.01	0.005	0.005	0.007
	33310	116236	957.0	967.0	967.0	969.5	0.004	12.9	9026.4	1780.3	1.01	0.005	0.005	0.005
	33115	116236	956.0	966.6	965.3	968.3	0.003	10.4	11217.6	1847.3	0.74	0.005	0.005	0.005
	32795	116236	954.0	964.6	964.6	967.2	0.004	13.0	8949.4	1735.6	1.01	0.006	0.006	0.006
	32605	116236	952.0	963.6	963.6	966.3	0.004	13.1	8889.4	1766.1	1.00	0.011	0.008	0.007

corr(x,v)=	0.387052
corr(x,a)=	-0.3601
corr(x,b)=	**-0.74378**
corr(x,m1)=	-0.14733
corr(x,m2)=	-0.13339
corr(x,m3)=	-0.33786

Figure A4.5B2: Santa Clara River Proposed Conditions HEC-RAS Reach B - Station vs Top Width

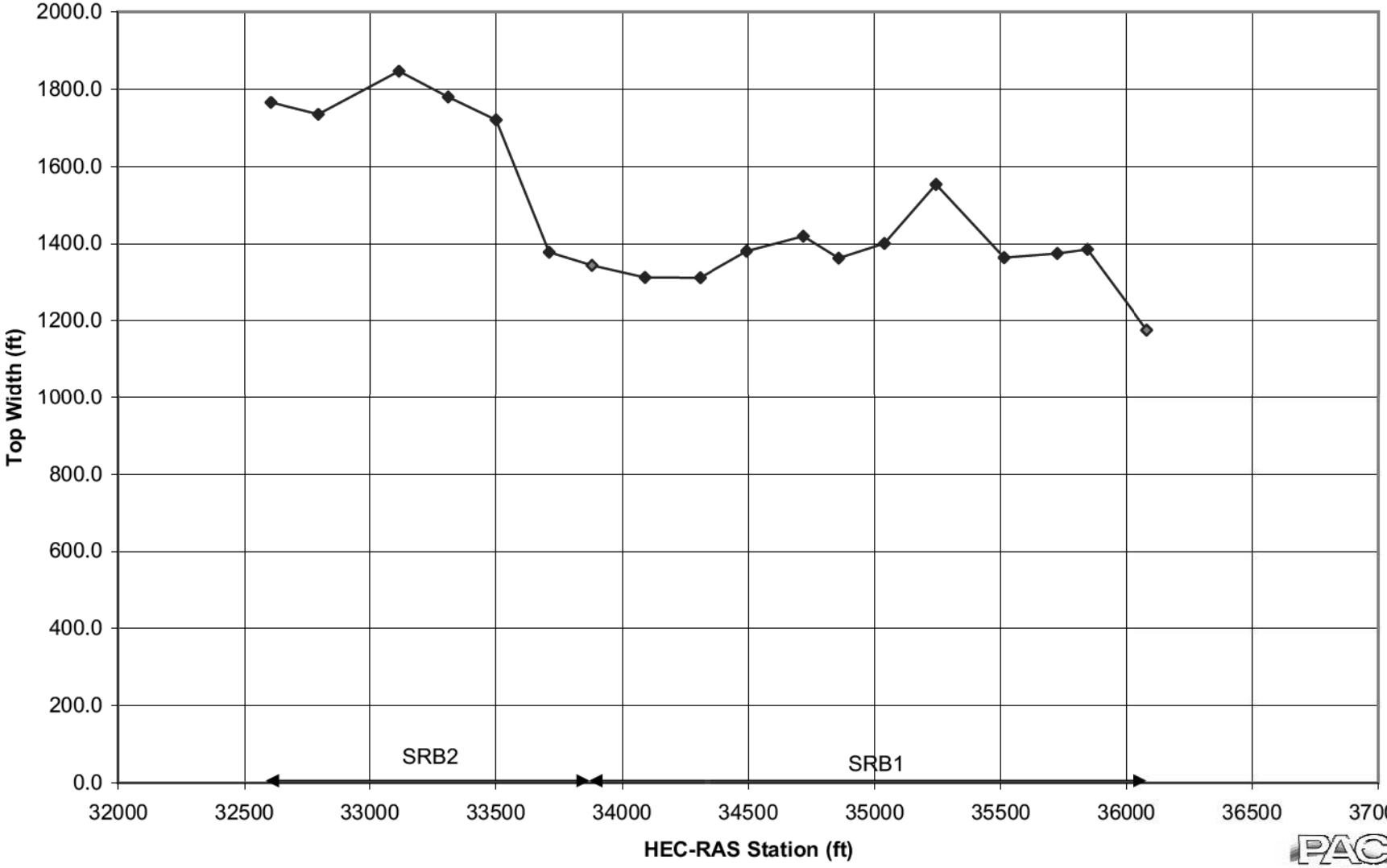


Table A4.5B3: Santa Clara River Proposed Conditions Hec-Ras Output and Parameter Correlation: Reach C

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRC1	**32265**	140776	950.0	961.3	961.3	964.1	0.004	13.4	10505.6	1941.1	1.02	0.006	0.008	0.007
	31875	140776	949.0	959.4	959.4	961.8	0.006	12.4	11368.1	2409.1	1.00	0.003	0.004	0.005
	31585	140776	946.0	957.3	957.0	959.5	0.004	12.1	11630.6	2178.5	0.92	0.010	0.006	0.006
	31360	140776	944.0	956.6	955.4	958.6	0.003	11.5	12197.9	1866.2	0.80			
	31060	140776	942.0	956.6	953.3	957.9	0.001	9.0	15628.5	1701.3	0.52	0.007		
	30720	140776	940.0	956.6	951.3	957.4	0.001	7.3	19427.4	1882.3	0.40	0.006	0.006	
	30445	140776	938.0	956.5	949.6	957.2	0.000	6.8	20869.5	1771.8	0.35	0.007	0.007	0.007
	30095	140776	936.0	956.3	947.9	957.1	0.000	7.0	20255.2	1619.5	0.35	0.006	0.006	0.006
	29815	140776	935.0	955.9	948.1	956.9	0.001	7.9	17894.8	1430.1	0.39	0.004	0.005	0.006
	29565	140776	934.0	955.8	947.3	956.7	0.001	7.7	18197.7	1320.3	0.37	0.004	0.004	0.005
	29385	140776	933.0	955.5	949.4	956.6	0.001	8.6	16378.8	1233.0	0.42	0.006	0.005	0.004
SRC2	**29140**	140776	932.0	954.8	950.0	956.4	0.001	10.2	13831.1	1082.5	0.50	0.004	0.005	0.004
	28895	140776	930.0	951.3	951.3	955.7	0.004	16.8	8407.0	966.7	1.00	0.008	0.006	0.006
	28695	140776	928.0	948.3	945.7	951.0	0.002	13.3	10604.2	929.9	0.69	0.010	0.009	0.007
	28500	140776	927.5	946.0	946.0	950.3	0.005	16.7	8456.7	998.2	1.01	0.003	0.006	0.007
	28280	140776	926.0	943.4	939.9	945.6	0.001	11.9	11789.8	976.2	0.61	0.007	0.005	0.007
	28080	140776	925.0	943.4	938.2	945.2	0.001	10.9	12937.5	923.4	0.51	0.005	0.006	0.005
	27925	140776	924.0	942.6	938.7	945.0	0.001	12.4	11348.0	864.0	0.60	0.006	0.006	0.006
	27725	140776	923.0	939.3	939.3	944.3	0.004	18.0	7836.7	784.8	1.00	0.005	0.006	0.005
	27545	140776	922.0	937.6	937.6	943.3	0.004	19.1	7378.1	656.3	1.00	0.006	0.005	0.006
	27335	140776	921.0	936.2	936.2	940.9	0.004	17.4	8079.1	865.4	1.00	0.005	0.005	0.005
	27155	140776	920.5	935.3	935.3	939.9	0.004	17.2	8170.8	888.2	1.00	0.003	0.004	0.004
SRC3	**26990**	140776	920.0	933.7	933.7	938.1	0.005	16.7	8413.9	976.9	1.00	0.003	0.003	0.004
	26780	140776	918.0	931.3	931.3	935.4	0.005	16.3	8650.6	1062.3	1.00	0.010	0.007	0.005
	26575	140776	917.0	930.4	930.0	933.8	0.004	14.7	9560.9	1203.7	0.92	0.005	0.007	0.006
	26355	140776	916.0	929.1	929.1	932.8	0.005	15.4	9144.2	1256.8	1.01	0.005	0.005	0.006
	26170	140776	915.0	928.2	928.2	931.8	0.005	15.3	9212.4	1267.9	1.00	0.005	0.005	0.005
	25965	140776	914.0	927.3	927.2	930.8	0.005	15.2	9292.6	1281.8	0.99	0.005	0.005	0.005
	25785	140776	913.5	926.8	926.2	930.0	0.004	14.4	9809.4	1224.0	0.89	0.003	0.004	0.004
	25600	140776	912.5	925.8	925.2	929.3	0.004	15.0	9384.8	1112.9	0.91	0.005	0.004	0.004
	25425	140776	911.0	925.3	924.4	928.6	0.003	14.6	9667.5	1090.1	0.86	0.009	0.007	0.006
	25215	140776	910.0	924.7	923.7	927.9	0.003	14.2	9894.1	1097.3	0.84	0.005	0.006	0.006
	25000	140776	909.0	924.5	922.5	927.2	0.002	13.1	10725.5	1062.4	0.73	0.005	0.005	0.006
SRC4	**24795**	140776	908.0	923.6	921.8	926.6	0.002	14.0	10061.5	957.4	0.76	0.005	0.005	0.005
	24550	140776	906.0	922.5	920.9	926.0	0.003	15.0	9403.5	856.1	0.80	0.008	0.007	0.006
	24335	140776	905.0	920.0	920.0	925.1	0.004	18.1	7779.4	765.0	1.00	0.005	0.007	0.006
	24115	140776	904.0	918.7	918.7	923.8	0.004	18.2	7736.8	757.9	1.00	0.005	0.005	0.006
	23975	140776	903.5	917.7	917.7	922.7	0.004	18.0	7837.6	789.5	1.00	0.004	0.004	0.004
	23755	140776	902.0	916.8	916.8	921.7	0.004	17.8	7930.3	816.5	1.00	0.007	0.006	0.005
	23565	140776	900.0	915.6	915.6	920.3	0.004	17.4	8100.0	867.0	1.00	0.011	0.009	0.007
	23365	140776	900.0	914.4	914.4	918.9	0.004	16.9	8320.3	939.5	1.00	0.000	0.005	0.006
	23180	140776	899.0	913.2	912.6	917.2	0.004	16.0	8806.1	926.0	0.91	0.005	0.003	0.005
	23000	140776	898.0	912.8	911.1	916.5	0.003	15.3	9178.0	784.0	0.79	0.006	0.005	0.004
	22790	140776	897.5	910.5	910.5	915.5	0.005	18.0	7838.5	784.0	1.00	0.002	0.004	0.004
	22600	140776	896.0	909.6	909.6	913.9	0.005	16.6	8469.8	1007.6	1.01	0.008	0.005	0.005
	22415	140776	895.5	908.0	908.0	912.1	0.005	16.3	8630.1	1052.8	1.00	0.003	0.005	0.004

corr(x,v)= -0.71507
corr(x,a)= **0.711145**
corr(x,b)= 0.655976
corr(x,m1)= 0.131527
corr(x,m2)= 0.154975
corr(x,m3)= 0.224278

Figure A4.5B3: Santa Clara River Proposed Conditions HEC-RAS Reach C - Station vs Flow Area

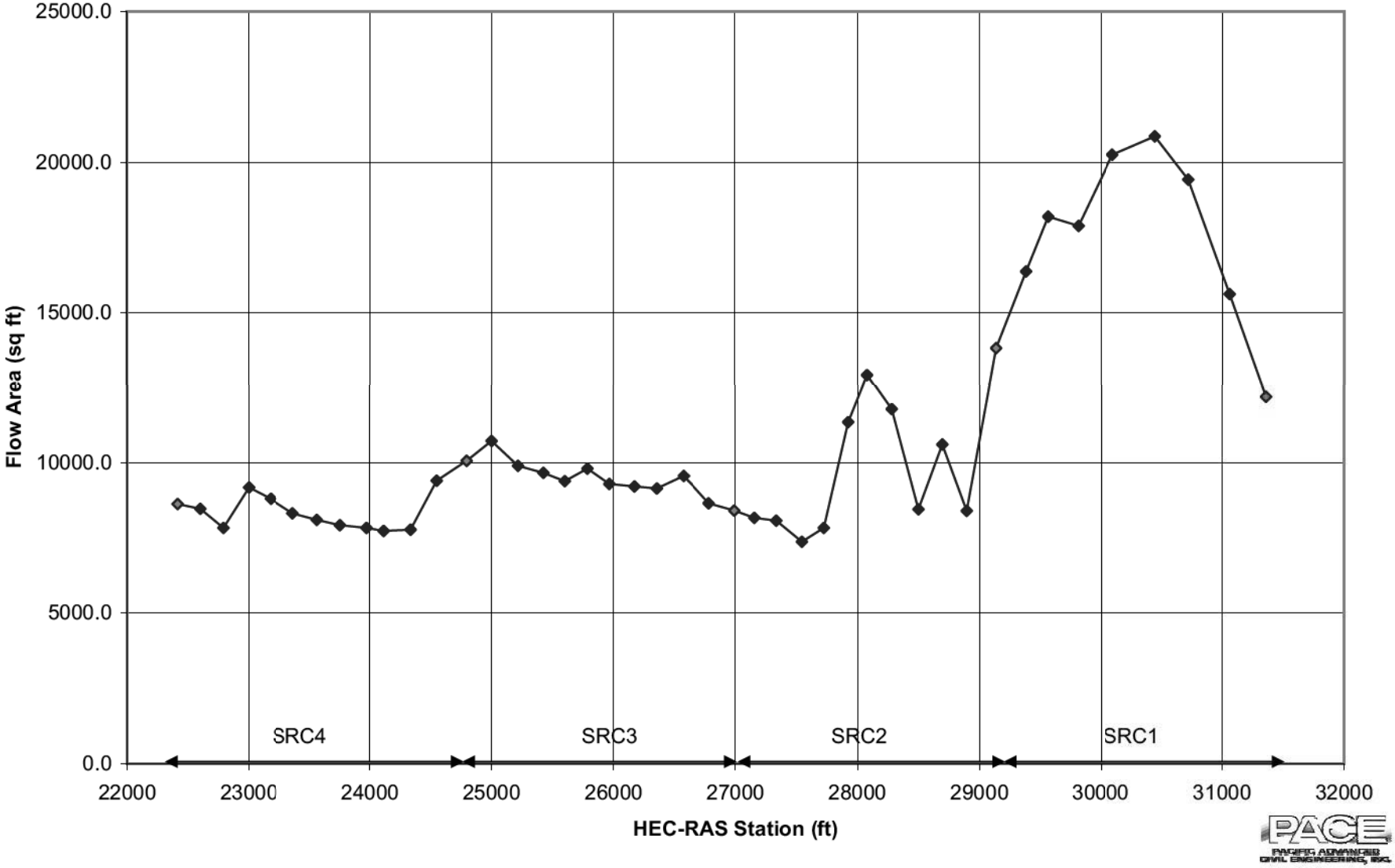
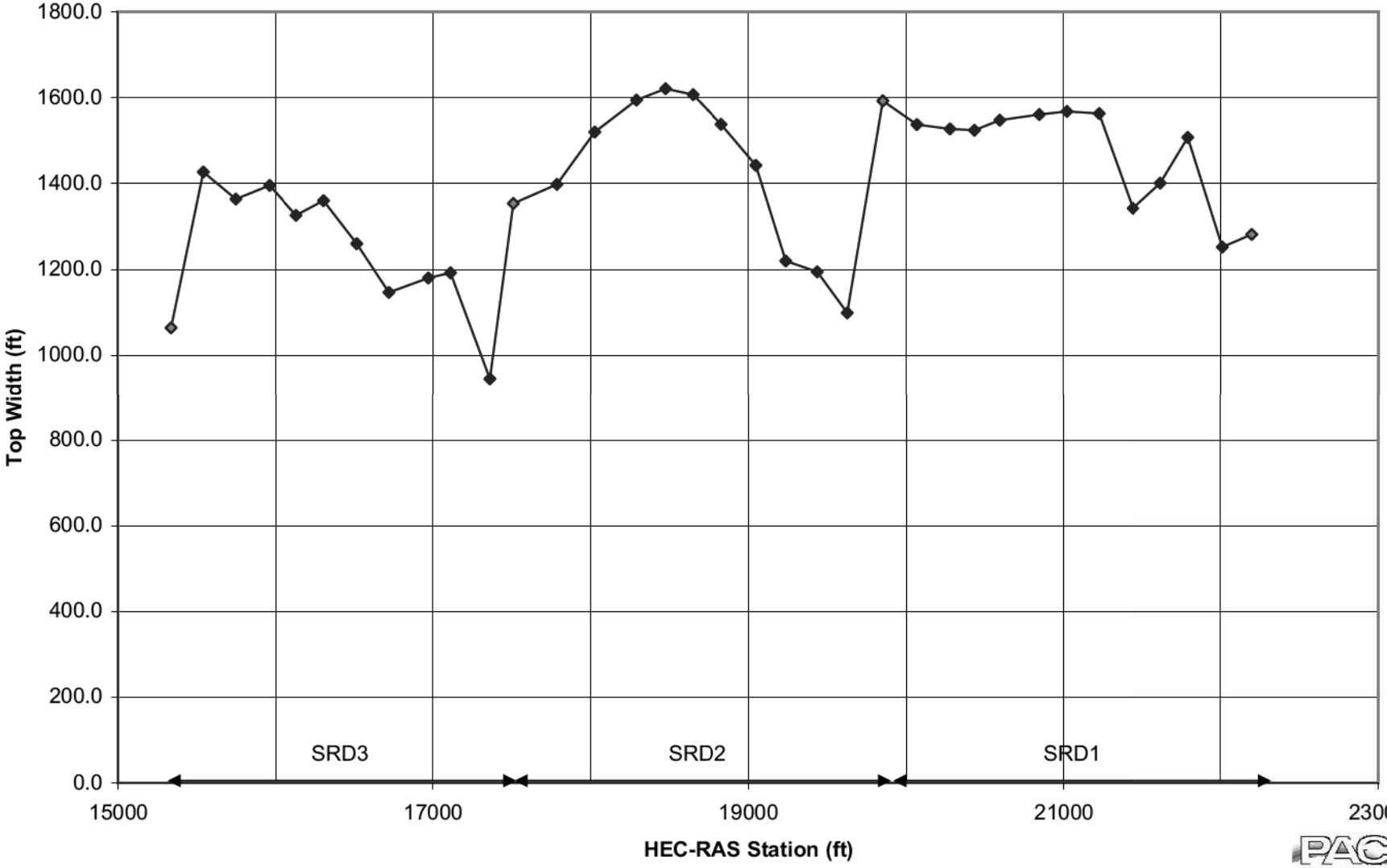


Table A4.5B4: Santa Clara River Proposed Conditions Hec-Ras Output and Parameter Correlation: Reach D

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRD1	**22195**	141426	894.0	907.5	906.9	910.6	0.004	14.2	9951.4	1281.6	0.90			
	22010	141426	892.0	906.1	906.1	909.8	0.005	15.4	9195.9	1252.3	1.00	0.011		
	21790	141426	891.5	904.8	904.8	908.1	0.005	14.7	9642.9	1507.8	1.00	0.002	0.006	
	21615	141426	892.0	902.8	902.8	906.2	0.005	14.8	9557.4	1401.1	1.00	-0.003	0.000	0.003
	21440	141426	890.0	901.6	901.6	905.1	0.005	15.0	9424.5	1342.6	1.00	0.011	0.004	0.004
	21225	141426	888.0	900.5	900.5	903.7	0.005	14.3	9886.6	1563.9	1.00	0.009	0.010	0.006
	21020	141426	887.0	900.0	898.9	902.3	0.003	12.3	11464.6	1568.5	0.80	0.005	0.007	0.008
	20845	141426	886.0	898.4	898.4	901.6	0.005	14.3	9883.4	1561.0	1.00	0.006	0.005	0.007
	20595	141426	885.0	898.3	896.5	900.3	0.002	11.1	12704.0	1548.1	0.68	0.004	0.005	0.005
	20435	141426	884.0	898.1	895.8	899.9	0.002	10.8	13124.4	1524.8	0.65	0.006	0.005	0.005
	20280	141426	883.7	896.0	896.0	899.3	0.005	14.5	9735.6	1527.4	1.01	0.002	0.004	0.004
	20070	141426	882.0	894.3	894.3	897.5	0.005	14.4	9793.6	1537.7	1.01	0.008	0.005	0.006
SRD2	**19855**	141426	880.5	892.7	892.7	895.8	0.005	14.3	9916.9	1593.1	1.01	0.007	0.008	0.006
	19630	141426	880.0	891.5	890.5	894.7	0.003	14.4	9854.6	1098.6	0.84	0.002	0.005	0.006
	19440	141426	878.0	891.4	889.7	894.0	0.002	12.9	10950.1	1194.6	0.75	0.011	0.006	0.006
	19240	141426	877.5	889.4	889.4	893.2	0.005	15.6	9068.4	1219.4	1.01	0.003	0.006	0.005
	19050	141426	876.0	889.4	887.9	891.7	0.003	12.2	11580.6	1442.6	0.76	0.008	0.005	0.007
	18830	141426	874.0	888.8	887.5	891.1	0.003	12.1	11667.4	1538.2	0.78	0.009	0.009	0.007
	18650	141426	873.5	888.7	886.7	890.5	0.002	10.8	13119.6	1607.3	0.66	0.003	0.006	0.007
	18475	141426	872.0	888.9	885.0	890.1	0.001	8.8	16151.2	1621.7	0.49	0.009	0.006	0.007
	18290	141426	871.5	888.5	885.1	889.9	0.001	9.4	15041.5	1594.7	0.54	0.003	0.006	0.005
	18025	141426	870.0	888.6	882.9	889.5	0.001	7.8	18154.4	1520.5	0.40	0.006	0.004	0.006
	17785	141426	868.0	888.3	882.8	889.3	0.001	8.4	16871.0	1398.4	0.43	0.008	0.007	0.006
SRD3	**17510**	141426	868.0	887.5	883.4	889.0	0.001	10.1	14045.6	1353.6	0.55	0.000	0.004	0.004
	17360	141426	868.0	884.0	884.0	888.4	0.004	16.9	8365.0	944.5	1.00	0.000	0.000	0.003
	17110	141426	864.0	881.1	881.1	884.9	0.005	15.7	9039.2	1191.9	1.00	0.016	0.010	0.006
	16970	141426	863.7	879.6	879.6	883.4	0.005	15.7	8997.0	1180.2	1.00	0.002	0.011	0.008
	16720	141426	863.5	875.4	875.4	879.4	0.005	15.9	8873.6	1146.5	1.01	0.001	0.001	0.007
	16515	141426	862.0	873.9	873.9	877.5	0.005	15.4	9209.6	1260.0	1.00	0.007	0.004	0.003
	16305	141426	860.0	874.5	872.0	876.4	0.002	11.1	12765.9	1360.4	0.64	0.010	0.008	0.006
	16130	141426	860.0	872.2	872.2	875.8	0.005	15.2	9332.9	1326.0	1.01	0.000	0.005	0.006
	15960	141426	859.0	871.6	871.0	874.5	0.004	13.7	10347.3	1395.6	0.88	0.006	0.003	0.005
	15745	141426	858.0	871.3	869.8	873.7	0.003	12.3	11500.9	1363.9	0.75	0.005	0.005	0.004
	15540	141426	857.5	871.2	868.5	873.0	0.002	10.5	13415.3	1427.0	0.61	0.002	0.004	0.004
	15335	141426	856.0	868.1	868.1	872.2	0.006	16.2	8723.3	1064.1	1.00	0.007	0.005	0.005

corr(x,v)=	0.100396
corr(x,a)=	-0.14163
corr(x,b)=	**0.358193**
corr(x,m1)=	0.081919
corr(x,m2)=	0.060966
corr(x,m3)=	0.113964

Figure A4.5B4: Santa Clara River Proposed Conditions HEC-RAS Reach D - Station vs Top Width



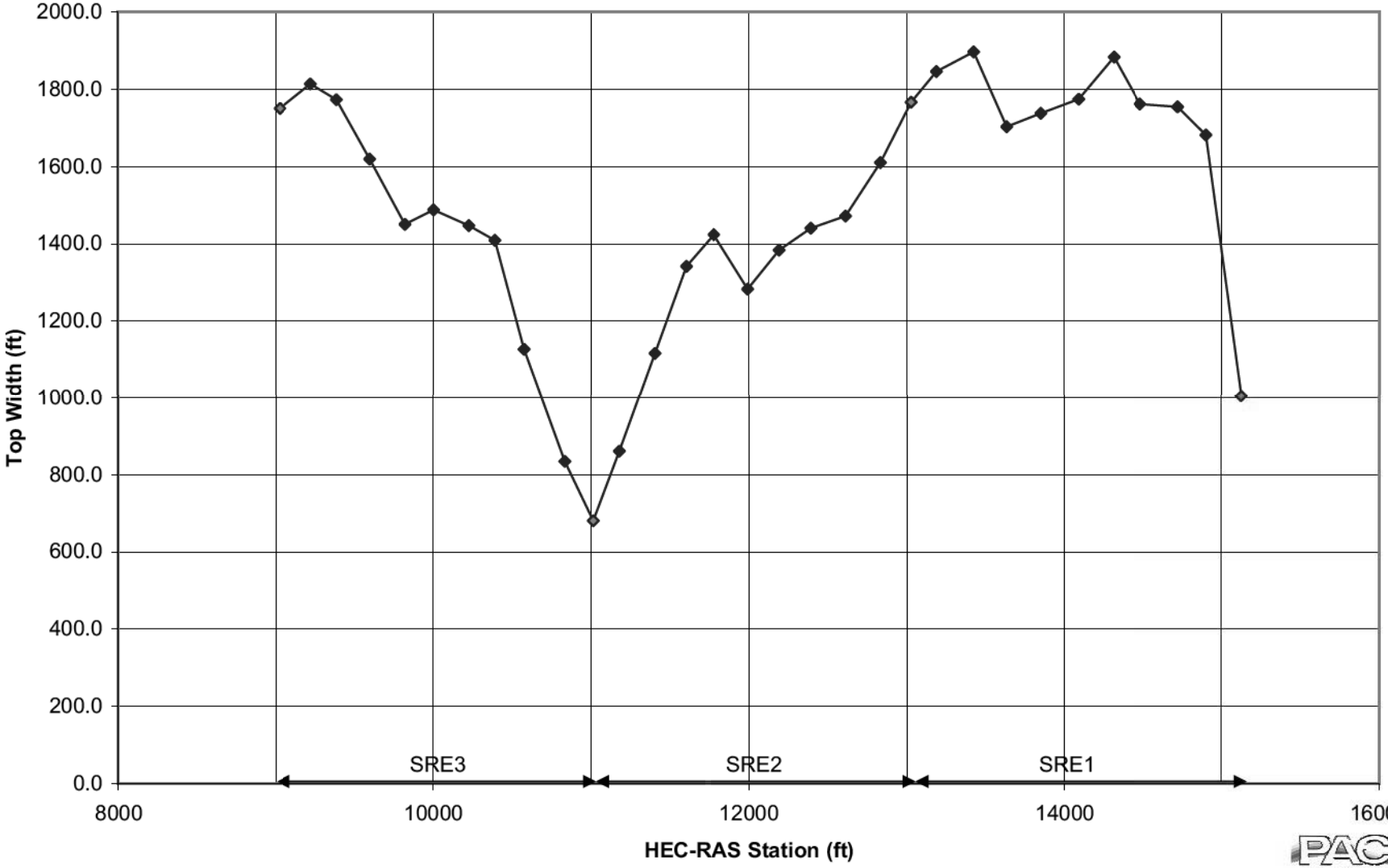
PACE
PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Table A4.5B5: Santa Clara River Proposed Conditions Hec-Ras Output and Parameter Correlation: Reach E

Subreach	River Sta	Q Total	Min Ch El ft	W.S. Elev ft	Crit W.S. ft	E.G. Elev ft	E.G. Slope	Vel Chnl fps	Flow Area sq ft	Top Width ft	Froude #	bedslope 1	bedslope 2	bedslope 3
SRE1	**15125**	142475	854.0	866.3	866.3	870.5	0.006	16.6	8594.5	1005.2	1.00			
	14900	142475	853.0	864.2	864.2	868.3	0.005	16.3	8744.6	1682.0	1.00	0.004		
	14720	142475	852.0	863.3	863.3	867.2	0.005	15.9	8988.3	1754.8	1.00	0.006	0.005	
	14480	142475	850.5	860.8	860.8	864.0	0.005	14.5	9824.9	1761.9	0.99	0.006	0.006	0.005
	14315	142475	850.0	860.1	860.1	863.2	0.005	14.0	10171.0	1883.6	1.00	0.003	0.005	0.005
	14090	142475	850.0	858.7	858.7	861.6	0.005	13.7	10369.2	1774.7	1.00	0.000	0.001	0.003
	13850	142475	848.0	857.1	857.1	860.1	0.005	13.9	10284.5	1738.4	1.00	0.008	0.004	0.004
	13635	142475	846.0	856.0	856.0	859.0	0.005	14.0	10211.8	1703.1	1.00	0.009	0.009	0.006
	13425	142475	845.0	854.2	854.2	857.1	0.005	13.5	10578.2	1897.2	1.01	0.005	0.007	0.008
	13190	142475	844.0	853.3	852.7	855.7	0.004	12.3	11549.9	1846.1	0.87	0.004	0.004	0.006
SRE2	**13030**	142475	843.0	852.9	852.0	855.1	0.003	12.0	11909.3	1766.8	0.81	0.006	0.005	0.005
	12835	142475	842.0	852.3	851.0	854.5	0.003	11.8	12100.7	1610.1	0.76	0.005	0.006	0.005
	12615	142475	841.0	852.0	849.8	853.9	0.002	11.0	12926.1	1472.3	0.66	0.005	0.005	0.005
	12395	142475	840.0	851.7	849.2	853.5	0.002	10.9	13135.4	1440.7	0.63	0.005	0.005	0.005
	12195	142475	839.0	851.6	848.1	853.1	0.001	10.0	14313.4	1384.2	0.55	0.005	0.005	0.005
	11995	142475	837.0	850.9	848.0	852.8	0.002	11.1	12823.3	1283.1	0.62	0.010	0.008	0.006
	11780	142475	836.0	850.7	847.7	852.4	0.002	10.4	13642.5	1424.2	0.59	0.005	0.007	0.007
	11605	142475	835.5	850.0	847.3	852.1	0.002	11.6	12285.5	1341.9	0.68	0.003	0.004	0.006
	11405	142475	834.0	849.4	846.2	851.7	0.002	12.1	11766.0	1116.4	0.66	0.008	0.005	0.005
	11180	142475	833.0	847.5	845.6	851.1	0.002	15.2	9359.0	861.1	0.81	0.004	0.006	0.005
SRE3	**11015**	142475	831.5	844.9	844.9	850.4	0.004	18.9	7546.8	680.7	1.00	0.009	0.006	0.007
	10835	142475	831.0	843.8	843.8	848.6	0.004	17.7	8059.5	834.5	1.00	0.003	0.006	0.005
	10575	142475	830.0	840.2	840.2	844.1	0.004	16.0	8907.8	1127.5	1.00	0.004	0.003	0.005
	10390	142475	828.0	839.8	838.5	842.3	0.003	12.7	11218.3	1409.0	0.79	0.011	0.007	0.006
	10225	142475	827.5	838.2	838.2	841.6	0.005	14.7	9676.6	1447.2	1.00	0.003	0.007	0.006
	10000	142475	826.0	837.1	837.1	840.4	0.004	14.6	9788.3	1488.1	1.00	0.007	0.005	0.007
	9820	142475	824.0	835.4	835.4	838.8	0.004	14.9	9537.7	1450.9	1.00	0.011	0.009	0.007
	9595	142475	823.8	834.2	834.2	837.4	0.005	14.5	9808.5	1620.1	1.00	0.001	0.005	0.006
	9385	142475	823.0	833.1	833.1	836.0	0.005	13.8	10337.7	1773.6	1.01	0.004	0.002	0.005
	9220	142475	822.0	831.8	831.8	834.7	0.005	13.7	10430.0	1814.1	1.00	0.006	0.005	0.003
	9025	142475	821.0	830.4	830.4	833.4	0.004	13.8	10307.8	1751.0	1.00	0.005	0.006	0.005

corr(x,v)=	-0.0153
corr(x,a)=	0.022217
corr(x,b)=	**0.248521**
corr(x,m1)=	-0.07691
corr(x,m2)=	-0.08554
corr(x,m3)=	-0.10549

Figure A4.5B5: Santa Clara River Proposed Conditions HEC-RAS Reach E - Station vs Top Width



Santa Clara River Fluvial Study

APPENDIX CHAPTER 4.6

Existing & Proposed Conditions SAM.AID Transport Equation Summary

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Table A4.6A: Santa Clara River Existing Conditions SAM Transport Potential Summary												
Subreach	US Sta	DS Sta	Width (ft)	Yang	Ackers-White	MPM	Brownlie, d50	Laursen-Copeland	Laursen-Madden	Yang, d50	Ackers-White, d50	MPM, d50
SRA1	46195	44210	525.6	11,578,207		403,938	10,213,413		10,288,930		2,616,358	428,254
SRA2	43820	41460	977.0	7,019,537		330,678	5,396,854		7,428,092		1,828,759	
SRA3	41280	38925	1,242.2	8,423,927		401,167	5,999,501		8,661,182		2,114,228	
SRA4	38710	36265	952.0	7,472,957		343,735	5,760,137		7,762,680		1,917,288	
SRB1	36080	34090	1,389.0	10,501,440		483,359	7,166,304		10,291,797		2,506,537	
SRB2	33880	32605	1,650.3	9,981,533		488,063	6,529,088		10,032,043		2,427,273	
SRC1	32265	29385	1,965.8	549,651		101,035		3,776,574		445,251		
SRC2	29140	27155	780.8	6,114,881	103,813,640	470,866	5,607,809	59,236,428		3,144,927		
SRC3	26990	25000	1,492.1	6,112,071	72,451,720	558,797	4,709,391	56,391,164		3,062,371		
SRC4	24795	22415	2,008.5	4,354,715	38,238,164	468,697	3,139,686	37,428,088		2,332,338		
SRD1	22195	20070	2,009.0	6,555,626	68,813,664	675,434	4,673,919	60,892,464		3,226,039		
SRD2	19855	17785	1,936.3	1,702,374		241,344		12,902,746		1,141,649		
SRD3	17510	15335	1,812.5	6,123,644	66,058,544	623,943	4,496,810	56,559,088		3,077,924		
SRE1	15125	13190	1,878.9	9,343,788		796,646	6,294,619		9,559,064		1,623,079	
SRE2	13030	11180	1,372.4	2,942,931		307,423	2,244,769	23,642,152	3,819,590	1,718,088	681,086	
SRE3	11015	9025	1,390.6	7,526,579		624,904	5,541,755		7,915,211		1,347,439	

Table A4.6B: Santa Clara River Proposed Conditions SAM Transport Potential Summary												
Subreach	US Sta	DS Sta	Width (ft)	Yang	Ackers-White	MPM	Brownlie, d50	Laursen-Copeland	Laursen-Madden	Yang, d50	Ackers-White, d50	MPM, d50
SRA1	46195	44210	525.6	11,578,207		403,938	10,213,413		10,288,930		2,616,358	428,254
SRA2	43820	41460	958.6	7,946,985		359,566	6,086,816		8,125,280		2,006,747	
SRA3	41280	38925	1,022.2	8,573,228		385,857	6,421,179		8,636,340		2,127,909	
SRA4	38710	36265	797.6	8,853,698		370,217	7,072,628		8,670,224		2,163,247	
SRB1	36080	34090	1,376.0	12,125,351		534,683	8,220,035		11,438,973		2,793,897	
SRB2	33880	32605	1,709.1	10,043,264		494,553	6,502,022		10,096,604		2,439,216	
SRC1	32265	29385	1,859.8	949,043		147,697		6,770,803		699,695		
SRC2	29140	27155	899.2	4,534,666		389,467		41,054,972		2,493,064		
SRC3	26990	25000	1,159.3	7,868,941	119,958,744	633,550	6,462,984	77,554,248		3,741,335		
SRC4	24795	22415	860.1	8,184,735		603,656		83,418,544		3,895,934		
SRD1	22195	20070	1,511.4	7,052,652	89,557,384	661,922	5,428,181	67,565,112		3,449,140		
SRD2	19855	17785	1,431.8	2,755,468		319,200		22,530,518		1,691,165		
SRD3	17510	15335	1,274.3	6,885,280	95,199,624	620,768	5,553,703	66,390,272		3,411,958		
SRE1	15125	13190	1,588.9	8,848,421	138,177,216	731,941	6,244,320	84,638,576		3,866,203		
SRE2	13030	11180	1,375.5	2,726,007		291,031		21,732,192		1,620,062		
SRE3	11015	9025	1,399.4	7,687,321	121,551,024	635,705	5,646,198	72,173,344		3,516,310		

Santa Clara River Fluvial Study

APPENDIX CHAPTER 5.1

Historical Topographic Maps

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

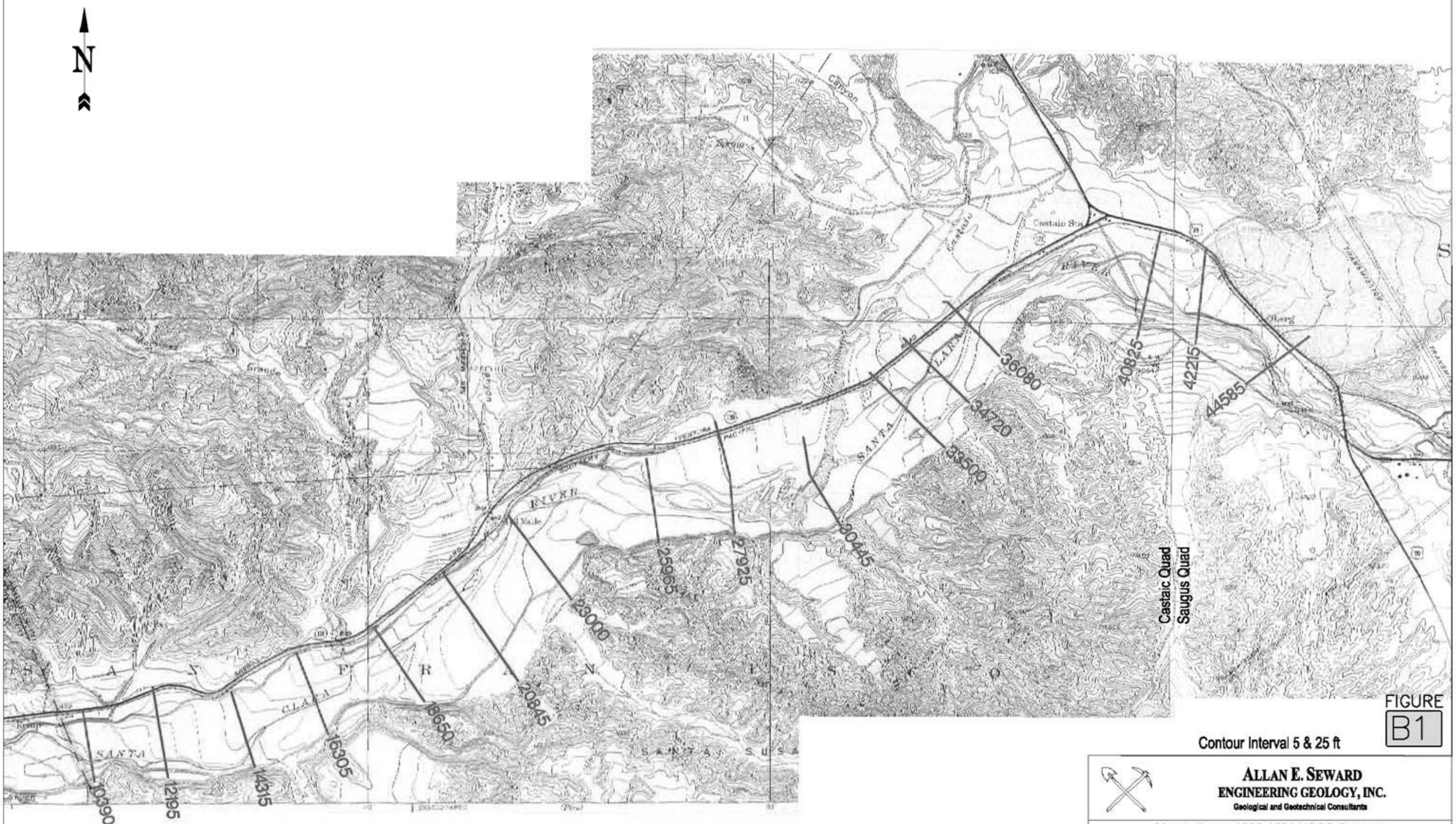


FIGURE B1

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Mesas Area - 1929-1931 USGS Surveys
1940 Editions of Castaic and Saugus 6' Quads

Date: 5/24/05		Job No.: 04-1155BE-9	
Scale: 1" = ~2300'		CAD File: 1940 Quad	
PLATE T29.II	Geology by: N/A	Revised:	
	Drawn by: N/A		

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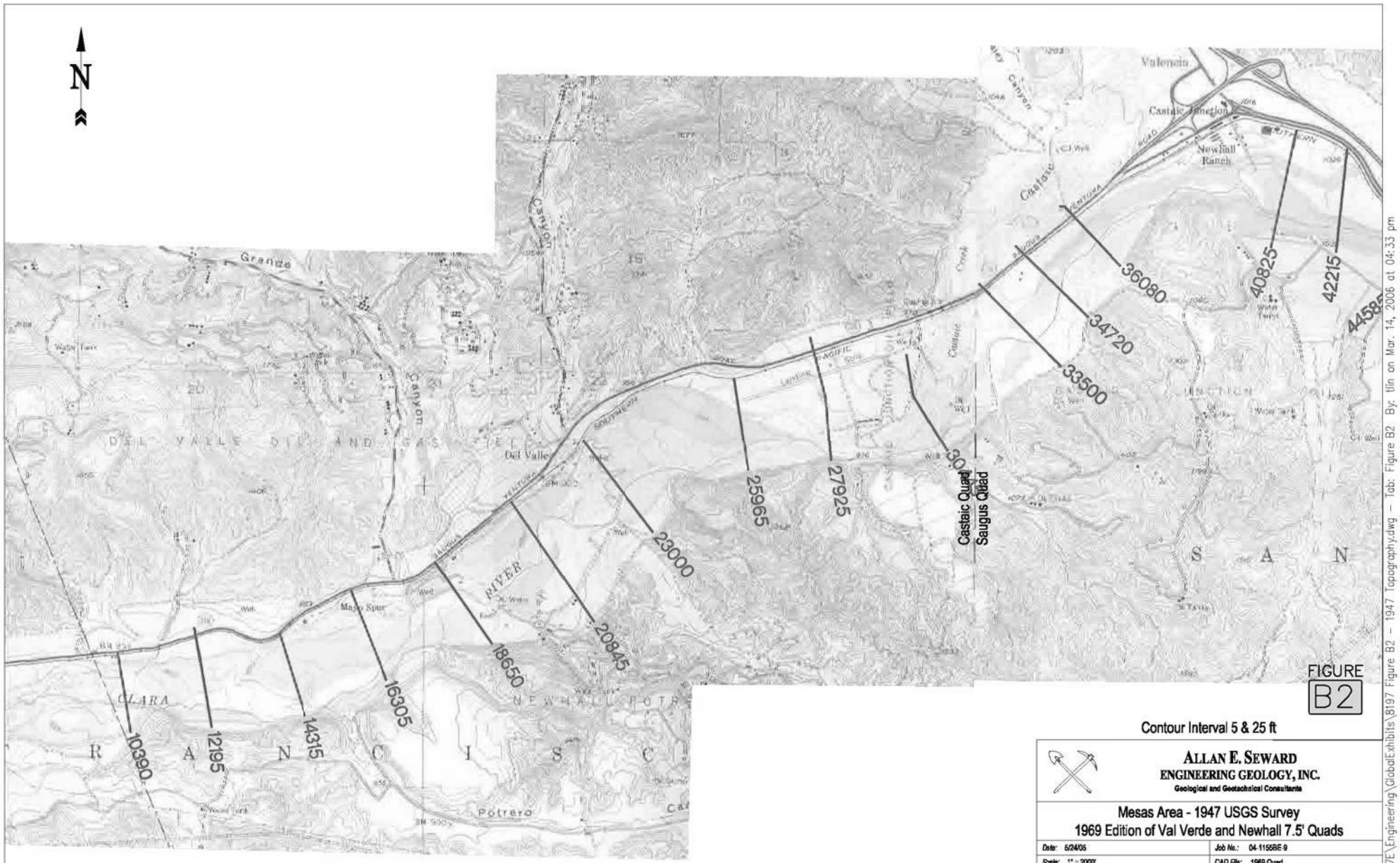

FIGURE B2

Contour Interval 5 & 25 ft

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

Mesas Area - 1947 USGS Survey
1969 Edition of Val Verde and Newhall 7.5' Quads

Date: 5/24/05		Job No.: 04-1155BE 9
Scale: 1" = 2000'		CAD File: 1969 Quad
PLATE T47.II	Geology by: N/A	Revised:
	Drawn by: N/A	

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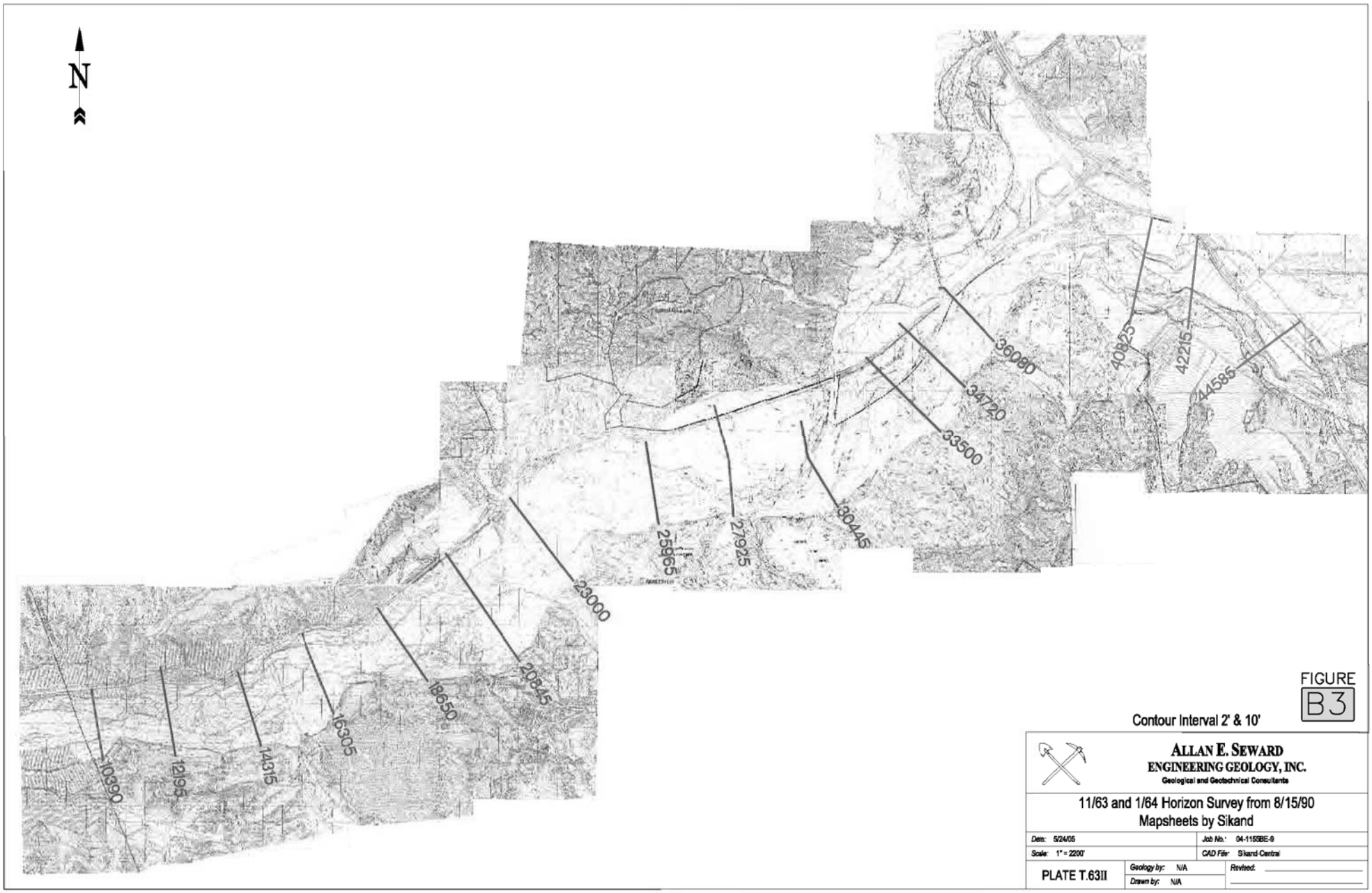


FIGURE B3

Contour Interval 2' & 10'

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

11/63 and 1/64 Horizon Survey from 8/15/90
Mapsheets by Sikand

Date: 5/24/05		Job No.: 04-1159BE-9
Scale: 1" = 2200'		CAD File: Sikand-Central
PLATE T.63II	Geology by: N/A	Revised:
	Drawn by: N/A	

P:\819TE\Engineering\GlobalExhibits\8197 Figure B3 - 1963 Topography.dwg - Tab: Figure B3 By: tlin on Mar. 14, 2006 at 04:27 pm

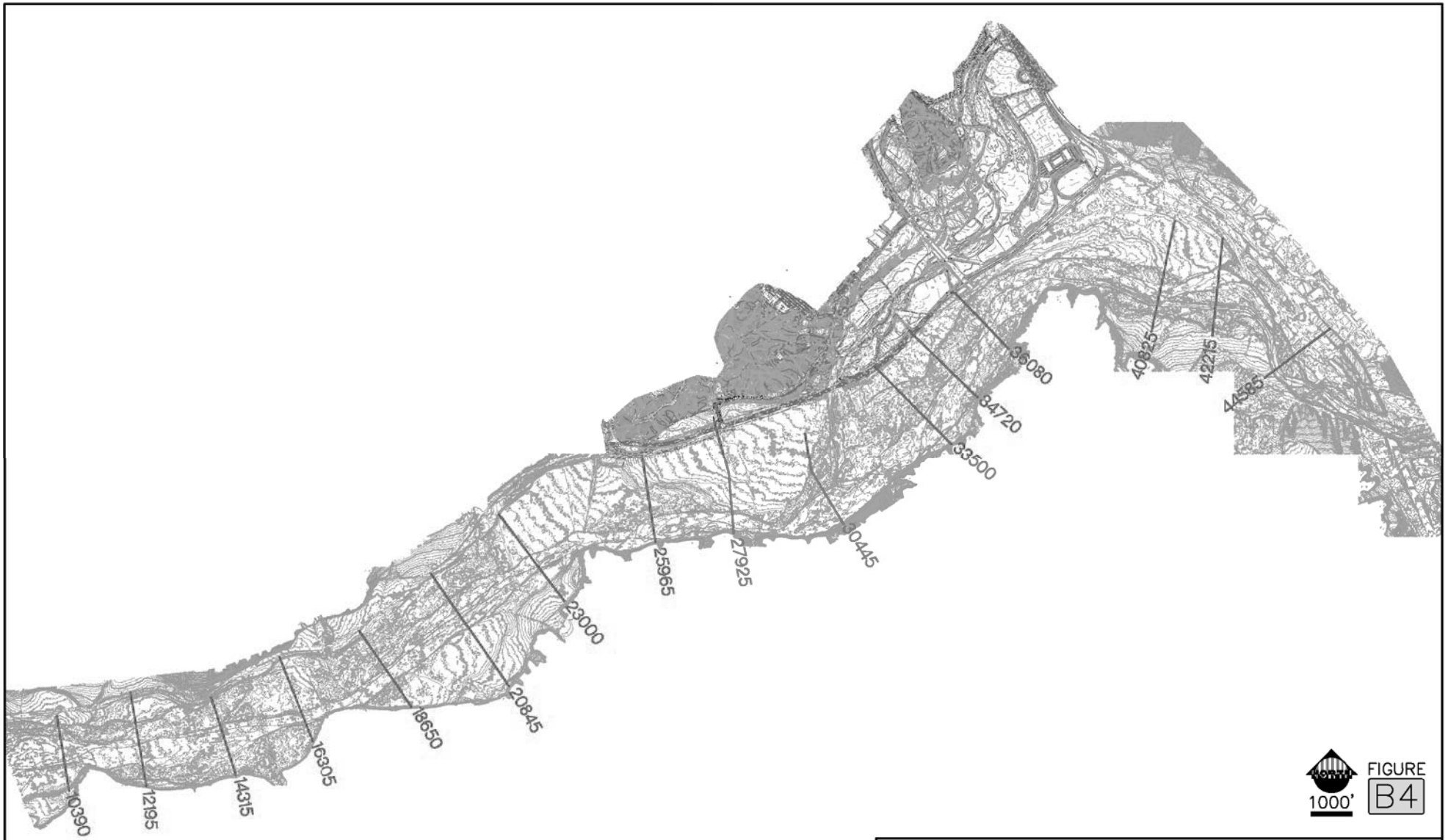


FIGURE B4

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

DIGITAL TOPOGRAPHY BY PSOMAS ENGINEERING
from Data Generated @1999

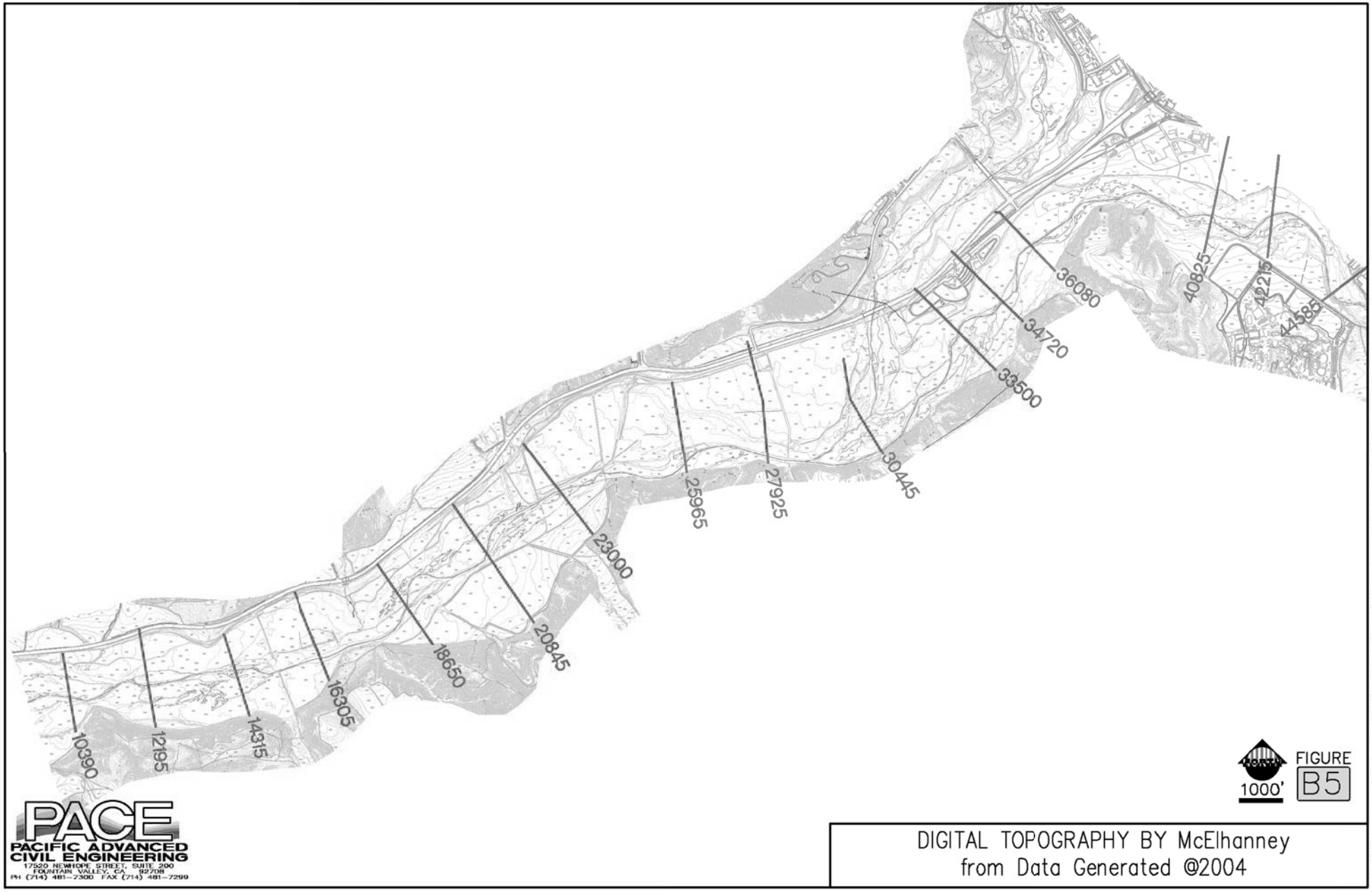


FIGURE B5

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

DIGITAL TOPOGRAPHY BY McElhanney
from Data Generated @2004

P:\8197E\Engineering\GlobalExhibits\8197 Figure B5 - 2004 Topography.dwg - Tab: Figure B3 By: tlin on Mar. 14, 2006 at 04:42 pm

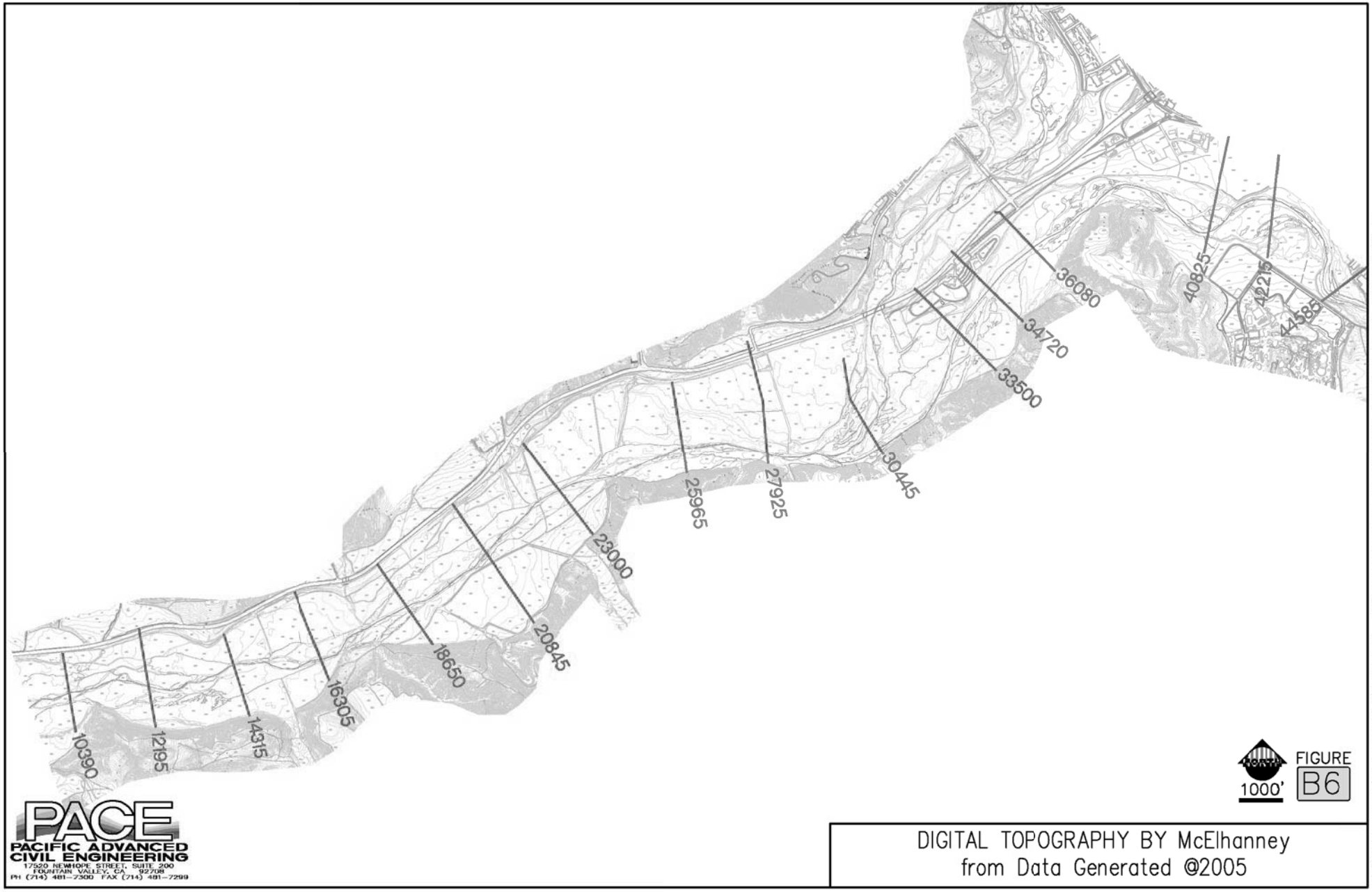


FIGURE B6

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

DIGITAL TOPOGRAPHY BY McElhanney
from Data Generated @2005

P:\8197E\Engineering\GlobalExhibits\8197 Figure B6 - 2005 Topography.dwg - Tab: Figure B3 By: tlin on Mar. 14, 2006 at 04:24 pm

Santa Clara River Fluvial Study

APPENDIX CHAPTER 5.2

Historical Thalweg Analysis

Previous drafts of this report calculated long-term trends based on an analysis of historic thalweg data. Analysis of long-term data based on cross-sections has been found to more clearly portray the historic trends of the creek bed. The historic analysis is included here for completeness.

The thalwegs and an additional alignment were digitized from the historic topography shown in Chapter 5, and these alignments were overlain in every digitized data set. That is, the 1930 thalweg was overlain in the 1930, 1947, 1963, 1999, 2004 and 2005 topographies. This was repeated for the other thalwegs as well. Thalwegs were chosen because they served as a reference and generally represent the lowest portion of the riverbed cross-section for a given year. The additional alignment was positioned so that an even distribution of alignments was achieved over the width of the channel for the study reach. The alignments are shown in Figure A5.3.1. The bed elevations along all alignments for all years were determined and compared, and a historic mean bed elevation was determined. Calculations of the minimum and mean bed elevation for all stations for all years examined is presented in Table A5.3.1. The historic bed elevation data, as well as historic mean bed elevation, is presented in Figure 5.2A-B. The figure illustrates variation in bed elevations throughout the period of record.

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Table A5.2 Santa Clara River Thalweg Analysis Caluclation of Long Term Aggradation/Degradation Based on Historical Bed Analysis (ft)

Subreach	HEC-RAS Station	1930 Topo Mean	1930 Topo Min	1947 Topo Mean	1947 Topo Min	1963 Topo Mean	1963 Topo Min	1999 Topo Mean	1999 Topo Min	2004 Topo Mean	2004 Topo Min	2005 Topo Mean	2005 Topo Min	(1) MINIMUM OF ALL MINIMUMS	(1) MEAN OF ALL MEANS	99 MEAN-ALL MEAN
	48025	1053.7	1053.5					1050.5	1049.1					1049.1	1050.5	0.0
	47850	1052.1	1051.8					1048.7	1046.0					1046.0	1048.7	0.0
	47670	1051.1	1050.3					1048.8	1044.4					1044.4	1048.8	0.0
	47510	1049.1	1049.1					1045.7	1044.0					1044.0	1045.7	0.0
	47440	1048.5	1048.5					1045.4	1044.0					1044.0	1045.4	0.0
	47180	1046.6	1045.9			1049.9	1049.6	1046.5	1042.0					1042.0	1048.2	-1.7
	47015	1046.9	1045.0			1048.9	1047.7	1046.7	1040.4					1040.4	1047.8	-1.1
	46890	1049.2	1043.5			1047.3	1046.5	1045.6	1040.0					1040.0	1046.4	-0.8
	46800	1047.0	1042.1			1046.3	1045.5	1042.0	1038.5					1038.5	1044.1	-2.1
	46760	1045.2	1041.5			1045.8	1045.1	1041.6	1039.4					1039.4	1043.7	-2.1
	46695	1043.7	1040.9			1045.3	1044.7	1040.9	1038.7					1038.7	1043.1	-2.2
	46550	1040.8	1038.9			1043.6	1043.3	1038.2	1037.1					1037.1	1040.9	-2.7
	46370	1042.8	1034.8			1043.1	1042.0	1036.9	1036.2	1039.6	1039.5			1036.2	1039.9	-2.9
SRA1	46195	1041.5	1032.2			1042.4	1041.6	1036.3	1034.6	1037.4	1032.3			1032.3	1038.7	-2.4
	46020	1029.4	1023.3			1040.1	1040.0	1032.9	1032.0	1031.7	1029.9	1034.6	1033.8	1029.9	1034.8	-1.9
	45545	1031.9	1017.5			1045.0	1040.0	1032.4	1030.0	1034.1	1027.6	1033.9	1030.7	1027.6	1036.4	-3.9
	45030	1038.7	1015.0			1034.0	1030.2	1028.8	1026.0	1028.6	1025.8	1027.2	1026.5	1025.8	1029.7	-0.8
	44585	1043.6	1015.0			1039.6	1030.0	1038.1	1022.0	1033.9	1019.2	1031.4	1023.0	1019.2	1035.8	2.4
	44210	1037.5	1015.0			1033.7	1026.7	1029.3	1020.0	1028.7	1017.3	1026.9	1020.9	1017.3	1029.7	-0.3
SRA2	43820	1017.8	1010.2			1023.0	1020.0	1018.4	1018.0	1017.2	1015.9	1017.5	1016.5	1015.9	1019.0	-0.6
	43610	1014.8	1010.0			1021.9	1020.0	1019.5	1018.7	1016.4	1014.4	1017.7	1016.1	1014.4	1018.9	0.6
	43410	1014.4	1010.0	1019.9	1019.9	1023.2	1020.0	1019.2	1015.7	1017.8	1013.5	1020.8	1014.8	1013.5	1020.2	-1.0
	43200	1018.2	1010.0	1023.3	1018.1	1025.2	1020.0	1021.4	1014.0	1020.2	1012.3	1024.4	1013.5	1012.3	1022.9	-1.5
	42975	1021.4	1010.0	1025.3	1016.9	1025.6	1020.0	1018.9	1012.0	1022.1	1011.0	1023.3	1013.0	1011.0	1023.0	-4.1
	42815	1019.9	1009.0	1026.8	1015.0	1024.7	1020.0	1017.5	1012.0	1021.4	1009.5	1024.2	1011.7	1009.5	1022.9	-5.4
	42590	1015.0	1006.5	1024.9	1015.0	1023.0	1017.9	1013.8	1010.0	1016.2	1008.8	1023.2	1009.3	1008.8	1020.3	-6.4
	42430	1012.5	1005.0	1023.1	1013.6	1020.1	1013.9	1012.3	1010.0	1012.9	1007.4	1013.3	1008.5	1007.4	1016.3	-4.1
	42215	1014.0	1005.0	1022.2	1012.1	1017.1	1010.0	1011.8	1008.0	1010.4	1006.6	1011.3	1007.5	1006.6	1014.6	-2.7
	41940	1008.8	1005.0	1020.0	1009.5	1013.5	1010.0	1010.4	1006.0	1006.2	1005.1	1008.6	1006.0	1005.1	1011.7	-1.3
	41730	1008.8	1002.6	1013.0	1008.0	1012.2	1010.0	1009.0	1004.0	1007.8	1003.5	1006.6	1003.5	1003.5	1009.7	-0.7
	41460	1010.1	999.5	1009.8	1006.7	1011.0	1009.7	1007.5	1002.0	1005.5	1000.9	1004.2	1002.5	1000.9	1007.6	-0.1
SRA3	41280	1010.0	998.2	1006.5	1004.0	1008.5	1006.7	1007.5	1002.0	1002.6	1000.4	1002.3	1000.6	1000.4	1005.5	2.0
	41080	1009.5	996.8	1004.1	1002.3	1004.6	1003.2	1003.7	1001.3	1000.5	999.1	999.8	998.8	998.8	1002.5	1.1
	40825	1005.0	995.0	1005.9	1000.0	1004.4	1000.0	1003.0	1000.0	1000.7	996.0	998.9	997.4	996.0	1002.6	0.4
	40585	1002.7	995.0	1003.3	1000.0	1003.5	1000.0	1003.3	998.0	999.7	995.5	996.9	995.6	995.5	1001.3	2.0
	40335	1005.4	995.0	1000.0	995.1	1002.3	1000.0	1001.2	996.0	997.4	992.7	994.8	994.2	992.7	999.1	2.0
	40130	1006.5	993.7	1001.2	992.5	1002.8	1000.0	999.8	996.0	997.0	992.1	994.0	993.2	992.1	999.0	0.8
	39945	1003.5	990.0	1000.0	991.3	1002.5	999.9	997.3	994.0	995.6	991.0	993.5	991.7	991.0	997.8	-0.5
	39755	999.2	990.0	993.5	988.6	1000.2	997.3	996.2	994.0	994.3	990.1	993.3	990.9	988.6	995.5	0.7
	39605	995.8	989.9	990.9	987.7	997.9	995.6	996.9	994.0	994.7	989.4	991.7	989.4	987.7	994.4	2.5
	39310	993.5	985.0	987.9	985.9	991.5	990.0	995.6	992.0	992.6	988.1	990.6	987.6	985.9	991.6	3.9
	39100	992.9	985.0	986.7	982.9	992.0	990.0	993.0	990.0	991.0	987.4	988.7	985.5	982.9	990.3	2.8
	38925	991.3	983.3	986.8	980.8	992.0	990.0	993.0	990.0	990.6	987.4	987.6	984.8	980.8	990.0	3.0
SRA4	38710	990.0	980.3	983.7	980.0	990.6	990.0	991.3	988.0	988.7	985.5	986.0	984.5	980.0	988.1	3.3
	38475	988.8	980.0	983.0	980.0	991.0	990.0	989.7	986.3	988.2	984.0	984.1	982.5	980.0	987.2	2.5
	38300	988.0	979.2	982.1	979.8	990.4	990.0	988.2	986.0	987.6	983.1	982.8	982.0	979.8	986.2	2.0
	38065	987.8	977.5	979.6	978.1	990.0	990.0	984.3	984.0	983.7	982.0	981.6	980.8	978.1	983.8	0.5
	37810	986.3	975.5	979.8	976.4	985.6	984.8	984.1	983.2	983.8	980.3	981.0	979.5	976.4	982.9	1.2
	37655	984.7	975.0	978.9	975.7	984.0	982.3	983.5	982.0	982.7	979.7	980.8	978.7	975.7	982.0	1.5
	37390	983.0	975.0	978.6	975.0	981.6	980.0	982.1	981.1	981.7	978.1	978.4	976.6	975.0	980.5	1.6
	37135	982.3	975.0	979.4	975.0	981.3	980.0	980.4	979.5	979.9	975.8	979.1	975.9	975.0	980.0	0.4
	36930	981.3	974.5	979.6	975.0	981.3	980.0	978.7	978.0	978.3	975.4	977.4	975.0	975.0	979.1	-0.4
	36735	980.8	973.1	977.3	974.9	980.6	980.0	977.7	976.3	977.4	974.6	976.0	973.7	973.7	977.8	-0.1
	36515	979.2	972.5	975.2	973.3	980.1	980.0	976.9	976.0	976.4	973.0	975.4	972.8	972.8	976.8	0.1
	36265	977.4	971.2	973.2	971.4	980.2	980.0	976.1	974.0	975.5	972.7	974.5	972.0	971.4	975.9	0.2
SRB1	36080	973.9	969.8	972.1	970.0	980.3	980.0	976.9	973.2	974.1	971.8	972.1	970.2	970.0	975.1	1.8
	35845	971.7	968.9	971.0	970.0	979.0	977.6	977.9	972.0	972.9	970.3	970.1	968.7	968.7	974.2	3.7
	35725	970.4	968.5	970.3	970.0	978.0	977.0	978.3	970.0	972.0	969.6	969.4	968.7	968.7	973.6	4.7
	35515	969.3	967.7	970.4	970.0	976.0	975.6	976.8	970.0	972.1	969.3	968.8	968.2	968.2	972.8	4.0
	35245	968.7	966.5	969.9	967.8	973.6	972.7	974.6	968.0	971.8	968.4	968.6	966.4	966.4	971.7	2.9
	35040	968.2	965.8	968.7	966.4	972.4	971.2	973.4	968.0	971.2	966.1	967.6	965.9	965.9	970.7	2.8
	34860	967.5	965.0	967.5	965.0	971.5	970.0	972.6	966.0	969.7	965.1	966.6	965.3	965.0	969.6	3.1
	34720	966.7	965.0	966.8	964.9	970.6	970.0	971.0	966.0	968.8	964.8	965.2	964.0	964.0	968.5	2.5
	34495	966.8	965.0	965.4	963.5	970.0	970.0	967.9	964.0	967.2	963.7	964.4	962.0	962.0	967.0	0.9
	34310	967.0	963.8	964.4	962.5	968.7	967.9	966.4	963.2	965.4	962.4	963.9	960.7	960.7	965.8	0.7
	34090	965.9	962.0	963.1	961.6	967.3	965.2	965.9	962.0	963.7	960.8	961.6	959.3	959.3	964.3	1.6
SRB2	33880	964.7	961.3	962.7	960.1	965.2	962.3	964.6	960.0	961.6	958.9	960.6	958.1	958.1	962.9	1.6
	33710	963.1	960.0	962.5	960.0	963.4	960.0	963.9	960.0	960.1	957.8	959.2	957.6	957.6	961.8	2.1
	33500	962.5	960.0	962.3	960.3	961.2	960.0	961.4	958.0	959.3	957.7	957.7	956.1	956.1	960.4	1.0
	33310	961.5	960.0	960.9	959.0	959.9	959.4	961.1	956.2	959.7	955.3	957.2	954.9	954.9	959.8	1.3
	33115	960.8	960.0	960.5	957.3	959.8	957.3	961.0	956.0	958.1	954.8	957.0	954.1	954.1	959.3	1.7
	32795	961.4	958.8	960.5	956.8	959.0	954.8	958.2	954.0	955.5	947.7	955.2	951.9	947.7	957.7	0.5
	32605	960.4	957.8	958.7	955.0	957.6	952.9	956.7	952.5	954.6	950.9	954.1	950.6	950.6	956.3	0.4
SRC1	32265	957.7	956.3	952.4	951.8	954.3	950.0	954.8	951.4	953.1	949.6	951.2	949.1	949.1	953.2	1.6
	31875	960.1	955.0	951.3	948.2	950.0	950.0	952.8	949.5	949.4	944.0	950.1	944.0	944.0	950.7	2.1
	31585	960.7	952.8	950.2	945.0	950.0	950.0	948.4	946.0	947.0	943.9	945.8	943.4	943.4	948.3	0.1
	31360	959.1	951.1	946.8	945.0	949.3	948.5	948.0	945.1	946.0	943.3	945.5	942.5	942.5	947.1	0.9
	31060	955.9	950.0	947.3	945.0	948.2	945.9	944.8	944.0	942.2	939.1	942.3	939.8	939.1	945.0	-0.2
	30720	950.7	945.0	946.8	942.2	946.1	942.7	943.0	940.0	939.8	936.2	940.9	938.7	936.2	943.3	-0.4
	30445	946.7	942.0	945.2	940.0	945.9	940.4	941.0	938.0	938.2	935.1	939.5	937.4	935.1	942.0	-0.9
	30095	946.1	944.1	940.4	937.3	943.6	940.0	939.1	936.8	935.8	933.4	935.0	931.6	931.6	938.8	0.3
	29815	942.0	936.7	939.3	935.9	940.5	940.0	937.0	936.0	933.8	931.0	933.6	933.0	931.0	936.8	0.2
	29565	938.9	934.3	939.1	933.9	940.0	940.0	935.1	934.0	933.2	930.0	931.9	930.5	930.0	935.9	-0.8
	29385	937.3	931.1	936.8	932.7	941.2	940.0	933.8	932.7	932.3	929.6	931.5	930.1	929.6	935.1	-1.3
SRC2	29140	936.9	930.4	933.4	931.2	940.0	940.0	933.5	932.0	929.0	926.8	928.9	927.6	926.8	933.0	0.5
	28895	925.0	924.4	930.4	930.0	937.9	937.6	931.6	930.0	927.7	926.1	928.4	926.9	926.1	931.2	0.4
	28695	923.9	923.7	930.4	929.5	934.5	932.7	932.1	928.0	929.8	925.0	930.4	925.7	925.0	931.4	0.7
	28500	922.9	922.5	928.6	927.0	932.3	930.3	929.9	928.0	926.2	924.0	928.0	924.6	924.0	929.0	1.0
	28280	922.0	921.6	926.7	925.0	931.7	930.0	929.9	926.0	927.2	922.7	926.1	923.2	922.7	928.3	1.6
	28080	921.6	920.5	927.0	925.0	931.0	930.0	928.5	926.0	926.2	921.8	925.0	923.2	921.8	927.5	0.9
	27925	920.0	920.0	925.5	925.0	930.2	930.0	927.1	924.7	924.2	921.9	923.4	922.1	921.9	926.1	1.0
	27725	919.5	919.4	924.2	923.8	928.6	928.3	924.0	924.0	920.8	920.4	921.9	920.5	920.4	923.9	0.1
	27545	919.3	919.1	923.1	922.8	927.9	927.3	923.2	922.5	920.0	919.3	920.6	919.4	919.3	923.0	0.3
	27335	919.0	918.6	922.0	921.4	926.6	925.9	922.0	922.0	919.6	918.7	920.0	918.3	918.3	922.0	0.0
	27155	918.8	918.3	921.0	920.3	925.7	924.3	921.2	920.5	919.5	918.0	919.1	918.0	918.0	921.3	-0.1
SRC3	26990	918.4	917.7	920.2	919.4	924.1	922.9	920.6	920.0	919.4	917.9	917.2	916.2	916.2	920.3	0.3
	26780	918.0	917.2	919.6	918.5	922.7	921.2	919.4	918.0	917.6	916.8	916.3	914.3	914.3	919.1	0.2
	26575	917.5	916.8	919.2	917.6	921.4	920.0	918.3	918.0	916.5	915.5	915.6	913.7	913.7	918.2	0.1
	26355	917.0	916.2	919.0	916.9	921.0	920.0	917.9	916.0	916.1	914.6	914.9	913.4	913.4	917.8	0.2
	26170	916.9	915.7	919.1	915.9	921.0	919.8	916.6	916.0	914.3	912.5	914.2	912.9	912.5	917.0	-0.5
	25965	917.1	915.3	918.3	915.0	919.2	918.1	916.4	914.1	915.1	912.3	913.8	911.6	911.6	916.6	-0.2
	25785	917.2	914.5	917.4	913.9	917.5	916.5	915.7	914.0	914.0	911.5	912.3	911.1	911.1	915.4	0.3
	25600	917.2	914.1	916.7	912.9	916.1	915.0	915.2	912.1	913.5	910.8	911.7	909.7	909.7	914.6	0.6
	25425	917.1	914.2	915.7	912.2	914.7	913.7	915.0	912.0	912.8	909.7	911.3	910.0	909.7	913.9	1.1
	25215	916.4	912.9	914.7	910.9	913.1	911.9	914.7	910.0	911.6	908.8	910.6	908.6	908.6	912.9	1.8
	25000	915.1	910.7	912.7	910.0	912.1	910.4	911.8	908.1	910.3	908.1	909.5	907.8	907.8	911.3	0.5
SRC4	24795	911.2	907.7	910.6	910.0	910.6	910.0	910.0	908.0	909.0	906.3	907.5	905.6	905.6	909.5	0.5
	24550	905.6	905.0	908.9	908.4	909.7	909.1	907.1	906.0	905.4	904.1	905.0	904.0	904.0	907.2	-0.1
	24335	904.6	902.2	908.7	906.3	908.3	907.9	906.5	906.0	904.7	903.5	904.2	903.2	903.2	906.5	0.0
	24115	904.2	899.1	905.7	904.7	907.0	906.7	905.1	904.0	903.2	902.6	902.8	901.8	901.8	904.7	0.4
	23975	903.8	897.5	904.8	904.2	906.1	905.8	903.9	903.5	903.2	901.6	901.7	901.2	901.2	903.9	-0.1
	23755	902.9	895.7	904.0	903.3	904.5	904.0	902.9	902.0	901.7	900.4	900.2	899.9	899.9	902.7	0.2
	23565	902.3	895.0	903.8	902.5	903.4	902.7	903.0	900.0	900.6	899.6	899.6	898.7	898.7	902.1	0.9
	23365	901.9	895.0	904.0	902.2	901.8	901.3	902.3	900.4	898.6	897.1	898.8	897.9	897.1	901.1	1.2
	23180	901.2	894.0	904.1	901.2	900.6	900.0	900.0	898.2	900.1	896.6	900.1	897.2	896.6	901.0	-1.0
	23000	900.5	892.7	902.8	900.3	900.2	900.0	898.0	898.0	898.4	896.1	896.7	896.0	896.0	899.2	-1.2
	22790	899.8	891.5	900.4	900.0	900.2	900.0	898.0	898.0	897.4	895.5	896.5	895.0	895.0	898.5	-0.5
	22600	898.8	890.0	899.4	898.9	899.1	898.4	899.8	896.0	898.3	894.8	896.7	894.5	894.5	898.7	1.1
	22415	897.3	890.0	898.2	897.5	897.5	896.7	898.2	894.8	897.0	894.1	896.5	893.3	893.3	897.5	0.7

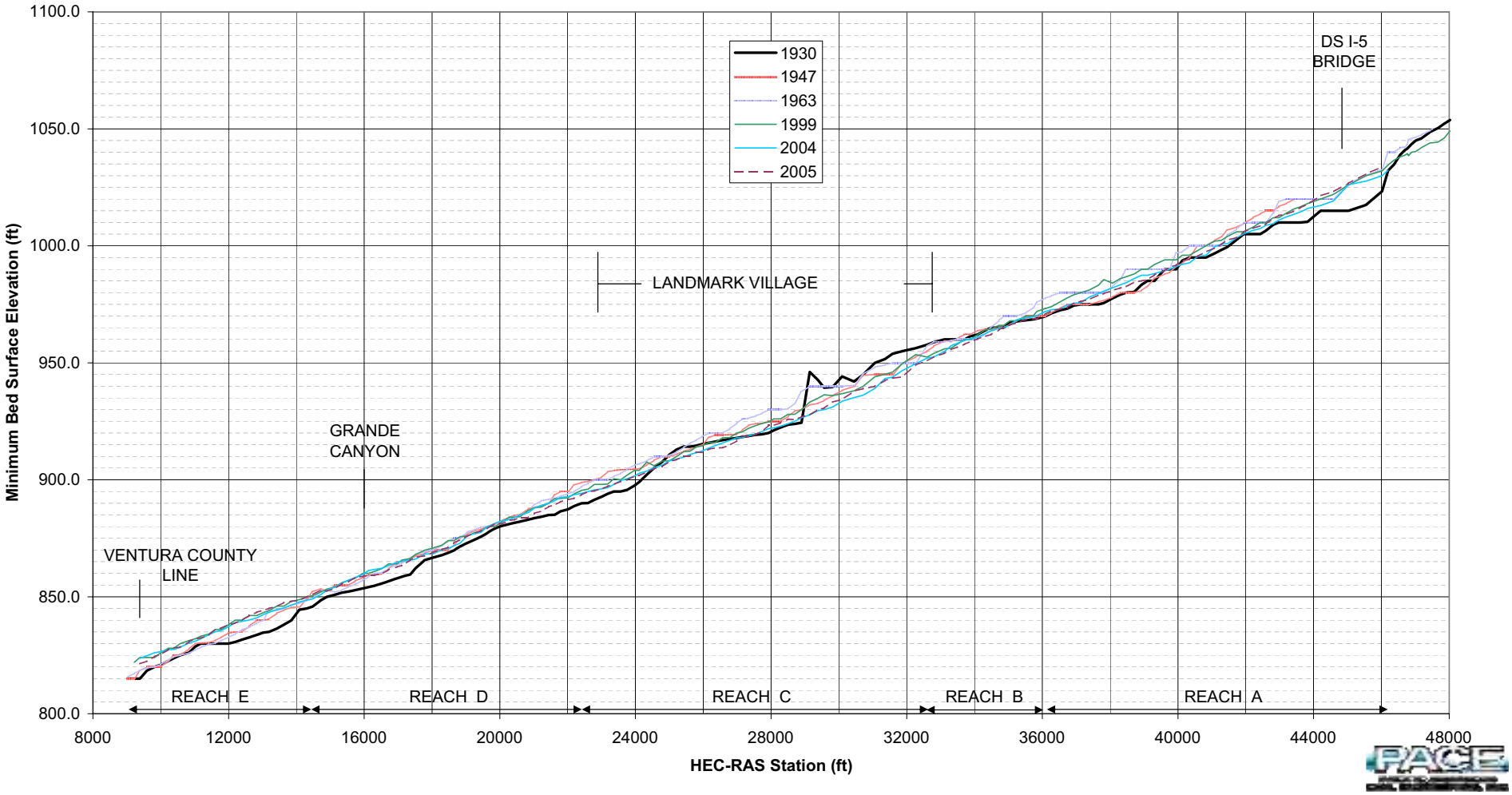
(1) "All years" excludes 1930

Table A5.2 Santa Clara River Thalweg Analysis Caluclation of Long Term Aggradation/Degradation Based on Historical Bed Analysis (ft) (continued)

Subreach	HEC-RAS	1930		1947		1963		1999		2004		2005		(1)MINIMUM OF	(1)MEAN OF	
	Station	Topo Mean	Topo Min	Topo Mean	Topo Min	Topo Mean	Topo Min	Topo Mean	Topo Min	Topo Mean	Topo Min	Topo Mean	Topo Min	ALL MINIMUMS	ALL MEANS	99 MEAN-ALL MEAN
SRD1	22195	895.9	888.8	896.9	896.1	895.3	894.7	896.2	894.0	895.7	893.6	895.3	892.1	892.1	895.9	0.3
	22010	894.9	887.4	895.6	894.5	894.3	893.8	894.3	892.3	894.3	892.5	893.4	891.5	891.5	894.4	-0.1
	21790	893.8	886.5	894.5	893.8	893.4	892.7	894.2	892.0	893.4	892.2	891.6	890.4	890.4	893.5	0.8
	21615	892.3	885.0	893.0	892.3	892.7	891.9	893.7	891.9	891.5	891.0	890.5	889.0	889.0	892.3	1.4
	21440	890.0	884.9	891.3	890.0	891.6	891.1	892.5	890.0	890.7	889.9	890.3	888.3	888.3	891.3	1.2
	21225	889.1	884.2	890.1	889.0	890.7	890.2	892.3	888.3	890.9	889.0	889.7	886.4	886.4	890.7	1.5
	21020	888.0	883.5	888.5	888.0	889.1	887.8	891.4	888.0	889.7	887.9	888.3	885.7	885.7	889.4	2.0
	20845	887.5	883.0	887.2	886.2	887.1	886.1	890.2	887.0	888.6	885.9	886.2	883.9	883.9	887.9	2.3
	20595	886.5	882.2	885.7	885.0	886.3	884.3	888.2	884.2	886.9	885.0	885.4	883.9	883.9	886.5	1.7
	20435	885.7	881.6	885.2	884.7	884.5	883.3	887.3	884.0	885.7	883.8	884.2	882.8	882.8	885.4	1.9
	20280	885.1	881.0	884.3	883.7	883.4	882.6	886.0	884.0	884.7	882.8	883.5	882.0	882.0	884.4	1.6
	20070	884.0	880.3	882.8	882.6	882.1	881.3	883.6	882.0	883.7	882.3	882.0	880.9	880.9	882.9	0.8
SRD2	19855	882.5	879.1	881.6	880.9	880.5	880.0	882.2	880.1	882.6	881.2	881.0	880.1	880.0	881.6	0.6
	19630	879.9	877.2	881.4	880.0	880.2	880.0	881.2	880.0	881.1	879.8	879.8	879.0	879.0	880.7	0.5
	19440	877.2	875.4	881.0	878.8	879.5	878.6	879.9	878.0	879.5	877.6	878.7	877.7	877.6	879.7	0.1
	19240	875.8	874.3	879.7	877.0	878.5	877.0	879.8	877.2	877.5	876.6	877.6	876.8	876.6	878.6	1.2
	19050	873.5	870.0	877.4	875.4	877.3	875.6	878.2	876.0	875.9	875.3	876.6	875.5	875.3	877.1	1.1
	18830	871.8	869.0	875.7	875.0	876.2	875.0	878.9	875.0	874.6	872.9	875.5	874.0	872.9	876.2	2.7
	18650	870.1	868.8	875.5	872.3	875.2	874.6	876.6	874.0	875.0	871.6	874.1	873.1	871.6	875.3	1.3
	18475	868.9	867.0	874.5	870.0	874.4	873.4	875.7	872.0	874.4	870.7	872.1	868.8	868.8	874.2	1.5
	18290	867.9	865.2	874.5	870.0	873.7	871.9	875.9	872.0	873.5	870.1	871.8	869.0	869.0	873.9	2.0
	18025	867.1	865.0	873.8	870.0	871.2	870.0	874.1	870.0	873.3	868.4	871.3	867.6	867.6	872.7	1.3
	17785	866.0	865.0	872.1	868.6	869.6	869.2	873.6	868.1	872.0	868.2	870.2	867.1	867.1	871.5	2.1
SRD3	17510	861.9	860.4	870.6	866.4	869.5	866.7	873.7	868.0	871.5	866.0	870.1	866.2	866.0	871.1	2.6
	17360	860.4	859.5	869.5	865.0	868.3	865.2	873.2	866.0	869.7	865.7	868.1	864.6	864.6	869.8	3.4
	17110	859.0	858.6	867.3	865.0	865.9	864.1	870.0	864.8	867.3	865.0	864.4	860.9	860.9	867.0	3.0
	16970	858.9	857.8	867.0	865.0	866.0	863.8	866.7	864.0	865.8	864.5	864.0	861.9	861.9	865.9	0.8
	16720	858.3	856.6	864.3	862.0	864.3	862.0	865.2	863.0	865.3	863.4	863.1	861.6	861.6	864.5	0.8
	16515	857.6	855.6	862.7	859.7	862.5	860.3	863.8	862.0	864.0	862.1	861.7	859.7	859.7	862.9	0.8
	16305	856.8	854.8	862.8	859.2	861.6	860.0	863.3	860.0	863.7	861.7	861.6	859.3	859.2	862.6	0.7
	16130	856.1	854.1	862.4	859.3	860.2	858.6	862.5	860.0	862.9	861.2	860.5	858.9	858.6	861.7	0.8
	15960	855.3	853.5	861.5	858.2	858.4	857.0	861.8	860.0	861.0	859.5	859.7	858.6	857.0	860.5	1.3
	15745	854.0	852.9	860.3	856.8	856.5	855.3	860.0	858.0	859.7	858.2	859.0	857.5	855.3	859.1	0.9
	15540	853.2	851.9	859.5	855.0	855.1	854.2	858.3	856.0	859.5	857.1	857.8	856.4	854.2	858.0	0.3
	15335	852.6	851.7	859.6	855.0	852.8	852.0	858.1	856.0	857.2	855.7	857.0	855.5	852.0	857.0	1.1
SRE1	15125	851.8	850.7	859.5	855.0	852.1	850.2	856.0	854.0	855.8	853.3	855.3	853.3	850.2	855.7	0.2
	14900	851.2	850.0	857.3	852.3	854.0	850.4	855.4	853.2	854.8	852.8	854.3	852.4	850.4	855.2	0.2
	14720	850.7	848.3	856.0	853.1	853.6	850.0	854.6	852.0	853.9	851.0	853.9	852.5	850.0	854.4	0.2
	14480	849.6	845.7	854.5	850.0	852.9	848.5	854.3	850.4	853.2	849.1	853.6	851.0	848.5	853.7	0.6
	14315	849.1	845.0	854.3	849.1	852.1	848.0	852.6	850.0	852.0	848.6	852.3	850.0	848.0	852.7	-0.1
	14090	848.3	844.2	852.0	845.0	851.3	847.2	851.6	848.6	850.6	847.8	850.7	848.5	845.0	851.2	0.4
	13850	845.8	839.9	850.7	845.0	850.2	846.4	850.8	848.0	849.2	846.4	849.5	848.1	845.0	850.1	0.7
	13635	843.4	837.9	849.4	844.3	847.7	845.0	850.0	846.0	848.0	845.2	848.8	847.6	844.3	848.8	1.2
	13425	843.5	836.4	847.7	842.5	846.2	843.2	848.1	846.0	847.2	844.5	847.6	845.9	842.5	847.4	0.8
	13190	841.7	835.0	845.7	840.4	844.6	841.7	846.4	844.0	845.8	843.3	846.1	845.0	840.4	845.7	0.7
SRE2	13030	840.1	834.7	844.0	840.0	842.5	840.0	846.1	843.3	844.8	842.4	845.3	844.2	840.0	844.5	1.6
	12835	838.0	833.7	841.8	840.0	841.1	838.5	844.4	842.0	843.7	841.0	844.0	842.9	838.5	843.0	1.4
	12615	836.5	832.5	840.4	837.1	839.8	837.0	843.6	841.5	842.3	840.1	842.5	841.6	837.0	841.7	1.9
	12395	835.8	831.7	839.2	835.0	838.7	835.9	841.9	840.0	841.7	839.5	841.4	840.0	835.0	840.6	1.3
	12195	834.7	830.7	839.2	835.0	836.4	834.0	841.1	839.0	840.0	838.9	840.1	838.7	834.0	839.4	1.8
	11995	833.4	830.0	839.2	834.6	836.3	832.6	839.6	838.0	838.7	837.2	839.1	838.1	832.6	838.6	1.0
	11780	831.8	830.0	837.7	832.6	834.8	831.2	837.7	836.0	837.2	835.5	837.7	836.1	831.2	837.0	0.7
	11605	831.1	830.0	836.5	831.3	833.5	830.1	837.1	836.0	836.5	834.8	836.6	834.2	830.1	836.1	1.1
	11405	830.2	830.0	834.5	830.0	831.8	829.7	834.8	834.0	835.5	833.7	835.0	832.8	829.7	834.3	0.5
	11180	829.1	828.4	832.5	828.4	828.9	828.3	833.4	832.5	833.5	831.8	833.6	832.4	828.3	832.4	1.0
SRE3	11015	827.8	827.1	831.3	826.6	828.4	827.3	832.1	832.0	832.8	831.0	832.3	830.5	826.6	831.4	0.7
	10835	826.4	825.7	829.9	825.0	827.6	825.7	832.3	830.0	832.2	830.2	831.5	829.4	825.0	830.7	1.5
	10575	825.4	825.0	827.6	825.0	826.2	825.0	831.3	830.0	831.0	828.3	830.1	828.4	825.0	829.2	2.0
	10390	824.1	823.7	826.1	825.0	824.6	823.5	829.7	828.0	830.2	827.5	829.0	828.1	823.5	827.9	1.8
	10225	823.3	822.6	825.2	822.6	823.5	822.4	828.7	828.0	828.6	827.3	827.9	827.4	822.4	826.8	2.0
	10000	823.9	820.9	822.2	820.0	821.5	821.0	827.3	826.0	828.0	826.4	825.4	824.3	820.0	824.9	2.5
	9820	823.0	820.0	821.2	820.0	820.9	820.0	826.3	824.0	827.6	826.0	825.4	823.7	820.0	824.3	2.1
	9595	822.9	818.5	820.3	819.3	819.9	819.1	825.8	824.0	826.5	824.8	824.3	822.3	819.1	823.4	2.4
	9385	822.5	815.0	819.4	816.7	818.9	818.3	825.5	824.0	825.2	823.7	823.7	821.3	816.7	822.5	3.0
	9220	821.6	815.0	818.0	815.0	818.0	816.9	824.2	822.0					815.0	820.0	4.1
	9025	820.0	815.0	816.1	815.0	816.5	815.8							815.0	816.3	

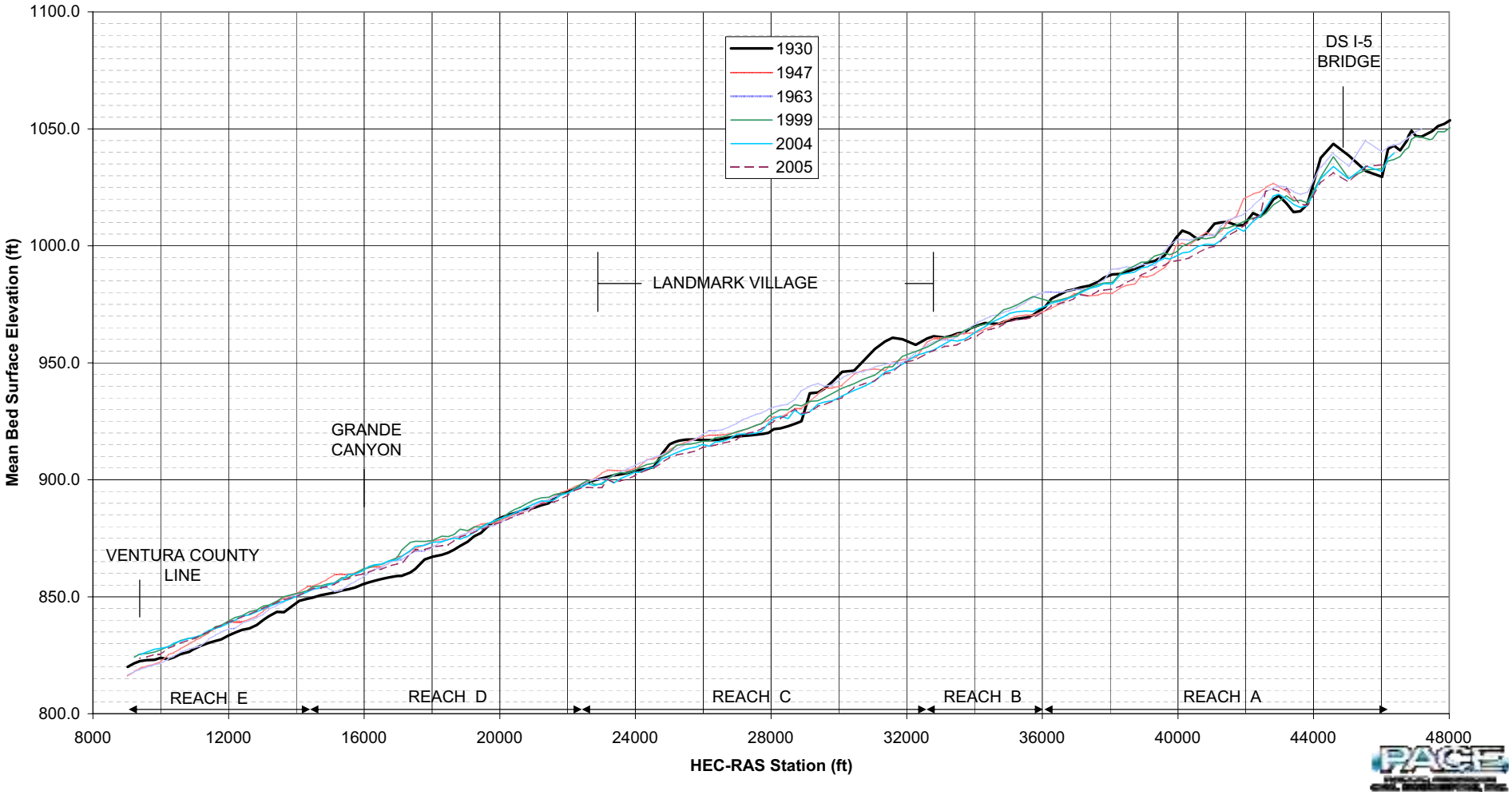
(1) "All years" excludes 1930

Figure A5.2.2A Santa Clara River Historical Minimum Bed Elevation



P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\Appendix 5.2 Min-Mean Thalweg by Year 11-02-05

Figure A5.2.2B Santa Clara River Historical Mean Bed Elevation



P:\8197E\5-Administrative\Reports\Fluvial Report\Fluvial Spreadsheets\Appendix 5.2 Min-Mean Thalweg by Year 11-02-05

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

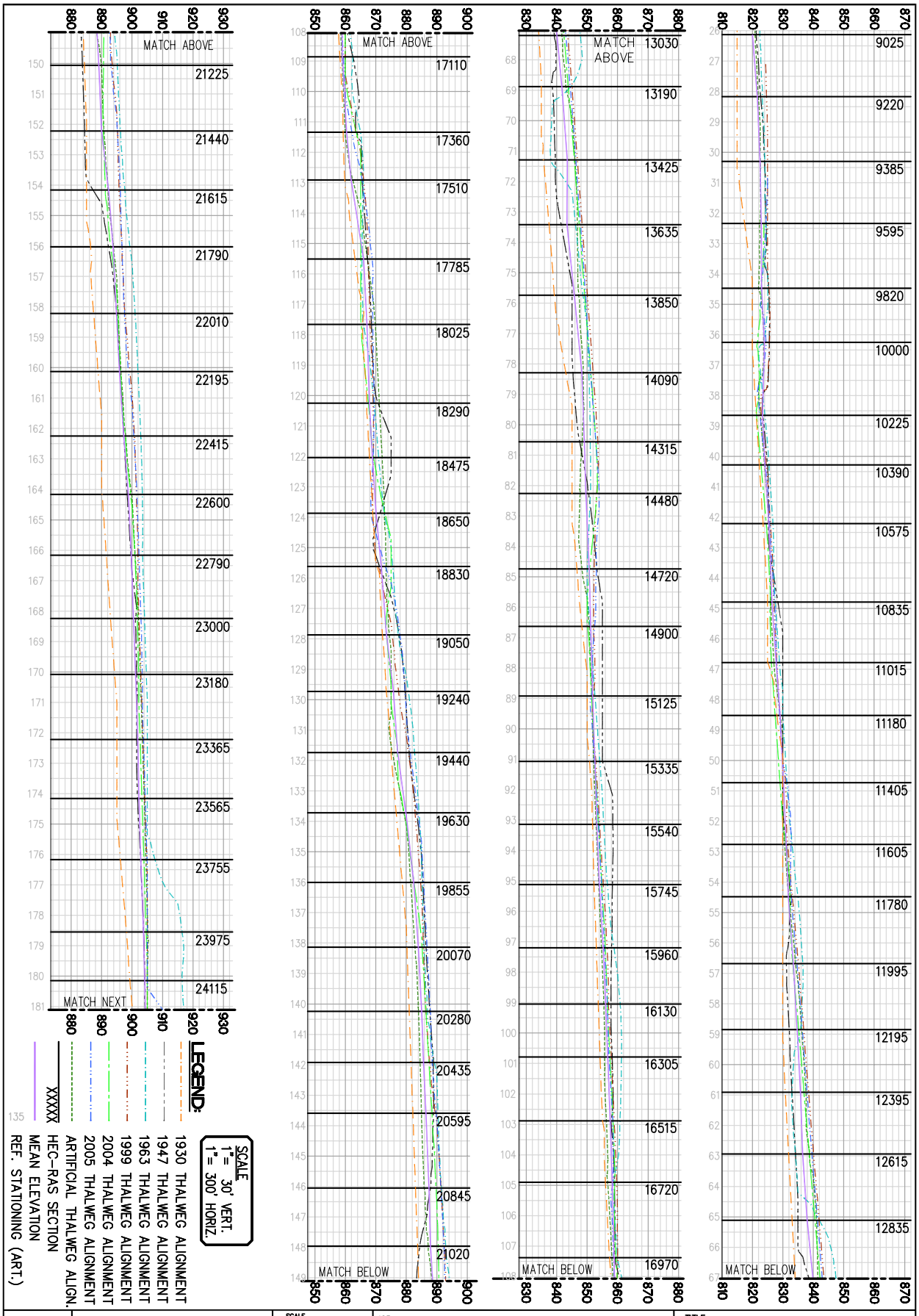


FIGURE A5.8.1A

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1930 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: A By: ddrahn on Mar. 14, 2006 at 05:05 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

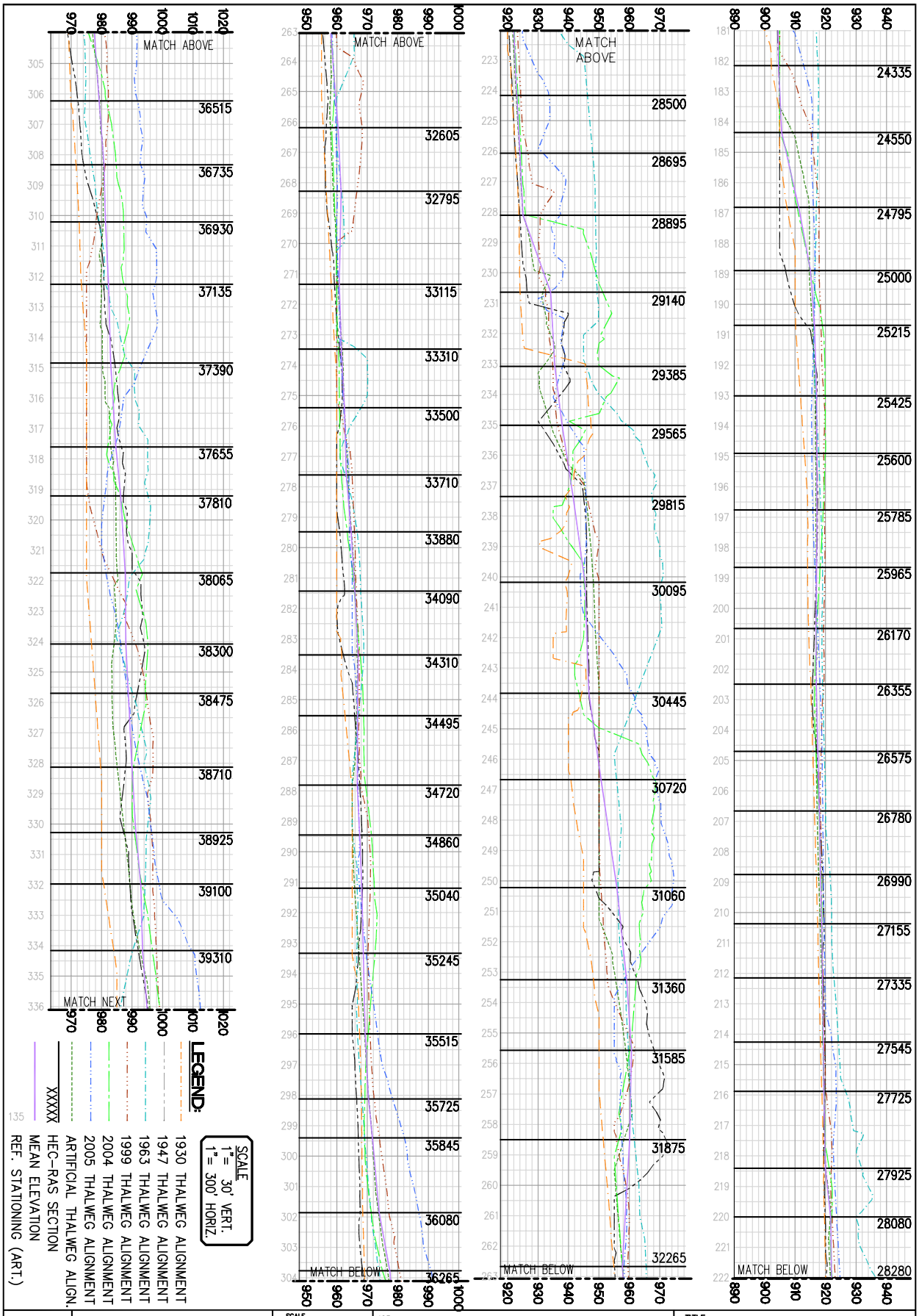


FIGURE A5.8.1B

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1930 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: B By: ddrahn on Mar. 14, 2006 at 05:05 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

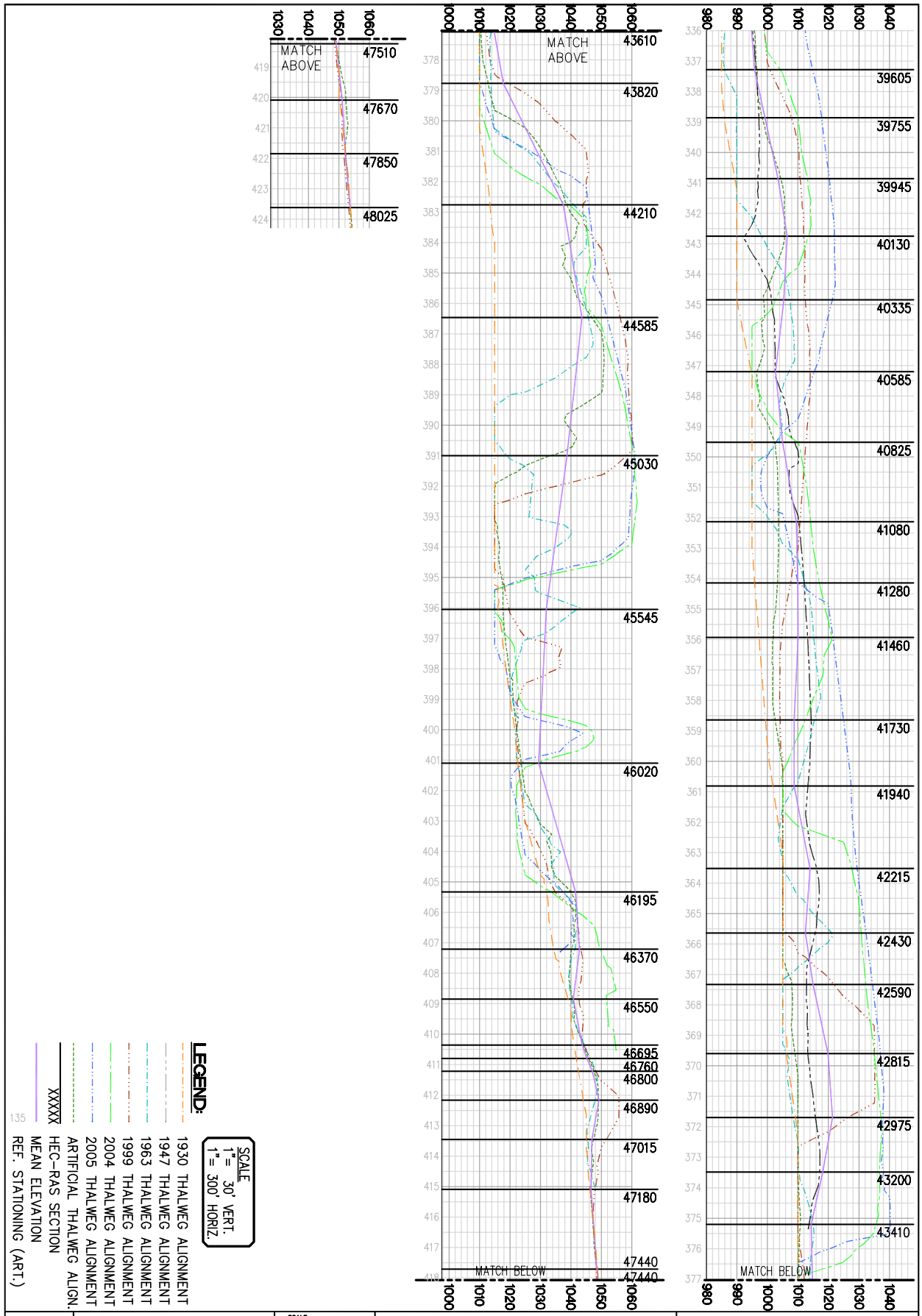


FIGURE A5.8.1G

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1930 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: C By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

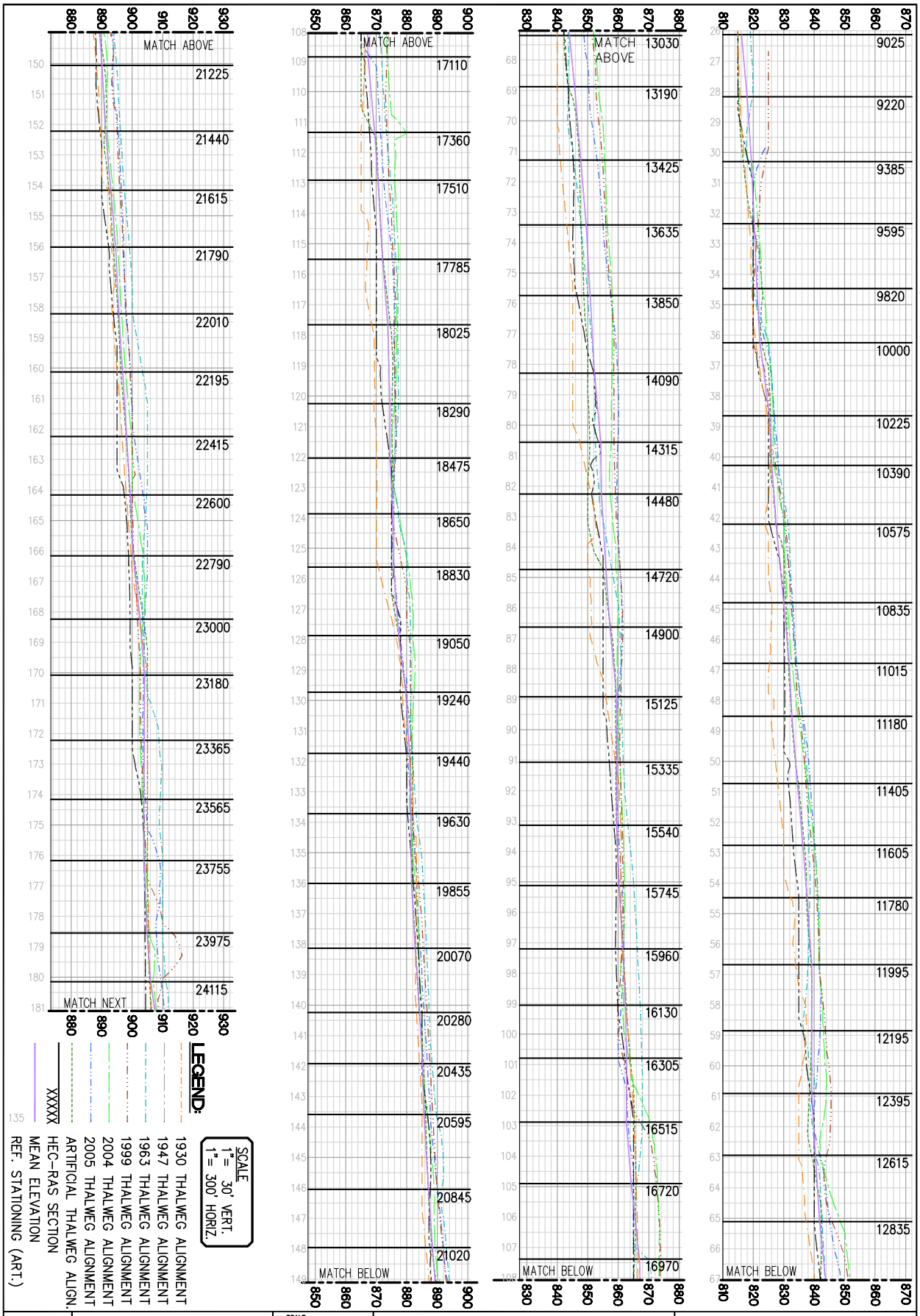


FIGURE A5.8.1D

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1947 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: D By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

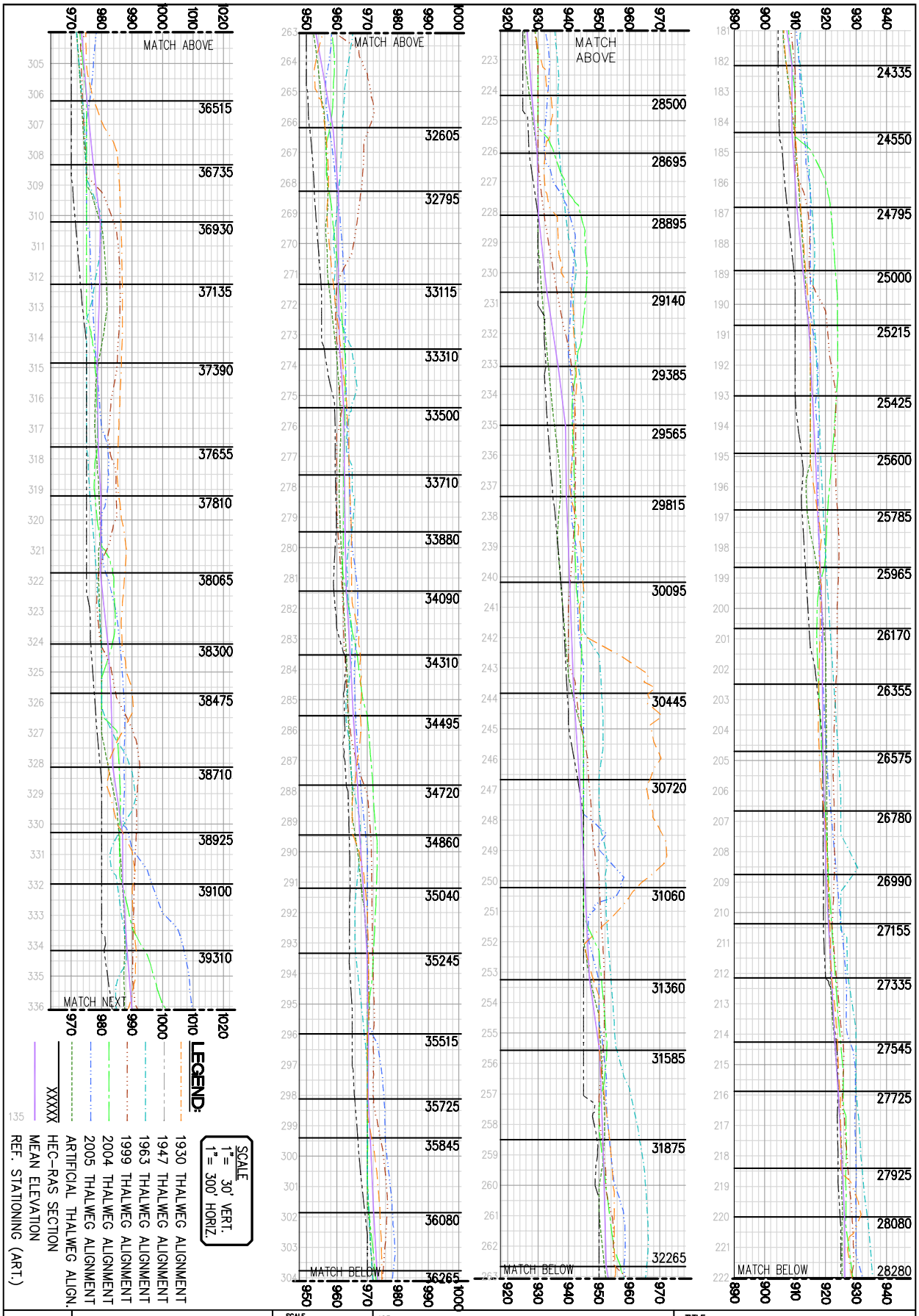


FIGURE A5.8.1E

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

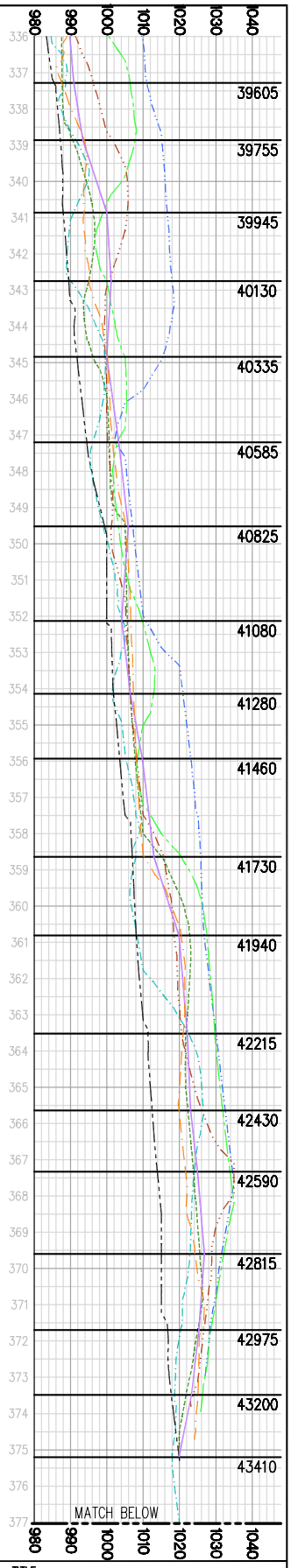
SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1947 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: E By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1



LEGEND:

- 1930 THALWEG ALIGNMENT
- 1947 THALWEG ALIGNMENT
- 1963 THALWEG ALIGNMENT
- 1999 THALWEG ALIGNMENT
- 2004 THALWEG ALIGNMENT
- 2005 THALWEG ALIGNMENT
- ARTIFICIAL THALWEG ALIGN.
- HEC-RAS SECTION
- XXXXX MEAN ELEVATION
- REF. STATIONING (ART.)

SCALE
1"= 30' VERT.
1"= 300' HORIZ.

FIGURE
A5.3.1F

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1947 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: F By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

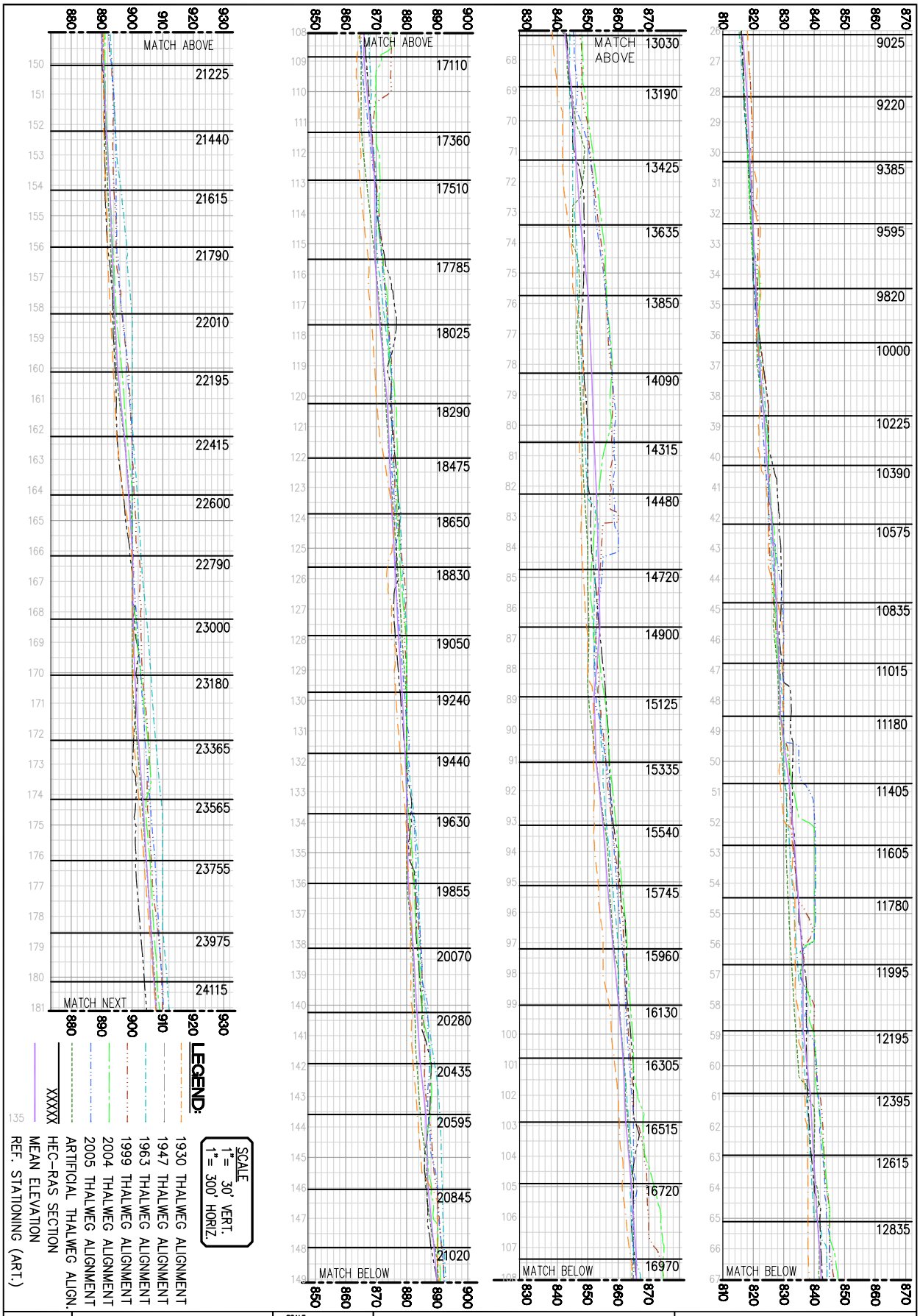


FIGURE A5.3.1G

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1963 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: G By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

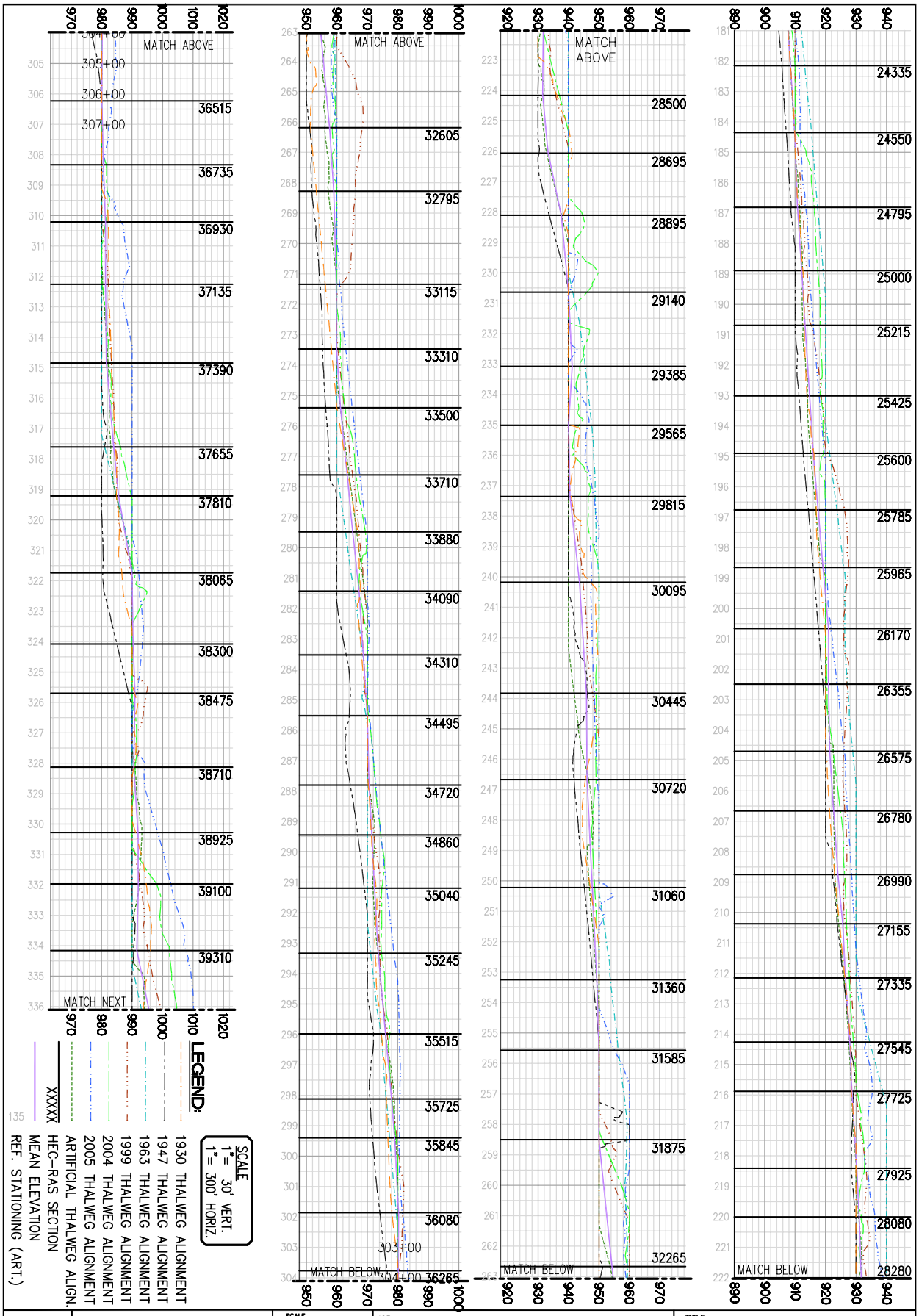


FIGURE A5.8.1H

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

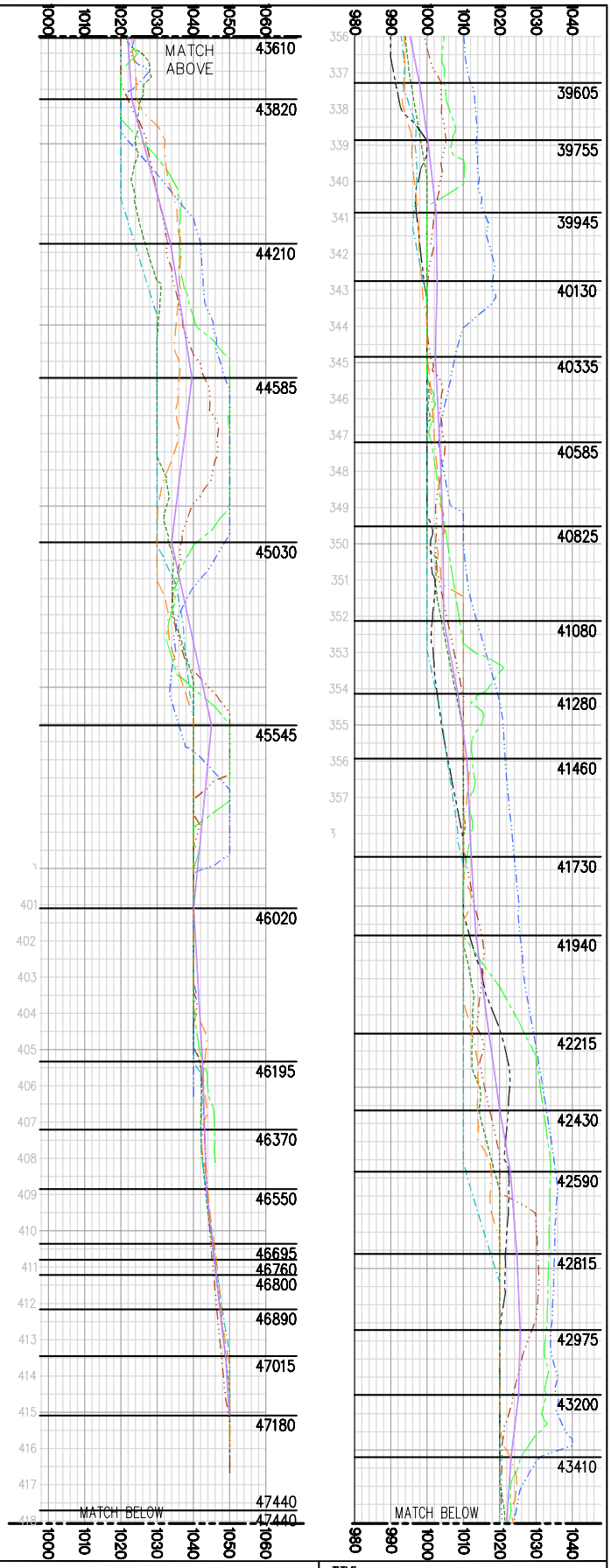
SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1963 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: H By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1



LEGEND:

- 1930 THALWEG ALIGNMENT
- 1947 THALWEG ALIGNMENT
- 1963 THALWEG ALIGNMENT
- 1999 THALWEG ALIGNMENT
- 2004 THALWEG ALIGNMENT
- 2005 THALWEG ALIGNMENT
- ARTIFICIAL THALWEG ALIGN.
- HEC-RAS SECTION
- XXXXX MEAN ELEVATION
- REF. STATIONING (ART.)

SCALE
1"= 30' VERT.
1"= 300' HORIZ.

FIGURE A5.3.11

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1963 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: I By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

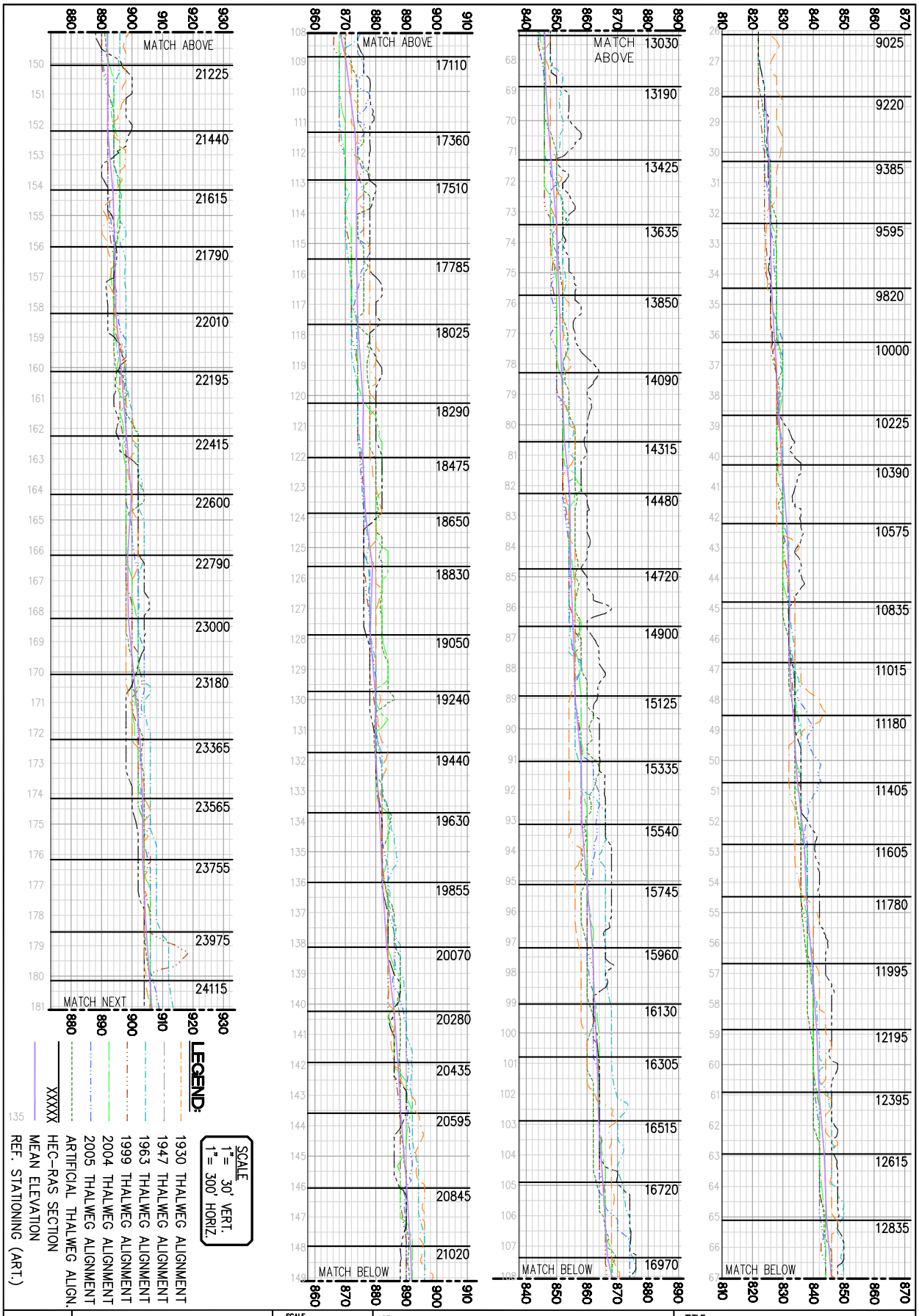


FIGURE A6.8.1J

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1999 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: J By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

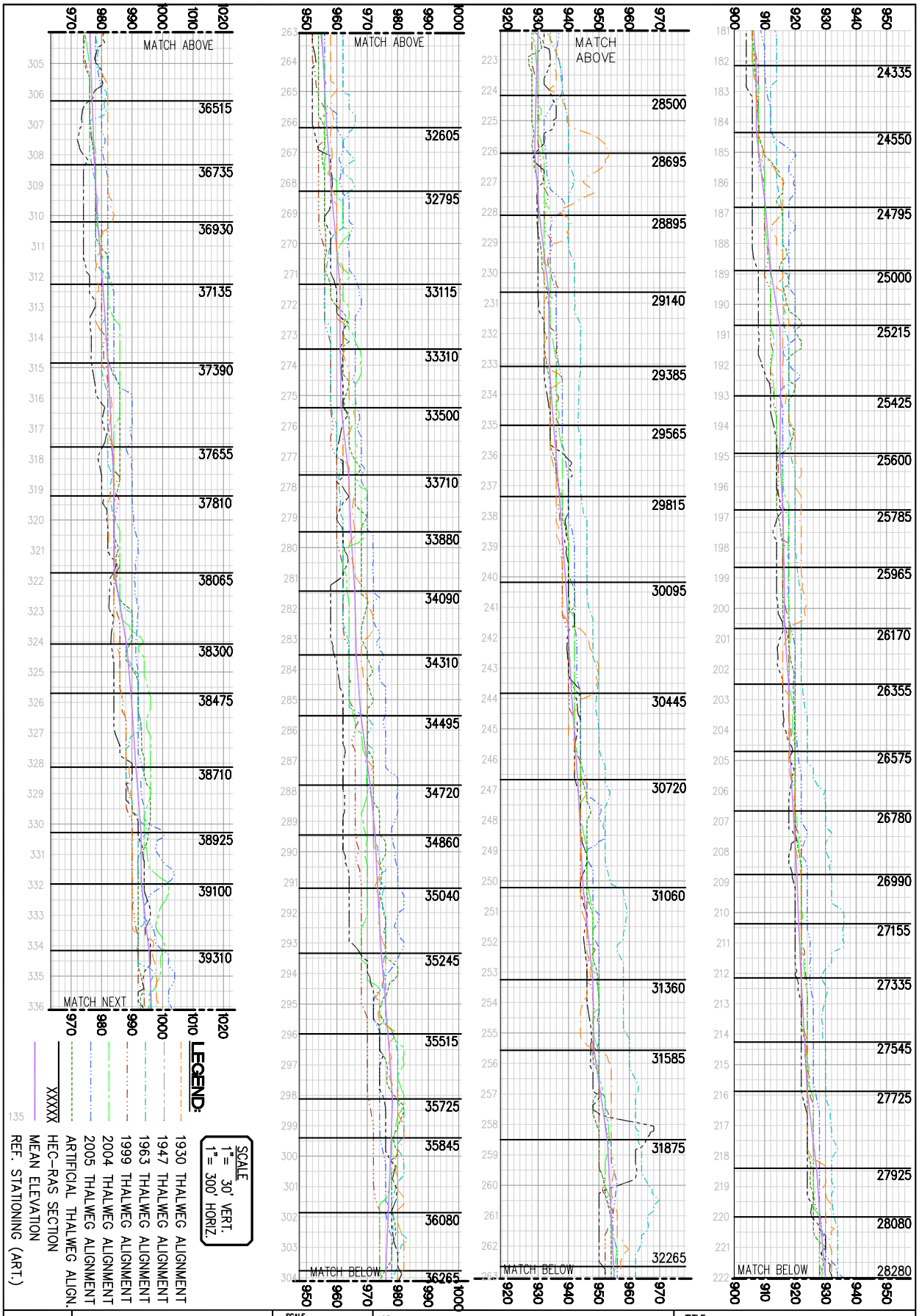


FIGURE A.3.3.1K

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1999 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: K By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

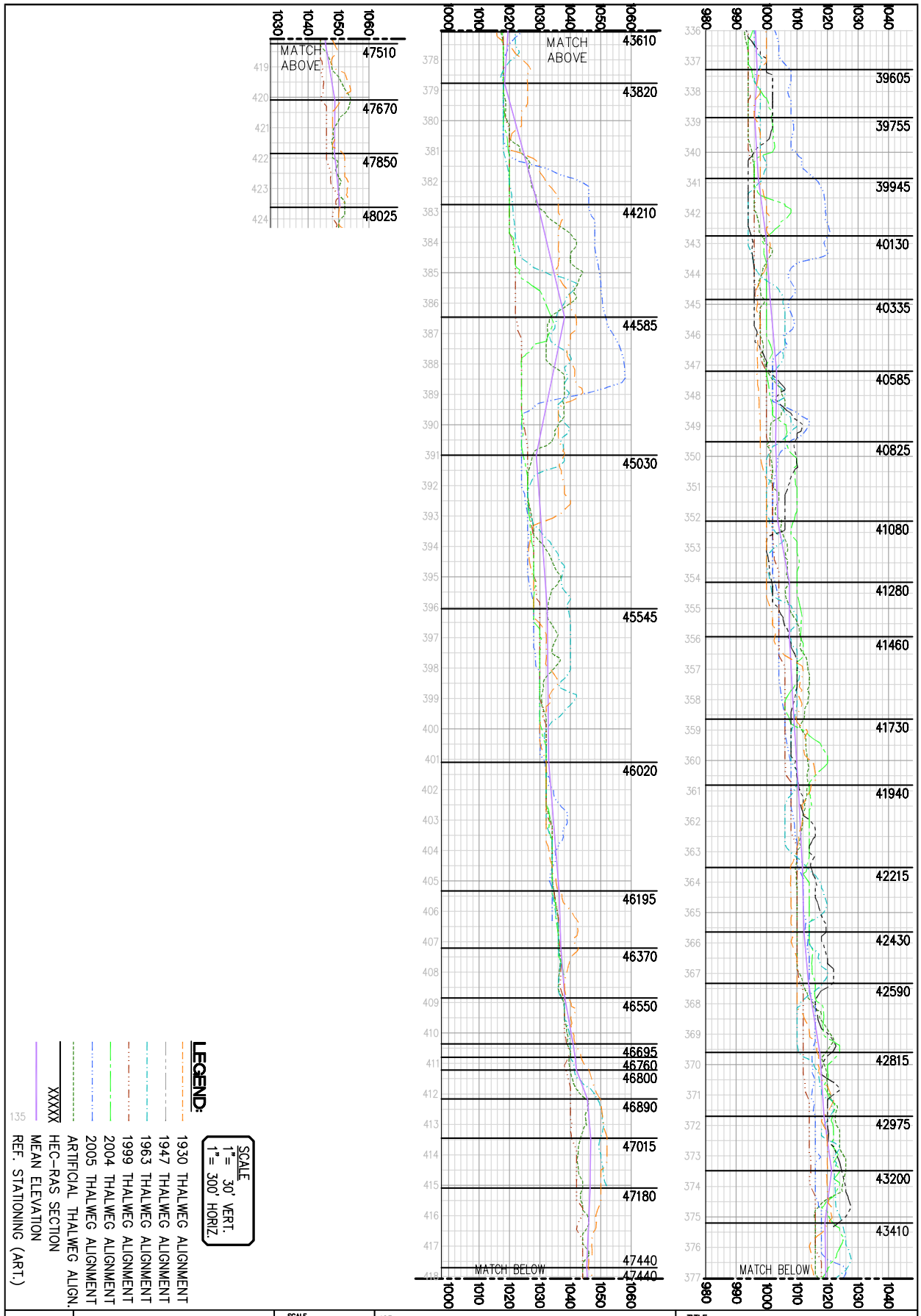


FIGURE A5.3.1L

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (1999 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: L By: ddrahn on Mar. 14, 2006 at 05:04 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

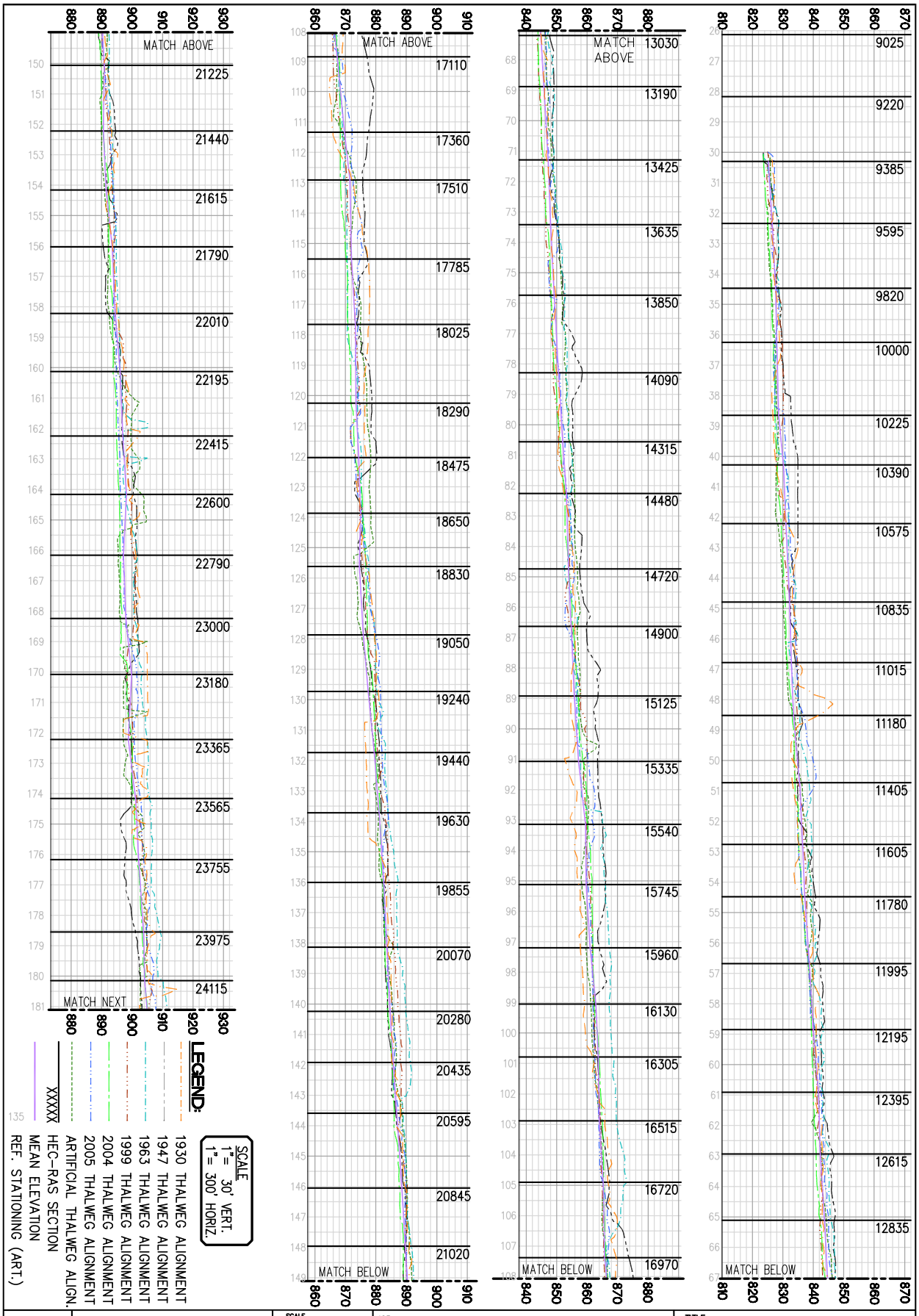


FIGURE A5.3.1M

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2004 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: M By: ddrahn on Mar. 14, 2006 at 05:03 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

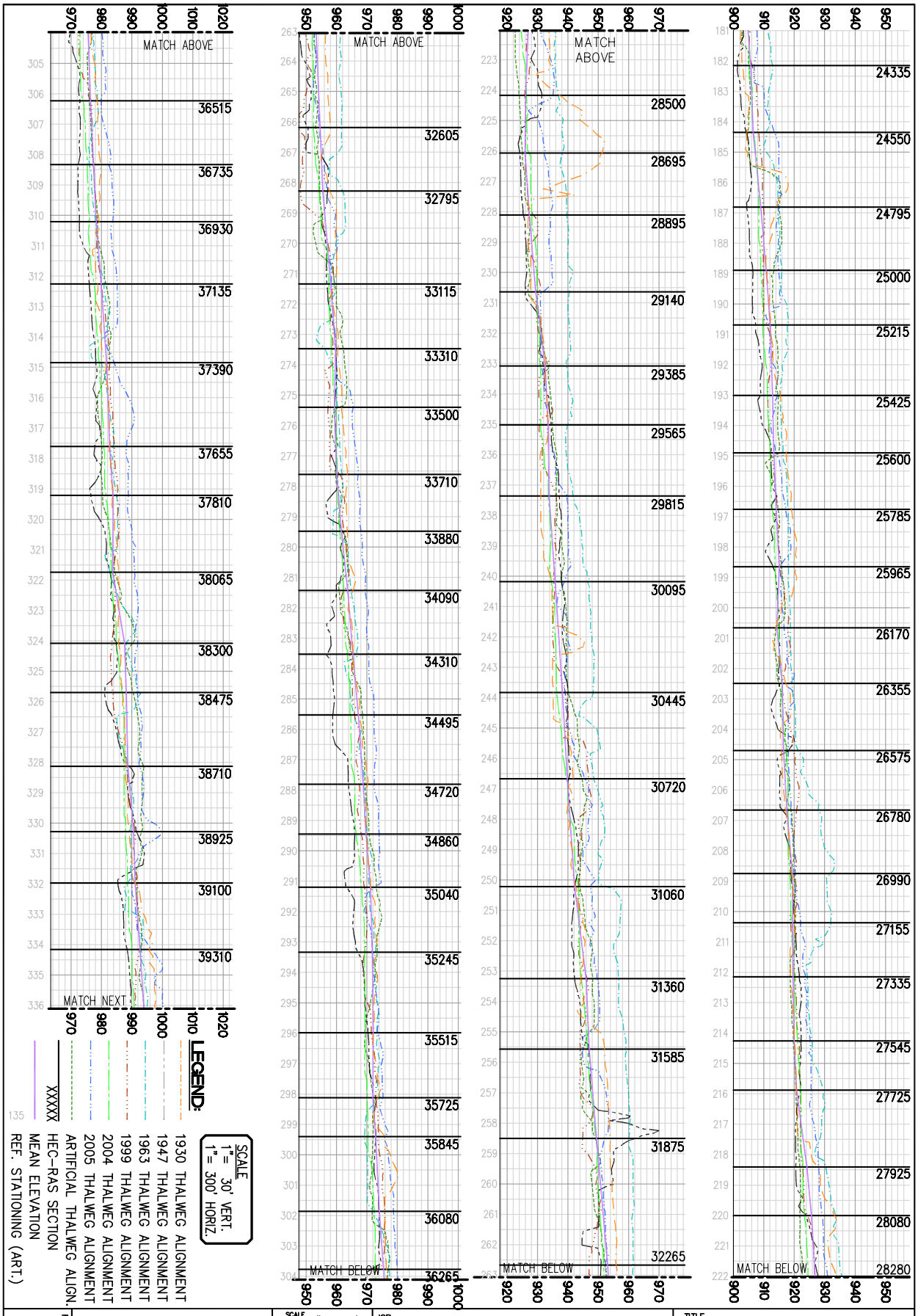


FIGURE A5.3.1N

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

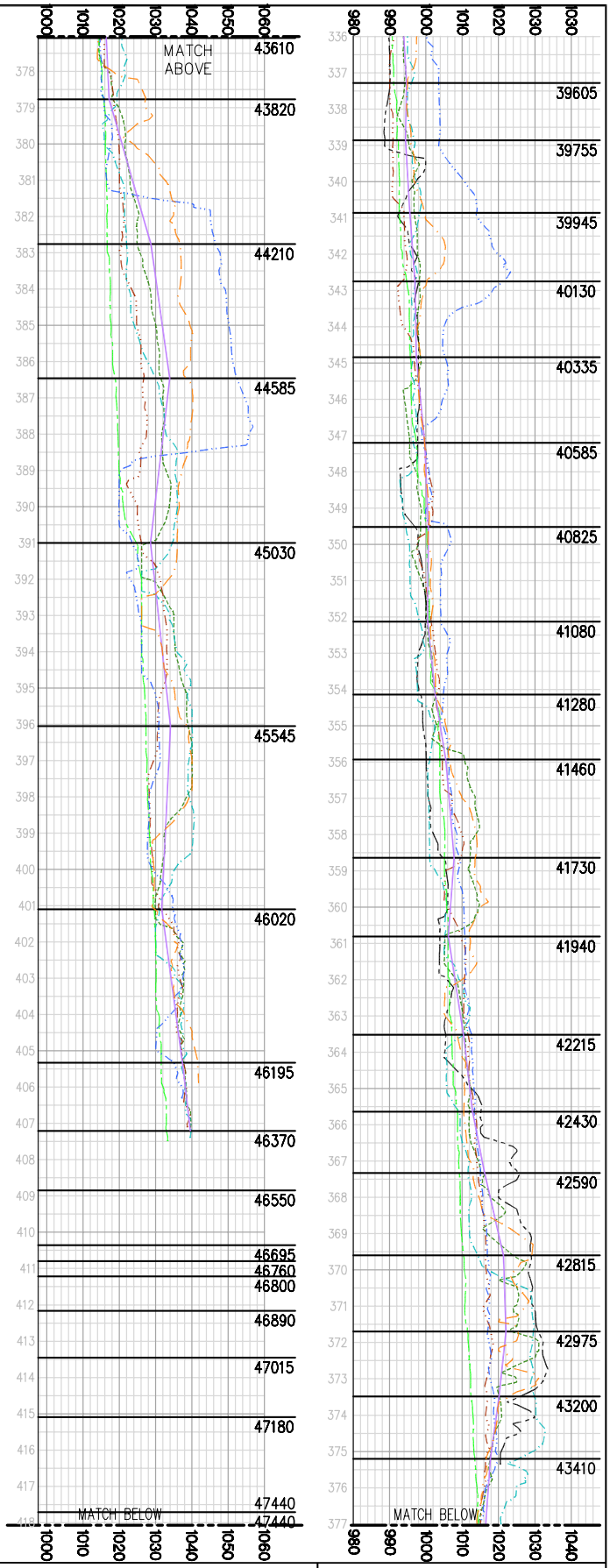
SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2004 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: N By: ddrahn on Mar. 14, 2006 at 05:03 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1



LEGEND:

- 1930 THALWEG ALIGNMENT
- 1947 THALWEG ALIGNMENT
- 1963 THALWEG ALIGNMENT
- 1999 THALWEG ALIGNMENT
- 2004 THALWEG ALIGNMENT
- 2005 THALWEG ALIGNMENT
- ARTIFICIAL THALWEG ALIGN.
- HEC-RAS SECTION
- XXXXX
- MEAN ELEVATION
- REF. STATIONING (ART.)

SCALE
1"= 30' VERT.
1"= 300' HORIZ.

FIGURE
A5.8.10

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2004 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: O By: ddrahn on Mar. 14, 2006 at 05:03 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

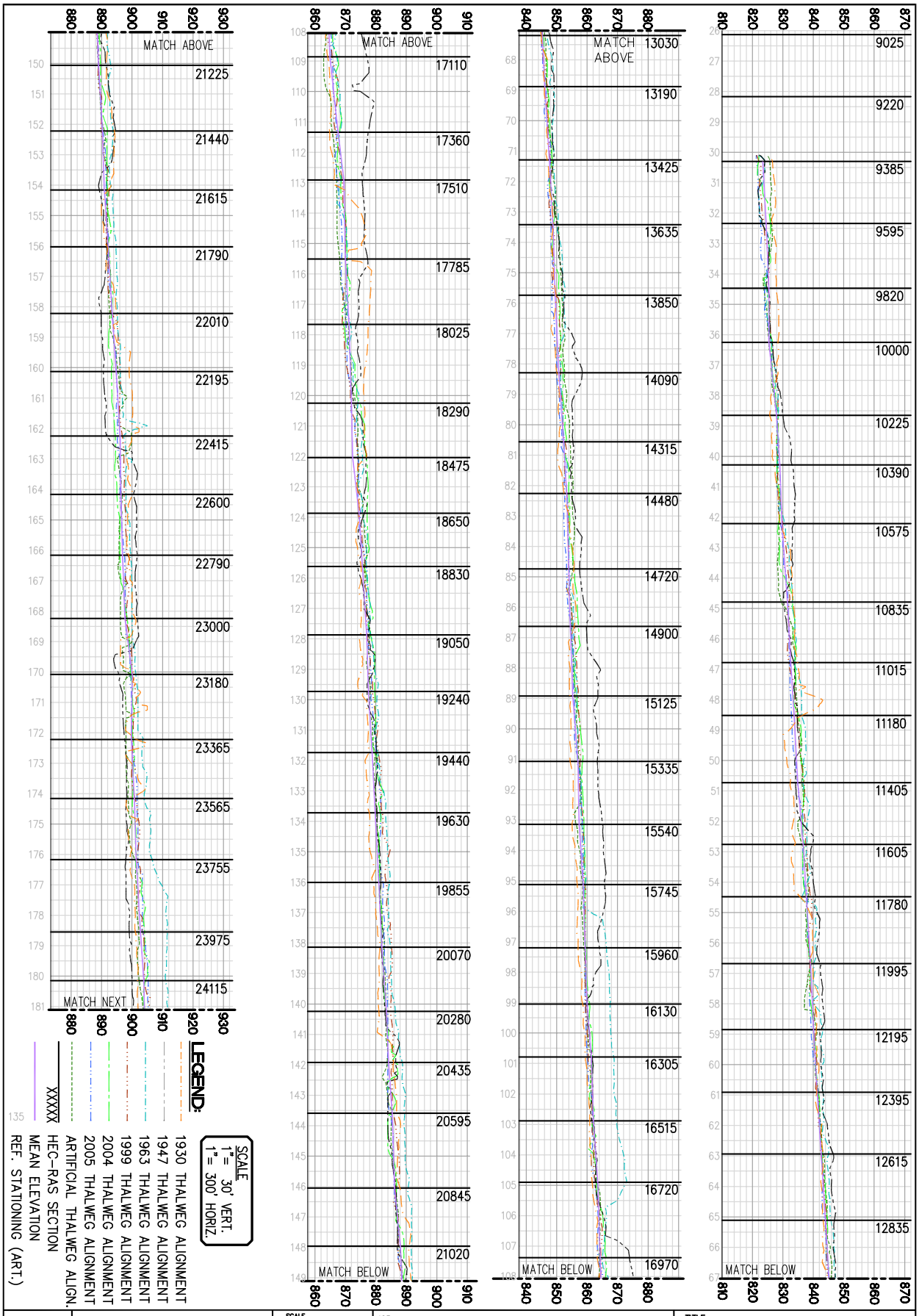


FIGURE A5.8.1P

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2005 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: P By: ddrahn on Mar. 14, 2006 at 05:03 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1

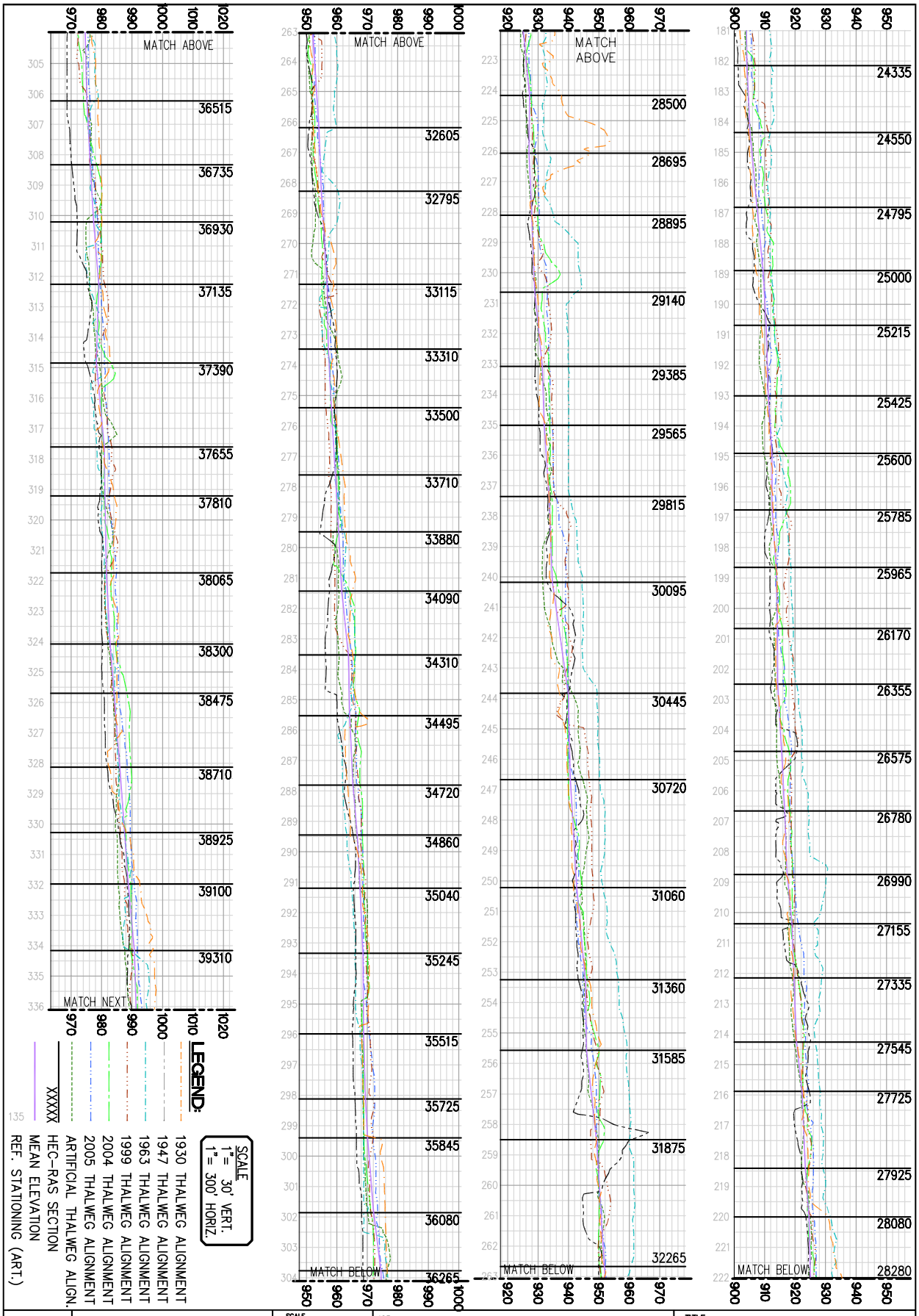


FIGURE A5.8.10

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

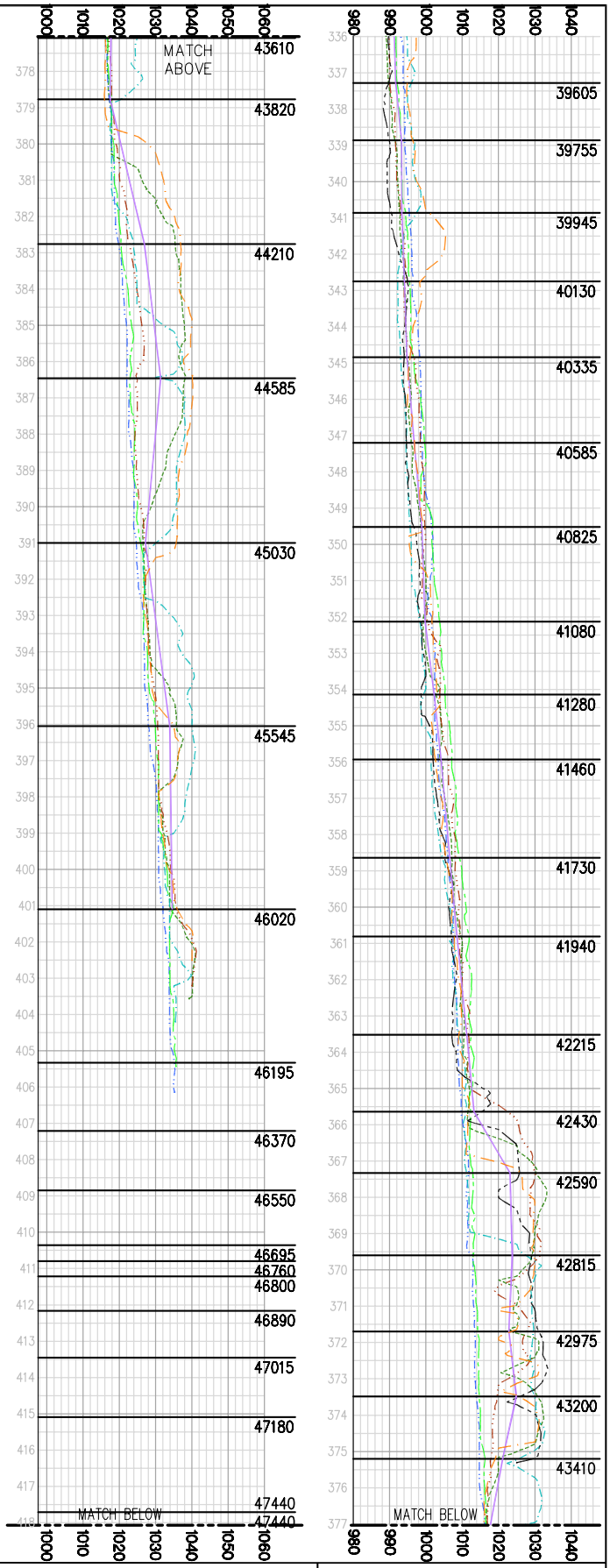
SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2005 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: Q By: ddrahn on Mar. 14, 2006 at 05:03 pm

Xrefs: 8197-SantaClara-Profiles.dwg; 8197-11x17Exh-Tblk.dwg
Dimscale = 300; LTscale = 0.5; PSltscale = 1; Acad Ver. = 16.2s (LMS Tech); Visretain = 1



LEGEND:

- 1930 THALWEG ALIGNMENT
- 1947 THALWEG ALIGNMENT
- 1963 THALWEG ALIGNMENT
- 1999 THALWEG ALIGNMENT
- 2004 THALWEG ALIGNMENT
- 2005 THALWEG ALIGNMENT
- ARTIFICIAL THALWEG ALIGN.
- HEC-RAS SECTION
- XXXXX
- MEAN ELEVATION
- REF. STATIONING (ART.)

SCALE
1"= 30' VERT.
1"= 300' HORIZ.

FIGURE
A5.8.1R

PACE
PACIFIC ADVANCED CIVIL ENGINEERING
17520 NEWHOPE STREET, SUITE 200
FOUNTAIN VALLEY, CA 92708
PH (714) 481-7300 FAX (714) 481-7299

SCALE	1"= 300'
DESIGNED	DAJ
DRAWN	DAD
CHECKED	MEK
DATE	09/13/05
JOB NO.	8197E

JOB
SANTA CLARA RIVER FLUVIAL STUDY
LOS ANGELES COUNTY CA

TITLE
SANTA CLARA RIVER HISTORIC BED PROFILES (2005 TOPO)

P:\8197E\Engineering\GlobalExhibits\8197 Historic Profiles - Santa Clara.dwg - Tab: R By: ddrahn on Mar. 14, 2006 at 05:03 pm

Santa Clara River Fluvial Study

APPENDIX CHAPTER 6.1A

LACH&SM Toe
Existing & Proposed Conditions
Curved & Straight Reaches

PACIFIC ADVANCED
CIVIL ENGINEERING, INC.

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM -- SANTA CLARA RIVER EXISTING CONDITIONS OUTSIDE CURVED REACH C_{LAP} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_f+	H/2	Z_{DM}=
46195	18.2	18.2	21.7	18.1	2.8	7.1	0	0.0	1	0.0	0	0.0	1	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	21.2	21.2	24.1	18.1	2.8	8.5	0	0.0	1	0.0	0	0.0	1	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	16.8	16.8	20.3	19.2	2.8	6.4	0	0.0	1	0.0	0	0.0	1	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	22.8	22.8	26.1	16.5	2.8	9.7	0	0.0	1	0.0	0	0.0	1	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	15.5	15.5	19.2	21.1	2.8	5.8	0	0.0	1	0.0	0	0.0	1	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	22.2	22.2	26.2	15.4	2.8	9.7	0	0.0	1	0.0	0	0.0	1	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	21.6	21.6	19.9	19.5	8.1	6.2	0	0.0	1	0.0	0	0.0	1	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	27.1	27.1	26.7	13.8	8.1	10.1	0	0.0	1	0.0	0	0.0	1	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	27.2	27.2	28.8	11.3	8.1	11.5	0	0.0	1	0.0	0	0.0	1	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	26.0	26.0	26.1	12.4	8.1	9.7	0	0.0	1	0.0	0	0.0	1	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	25.6	25.6	26.6	10.8	8.1	10.0	0	0.0	1	0.0	0	0.0	1	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	23.9	23.9	24.1	10.6	8.1	8.5	0	0.0	1	0.0	0	0.0	1	5.5	0.016	878.5	9000	0.0	2.0	5.3	14.0
42590	22.6	22.6	22.6	8.9	8.1	7.6	0	0.0	1	0.0	0	0.0	1	5.1	0.014	1023.2	9000	0.4	2.0	4.5	21.0
42430	21.7	21.7	20.8	9.6	8.1	6.6	0	0.0	1	0.0	0	0.0	1	5.9	0.012	940.5	9000	0.2	2.0	4.8	21.0
42215	15.3	15.3	10.4	14.3	8.1	2.2	0	0.0	1	0.0	0	0.0	1	8.5	0.002	1310.4	9000	1.5	2.0	1.5	15.0
41940	16.1	16.1	11.6	14.3	8.1	2.6	0	0.0	1	0.0	0	0.0	1	7.6	0.002	1321.5	9000	1.6	2.0	1.8	15.0
41730	16.0	16.0	11.8	14.7	8.1	2.7	0	0.0	1	0.0	0	0.0	1	8.0	0.002	1229.5	9000	1.3	2.0	1.9	15.0
41460	16.4	16.4	11.5	16.2	8.1	2.6	0	0.0	1	0.0	0	0.0	1	7.6	0.002	1329.0	9000	1.9	2.0	1.8	15.0
41280	15.4	15.4	16.5	14.3	5.2	4.5	0	0.0	1	0.0	0	0.0	1	8.2	0.004	852.1	9000	0.0	2.0	3.7	12.5
41080	18.7	18.7	19.9	12.1	5.2	6.2	0	0.0	1	0.0	0	0.0	1	6.7	0.007	874.2	9000	0.0	2.0	5.3	14.0
40825	21.0	17.4	18.0	11.5	5.2	5.2	0	0.0	1	0.0	0	0.0	1	6.2	0.007	1039.9	9000	0.5	2.0	4.4	21.0
40585	18.0	16.3	17.0	11.7	5.2	4.7	0	0.0	1	0.0	0	0.0	1	6.8	0.006	1005.9	9000	0.4	2.0	3.9	18.0
40335	15.0	13.5	11.1	14.5	5.2	2.4	0	0.0	1	0.0	0	0.0	1	7.1	0.002	1504.8	9000	2.2	2.0	1.7	15.0
40130	15.0	14.2	11.2	15.1	5.2	2.5	0	0.0	1	0.0	0	0.0	1	6.9	0.002	1636.5	9000	2.8	2.0	1.7	15.0
39945	15.0	13.8	10.3	16.1	5.2	2.2	0	0.0	1	0.0	0	0.0	1	7.6	0.001	1648.1	9000	3.0	2.0	1.4	15.0
39755	18.0	15.9	15.4	13.5	5.2	4.0	0	0.0	1	0.0	0	0.0	1	6.6	0.003	1251.4	9000	1.5	2.0	3.2	18.0
39605	21.0	19.0	19.4	11.4	5.2	5.9	0	0.0	1	0.0	0	0.0	1	5.8	0.007	1100.6	9000	0.8	2.0	5.1	21.0
39310	18.0	16.2	16.0	12.4	5.2	4.3	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1204.5	9000	1.3	2.0	3.5	18.0
39100	15.0	13.8	12.4	14.1	5.2	2.9	0	0.0	1	0.0	0	0.0	1	7.8	0.002	1294.8	9000	1.6	2.0	2.1	15.0
38925	15.0	12.7	11.4	14.5	5.2	2.5	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1181.3	9000	1.2	2.0	1.8	15.0
38710	15.0	9.2	10.6	15.9	2.7	2.3	0	0.0	1	0.0	0	0.0	1	10.8	0.001	1043.1	9000	0.7	2.0	1.5	15.0
38475	14.1	14.1	17.8	14.0	2.7	5.1	0	0.0	1	0.0	0	0.0	1	8.8	0.004	755.4	9000	0.0	2.0	4.3	12.5
38300	17.3	17.3	22.7	9.8	2.7	7.7	0	0.0	1	0.0	0	0.0	1	7.4	0.010	688.1	9000	0.0	2.0	4.9	14.0
38065	10.9	10.9	14.1	14.2	2.7	3.5	0	0.0	1	0.0	0	0.0	1	12.0	0.002	678.3	9000	0.0	2.0	2.7	10.0
37810	14.5	14.5	18.2	12.2	2.7	5.3	0	0.0	1	0.0	0	0.0	1	10.2	0.004	622.3	9000	0.0	2.0	4.5	14.0
37655	16.7	16.7	21.2	10.3	2.7	6.8	0	0.0	1	0.0	0	0.0	1	7.4	0.009	735.9	9000	0.0	2.0	5.1	14.0
37390	16.1	16.1	23.9	6.1	2.7	8.4	0	0.0	1	0.0	0	0.0	1	5.4	0.017	892.2	9000	0.0	2.0	3.1	14.0
37135	18.0	13.9	17.0	8.0	2.7	4.8	0	0.0	1	0.0	0	0.0	1	6.4	0.006	1088.9	9000	0.5	2.0	3.9	18.0
36930	21.0	14.6	18.3	7.9	2.7	5.4	0	0.0	1	0.0	0	0.0	1	6.0	0.007	1112.0	9000	0.6	2.0	3.9	21.0
36735	18.0	12.5	15.0	9.6	2.7	3.9	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1195.7	9000	0.9	2.0	3.0	18.0
36515	18.0	14.3	16.7	9.6	2.7	4.6	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1306.1	9000	1.2	2.0	3.8	18.0
36265	15.0	11.5	13.0	11.2	2.7	3.1	0	0.0	1	0.0	0	0.0	1	6.4	0.003	1373.1	9000	1.4	2.0	2.3	15.0
36080	15.0	11.8	12.5	11.7	3.2	2.9	0	0.0	1	0.0	0	0.0	1	6.4	0.004	1455.4	9000	1.6	2.0	2.1	15.0
35845	15.0	11.2	10.9	13.5	3.2	2.4	0	0.0	1	0.0	0	0.0	1	7.4	0.002	1496.2	9000	2.1	2.0	1.6	15.0
35725	15.0	13.9	14.7	13.0	3.2	3.8	0	0.0	1	0.0	0	0.0	1	6.3	0.003	1431.2	9000	2.1	2.0	2.9	15.0
35515	18.0	15.7	17.1	11.9	3.2	4.8	0	0.0	1	0.0	0	0.0	1	5.7	0.005	1353.4	9000	1.8	2.0	3.9	18.0
35245	15.0	14.1	14.5	12.5	3.2	3.7	0	0.0	1	0.0	0	0.0	1	5.8	0.003	1555.5	9000	2.4	2.0	2.8	15.0
35040	21.0	17.9	19.5	10.7	3.2	5.9	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1355.9	9000	1.7	2.0	5.1	21.0
34860	21.0	16.2	18.1	10.1	3.2	5.3	0	0.0	1	0.0	0	0.0	1	4.8	0.008	1338.9	9000	1.3	2.0	4.4	21.0
34720	21.0	16.3	18.2	9.3	3.2	5.3	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1411.5	9000	1.4	2.0	4.4	21.0
34495	21.0	15.8	18.1	8.9	3.2	5.3	0	0.0	1	0.0	0	0.0	1	5.0	0.009	1277.2	9000	1.0	2.0	4.4	21.0
34310	18.0	15.5	17.6	9.0	3.2	5.0	0	0.0	1	0.0	0	0.0	1	5.7	0.005	1280.8	9000	1.1	2.0	4.2	18.0
34090	18.0	14.9	17.2	8.6	3.2	4.8	0	0.0	1	0.0	0	0.0	1	5.4	0.007	1267.8	9000	1.0	2.0	4.0	18.0
33880	18.0	14.1	15.8	9.8	3.4	4.2	0	0.0	1	0.0	0	0.0	1	5.6	0.005	1310.6	9000	1.2	2.0	3.3	18.0
33710	18.0	14.9	16.5	9.4	3.4	4.6	0	0.0	1	0.0	0	0.0	1	5.2	0.007	1355.1	9000	1.3	2.0	3.7	18.0
33500	18.0	14.5	15.8	9.5	3.4	4.2	0	0.0	1	0.0	0	0.0	1	5.4	0.006	1474.3	9000	1.5	2.0	3.4	18.0
33310	18.0	15.1	15.9	9.1	3.4	4.3	0	0.0	1	0.0	0	0.0	1	4.2	0.006	1744.5	9000	2.1	2.0	3.4	18.0
33115	18.0	14.2	15.5	8.7	3.4	4.1	0	0.0	1	0.0	0	0.0	1	4.8	0.009	1573.2	9000	1.5	2.0	3.3	18.0
32795	15.0	12.5	12.2	11.0	3.4	2.8	0	0.0	1	0.0	0	0.0	1	5.5	0.003	1732.9	9000	2.3	2.0	2.0	15.0
32605	15.0	13.0	14.1	11.5	3.4	3.5	0	0.0	1	0.0	0	0.0	1	6.2	0.004	1344.6	9000	1.4	2.0	2.7	15.0
32265	18.0	14.8	16.7	10.2	2.0	4.6	0	0.0	1	0.0	0	0.0	1	4.6	0.007	1829.9	9000	2.5	2.0	3.8	18.0
31875	15.0	11.2	10.9	11.0	2.0	2.4	0	0.0	1	0.0	0	0.0	1	5.2	0.004	2482.2	9000	3.3	2.0	1.6	15.0
31585	18.0	15.2	16.6	9.8	2.0	4.6	0	0.0	1	0.0	0	0.0	1	4.0	0.009	2120.3	9000	2.9	2.0	3.7	18.0
31360	12.0	10.3	9.8	13.9	2.0	2.0	0	0.0	1	0.0	0	0.0	1	7.8	0.001	1884.4	9000	3.0	2.0	1.3	12.0
31060	12.0	9.0	7.9	15.9	2.0	1.5	0	0.0	1	0.0	0	0.0	1	10.5	0.001	1711.5	9000	2.7	2.0	0.8	12.0
30720	12.0	9.1	6.4	18.0	2.0	1.1	0	0.0	1	0.0	0	0.0	1	11.6	0.000	1891.7	9000	3.5	2.0	0.6	12.0
30445	12.0	9.0	6.0	19.9	2.0	1.0	0	0.0	1	0.0	0	0.0	1	13.1	0.000	1783.7	9000	3.5	2.0	0.5	12.0
30095	12.0	9.8	6.6	21.7	2.0	1.1	0	0.0	1	0.0	0	0.0	1	12.7	0.000	1730.3	9000	4.1	2.0	0.6	12.0
29815	12.0	10.5	7.7	22.4	2.0	1.4	0	0.0	1	0.0	0	0.0	1	11.7	0.000	1675.2	9000	4.3	2.0	0.8	12.0
29565	12.0	10.7	7.4	23.3	2.0	1.3	0	0.0	1	0.0	0	0.0	1	11.8	0.000	1717.4	9000	4.6	2.0	0.7	12.0
29385	12.0	11.4	8.5	24.0	2.0	1.6	0	0.0	1	0.0	0	0.0	1	10.8	0.000	1675.1	9000	4.8	2.0	1.0	12.0
29140	15.0	14.3	10.1	24.3	4.4	2.1	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1557.6	9000	4.4	2.0	1.4	15.0
28895	21.0	19.2	19.7	22.4	4.4	6.0	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1062.3	9000	1.6	2.0	5.2	21.0
28695	25.0	25.0	27.5	16.0	4.4	10.6	0	0.0	1	0.0	0	0.0	1	9.4	0.009	544.9	9000	0.0	2.0	8.0	14.0
28500	24.5	24.5	28.6	13.6	4.4	11.4	0	0.0	1	0.0	0	0.0	1	9.8	0.010	503.7	9000	0.0	2.0	6.8	14.0
28280	24.4	24.4	29.7	11.8	4.4	12.1	0	0.0	1	0.0	0	0.0	1	8.8	0.011	549.3	9000	0.0	2.0	5.9	14.0
28080	23.1	23.1	28.1	11.4	4.4	11.0	0	0.0	1	0.0	0	0.0	1	9.2	0.011	547.6	9000	0.0	2.0	5.7	14.0
27925	15.9	15.9	18.0	17.5	4.4	5.2	0	0.0	1	0.0	0	0.0	1	13.0	0.002	612.7	9000	0.0	2.0	4.3	12.5
27725	18.6	18.6	20.5	16.3	4.4	6.5	0	0.0	1	0.0	0	0.0	1	12.1	0.003	587.1	9000	0.0	2.0	5.7	14.0
27545	21.8	21.8	24.7	13.2	4.4	8.8	0	0.0	1	0.0	0	0.0	1	9.5	0.007	613.0	9000	0.0	2.0	6.6	14.0
27335	21.7	21.7	25.5	12.0	4.4	9.3	0	0.0	1	0.0	0	0.0	1	8.1	0.008	691.0	9000	0.0	2.0	6.0	14.0
27155	20.4	20.4	22.3	13.2	4.4	7.4	0	0.0	1	0.0	0	0.0	1	8.0	0.005	856.6	9000	0.0	2.0	6.6	14.0
26990	21.0	18.2	23.5	11.2	2.0	8.1	0	0.0	1	0.0	0	0.0	1	6.0	0.010	1008.2	9000	0.5	2.0	5.6	21.0
26780	21.0	18.9	23.9	11.0	2.0	8.4	0	0.0	1	0.0	0	0.0	1	5.6	0.010	1131.7	9000	1.0	2.0	5.5	21.0
26575	21.5	21.5	21.0	11.0	2.0	6.7	0	0.0	1	0.0	0	0.0	1	5.5	0.013	1216.4	3000	5.3	2.0	5.5	21.0
26355	18.6	18.6	15.8	13.4	2.0	4.2	0	0.0	1	0.0	0	0.0	1	7.5	0.003	1282.4	3000	7.0	2.0	3.4	18.0
26170	21.3	21.3	18.0	13.0	2.0	5.2	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1347.9	3000	7.7	2.0	4.4	18.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_f=LOW-FLOW INCISEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{SS}+	Z+	H/2	Z_{DM}=
25965	20.9	20.9	17.9	13.0	2.0	5.2	0	0.0	1	0.0	0	0.0	1	7.0	0.004	1288.3	3000	7.4	2.0	4.3	18.0
25785	22.1	22.1	19.5	11.7	2.0	6.0	0	0.0	1	0.0	0	0.0	1	6.2	0.005	1336.9	3000	7.0	2.0	5.2	21.0
25600	24.5	24.5	20.6	11.3	2.0	6.5	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1596.5	3000	8.3	2.0	5.6	21.0
25425	24.3	24.3	20.0	11.3	2.0	6.2	0	0.0	1	0.0	0	0.0	1	4.4	0.008	1773.8	3000	8.7	2.0	5.4	21.0
25215	19.6	19.6	14.5	13.6	2.0	3.7	0	0.0	1	0.0	0	0.0	1	6.1	0.003	1748.6	3000	9.0	2.0	2.8	15.0
25000	23.5	23.5	17.4	12.2	2.0	5.0	0	0.0	1	0.0	0	0.0	1	4.4	0.006	2103.2	3000	10.5	2.0	4.1	18.0
24795	25.4	25.4	19.0	11.4	2.0	5.7	0	0.0	1	0.0	0	0.0	1	3.9	0.007	2311.7	3000	10.8	2.0	4.9	21.0
24550	26.5	26.5	21.3	10.8	2.0	6.9	0	0.0	1	0.0	0	0.0	1	3.8	0.009	2227.0	3000	10.2	2.0	5.4	21.0
24335	20.7	20.7	14.5	13.1	2.0	3.7	0	0.0	1	0.0	0	0.0	1	5.7	0.003	2089.5	3000	10.2	2.0	2.8	15.0
24115	23.1	23.1	18.8	11.1	2.0	5.6	0	0.0	1	0.0	0	0.0	1	4.5	0.008	2015.8	3000	8.7	2.0	4.8	21.0
23975	22.3	22.3	19.0	10.2	2.0	5.7	0	0.0	1	0.0	0	0.0	1	4.6	0.008	1913.7	3000	7.7	2.0	4.9	21.0
23755	20.4	20.4	16.7	10.9	2.0	4.6	0	0.0	1	0.0	0	0.0	1	5.1	0.006	1935.4	3000	8.0	2.0	3.8	18.0
23565	19.8	19.8	14.5	12.7	2.0	3.7	0	0.0	1	0.0	0	0.0	1	5.6	0.004	2039.5	3000	9.3	2.0	2.8	15.0
23365	20.1	20.1	17.0	10.8	2.0	4.8	0	0.0	1	0.0	0	0.0	1	5.4	0.006	1781.4	3000	7.4	2.0	3.9	18.0
23180	18.7	18.7	13.2	11.8	2.0	3.2	0	0.0	1	0.0	0	0.0	1	6.6	0.002	2084.2	3000	9.2	2.0	2.3	15.0
23000	14.7	14.7	8.9	13.0	2.0	1.7	0	0.0	1	0.0	0	0.0	1	7.7	0.001	2069.1	3000	7.9	2.0	1.1	12.0
22790	14.9	14.9	9.4	13.1	2.0	1.9	0	0.0	1	0.0	0	0.0	1	7.8	0.001	1949.0	3000	7.8	2.0	1.2	12.0
22600	17.6	17.6	11.4	14.1	2.0	2.5	0	0.0	1	0.0	0	0.0	1	7.9	0.001	1865.2	3000	9.3	2.0	1.7	15.0
22415	17.3	17.3	11.8	14.1	2.0	2.7	0	0.0	1	0.0	0	0.0	1	8.1	0.002	1705.6	3000	8.7	2.0	1.9	15.0
22195	17.3	17.3	14.1	13.7	2.0	3.5	0	0.0	1	0.0	0	0.0	1	7.8	0.003	1322.2	3000	7.1	2.0	2.7	15.0
22010	19.9	19.9	16.0	14.4	2.0	4.3	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1328.0	3000	8.2	2.0	3.5	18.0
21790	21.2	21.2	19.7	11.6	2.0	6.0	0	0.0	1	0.0	0	0.0	1	6.5	0.006	1145.7	3000	5.9	2.0	5.2	21.0
21615	21.0	19.4	21.4	8.5	2.0	6.9	0	0.0	1	0.0	0	0.0	1	5.8	0.010	1161.3	3000	4.2	2.0	4.3	21.0
21440	21.7	21.7	20.1	9.7	2.0	6.3	0	0.0	1	0.0	0	0.0	1	5.0	0.008	1574.6	3000	6.6	2.0	4.8	21.0
21225	24.8	24.8	19.5	10.6	2.0	5.9	0	0.0	1	0.0	0	0.0	1	3.9	0.008	2217.7	3000	9.7	2.0	5.1	21.0
21020	21.5	21.5	20.8	8.9	2.0	6.6	0	0.0	1	0.0	0	0.0	1	4.6	0.009	1676.4	3000	6.5	2.0	4.4	21.0
20845	22.3	22.3	17.1	10.4	2.0	4.8	0	0.0	1	0.0	0	0.0	1	4.2	0.006	2369.3	3000	9.6	2.0	3.9	18.0
20595	21.4	21.4	15.2	10.9	2.0	4.0	0	0.0	1	0.0	0	0.0	1	4.7	0.003	2463.7	3000	10.3	2.0	3.1	18.0
20435	20.7	20.7	12.9	12.2	2.0	3.1	0	0.0	1	0.0	0	0.0	1	5.4	0.002	2582.7	3000	11.3	2.0	2.3	15.0
20280	21.1	21.1	14.0	11.8	2.0	3.5	0	0.0	1	0.0	0	0.0	1	5.0	0.003	2589.6	3000	11.0	2.0	2.6	15.0
20070	21.6	21.6	20.2	9.2	2.0	6.3	0	0.0	1	0.0	0	0.0	1	4.7	0.009	1767.5	3000	6.7	2.0	4.6	21.0
19855	21.3	21.3	17.8	9.9	2.0	5.1	0	0.0	1	0.0	0	0.0	1	4.8	0.006	1975.1	3000	7.9	2.0	4.3	18.0
19630	20.0	20.0	17.9	9.9	2.0	5.2	0	0.0	1	0.0	0	0.0	1	4.9	0.006	1836.2	3000	6.6	2.0	4.3	18.0
19440	17.5	17.5	11.9	12.1	2.0	2.7	0	0.0	1	0.0	0	0.0	1	6.5	0.002	2095.3	3000	8.9	2.0	1.9	15.0
19240	18.8	18.8	13.9	11.4	2.0	3.5	0	0.0	1	0.0	0	0.0	1	5.6	0.003	2081.7	3000	8.7	2.0	2.6	15.0
19050	17.1	17.1	11.0	12.9	2.0	2.4	0	0.0	1	0.0	0	0.0	1	6.7	0.002	2160.8	3000	9.1	2.0	1.6	15.0
18830	17.9	17.9	10.7	14.6	2.0	2.3	0	0.0	1	0.0	0	0.0	1	7.1	0.002	2094.4	3000	10.1	2.0	1.5	15.0
18650	17.5	17.5	9.9	15.0	2.0	2.1	0	0.0	1	0.0	0	0.0	1	8.0	0.001	2022.7	3000	10.1	2.0	1.3	12.0
18475	16.1	16.1	8.1	16.6	2.0	1.5	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1944.4	3000	9.7	2.0	0.9	12.0
18290	16.6	16.6	8.7	16.8	2.0	1.7	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1843.7	3000	9.9	2.0	1.0	12.0
18025	8.0	6.3	7.8	18.2	2.0	1.5	0	0.0	1	0.0	0	0.0	1	11.5	0.001	1610.9	17000	0.0	2.0	0.8	8.0
17785	8.0	6.7	8.7	19.8	2.0	1.7	0	0.0	1	0.0	0	0.0	1	11.6	0.001	1417.5	17000	0.0	2.0	1.0	8.0
17510	10.1	10.1	14.0	18.0	2.0	3.5	0	0.0	1	0.0	0	0.0	1	8.5	0.002	1243.6	17000	0.0	2.0	2.6	10.0
17360	12.7	12.7	17.0	16.9	2.0	4.8	0	0.0	1	0.0	0	0.0	1	8.9	0.004	936.6	17000	0.0	2.0	3.9	12.5
17110	17.5	17.5	21.7	15.4	2.0	7.1	0	0.0	1	0.0	0	0.0	1	5.6	0.006	1274.3	17000	0.0	2.0	6.4	14.0
16970	18.6	18.6	22.9	13.6	2.0	7.8	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1125.6	17000	0.0	2.0	6.8	14.0
16720	17.6	17.6	25.2	9.0	2.0	9.1	0	0.0	1	0.0	0	0.0	1	4.1	0.018	1404.6	17000	0.0	2.0	4.5	14.0
16515	15.7	15.7	21.5	9.5	2.0	7.0	0	0.0	1	0.0	0	0.0	1	4.3	0.012	1622.6	17000	0.0	2.0	4.8	14.0
16305	21.0	16.1	21.5	9.6	2.0	7.0	0	0.0	1	0.0	0	0.0	1	4.2	0.011	1812.8	17000	0.3	2.0	4.8	21.0
16130	18.0	12.3	16.1	10.2	2.0	4.3	0	0.0	1	0.0	0	0.0	1	5.2	0.005	1945.1	17000	0.5	2.0	3.5	18.0
15960	18.0	12.3	15.8	9.3	2.0	4.2	0	0.0	1	0.0	0	0.0	1	4.1	0.011	2180.9	17000	0.7	2.0	3.4	18.0
15745	15.0	8.9	10.9	10.6	2.0	2.4	0	0.0	1	0.0	0	0.0	1	5.7	0.003	2279.0	17000	0.9	2.0	1.6	15.0
15540	15.0	9.0	11.0	10.6	2.0	2.4	0	0.0	1	0.0	0	0.0	1	5.8	0.003	2324.2	17000	1.0	2.0	1.6	15.0
15335	15.0	10.1	12.7	10.5	2.0	3.0	0	0.0	1	0.0	0	0.0	1	4.9	0.005	2302.1	17000	1.0	2.0	2.2	15.0
15125	12.5	11.9	16.2	9.6	2.0	4.4	0	0.0	1	0.0	0	0.0	1	5.5	0.007	1618.5	17000	0.0	2.0	3.5	12.5
14900	15.0	10.6	14.5	10.4	2.0	3.7	0	0.0	1	0.0	0	0.0	1	6.1	0.004	1704.5	17000	0.1	2.0	2.9	15.0
14720	18.0	12.7	16.8	9.3	2.0	4.7	0	0.0	1	0.0	0	0.0	1	5.1	0.008	1763.5	17000	0.1	2.0	3.8	18.0
14480	15.0	10.6	14.3	10.2	2.0	3.6	0	0.0	1	0.0	0	0.0	1	6.0	0.004	1801.7	17000	0.2	2.0	2.7	15.0
14315	15.0	11.1	14.8	9.4	2.0	3.8	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1868.1	17000	0.3	2.0	3.0	15.0
14090	15.0	10.1	13.8	9.0	2.0	3.4	0	0.0	1	0.0	0	0.0	1	5.9	0.005	1766.8	17000	0.1	2.0	2.6	15.0
13850	18.0	11.5	15.6	8.4	2.0	4.2	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1727.3	17000	0.1	2.0	3.3	18.0
13635	12.5	11.3	15.4	10.3	2.0	4.1	0	0.0	1	0.0	0	0.0	1	6.4	0.004	1691.9	17000	0.0	2.0	3.2	12.5
13425	18.0	13.2	17.3	8.3	2.0	4.9	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1854.4	17000	0.3	2.0	4.0	18.0
13190	15.0	9.1	12.2	9.5	2.0	2.8	0	0.0	1	0.0	0	0.0	1	6.4	0.003	1847.3	17000	0.3	2.0	2.0	15.0
13030	15.0	10.4	14.2	9.6	2.0	3.6	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1763.0	17000	0.2	2.0	2.7	15.0
12835	10.0	9.6	13.3	10.1	2.0	3.2	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	9.0	12.4	10.9	2.0	2.9	0	0.0	1	0.0	0	0.0	1	8.7	0.002	1471.0	17000	0.0	2.0	2.1	10.0
12395	10.0	8.9	12.3	11.5	2.0	2.9	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1438.4	17000	0.0	2.0	2.0	10.0
12195	10.0	7.8	10.6	12.5	2.0	2.3	0	0.0	1	0.0	0	0.0	1	10.3	0.001	1389.3	17000	0.0	2.0	1.5	10.0
11995	10.0	9.2	12.7	13.7	2.0	3.0	0	0.0	1	0.0	0	0.0	1	9.8	0.002	1281.1	17000	0.0	2.0	2.2	10.0
11780	10.0	9.0	12.5	14.4	2.0	2.9	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1400.9	17000	0.0	2.0	2.1	10.0
11605	10.2	10.2	14.1	13.7	2.0	3.5	0	0.0	1	0.0	0	0.0	1	8.7	0.002	1282.9	17000	0.0	2.0	2.7	10.0
11405	10.0	9.5	13.2	15.1	2.0	3.2	0	0.0	1	0.0	0	0.0	1	10.1	0.002	1130.2	17000	0.0	2.0	2.3	10.0
11180	12.5	12.3	16.6	13.9	2.0	4.6	0	0.0	1	0.0	0	0.0	1	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.7	14.7	19.1	13.3	2.0	5.7	0	0.0	1	0.0	0	0.0	1	11.0	0.004	679.4	17000	0.0	2.0	4.9	14.0
10835	16.7	16.7	21.9	10.9	2.0	7.2	0	0.0	1	0.0	0	0.0	1	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	16.2	16.2	24.1	7.5	2.0	8.5	0	0.0	1	0.0	0	0.0	1	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	16.1	16.1	22.7	8.8	2.0	7.7	0	0.0	1	0.0	0	0.0	1	5.8	0.008	1247.1	17000	0.0	2.0	4.4	14.0
10225	13.4	13.4	17.8	9.5	2.0	5.1	0	0.0	1	0.0	0	0.0	1	5.9	0.007	1373.8	17000	0.0	2.0	4.3	12.5
10000	10.9	10.9	14.9	11.1	2.0	3.9	0	0.0	1	0.0	0	0.0	1	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.2	14.2	18.6	10.0	2.0	5.5	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1336.6	17000	0.0	2.0	4.7	14.0
9595	10.6	10.6	14.6	10.3	2.0	3.7	0	0.0	1	0.0	0	0.0	1	6.6	0.005	1619.7	17000	0.0	2.0	2.9	10.0
9385	18.0	11.7	15.8	9.5	2.0	4.2	0	0.0	1	0.0	0	0.0	1	5.3	0.006	1770.4	17000	0.2	2.0	3.4	18.0
9220	18.0	12.3	16.4	8.9	2.0	4.5	0	0.0	1	0.0	0	0.0	1	4.9	0.008	1771.4	17000	0.1	2.0	3.6	18.0
9025	18.0	11.8	15.9	8.9	2.0	4.3	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1736.9	17000	0.1	2.0	3.4	18.0
MAX=	27.2	27.2			8.1	12.1						0.0					17000.0	11.3	2.0	8.3	21.0
MIN=	8.0	6.3			2.0	1.0						0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM -- SANTA CLARA RIVER EXISTING CONDITIONS STRAIGHT-INSIDE CURVED REACH, Q_{50} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_T+	H/2	Z_{DM}=
46195	18.2	18.2	21.7	18.1	2.8	7.1	0	0.0	1	0.0	0	0.0	0	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	21.2	21.2	24.1	18.1	2.8	8.5	0	0.0	1	0.0	0	0.0	0	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	16.8	16.8	20.3	19.2	2.8	6.4	0	0.0	1	0.0	0	0.0	0	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	22.8	22.8	26.1	16.5	2.8	9.7	0	0.0	1	0.0	0	0.0	0	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	15.5	15.5	19.2	21.1	2.8	5.8	0	0.0	1	0.0	0	0.0	0	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	22.2	22.2	26.2	15.4	2.8	9.7	0	0.0	1	0.0	0	0.0	0	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	21.6	21.6	19.9	19.5	8.1	6.2	0	0.0	1	0.0	0	0.0	0	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	27.1	27.1	26.7	13.8	8.1	10.1	0	0.0	1	0.0	0	0.0	0	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	27.2	27.2	28.8	11.3	8.1	11.5	0	0.0	1	0.0	0	0.0	0	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	26.0	26.0	26.1	12.4	8.1	9.7	0	0.0	1	0.0	0	0.0	0	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	25.6	25.6	26.6	10.8	8.1	10.0	0	0.0	1	0.0	0	0.0	0	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	23.9	23.9	24.1	10.6	8.1	8.5	0	0.0	1	0.0	0	0.0	0	5.5	0.016	878.5	9000	0.0	2.0	5.3	14.0
42590	22.2	22.2	22.6	8.9	8.1	7.6	0	0.0	1	0.0	0	0.0	0	5.1	0.014	1023.2	9000	0.0	2.0	4.5	14.0
42430	21.6	21.6	20.8	9.6	8.1	6.6	0	0.0	1	0.0	0	0.0	0	5.9	0.012	1067.5	9000	0.0	2.0	4.8	14.0
42215	13.8	13.8	10.4	14.3	8.1	2.2	0	0.0	1	0.0	0	0.0	0	8.5	0.002	1310.4	9000	0.0	2.0	1.5	10.0
41940	14.5	14.5	11.6	14.3	8.1	2.6	0	0.0	1	0.0	0	0.0	0	7.6	0.002	1321.5	9000	0.0	2.0	1.8	10.0
41730	14.6	14.6	11.8	14.7	8.1	2.7	0	0.0	1	0.0	0	0.0	0	8.0	0.002	1229.5	9000	0.0	2.0	1.9	10.0
41460	14.5	14.5	11.5	16.2	8.1	2.6	0	0.0	1	0.0	0	0.0	0	7.6	0.002	1329.0	9000	0.0	2.0	1.8	10.0
41280	15.4	15.4	16.5	14.3	5.2	4.5	0	0.0	1	0.0	0	0.0	0	8.2	0.004	852.1	9000	0.0	2.0	3.7	12.5
41080	18.7	18.7	19.9	12.1	5.2	6.2	0	0.0	1	0.0	0	0.0	0	6.7	0.007	874.2	9000	0.0	2.0	5.3	14.0
40825	16.8	16.8	18.0	11.5	5.2	5.2	0	0.0	1	0.0	0	0.0	0	6.2	0.007	1039.9	9000	0.0	2.0	4.4	14.0
40585	15.8	15.8	17.0	11.7	5.2	4.7	0	0.0	1	0.0	0	0.0	0	6.8	0.006	1065.9	9000	0.0	2.0	3.9	12.5
40335	11.3	11.3	11.1	14.5	5.2	2.4	0	0.0	1	0.0	0	0.0	0	7.1	0.002	1504.8	9000	0.0	2.0	1.7	10.0
40130	11.3	11.3	11.2	15.1	5.2	2.5	0	0.0	1	0.0	0	0.0	0	6.9	0.002	1636.5	9000	0.0	2.0	1.7	10.0
39945	10.8	10.8	10.3	16.1	5.2	2.2	0	0.0	1	0.0	0	0.0	0	7.6	0.001	1648.1	9000	0.0	2.0	1.4	10.0
39755	14.4	14.4	15.4	13.5	5.2	4.0	0	0.0	1	0.0	0	0.0	0	6.6	0.003	1251.4	9000	0.0	2.0	3.2	12.5
39605	18.1	18.1	19.4	11.4	5.2	5.9	0	0.0	1	0.0	0	0.0	0	5.8	0.007	1100.6	9000	0.0	2.0	5.1	14.0
39310	15.0	15.0	16.0	12.4	5.2	4.3	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1204.5	9000	0.0	2.0	3.5	12.5
39100	12.1	12.1	12.4	14.1	5.2	2.9	0	0.0	1	0.0	0	0.0	0	7.8	0.002	1294.8	9000	0.0	2.0	2.1	10.0
38925	11.5	11.5	11.4	14.5	5.2	2.5	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1181.3	9000	0.0	2.0	1.8	10.0
38710	10.0	8.5	10.6	15.9	2.7	2.3	0	0.0	1	0.0	0	0.0	0	10.8	0.001	1043.1	9000	0.0	2.0	1.5	10.0
38475	14.1	14.1	17.8	14.0	2.7	5.1	0	0.0	1	0.0	0	0.0	0	8.8	0.004	755.4	9000	0.0	2.0	4.3	12.5
38300	17.3	17.3	22.7	9.8	2.7	7.7	0	0.0	1	0.0	0	0.0	0	7.4	0.010	688.1	9000	0.0	2.0	4.9	14.0
38065	10.9	10.9	14.1	14.2	2.7	3.5	0	0.0	1	0.0	0	0.0	0	12.0	0.002	678.3	9000	0.0	2.0	2.7	10.0
37810	14.5	14.5	18.2	12.2	2.7	5.3	0	0.0	1	0.0	0	0.0	0	10.2	0.004	622.3	9000	0.0	2.0	4.5	14.0
37655	16.7	16.7	21.2	10.3	2.7	6.8	0	0.0	1	0.0	0	0.0	0	7.4	0.009	735.9	9000	0.0	2.0	5.1	14.0
37390	16.1	16.1	23.9	6.1	2.7	8.4	0	0.0	1	0.0	0	0.0	0	5.4	0.017	892.2	9000	0.0	2.0	3.1	14.0
37135	13.4	13.4	17.0	8.0	2.7	4.8	0	0.0	1	0.0	0	0.0	0	6.4	0.006	1088.9	9000	0.0	2.0	3.9	12.5
36930	14.0	14.0	18.3	7.9	2.7	5.4	0	0.0	1	0.0	0	0.0	0	6.0	0.007	1112.0	9000	0.0	2.0	3.9	14.0
36735	12.5	11.6	15.0	9.6	2.7	3.9	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1195.7	9000	0.0	2.0	3.0	12.5
36515	13.1	13.1	16.7	9.6	2.7	4.6	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1306.1	9000	0.0	2.0	3.8	12.5
36265	10.1	10.1	13.0	11.2	2.7	3.1	0	0.0	1	0.0	0	0.0	0	6.4	0.003	1373.1	9000	0.0	2.0	2.3	10.0
36080	10.2	10.2	12.5	11.7	3.2	2.9	0	0.0	1	0.0	0	0.0	0	6.4	0.004	1455.4	9000	0.0	2.0	2.1	10.0
35845	10.0	8.1	10.9	13.5	3.2	2.4	0	0.0	1	0.0	0	0.0	0	7.4	0.002	1484.2	9000	0.0	2.0	1.6	10.0
35725	11.8	11.8	14.7	13.0	3.2	3.8	0	0.0	1	0.0	0	0.0	0	6.3	0.003	1431.2	9000	0.0	2.0	2.9	10.0
35515	13.9	13.9	17.1	11.9	3.2	4.8	0	0.0	1	0.0	0	0.0	0	5.7	0.005	1353.4	9000	0.0	2.0	3.9	12.5
35245	11.7	11.7	14.5	12.5	3.2	3.7	0	0.0	1	0.0	0	0.0	0	5.8	0.003	1555.5	9000	0.0	2.0	2.8	10.0
35040	16.2	16.2	19.5	10.7	3.2	5.9	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1355.9	9000	0.0	2.0	5.1	14.0
34860	14.8	14.8	18.1	10.1	3.2	5.3	0	0.0	1	0.0	0	0.0	0	4.8	0.008	1338.9	9000	0.0	2.0	4.4	14.0
34720	14.9	14.9	18.2	9.3	3.2	5.3	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1411.5	9000	0.0	2.0	4.4	14.0
34495	14.8	14.8	18.1	8.9	3.2	5.3	0	0.0	1	0.0	0	0.0	0	5.0	0.009	1277.2	9000	0.0	2.0	4.4	14.0
34310	14.4	14.4	17.6	8.0	3.2	5.0	0	0.0	1	0.0	0	0.0	0	5.7	0.005	1280.8	9000	0.0	2.0	4.2	12.5
34090	14.0	14.0	17.2	8.6	3.2	4.8	0	0.0	1	0.0	0	0.0	0	5.4	0.007	1267.8	9000	0.0	2.0	4.0	12.5
33880	12.9	12.9	15.8	9.8	3.4	4.2	0	0.0	1	0.0	0	0.0	0	5.6	0.005	1310.6	9000	0.0	2.0	3.3	12.5
33710	13.6	13.6	16.5	9.4	3.4	4.6	0	0.0	1	0.0	0	0.0	0	5.2	0.007	1355.1	9000	0.0	2.0	3.7	12.5
33500	13.0	13.0	15.8	9.5	3.4	4.2	0	0.0	1	0.0	0	0.0	0	5.4	0.006	1474.3	9000	0.0	2.0	3.4	12.5
33310	13.0	13.0	15.9	9.1	3.4	4.3	0	0.0	1	0.0	0	0.0	0	4.2	0.006	1744.5	9000	0.0	2.0	3.4	12.5
33115	12.7	12.7	15.5	8.7	3.4	4.1	0	0.0	1	0.0	0	0.0	0	4.8	0.009	1573.2	9000	0.0	2.0	3.3	12.5
32795	10.2	10.2	12.2	11.0	3.4	2.8	0	0.0	1	0.0	0	0.0	0	5.5	0.003	1732.9	9000	0.0	2.0	2.0	10.0
32605	11.6	11.6	14.1	11.5	3.4	3.5	0	0.0	1	0.0	0	0.0	0	6.2	0.004	1344.6	9000	0.0	2.0	2.7	10.0
32265	12.5	12.4	16.7	10.2	2.0	4.6	0	0.0	1	0.0	0	0.0	0	4.6	0.007	1829.9	9000	0.0	2.0	3.8	12.5
31875	10.0	8.0	10.9	11.0	2.0	2.4	0	0.0	1	0.0	0	0.0	0	5.2	0.004	2482.2	9000	0.0	2.0	1.6	10.0
31585	12.5	12.3	16.6	9.8	2.0	4.6	0	0.0	1	0.0	0	0.0	0	4.0	0.009	2120.3	9000	0.0	2.0	3.7	12.5
31360	8.0	7.3	9.8	13.9	2.0	2.0	0	0.0	1	0.0	0	0.0	0	7.8	0.001	1884.4	9000	0.0	2.0	1.3	8.0
31060	8.0	6.3	7.9	15.9	2.0	1.5	0	0.0	1	0.0	0	0.0	0	10.5	0.001	1711.5	9000	0.0	2.0	0.8	8.0
30720	8.0	5.6	6.4	18.0	2.0	1.1	0	0.0	1	0.0	0	0.0	0	11.6	0.000	1891.7	9000	0.0	2.0	0.6	8.0
30445	8.0	5.5	6.0	19.9	2.0	1.0	0	0.0	1	0.0	0	0.0	0	13.1	0.000	1783.7	9000	0.0	2.0	0.5	8.0
30095	8.0	5.7	6.6	21.7	2.0	1.1	0	0.0	1	0.0	0	0.0	0	12.7	0.000	1730.3	9000	0.0	2.0	0.6	8.0
29815	8.0	6.2	7.7	22.4	2.0	1.4	0	0.0	1	0.0	0	0.0	0	11.7	0.000	1675.2	9000	0.0	2.0	0.8	8.0
29565	8.0	6.1	7.4	23.3	2.0	1.3	0	0.0	1	0.0	0	0.0	0	11.8	0.000	1717.4	9000	0.0	2.0	0.7	8.0
29385	8.0	6.6	8.5	24.0	2.0	1.6	0	0.0	1	0.0	0	0.0	0	10.8	0.000	1675.1	9000	0.0	2.0	1.0	8.0
29140	10.0	9.8	10.1	24.3	4.4	2.1	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1557.6	9000	0.0	2.0	1.4	10.0
28895	17.6	17.6	19.7	22.4	4.4	6.0	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1062.3	9000	0.0	2.0	5.2	14.0
28695	25.0	25.0	27.5	16.0	4.4	10.6	0	0.0	1	0.0	0	0.0	0	9.4	0.009	544.9	9000	0.0	2.0	8.0	14.0
28500	24.5	24.5	28.6	13.6	4.4	11.4	0	0.0	1	0.0	0	0.0	0	9.8	0.010	503.7	9000	0.0	2.0	6.8	14.0
28280	24.4	24.4	29.7	11.8	4.4	12.1	0	0.0	1	0.0	0	0.0	0	8.8	0.011	549.3	9000	0.0	2.0	5.9	14.0
28080	23.1	23.1	28.1	11.4	4.4	11.0	0	0.0	1	0.0	0	0.0	0	9.2	0.011	547.6	9000	0.0	2.0	5.7	14.0
27925	15.9	15.9	18.0	17.5	4.4	5.2	0	0.0	1	0.0	0	0.0	0	13.0	0.002	612.7	9000	0.0	2.0	4.3	12.5
27725	18.6	18.6	20.5	16.3	4.4	6.5	0	0.0	1	0.0	0	0.0	0	12.1	0.003	587.1	9000	0.0	2.0	5.7	14.0
27545	21.8	21.8	24.7	13.2	4.4	8.8	0	0.0	1	0.0	0	0.0	0	9.5	0.007	613.0	9000	0.0	2.0	6.6	14.0
27335	21.7	21.7	25.5	12.0	4.4	9.3	0	0.0	1	0.0	0	0.0	0	8.1	0.008	691.0	9000	0.0	2.0	6.0	14.0
27155	20.4	20.4	22.3	13.2	4.4	7.4	0	0.0	1	0.0	0	0.0	0	8.0	0.005	856.6	9000	0.0	2.0	6.6	14.0
26990	17.7	17.7	23.5	11.2	2.0	8.1	0	0.0	1	0.0	0	0.0	0	6.0	0.010	1008.2	9000	0.0	2.0	5.6	14.0
26780	17.9	17.9	23.9	11.0	2.0	8.4	0	0.0	1	0.0	0	0.0	0	5.6	0.010	1131.7	9000	0.0	2.0	5.5	14.0
26575	16.2	16.2	21.0	11.0	2.0	6.7	0	0.0	1	0.0	0	0.0	0	5.5	0.013	1216.4	3000	0.0	2.0	5.5	14.0
26355	12.5	11.6	15.8	13.4	2.0	4.2	0	0.0	1	0.0	0	0.0	0	7.5	0.003	1282.4	3000	0.0	2.0	3.4	12.5
26170	13.6	13.6	18.0	13.0	2.0	5.2	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1347.9	3000	0.0	2.0	4.4	12.5
25965	13.5	13.5	17.9	13.0	2.0	5.2	0	0.0	1	0.0	0	0.0	0	7.0	0.004	1288.3	3000	0.0	2.0	4.3	12.5

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_T=FLOW DISPLACEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25785	15.1	15.1	19.5	11.7	2.0	6.0	0	0.0	1	0.0	0	0.0	0	6.2	0.005	1336.9	3000	0.0	2.0	5.2	14.0
25600	16.1	16.1	20.6	11.3	2.0	6.5	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1596.5	3000	0.0	2.0	5.6	14.0
25425	15.6	15.6	20.0	11.3	2.0	6.2	0	0.0	1	0.0	0	0.0	0	4.4	0.008	1773.8	3000	0.0	2.0	5.4	14.0
25215	10.5	10.5	14.5	13.6	2.0	3.7	0	0.0	1	0.0	0	0.0	0	6.1	0.003	1748.6	3000	0.0	2.0	2.8	10.0
25000	13.0	13.0	17.4	12.2	2.0	5.0	0	0.0	1	0.0	0	0.0	0	4.4	0.006	2103.2	3000	0.0	2.0	4.1	12.5
24795	14.5	14.5	19.0	11.4	2.0	5.7	0	0.0	1	0.0	0	0.0	0	3.9	0.007	2311.7	3000	0.0	2.0	4.9	14.0
24550	16.3	16.3	21.3	10.8	2.0	6.9	0	0.0	1	0.0	0	0.0	0	3.8	0.009	2227.0	3000	0.0	2.0	5.4	14.0
24335	10.5	10.5	14.5	13.1	2.0	3.7	0	0.0	1	0.0	0	0.0	0	5.7	0.003	2089.5	3000	0.0	2.0	2.8	10.0
24115	14.4	14.4	18.8	11.1	2.0	5.6	0	0.0	1	0.0	0	0.0	0	4.5	0.008	2015.8	3000	0.0	2.0	4.8	14.0
23975	14.6	14.6	19.0	10.2	2.0	5.7	0	0.0	1	0.0	0	0.0	0	4.6	0.008	1913.7	3000	0.0	2.0	4.9	14.0
23755	12.5	12.4	16.7	10.9	2.0	4.6	0	0.0	1	0.0	0	0.0	0	5.1	0.006	1935.4	3000	0.0	2.0	3.8	12.5
23565	10.5	10.5	14.5	12.7	2.0	3.7	0	0.0	1	0.0	0	0.0	0	5.6	0.004	2039.5	3000	0.0	2.0	2.8	10.0
23365	12.7	12.7	17.0	10.8	2.0	4.8	0	0.0	1	0.0	0	0.0	0	5.4	0.006	1781.4	3000	0.0	2.0	3.9	12.5
23180	10.0	9.5	13.2	11.8	2.0	3.2	0	0.0	1	0.0	0	0.0	0	6.6	0.002	2084.2	3000	0.0	2.0	2.3	10.0
23000	8.0	6.8	8.9	13.0	2.0	1.7	0	0.0	1	0.0	0	0.0	0	7.7	0.001	2069.1	3000	0.0	2.0	1.1	8.0
22790	8.0	7.1	9.4	13.1	2.0	1.9	0	0.0	1	0.0	0	0.0	0	7.8	0.001	1949.0	3000	0.0	2.0	1.2	8.0
22600	10.0	8.3	11.4	14.1	2.0	2.5	0	0.0	1	0.0	0	0.0	0	7.9	0.001	1865.2	3000	0.0	2.0	1.7	10.0
22415	10.0	8.5	11.8	14.1	2.0	2.7	0	0.0	1	0.0	0	0.0	0	8.1	0.002	1705.6	3000	0.0	2.0	1.9	10.0
22195	10.2	10.2	14.1	13.7	2.0	3.5	0	0.0	1	0.0	0	0.0	0	7.8	0.003	1322.2	3000	0.0	2.0	2.7	10.0
22010	12.5	11.8	16.0	14.4	2.0	4.3	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1328.0	3000	0.0	2.0	3.5	12.5
21790	15.3	15.3	19.7	11.6	2.0	6.0	0	0.0	1	0.0	0	0.0	0	6.5	0.006	1145.7	3000	0.0	2.0	5.2	14.0
21615	15.2	15.2	21.4	8.5	2.0	6.9	0	0.0	1	0.0	0	0.0	0	5.8	0.010	1161.3	3000	0.0	2.0	4.3	14.0
21440	15.1	15.1	20.1	9.7	2.0	6.3	0	0.0	1	0.0	0	0.0	0	5.0	0.008	1574.6	3000	0.0	2.0	4.8	14.0
21225	15.0	15.0	19.5	10.6	2.0	5.9	0	0.0	1	0.0	0	0.0	0	3.9	0.008	2217.7	3000	0.0	2.0	5.1	14.0
21020	15.1	15.1	20.8	8.9	2.0	6.6	0	0.0	1	0.0	0	0.0	0	4.6	0.009	1676.4	3000	0.0	2.0	4.4	14.0
20845	12.7	12.7	17.1	10.4	2.0	4.8	0	0.0	1	0.0	0	0.0	0	4.2	0.006	2369.3	3000	0.0	2.0	3.9	12.5
20595	12.5	11.1	15.2	10.9	2.0	4.0	0	0.0	1	0.0	0	0.0	0	4.7	0.003	2463.7	3000	0.0	2.0	3.1	12.5
20435	10.0	9.3	12.9	12.2	2.0	3.1	0	0.0	1	0.0	0	0.0	0	5.4	0.002	2582.7	3000	0.0	2.0	2.3	10.0
20280	10.1	10.1	14.0	11.8	2.0	3.5	0	0.0	1	0.0	0	0.0	0	5.0	0.003	2589.6	3000	0.0	2.0	2.6	10.0
20070	14.9	14.9	20.2	9.2	2.0	6.3	0	0.0	1	0.0	0	0.0	0	4.7	0.009	1767.5	3000	0.0	2.0	4.6	14.0
19855	13.4	13.4	17.8	9.9	2.0	5.1	0	0.0	1	0.0	0	0.0	0	4.8	0.006	1975.1	3000	0.0	2.0	4.3	12.5
19630	13.5	13.5	17.9	8.9	2.0	5.2	0	0.0	1	0.0	0	0.0	0	4.9	0.006	1836.2	3000	0.0	2.0	4.3	12.5
19440	10.0	8.7	11.9	12.1	2.0	2.7	0	0.0	1	0.0	0	0.0	0	6.5	0.002	2095.3	3000	0.0	2.0	1.9	10.0
19240	10.1	10.1	13.9	11.4	2.0	3.5	0	0.0	1	0.0	0	0.0	0	5.6	0.003	2091.7	3000	0.0	2.0	2.6	10.0
19050	10.0	8.0	11.0	12.9	2.0	2.4	0	0.0	1	0.0	0	0.0	0	6.7	0.002	2160.8	3000	0.0	2.0	1.6	10.0
18830	10.0	7.8	10.7	14.6	2.0	2.3	0	0.0	1	0.0	0	0.0	0	7.1	0.002	2094.4	3000	0.0	2.0	1.5	10.0
18650	8.0	7.4	9.9	15.0	2.0	2.1	0	0.0	1	0.0	0	0.0	0	8.0	0.001	2022.7	3000	0.0	2.0	1.3	8.0
18475	8.0	6.4	8.1	16.6	2.0	1.5	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1944.4	3000	0.0	2.0	0.9	8.0
18290	8.0	6.7	8.7	16.8	2.0	1.7	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1843.7	3000	0.0	2.0	1.0	8.0
18025	8.0	6.3	7.8	19.2	2.0	1.5	0	0.0	1	0.0	0	0.0	0	11.5	0.001	1610.9	17000	0.0	2.0	0.8	8.0
17785	8.0	6.7	8.7	19.8	2.0	1.7	0	0.0	1	0.0	0	0.0	0	11.6	0.001	1417.5	17000	0.0	2.0	1.0	8.0
17510	10.1	10.1	14.0	18.0	2.0	3.5	0	0.0	1	0.0	0	0.0	0	8.5	0.002	1243.6	17000	0.0	2.0	2.6	10.0
17360	12.7	12.7	17.0	16.9	2.0	4.8	0	0.0	1	0.0	0	0.0	0	8.9	0.004	936.6	17000	0.0	2.0	3.9	12.5
17110	17.5	17.5	21.7	15.4	2.0	7.1	0	0.0	1	0.0	0	0.0	0	5.6	0.006	1274.3	17000	0.0	2.0	6.4	14.0
16970	18.6	18.6	22.9	13.6	2.0	7.8	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1125.6	17000	0.0	2.0	6.8	14.0
16720	17.6	17.6	25.2	9.0	2.0	9.1	0	0.0	1	0.0	0	0.0	0	4.1	0.018	1404.6	17000	0.0	2.0	4.5	14.0
16515	15.7	15.7	21.5	9.5	2.0	7.0	0	0.0	1	0.0	0	0.0	0	4.3	0.012	1622.6	17000	0.0	2.0	4.8	14.0
16305	15.8	15.8	21.5	9.6	2.0	7.0	0	0.0	1	0.0	0	0.0	0	4.2	0.011	1812.5	17000	0.0	2.0	4.8	14.0
16130	12.5	11.8	16.1	10.2	2.0	4.3	0	0.0	1	0.0	0	0.0	0	5.2	0.005	1945.1	17000	0.0	2.0	3.5	12.5
15960	12.5	11.6	15.8	9.3	2.0	4.2	0	0.0	1	0.0	0	0.0	0	4.1	0.011	2180.9	17000	0.0	2.0	3.4	12.5
15745	10.0	8.0	10.9	10.6	2.0	2.4	0	0.0	1	0.0	0	0.0	0	5.7	0.003	2279.0	17000	0.0	2.0	1.6	10.0
15540	10.0	8.1	11.0	10.6	2.0	2.4	0	0.0	1	0.0	0	0.0	0	5.8	0.003	2324.2	17000	0.0	2.0	1.6	10.0
15335	10.0	9.2	12.7	10.5	2.0	3.0	0	0.0	1	0.0	0	0.0	0	4.9	0.005	2302.1	17000	0.0	2.0	2.2	10.0
15125	12.5	11.9	16.2	9.6	2.0	4.4	0	0.0	1	0.0	0	0.0	0	5.5	0.007	1618.5	17000	0.0	2.0	3.5	12.5
14900	10.6	10.6	14.5	10.4	2.0	3.7	0	0.0	1	0.0	0	0.0	0	6.1	0.004	1704.5	17000	0.0	2.0	2.9	10.0
14720	12.5	12.5	16.8	9.3	2.0	4.7	0	0.0	1	0.0	0	0.0	0	5.1	0.008	1763.5	17000	0.0	2.0	3.8	12.5
14480	10.3	10.3	14.3	10.2	2.0	3.6	0	0.0	1	0.0	0	0.0	0	6.0	0.004	1801.7	17000	0.0	2.0	2.7	10.0
14315	10.8	10.8	14.8	9.4	2.0	3.8	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1868.1	17000	0.0	2.0	3.0	10.0
14090	10.0	9.9	13.8	9.0	2.0	3.4	0	0.0	1	0.0	0	0.0	0	5.9	0.005	1766.8	17000	0.0	2.0	2.6	10.0
13850	12.5	11.4	15.6	8.4	2.0	4.2	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1727.3	17000	0.0	2.0	3.3	12.5
13635	12.5	11.3	15.4	10.3	2.0	4.1	0	0.0	1	0.0	0	0.0	0	6.4	0.004	1691.9	17000	0.0	2.0	3.2	12.5
13425	12.9	12.9	17.3	8.3	2.0	4.9	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1854.4	17000	0.0	2.0	4.0	12.5
13190	10.0	8.8	12.2	9.5	2.0	2.8	0	0.0	1	0.0	0	0.0	0	6.4	0.003	1847.3	17000	0.0	2.0	2.0	10.0
13030	10.3	10.3	14.2	9.6	2.0	3.6	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1763.0	17000	0.0	2.0	2.7	10.0
12835	10.0	9.6	13.3	10.1	2.0	3.2	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	9.0	12.4	10.9	2.0	2.9	0	0.0	1	0.0	0	0.0	0	8.7	0.002	1471.0	17000	0.0	2.0	2.1	10.0
12395	10.0	8.9	12.3	11.5	2.0	2.9	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1438.4	17000	0.0	2.0	2.0	10.0
12195	10.0	7.8	10.6	12.5	2.0	2.3	0	0.0	1	0.0	0	0.0	0	10.3	0.001	1399.3	17000	0.0	2.0	1.5	10.0
11995	10.0	9.2	12.7	13.7	2.0	3.0	0	0.0	1	0.0	0	0.0	0	9.8	0.002	1281.1	17000	0.0	2.0	2.2	10.0
11780	10.0	9.0	12.5	14.4	2.0	2.9	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1400.9	17000	0.0	2.0	2.1	10.0
11605	10.2	10.2	14.1	13.7	2.0	3.5	0	0.0	1	0.0	0	0.0	0	8.7	0.002	1282.9	17000	0.0	2.0	2.7	10.0
11405	10.0	9.5	13.2	15.1	2.0	3.2	0	0.0	1	0.0	0	0.0	0	10.1	0.002	1130.2	17000	0.0	2.0	2.3	10.0
11180	12.5	12.3	16.6	13.9	2.0	4.6	0	0.0	1	0.0	0	0.0	0	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.7	14.7	19.1	13.3	2.0	5.7	0	0.0	1	0.0	0	0.0	0	11.0	0.004	879.4	17000	0.0	2.0	4.9	14.0
10835	16.7	16.7	21.9	10.9	2.0	7.2	0	0.0	1	0.0	0	0.0	0	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	16.2	16.2	24.1	7.5	2.0	8.5	0	0.0	1	0.0	0	0.0	0	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	16.1	16.1	22.7	8.8	2.0	7.7	0	0.0	1	0.0	0	0.0	0	5.8	0.008	1247.1	17000	0.0	2.0	4.4	14.0
10225	13.4	13.4	17.8	9.5	2.0	5.1	0	0.0	1	0.0	0	0.0	0	5.9	0.007	1373.8	17000	0.0	2.0	4.3	12.5
10000	10.9	10.9	14.9	11.1	2.0	3.9	0	0.0	1	0.0	0	0.0	0	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.2	14.2	18.6	10.0	2.0	5.5	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1336.6	17000	0.0	2.0	4.7	14.0
9595	10.6	10.6	14.6	10.3	2.0	3.7	0	0.0	1	0.0	0	0.0	0	6.6	0.005	1619.7	17000	0.0	2.0	2.9	10.0
9385	12.5	11.9	15.8	9.5	2.0	4.2	0	0.0	1	0.0	0	0.0	0	5.3	0.008	1770.4	17000	0.0	2.0	3.4	12.5
9220	12.5	12.1	16.4	8.9	2.0	4.5	0	0.0	1	0.0	0	0.0	0	4.9	0.008	1771.4	17000	0.0	2.0	3.6	12.5
9025	12.5	11.7	15.9	8.9	2.0	4.3	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1736.9	17000	0.0	2.0	3.4	12.5
MAX=	27.2	27.2			8.1	12.1						0.0					17000.0	0.0	2.0	8.3	14.0
MIN=	8.0	5.5			2.0	1.0						0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM -- SANTA CLARA RIVER PROPOSED CONDITIONS OUTSIDE CURVED REACH Q_{100} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG} +	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_I+	H/2	Z_{DM}=
46195	18.2	18.2	21.7	18.1	2.8	7.1	0	0.0	1	0.0	0	0.0	1	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	21.2	21.2	24.1	18.1	2.8	8.5	0	0.0	1	0.0	0	0.0	1	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	16.8	16.8	20.3	19.2	2.8	6.4	0	0.0	1	0.0	0	0.0	1	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	22.8	22.8	26.1	16.5	2.8	9.7	0	0.0	1	0.0	0	0.0	1	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	15.5	15.5	19.2	21.1	2.8	5.8	0	0.0	1	0.0	0	0.0	1	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	22.2	22.2	26.2	15.4	2.8	9.7	0	0.0	1	0.0	0	0.0	1	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	21.6	21.6	19.9	19.5	8.1	6.2	0	0.0	1	0.0	0	0.0	1	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	27.1	27.1	26.7	13.8	8.1	10.1	0	0.0	1	0.0	0	0.0	1	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	27.2	27.2	28.8	11.3	8.1	11.5	0	0.0	1	0.0	0	0.0	1	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	26.0	26.0	28.1	12.4	8.1	9.7	0	0.0	1	0.0	0	0.0	1	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	25.6	25.6	26.6	10.8	8.1	10.0	0	0.0	1	0.0	0	0.0	1	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	23.8	23.8	23.9	10.7	8.1	8.4	0	0.0	1	0.0	0	0.0	1	5.6	0.016	864.3	9000	0.0	2.0	5.4	14.0
42590	22.6	22.6	22.4	9.2	8.1	7.5	0	0.0	1	0.0	0	0.0	1	5.2	0.014	1013.1	9000	0.4	2.0	4.6	21.0
42430	21.4	21.4	19.6	10.7	8.1	6.0	0	0.0	1	0.0	0	0.0	1	6.4	0.009	915.8	9000	0.1	2.0	5.2	21.0
42215	21.0	20.6	18.5	11.2	8.1	5.5	0	0.0	1	0.0	0	0.0	1	6.1	0.009	1019.0	9000	0.5	2.0	4.6	21.0
41940	16.0	16.0	11.6	14.3	8.1	2.6	0	0.0	1	0.0	0	0.0	1	7.7	0.002	1284.2	9000	1.4	2.0	1.8	15.0
41730	15.8	15.8	11.8	14.7	8.1	2.7	0	0.0	1	0.0	0	0.0	1	8.2	0.002	1190.9	9000	1.2	2.0	1.9	15.0
41460	15.4	15.4	11.6	16.2	8.1	2.6	0	0.0	1	0.0	0	0.0	1	9.1	0.002	1093.5	9000	0.9	2.0	1.8	15.0
41280	15.3	15.3	16.4	14.4	5.2	4.5	0	0.0	1	0.0	0	0.0	1	8.3	0.004	852.3	9000	0.0	2.0	3.6	12.5
41080	18.7	18.7	19.9	12.1	5.2	6.2	0	0.0	1	0.0	0	0.0	1	6.7	0.008	874.1	9000	0.0	2.0	5.4	14.0
40825	21.0	17.4	18.0	11.5	5.2	5.2	0	0.0	1	0.0	0	0.0	1	6.2	0.007	1040.4	9000	0.5	2.0	4.4	21.0
40585	18.0	16.3	17.0	11.7	5.2	4.8	0	0.0	1	0.0	0	0.0	1	6.8	0.006	1005.8	9000	0.4	2.0	3.9	18.0
40335	15.0	12.3	10.5	15.1	5.2	2.3	0	0.0	1	0.0	0	0.0	1	8.8	0.002	1249.6	9000	1.4	2.0	1.5	15.0
40130	15.0	12.7	11.3	15.5	5.2	2.5	0	0.0	1	0.0	0	0.0	1	8.8	0.002	1195.6	9000	1.3	2.0	1.7	15.0
39945	15.0	12.5	11.0	16.3	5.2	2.4	0	0.0	1	0.0	0	0.0	1	9.3	0.002	1173.3	9000	1.3	2.0	1.6	15.0
39755	15.4	15.4	16.5	13.3	5.2	4.5	0	0.0	1	0.0	0	0.0	1	8.1	0.004	894.5	9000	0.0	2.0	3.7	12.5
39605	18.5	18.5	19.7	11.5	5.2	6.1	0	0.0	1	0.0	0	0.0	1	7.1	0.007	849.7	9000	0.0	2.0	5.2	14.0
39310	18.0	15.6	16.5	12.7	5.2	4.6	0	0.0	1	0.0	0	0.0	1	8.1	0.004	931.1	9000	0.2	2.0	3.7	18.0
39100	19.1	19.1	20.9	10.4	5.2	6.7	0	0.0	1	0.0	0	0.0	1	7.2	0.009	761.1	9000	0.0	2.0	5.2	14.0
38925	12.5	12.5	12.8	14.3	5.2	3.0	0	0.0	1	0.0	0	0.0	1	10.3	0.002	873.5	9000	0.0	2.0	2.2	10.0
38710	10.0	9.4	12.0	15.6	2.7	2.8	0	0.0	1	0.0	0	0.0	1	11.7	0.002	820.3	9000	0.0	2.0	2.0	10.0
38475	14.2	14.2	17.9	14.0	2.7	5.2	0	0.0	1	0.0	0	0.0	1	9.8	0.004	659.7	9000	0.0	2.0	4.3	12.5
38300	17.4	17.4	22.5	10.3	2.7	7.6	0	0.0	1	0.0	0	0.0	1	7.7	0.010	666.3	9000	0.0	2.0	5.1	14.0
38065	11.3	11.3	14.5	14.0	2.7	3.7	0	0.0	1	0.0	0	0.0	1	12.0	0.002	658.4	9000	0.0	2.0	2.9	10.0
37810	14.5	14.5	18.2	12.2	2.7	5.3	0	0.0	1	0.0	0	0.0	1	10.2	0.004	618.2	9000	0.0	2.0	4.5	14.0
37655	16.6	16.6	20.9	10.5	2.7	6.7	0	0.0	1	0.0	0	0.0	1	7.8	0.008	706.7	9000	0.0	2.0	5.3	14.0
37390	16.2	16.2	23.7	6.5	2.7	8.3	0	0.0	1	0.0	0	0.0	1	5.9	0.015	823.8	9000	0.0	2.0	3.3	14.0
37135	13.0	13.0	16.6	9.3	2.7	4.6	0	0.0	1	0.0	0	0.0	1	8.5	0.005	921.4	9000	0.0	2.0	3.7	12.5
36930	14.8	14.8	19.8	8.1	2.7	6.1	0	0.0	1	0.0	0	0.0	1	7.2	0.008	812.4	9000	0.0	2.0	4.1	14.0
36735	12.6	12.6	16.1	9.8	2.7	4.4	0	0.0	1	0.0	0	0.0	1	8.0	0.005	896.9	9000	0.0	2.0	3.5	12.5
36515	15.0	10.4	12.9	12.0	2.7	3.1	0	0.0	1	0.0	0	0.0	1	9.0	0.002	994.7	9000	0.4	2.0	2.2	15.0
36265	15.0	10.5	12.3	12.5	2.7	2.9	0	0.0	1	0.0	0	0.0	1	7.9	0.003	1176.0	9000	0.9	2.0	2.1	15.0
36080	26.0	26.0	14.7	11.6	3.2	3.8	0.9	2.0	1	0.0	0	13.3	1	6.7	0.006	1176.0	9000	0.9	2.0	2.9	15.0
35845	15.0	10.9	11.0	13.6	3.2	2.4	0	0.0	1	0.0	0	0.0	1	7.9	0.002	1401.7	9000	1.7	2.0	1.6	15.0
35725	15.0	13.9	15.0	13.0	3.2	3.9	0	0.0	1	0.0	0	0.0	1	6.5	0.004	1377.9	9000	1.8	2.0	3.0	15.0
35515	18.0	15.6	17.1	12.0	3.2	4.8	0	0.0	1	0.0	0	0.0	1	6.0	0.005	1354.8	9000	1.7	2.0	3.9	18.0
35245	18.0	15.6	17.3	11.3	3.2	4.9	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1328.3	9000	1.5	2.0	4.0	18.0
35040	21.0	18.0	19.6	10.7	3.2	6.0	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1354.8	9000	1.7	2.0	5.2	21.0
34860	21.0	16.3	18.4	10.0	3.2	5.4	0	0.0	1	0.0	0	0.0	1	4.9	0.009	1285.7	9000	1.2	2.0	4.6	21.0
34720	21.0	16.5	18.4	9.2	3.2	5.4	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1411.2	9000	1.4	2.0	4.6	21.0
34495	18.0	15.2	17.4	9.0	3.2	5.0	0	0.0	1	0.0	0	0.0	1	5.2	0.009	1283.9	9000	1.0	2.0	4.1	18.0
34310	18.0	14.8	16.8	9.3	3.2	4.7	0	0.0	1	0.0	0	0.0	1	5.9	0.005	1308.5	9000	1.2	2.0	3.8	18.0
34090	18.0	14.8	17.0	8.6	3.2	4.8	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1295.5	9000	1.0	2.0	3.9	18.0
33880	18.0	14.8	16.6	9.3	3.4	4.6	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1318.4	9000	1.2	2.0	3.7	18.0
33710	18.0	13.9	15.4	9.7	3.4	4.1	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1372.1	9000	1.3	2.0	3.2	18.0
33500	18.0	14.8	16.2	9.3	3.4	4.4	0	0.0	1	0.0	0	0.0	1	5.1	0.007	1496.0	9000	1.5	2.0	3.5	18.0
33310	18.0	15.1	15.8	9.0	3.4	4.2	0	0.0	1	0.0	0	0.0	1	4.2	0.006	1770.4	9000	2.1	2.0	3.4	18.0
33115	15.0	11.2	10.4	10.6	3.4	2.2	0	0.0	1	0.0	0	0.0	1	6.1	0.003	1847.3	9000	2.1	2.0	1.4	15.0
32795	15.0	13.0	13.0	10.6	3.4	3.1	0	0.0	1	0.0	0	0.0	1	5.2	0.004	1735.6	9000	2.3	2.0	2.3	15.0
32605	15.0	14.2	14.4	11.1	3.4	3.6	0	0.0	1	0.0	0	0.0	1	5.0	0.005	1699.9	9000	2.3	2.0	2.8	15.0
32265	18.0	14.2	15.9	10.5	2.0	4.3	0	0.0	1	0.0	0	0.0	1	4.8	0.006	1853.2	9000	2.5	2.0	3.4	18.0
31875	15.0	12.0	12.4	10.4	2.0	2.9	0	0.0	1	0.0	0	0.0	1	4.7	0.005	2409.2	9000	3.0	2.0	2.1	15.0
31585	15.0	11.0	10.9	11.9	2.0	2.4	0	0.0	1	0.0	0	0.0	1	5.9	0.003	2182.2	9000	3.0	2.0	1.6	15.0
31360	15.0	10.4	10.3	13.5	2.0	2.2	0	0.0	1	0.0	0	0.0	1	7.4	0.002	1878.7	9000	2.8	2.0	1.4	15.0
31060	12.0	9.1	8.2	15.5	2.0	1.6	0	0.0	1	0.0	0	0.0	1	10.1	0.001	1708.2	9000	2.6	2.0	0.9	12.0
30720	12.0	9.1	6.7	17.5	2.0	1.2	0	0.0	1	0.0	0	0.0	1	11.2	0.001	1888.6	9000	3.3	2.0	0.6	12.0
30445	12.0	8.9	6.3	19.5	2.0	1.1	0	0.0	1	0.0	0	0.0	1	12.7	0.000	1779.7	9000	3.3	2.0	0.5	12.0
30095	12.0	9.2	6.7	21.3	2.0	1.2	0	0.0	1	0.0	0	0.0	1	13.4	0.000	1622.7	9000	3.5	2.0	0.6	12.0
29815	12.0	9.1	7.7	21.9	2.0	1.4	0	0.0	1	0.0	0	0.0	1	13.5	0.000	1433.2	9000	2.9	2.0	0.8	12.0
29565	12.0	8.4	7.4	22.9	2.0	1.3	0	0.0	1	0.0	0	0.0	1	14.8	0.000	1323.8	9000	2.4	2.0	0.7	12.0
29385	12.0	8.6	8.3	23.6	2.0	1.6	0	0.0	1	0.0	0	0.0	1	14.4	0.000	1237.4	9000	2.1	2.0	0.9	12.0
29140	12.0	10.6	9.2	24.1	4.4	1.8	0	0.0	1	0.0	0	0.0	1	14.1	0.001	1087.2	9000	1.2	2.0	1.1	12.0
28895	21.0	17.5	18.8	22.5	4.4	5.6	0	0.0	1	0.0	0	0.0	1	9.9	0.002	972.1	9000	0.8	2.0	4.8	21.0
28695	24.9	24.9	28.9	14.9	4.4	11.5	0	0.0	1	0.0	0	0.0	1	5.4	0.025	899.4	9000	0.0	2.0	7.0	14.0
28500	20.6	20.6	22.4	16.1	4.4	7.5	0	0.0	1	0.0	0	0.0	1	11.4	0.006	552.2	9000	0.0	2.0	6.8	14.0
28280	24.1	24.1	29.6	10.8	4.4	12.0	0	0.0	1	0.0	0	0.0	1	5.8	0.013	944.5	9000	0.3	2.0	5.4	21.0
28080	15.0	10.8	11.3	19.1	4.4	2.5	0	0.0	1	0.0	0	0.0	1	14.7	0.001	926.4	9000	0.2	2.0	1.7	15.0
27925	11.8	11.8	13.1	19.3	4.4	3.1	0	0.0	1	0.0	0	0.0	1	13.8	0.001	866.6	9000	0.0	2.0	2.3	10.0
27725	17.0	17.0	19.0	16.7	4.4	5.7	0	0.0	1	0.0	0	0.0	1	10.4	0.003	786.6	9000	0.0	2.0	4.9	14.0
27545	21.2	21.2	22.9	14.1	4.4	7.8	0	0.0	1	0.0	0	0.0	1	9.9	0.005	643.2	9000	0.0	2.0	7.0	14.0
27335	21.3	21.3	24.6	12.3	4.4	8.7	0	0.0	1	0.0	0	0.0	1	8.3	0.008	703.5	9000	0.0	2.0	6.2	14.0
27155	17.0	17.0	19.1	14.8	4.4	5.7	0	0.0	1	0.0	0	0.0	1	9.2	0.003	888.4	9000	0.0	2.0	4.9	14.0
26990	21.0	17.5	22.6	11.5	2.0	7.6	0	0.0	1	0.0	0	0.0	1	6.8	0.011	922.3	9000	0.1	2.0	5.7	21.0
26780	21.0	18.2	23.1	11.3	2.0	7.9	0	0.0	1	0.0	0	0.0	1	6.2	0.009	1043.3	9000	0.6	2.0	5.6	21.0
26575	21.3	21.3	20.7	11.1	2.0	6.6	0	0.0	1	0.0	0	0.0	1	5.7	0.012	1187.3	3000	5.2	2.0	5.6	21.0
26355	18.3	18.3	15.9	13.4	2.0	4.3	0	0.0	1	0.0	0	0.0	1	7.5	0.004	1269.4	3000	6.7	2.0	3.4	18.0
26170	20.1	20.1	17.0	13.5	2.0	4.8	0	0.0	1	0.0	0	0.0	1	7.6	0.003	1269.0	3000	7.4	2.0	3.9	18.0
25965	21.1	21.1	18.2	12.9	2.0	5.3	0	0.0	1	0.0	0	0.0	1	6.9	0.004	1281.3	3000	7.3	2.0	4.5	21.0
25785	21.0	21.0	18.9	12.1	2.0	5.7	0	0.0	1	0.0	0	0.0	1	6.9	0.005	1219.7	3000	6.5	2.0	4.8	21.0
25600	21.0	20.1	18.5	12.4	2.0	5.5	0	0.0	1	0.0	0	0.0	1	7.6	0.005	1109.4	3000	6.0	2.0	4.6	21.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_I=LOW-FLOW INCISEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25425	21.0	19.2	18.3	12.5	2.0	5.4	0	0.0	1	0.0	0	0.0	1	7.1	0.007	1082.2	3000	5.3	2.0	4.5	21.0
25215	16.3	16.3	14.3	14.7	2.0	3.6	0	0.0	1	0.0	0	0.0	1	9.0	0.003	1097.3	3000	6.0	2.0	2.7	15.0
25000	15.5	15.5	13.2	15.5	2.0	3.2	0	0.0	1	0.0	0	0.0	1	10.1	0.002	1062.4	3000	6.0	2.0	2.3	15.0
24795	15.8	15.8	14.1	15.6	2.0	3.5	0	0.0	1	0.0	0	0.0	1	10.5	0.002	957.4	3000	5.6	2.0	2.7	15.0
24550	18.0	16.4	15.1	16.5	2.0	3.9	0	0.0	1	0.0	0	0.0	1	11.0	0.003	856.1	3000	5.4	2.0	3.1	18.0
24335	21.0	18.3	18.2	15.0	2.0	5.3	0	0.0	1	0.0	0	0.0	1	10.1	0.004	764.8	3000	4.5	2.0	4.5	21.0
24115	21.0	19.7	20.0	13.8	2.0	6.2	0	0.0	1	0.0	0	0.0	1	9.4	0.006	754.2	3000	4.1	2.0	5.4	21.0
23975	21.0	20.5	20.8	12.9	2.0	6.6	0	0.0	1	0.0	0	0.0	1	8.7	0.007	783.2	3000	4.1	2.0	5.8	21.0
23755	21.0	18.5	18.1	14.7	2.0	5.3	0	0.0	1	0.0	0	0.0	1	9.7	0.004	815.7	3000	4.8	2.0	4.4	21.0
23565	21.0	20.8	20.2	14.3	2.0	6.3	0	0.0	1	0.0	0	0.0	1	8.2	0.007	850.9	3000	4.9	2.0	5.5	21.0
23365	21.0	19.7	18.4	14.3	2.0	5.4	0	0.0	1	0.0	0	0.0	1	8.7	0.004	939.0	3000	5.7	2.0	4.6	21.0
23180	23.0	23.0	21.9	12.6	2.0	7.2	0	0.0	1	0.0	0	0.0	1	8.0	0.005	916.6	3000	5.5	2.0	6.3	21.0
23000	21.0	20.3	22.0	11.3	2.0	7.3	0	0.0	1	0.0	0	0.0	1	8.2	0.010	784.0	3000	3.4	2.0	5.6	21.0
22790	31.9	31.9	17.9	13.0	2.0	5.2	0.9	2.0	1	0.0	0	14.7	1	10.0	0.005	784.0	3000	3.7	2.0	4.3	18.0
22600	21.0	20.9	19.8	12.8	2.0	6.1	0	0.0	1	0.0	0	0.0	1	7.6	0.006	999.0	3000	5.5	2.0	5.3	21.0
22415	21.0	20.9	21.3	10.8	2.0	6.9	0	0.0	1	0.0	0	0.0	1	6.6	0.010	1039.1	3000	4.6	2.0	5.4	21.0
22195	16.5	16.5	13.6	14.0	2.0	3.4	0	0.0	1	0.0	0	0.0	1	8.7	0.003	1309.6	3000	6.6	2.0	2.5	15.0
22010	19.5	19.5	16.1	14.3	2.0	4.4	0	0.0	1	0.0	0	0.0	1	7.6	0.003	1254.1	3000	7.6	2.0	3.5	18.0
21790	21.2	21.2	19.7	11.6	2.0	6.1	0	0.0	1	0.0	0	0.0	1	6.5	0.006	1144.5	3000	5.9	2.0	5.2	21.0
21615	21.0	19.2	21.3	8.5	2.0	6.9	0	0.0	1	0.0	0	0.0	1	5.8	0.011	1163.0	3000	4.1	2.0	4.3	21.0
21440	18.9	18.9	17.5	11.0	2.0	5.0	0	0.0	1	0.0	0	0.0	1	6.9	0.005	1286.1	3000	5.8	2.0	4.1	18.0
21225	21.4	21.4	18.1	11.7	2.0	5.2	0	0.0	1	0.0	0	0.0	1	5.6	0.005	1559.0	3000	7.7	2.0	4.4	21.0
21020	21.0	18.8	20.3	9.7	2.0	6.3	0	0.0	1	0.0	0	0.0	1	7.8	0.007	903.0	3000	3.6	2.0	4.9	21.0
20845	18.9	18.9	15.1	12.7	2.0	3.9	0	0.0	1	0.0	0	0.0	1	6.7	0.003	1563.7	3000	7.9	2.0	3.1	18.0
20595	16.8	16.8	12.4	13.4	2.0	2.9	0	0.0	1	0.0	0	0.0	1	8.3	0.002	1548.8	3000	7.8	2.0	2.1	15.0
20435	17.0	17.0	12.1	14.3	2.0	2.8	0	0.0	1	0.0	0	0.0	1	8.8	0.001	1528.3	3000	8.3	2.0	2.0	15.0
20280	19.4	19.4	15.6	12.8	2.0	4.1	0	0.0	1	0.0	0	0.0	1	6.8	0.003	1531.3	3000	8.0	2.0	3.3	18.0
20070	22.5	22.5	19.3	11.1	2.0	5.9	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1526.6	3000	7.5	2.0	5.0	21.0
19855	21.0	21.0	20.6	10.2	2.0	6.5	0	0.0	1	0.0	0	0.0	1	6.0	0.008	1205.4	3000	5.4	2.0	5.1	21.0
19630	21.0	18.8	20.6	8.9	2.0	6.5	0	0.0	1	0.0	0	0.0	1	6.6	0.009	1060.3	3000	3.8	2.0	4.4	21.0
19440	15.4	15.4	13.1	13.4	2.0	3.2	0	0.0	1	0.0	0	0.0	1	9.2	0.002	1194.5	3000	5.9	2.0	2.3	15.0
19240	18.0	17.3	15.9	11.9	2.0	4.3	0	0.0	1	0.0	0	0.0	1	7.4	0.004	1216.9	3000	5.6	2.0	3.4	18.0
19050	21.0	19.8	18.8	10.5	2.0	5.6	0	0.0	1	0.0	0	0.0	1	5.8	0.009	1321.4	3000	5.4	2.0	4.8	21.0
18830	17.7	17.7	13.3	14.6	2.0	3.2	0	0.0	1	0.0	0	0.0	1	7.4	0.002	1531.5	3000	8.1	2.0	2.4	15.0
18650	17.5	17.5	12.1	15.0	2.0	2.8	0	0.0	1	0.0	0	0.0	1	8.0	0.002	1604.5	3000	8.8	2.0	2.0	15.0
18475	15.4	15.4	8.9	16.9	2.0	1.8	0	0.0	1	0.0	0	0.0	1	9.9	0.001	1621.5	3000	8.5	2.0	1.1	12.0
18290	16.2	16.2	9.8	16.9	2.0	2.0	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1594.2	3000	8.9	2.0	1.3	12.0
18025	8.0	6.3	7.9	18.5	2.0	1.5	0	0.0	1	0.0	0	0.0	1	11.9	0.001	1520.2	17000	0.0	2.0	0.8	8.0
17785	8.0	6.6	8.5	20.2	2.0	1.6	0	0.0	1	0.0	0	0.0	1	12.0	0.001	1398.1	17000	0.0	2.0	1.0	8.0
17510	10.0	8.0	11.0	19.2	2.0	2.4	0	0.0	1	0.0	0	0.0	1	10.2	0.001	1350.7	17000	0.0	2.0	1.6	10.0
17360	12.8	12.8	17.1	15.9	2.0	4.8	0	0.0	1	0.0	0	0.0	1	8.8	0.004	943.2	17000	0.0	2.0	3.9	12.5
17110	18.1	18.1	22.3	15.2	2.0	7.4	0	0.0	1	0.0	0	0.0	1	5.8	0.007	1175.4	17000	0.0	2.0	6.7	14.0
16970	18.6	18.6	23.1	13.6	2.0	7.9	0	0.0	1	0.0	0	0.0	1	5.9	0.010	1067.0	17000	0.0	2.0	6.8	14.0
16720	17.2	17.2	24.4	9.2	2.0	8.6	0	0.0	1	0.0	0	0.0	1	5.2	0.019	1122.9	17000	0.0	2.0	4.6	14.0
16515	15.0	15.0	19.4	10.4	2.0	5.9	0	0.0	1	0.0	0	0.0	1	5.8	0.010	1249.9	17000	0.0	2.0	5.1	14.0
16305	10.0	8.4	11.6	14.6	2.0	2.6	0	0.0	1	0.0	0	0.0	1	9.4	0.002	1360.5	17000	0.0	2.0	1.8	10.0
16130	12.5	11.5	15.7	12.3	2.0	4.2	0	0.0	1	0.0	0	0.0	1	7.1	0.005	1326.5	17000	0.0	2.0	3.3	12.5
15960	13.3	13.3	17.7	11.0	2.0	5.1	0	0.0	1	0.0	0	0.0	1	5.9	0.008	1386.0	17000	0.0	2.0	4.2	12.5
15745	10.0	8.9	12.3	13.3	2.0	2.9	0	0.0	1	0.0	0	0.0	1	8.4	0.003	1363.9	17000	0.0	2.0	2.0	10.0
15540	10.0	7.8	10.6	13.7	2.0	2.3	0	0.0	1	0.0	0	0.0	1	9.4	0.002	1426.6	17000	0.0	2.0	1.5	10.0
15335	12.5	12.0	16.2	12.1	2.0	4.4	0	0.0	1	0.0	0	0.0	1	8.2	0.006	1064.1	17000	0.0	2.0	3.5	12.5
15125	30.9	30.9	17.9	11.6	2.0	5.2	0.9	4.0	1	0.0	0	17.4	1	8.0	0.007	1000.5	17000	0.0	2.0	4.3	12.5
14900	14.7	14.7	19.3	9.8	2.0	5.8	0	0.0	1	0.0	0	0.0	1	6.3	0.009	1626.5	17000	0.0	2.0	4.9	14.0
14720	21.0	13.7	18.1	9.8	2.0	5.3	0	0.0	1	0.0	0	0.0	1	6.0	0.008	1722.3	17000	0.1	2.0	4.4	21.0
14480	21.0	14.2	19.0	8.9	2.0	5.7	0	0.0	1	0.0	0	0.0	1	5.2	0.010	1726.7	17000	0.1	2.0	4.4	21.0
14315	15.0	10.4	14.0	9.9	2.0	3.5	0	0.0	1	0.0	0	0.0	1	5.8	0.005	1881.0	17000	0.3	2.0	2.6	15.0
14090	15.0	10.5	14.3	8.5	2.0	3.6	0	0.0	1	0.0	0	0.0	1	5.6	0.006	1772.8	17000	0.1	2.0	2.8	15.0
13850	15.0	9.2	12.6	9.7	2.0	3.0	0	0.0	1	0.0	0	0.0	1	6.5	0.004	1741.6	17000	0.1	2.0	2.2	15.0
13635	18.0	11.4	15.5	10.3	2.0	4.1	0	0.0	1	0.0	0	0.0	1	6.3	0.004	1705.8	17000	0.1	2.0	3.2	18.0
13425	21.0	13.4	18.0	7.8	2.0	5.2	0	0.0	1	0.0	0	0.0	1	4.3	0.011	1850.7	17000	0.2	2.0	3.9	21.0
13190	15.0	9.1	12.2	9.5	2.0	2.8	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1847.4	17000	0.3	2.0	2.0	15.0
13030	15.0	10.4	14.2	9.6	2.0	3.6	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1763.0	17000	0.2	2.0	2.7	15.0
12835	10.0	9.6	13.3	10.1	2.0	3.2	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	9.0	12.5	10.9	2.0	2.9	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1470.8	17000	0.0	2.0	2.1	10.0
12395	10.0	8.9	12.3	11.5	2.0	2.9	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1438.1	17000	0.0	2.0	2.0	10.0
12195	10.0	7.8	10.6	12.5	2.0	2.3	0	0.0	1	0.0	0	0.0	1	10.3	0.001	1383.7	17000	0.0	2.0	1.5	10.0
11995	10.0	9.3	12.8	13.6	2.0	3.0	0	0.0	1	0.0	0	0.0	1	9.7	0.002	1280.5	17000	0.0	2.0	2.2	10.0
11780	10.0	9.1	12.6	14.4	2.0	3.0	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1422.2	17000	0.0	2.0	2.1	10.0
11605	10.1	10.1	13.9	13.8	2.0	3.5	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1325.5	17000	0.0	2.0	2.6	10.0
11405	10.0	9.5	13.2	15.1	2.0	3.2	0	0.0	1	0.0	0	0.0	1	10.3	0.002	1114.6	17000	0.0	2.0	2.3	10.0
11180	12.5	12.3	16.6	13.9	2.0	4.6	0	0.0	1	0.0	0	0.0	1	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.7	14.7	19.1	13.3	2.0	5.7	0	0.0	1	0.0	0	0.0	1	11.0	0.004	679.4	17000	0.0	2.0	4.9	14.0
10835	16.7	16.7	21.9	10.9	2.0	7.2	0	0.0	1	0.0	0	0.0	1	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	16.2	16.2	24.1	7.5	2.0	8.5	0	0.0	1	0.0	0	0.0	1	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	16.1	16.1	22.7	8.8	2.0	7.7	0	0.0	1	0.0	0	0.0	1	5.8	0.008	1247.0	17000	0.0	2.0	4.4	14.0
10225	13.4	13.4	17.8	9.5	2.0	5.1	0	0.0	1	0.0	0	0.0	1	5.9	0.007	1374.1	17000	0.0	2.0	4.3	12.5
10000	10.9	10.9	14.9	11.1	2.0	3.9	0	0.0	1	0.0	0	0.0	1	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.2	14.2	18.6	10.0	2.0	5.5	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1402.3	17000	0.0	2.0	4.7	14.0
9595	10.6	10.6	14.6	10.3	2.0	3.7	0	0.0	1	0.0	0	0.0	1	6.6	0.005	1619.5	17000	0.0	2.0	2.9	10.0
9385	18.0	11.7	15.8	9.5	2.0	4.2	0	0.0	1	0.0	0	0.0	1	5.3	0.008	1770.4	17000	0.2	2.0	3.4	18.0
9220	18.0	12.3	16.4	8.9	2.0	4.5	0	0.0	1	0.0	0	0.0	1	4.9	0.008	1771.4	17000	0.1	2.0	3.6	18.0
9025	18.0	11.8	15.9	8.9	2.0	4.3	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1736.9	17000	0.1	2.0	3.4	18.0
MAX=	31.9	31.9			8.1	12.0						17.4					17000.0	8.9	2.0	8.3	21.0
MIN=	8.0	6.3			2.0	1.1						0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM -- SANTA CLARA RIVER PROPOSED CONDITIONS STRAIGHT-INSIDE CURVED REACH,Q_{50} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
46195	18.2	18.2	21.7	18.1	2.8	7.1	0	0.0	1	0.0	0	0.0	0	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	21.2	21.2	24.1	18.1	2.8	8.5	0	0.0	1	0.0	0	0.0	0	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	16.8	16.8	20.3	19.2	2.8	6.4	0	0.0	1	0.0	0	0.0	0	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	22.8	22.8	26.1	16.5	2.8	9.7	0	0.0	1	0.0	0	0.0	0	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	15.5	15.5	19.2	21.1	2.8	5.8	0	0.0	1	0.0	0	0.0	0	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	22.2	22.2	26.2	15.4	2.8	9.7	0	0.0	1	0.0	0	0.0	0	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	21.6	21.6	19.9	19.5	8.1	6.2	0	0.0	1	0.0	0	0.0	0	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	27.1	27.1	26.7	13.8	8.1	10.1	0	0.0	1	0.0	0	0.0	0	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	27.2	27.2	28.8	11.3	8.1	11.5	0	0.0	1	0.0	0	0.0	0	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	26.0	26.0	26.1	12.4	8.1	9.7	0	0.0	1	0.0	0	0.0	0	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	25.6	25.6	26.6	10.8	8.1	10.0	0	0.0	1	0.0	0	0.0	0	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	23.8	23.8	23.9	10.7	8.1	8.4	0	0.0	1	0.0	0	0.0	0	5.6	0.016	864.3	9000	0.0	2.0	5.4	14.0
42590	22.2	22.2	22.4	9.2	8.1	7.5	0	0.0	1	0.0	0	0.0	0	5.2	0.014	1013.1	9000	0.0	2.0	4.6	14.0
42430	21.3	21.3	18.5	10.7	8.1	6.0	0	0.0	1	0.0	0	0.0	0	6.4	0.009	915.8	9000	0.0	2.0	5.2	14.0
42215	20.2	20.2	18.5	11.2	8.1	5.5	0	0.0	1	0.0	0	0.0	0	6.1	0.009	1019.0	9000	0.0	2.0	4.6	14.0
41940	14.5	14.5	11.6	14.3	8.1	2.6	0	0.0	1	0.0	0	0.0	0	7.7	0.002	1284.2	9000	0.0	2.0	1.8	10.0
41730	14.7	14.7	11.8	14.7	8.1	2.7	0	0.0	1	0.0	0	0.0	0	8.2	0.002	1190.9	9000	0.0	2.0	1.9	10.0
41460	14.5	14.5	11.6	16.2	8.1	2.6	0	0.0	1	0.0	0	0.0	0	9.1	0.002	1093.5	9000	0.0	2.0	1.8	10.0
41280	15.3	15.3	16.4	14.4	5.2	4.5	0	0.0	1	0.0	0	0.0	0	8.3	0.004	852.3	9000	0.0	2.0	3.6	12.5
41080	18.7	18.7	19.9	12.1	5.2	6.2	0	0.0	1	0.0	0	0.0	0	6.7	0.008	874.1	9000	0.0	2.0	5.4	14.0
40825	16.8	16.8	18.0	11.5	5.2	5.2	0	0.0	1	0.0	0	0.0	0	6.2	0.007	1040.4	9000	0.0	2.0	4.4	14.0
40585	15.8	15.8	17.0	11.7	5.2	4.8	0	0.0	1	0.0	0	0.0	0	6.8	0.006	1005.8	9000	0.0	2.0	3.9	12.5
40335	11.0	11.0	10.5	15.1	5.2	2.3	0	0.0	1	0.0	0	0.0	0	8.8	0.002	1249.6	9000	0.0	2.0	1.5	10.0
40130	11.4	11.4	11.3	15.5	5.2	2.5	0	0.0	1	0.0	0	0.0	0	8.8	0.002	1195.6	9000	0.0	2.0	1.7	10.0
39945	11.2	11.2	11.0	16.3	5.2	2.4	0	0.0	1	0.0	0	0.0	0	9.3	0.002	1173.3	9000	0.0	2.0	1.6	10.0
39755	15.4	15.4	16.5	13.3	5.2	4.5	0	0.0	1	0.0	0	0.0	0	8.1	0.004	894.5	9000	0.0	2.0	3.7	12.5
39605	18.5	18.5	19.7	11.5	5.2	6.1	0	0.0	1	0.0	0	0.0	0	7.1	0.007	849.7	9000	0.0	2.0	5.2	14.0
39310	15.4	15.4	16.5	12.7	5.2	4.6	0	0.0	1	0.0	0	0.0	0	8.1	0.004	931.1	9000	0.0	2.0	3.7	12.5
39100	19.1	19.1	20.9	10.4	5.2	6.7	0	0.0	1	0.0	0	0.0	0	7.2	0.009	761.1	9000	0.0	2.0	5.2	14.0
38925	12.5	12.5	12.8	14.3	5.2	3.0	0	0.0	1	0.0	0	0.0	0	10.3	0.002	873.5	9000	0.0	2.0	2.2	10.0
38710	10.0	9.4	12.0	15.6	2.7	2.8	0	0.0	1	0.0	0	0.0	0	11.7	0.002	820.3	9000	0.0	2.0	2.0	10.0
38475	14.2	14.2	17.9	14.0	2.7	5.2	0	0.0	1	0.0	0	0.0	0	9.8	0.004	659.7	9000	0.0	2.0	4.3	12.5
38300	17.4	17.4	22.5	10.3	2.7	7.6	0	0.0	1	0.0	0	0.0	0	7.7	0.010	666.3	9000	0.0	2.0	5.1	14.0
38065	11.3	11.3	14.5	14.0	2.7	3.7	0	0.0	1	0.0	0	0.0	0	12.0	0.002	658.4	9000	0.0	2.0	2.9	10.0
37810	14.5	14.5	18.2	12.2	2.7	5.3	0	0.0	1	0.0	0	0.0	0	10.2	0.004	618.2	9000	0.0	2.0	4.5	14.0
37655	16.6	16.6	20.9	10.5	2.7	6.7	0	0.0	1	0.0	0	0.0	0	7.8	0.008	706.7	9000	0.0	2.0	5.3	14.0
37390	16.2	16.2	23.7	6.5	2.7	8.3	0	0.0	1	0.0	0	0.0	0	5.9	0.015	823.8	9000	0.0	2.0	3.3	14.0
37135	13.0	13.0	16.6	9.3	2.7	4.6	0	0.0	1	0.0	0	0.0	0	8.5	0.005	821.4	9000	0.0	2.0	3.7	12.5
36930	14.8	14.8	19.8	8.1	2.7	6.1	0	0.0	1	0.0	0	0.0	0	7.2	0.008	812.4	9000	0.0	2.0	4.1	14.0
36735	12.6	12.6	16.1	9.8	2.7	4.4	0	0.0	1	0.0	0	0.0	0	8.0	0.005	896.9	9000	0.0	2.0	3.5	12.5
36515	10.0	10.0	12.9	12.0	2.7	3.1	0	0.0	1	0.0	0	0.0	0	9.0	0.002	994.7	9000	0.0	2.0	2.2	10.0
36265	10.0	9.6	12.3	12.5	2.7	2.9	0	0.0	1	0.0	0	0.0	0	7.9	0.003	1176.0	9000	0.0	2.0	2.1	10.0
36080	25.1	25.1	14.7	11.6	3.2	3.8	0.9	2.0	1	0.0	0	13.3	0	6.7	0.006	1176.0	9000	0.0	2.0	2.9	10.0
35845	10.0	9.2	11.9	13.6	3.2	2.4	0	0.0	1	0.0	0	0.0	0	7.9	0.002	1401.7	9000	0.0	2.0	1.6	10.0
35725	12.1	12.1	15.0	13.0	3.2	3.9	0	0.0	1	0.0	0	0.0	0	6.5	0.004	1377.9	9000	0.0	2.0	3.0	10.0
35515	13.9	13.9	17.1	12.0	3.2	4.8	0	0.0	1	0.0	0	0.0	0	6.0	0.005	1354.8	9000	0.0	2.0	3.9	12.5
35245	14.1	14.1	17.3	11.3	3.2	4.9	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1328.3	9000	0.0	2.0	4.0	12.5
35040	16.3	16.3	19.6	10.7	3.2	6.0	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1354.8	9000	0.0	2.0	5.2	14.0
34860	15.1	15.1	18.4	10.0	3.2	5.4	0	0.0	1	0.0	0	0.0	0	4.9	0.009	1285.7	9000	0.0	2.0	4.6	14.0
34720	15.1	15.1	18.4	9.2	3.2	5.4	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1411.2	9000	0.0	2.0	4.6	14.0
34495	14.2	14.2	17.4	9.0	3.2	5.0	0	0.0	1	0.0	0	0.0	0	5.2	0.009	1283.9	9000	0.0	2.0	4.1	12.5
34310	13.6	13.6	16.8	9.3	3.2	4.7	0	0.0	1	0.0	0	0.0	0	5.9	0.005	1308.5	9000	0.0	2.0	3.8	12.5
34090	13.8	13.8	17.0	8.6	3.2	4.8	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1295.5	9000	0.0	2.0	3.9	12.5
33880	13.7	13.7	16.6	9.3	3.4	4.6	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1318.4	9000	0.0	2.0	3.7	12.5
33710	12.6	12.6	15.4	9.7	3.4	4.1	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1372.1	9000	0.0	2.0	3.2	12.5
33500	13.3	13.3	16.2	9.3	3.4	4.4	0	0.0	1	0.0	0	0.0	0	5.1	0.007	1496.0	9000	0.0	2.0	3.5	12.5
33310	13.0	13.0	15.8	9.0	3.4	4.2	0	0.0	1	0.0	0	0.0	0	4.2	0.006	1770.4	9000	0.0	2.0	3.4	12.5
33115	10.0	9.0	10.4	10.6	3.4	2.2	0	0.0	1	0.0	0	0.0	0	6.1	0.003	1847.3	9000	0.0	2.0	1.4	10.0
32795	10.8	10.8	13.0	10.6	3.4	3.1	0	0.0	1	0.0	0	0.0	0	5.2	0.004	1735.6	9000	0.0	2.0	2.3	10.0
32605	11.8	11.8	14.4	11.1	3.4	3.6	0	0.0	1	0.0	0	0.0	0	5.0	0.005	1699.9	9000	0.0	2.0	2.8	10.0
32265	12.5	11.7	15.9	10.5	2.0	4.3	0	0.0	1	0.0	0	0.0	0	4.8	0.006	1853.2	9000	0.0	2.0	3.4	12.5
31875	10.0	9.0	12.4	10.4	2.0	2.9	0	0.0	1	0.0	0	0.0	0	4.7	0.006	2409.2	9000	0.0	2.0	2.1	10.0
31585	10.0	8.0	10.9	11.9	2.0	2.4	0	0.0	1	0.0	0	0.0	0	5.9	0.003	2182.2	9000	0.0	2.0	1.6	10.0
31360	10.0	7.8	10.3	13.5	2.0	2.2	0	0.0	1	0.0	0	0.0	0	7.4	0.002	1878.7	9000	0.0	2.0	1.4	10.0
31060	8.0	6.5	8.2	15.5	2.0	1.6	0	0.0	1	0.0	0	0.0	0	10.1	0.001	1708.2	9000	0.0	2.0	0.9	8.0
30720	8.0	5.7	6.7	17.5	2.0	1.2	0	0.0	1	0.0	0	0.0	0	11.2	0.001	1888.6	9000	0.0	2.0	0.6	8.0
30445	8.0	5.6	6.3	19.5	2.0	1.1	0	0.0	1	0.0	0	0.0	0	12.7	0.000	1779.7	9000	0.0	2.0	0.5	8.0
30095	8.0	5.8	6.7	21.3	2.0	1.2	0	0.0	1	0.0	0	0.0	0	13.4	0.000	1622.7	9000	0.0	2.0	0.6	8.0
29815	8.0	6.2	7.7	21.9	2.0	1.4	0	0.0	1	0.0	0	0.0	0	13.5	0.000	1433.2	9000	0.0	2.0	0.8	8.0
29565	8.0	6.1	7.4	22.9	2.0	1.3	0	0.0	1	0.0	0	0.0	0	14.8	0.000	1323.8	9000	0.0	2.0	0.7	8.0
29385	8.0	6.5	8.3	23.6	2.0	1.6	0	0.0	1	0.0	0	0.0	0	14.4	0.000	1237.4	9000	0.0	2.0	0.9	8.0
29140	9.4	9.4	9.2	24.1	4.4	1.8	0	0.0	1	0.0	0	0.0	0	14.1	0.001	1087.2	9000	0.0	2.0	1.1	8.0
28895	16.8	16.8	18.8	22.5	4.4	5.6	0	0.0	1	0.0	0	0.0	0	9.9	0.002	972.1	9000	0.0	2.0	4.8	14.0
28695	24.9	24.9	28.9	14.0	4.4	11.5	0	0.0	1	0.0	0	0.0	0	5.4	0.025	899.4	9000	0.0	2.0	7.0	14.0
28500	20.6	20.6	22.4	16.1	4.4	7.5	0	0.0	1	0.0	0	0.0	0	11.4	0.006	552.2	9000	0.0	2.0	6.8	14.0
28280	23.8	23.8	29.6	10.8	4.4	12.0	0	0.0	1	0.0	0	0.0	0	5.8	0.013	944.5	9000	0.0	2.0	5.4	14.0
28080	10.6	10.6	11.3	19.1	4.4	2.5	0	0.0	1	0.0	0	0.0	0	14.7	0.001	926.4	9000	0.0	2.0	1.7	10.0
27925	11.8	11.8	13.1	19.3	4.4	3.1	0	0.0	1	0.0	0	0.0	0	13.8	0.001	866.6	9000	0.0	2.0	2.3	10.0
27725	17.0	17.0	19.0	16.7	4.4	5.7	0	0.0	1	0.0	0	0.0	0	10.4	0.003	786.6	9000	0.0	2.0	4.9	14.0
27545	21.2	21.2	22.9	14.1	4.4	7.8	0	0.0	1	0.0	0	0.0	0	9.9	0.005	643.2	9000	0.0	2.0	7.0	14.0
27335	21.3	21.3	24.6	12.3	4.4	8.7	0	0.0	1	0.0	0	0.0	0	8.3	0.008	703.5	9000	0.0	2.0	6.2	14.0
27155	17.0	17.0	19.1	14.8	4.4	5.7	0	0.0	1	0.0	0	0.0	0	9.2	0.003	888.4	9000	0.0	2.0	4.9	14.0
26990	17.3	17.3	22.6	11.5	2.0	7.6	0	0.0	1	0.0	0	0.0	0	6.8	0.011	922.3	9000	0.0	2.0	5.7	14.0
26780	17.5	17.5	23.1	11.3	2.0	7.9	0	0.0	1	0.0	0	0.0	0	6.2	0.009	1043.3	9000	0.0	2.0	5.6	14.0
26575	16.1	16.1	20.7	11.1	2.0	6.6	0	0.0	1	0.0	0	0.0	0	5.7	0.012	1187.3	3000	0.0	2.0	5.6	14.0
26355	12.5	11.7	15.9	13.4	2.0	4.3	0	0.0	1	0.0	0	0.0	0	7.5	0.004	1260.4	3000	0.0	2.0	3.4	12.5
26170	12.7	12.7	17.0	13.5	2.0	4.8	0	0.0	1	0.0	0	0.0	0	7.6	0.003	1269.0	3000	0.0	2.0	3.9	12.5
25965	14.0	13.8	18.2	12.9	2.0	5.3	0	0.0	1	0.0	0	0.0	0	6.9	0.004	1281.3	3000	0.0	2.0	4.5	14.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z=FLOW MEASUREMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06
THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25785	14.5	14.5	18.9	12.1	2.0	5.7	0	0.0	1	0.0	0	0.0	0	6.9	0.005	1219.7	3000	0.0	2.0	4.8	14.0
25600	14.1	14.1	18.5	12.4	2.0	5.5	0	0.0	1	0.0	0	0.0	0	7.6	0.005	1109.4	3000	0.0	2.0	4.6	14.0
25425	14.0	13.9	18.3	12.5	2.0	5.4	0	0.0	1	0.0	0	0.0	0	7.1	0.007	1082.2	3000	0.0	2.0	4.5	14.0
25215	10.4	10.4	14.3	14.7	2.0	3.6	0	0.0	1	0.0	0	0.0	0	9.0	0.003	1097.3	3000	0.0	2.0	2.7	10.0
25000	10.0	9.5	13.2	15.5	2.0	3.2	0	0.0	1	0.0	0	0.0	0	10.1	0.002	1062.4	3000	0.0	2.0	2.3	10.0
24795	10.2	10.2	14.1	15.6	2.0	3.5	0	0.0	1	0.0	0	0.0	0	10.5	0.002	957.4	3000	0.0	2.0	2.7	10.0
24550	12.5	11.0	15.1	16.5	2.0	3.9	0	0.0	1	0.0	0	0.0	0	11.0	0.003	856.1	3000	0.0	2.0	3.1	12.5
24335	14.0	13.8	18.2	15.0	2.0	5.3	0	0.0	1	0.0	0	0.0	0	10.1	0.004	764.8	3000	0.0	2.0	4.5	14.0
24115	15.6	15.6	20.0	13.8	2.0	6.2	0	0.0	1	0.0	0	0.0	0	9.4	0.006	754.2	3000	0.0	2.0	5.4	14.0
23975	16.5	16.5	20.8	12.9	2.0	6.6	0	0.0	1	0.0	0	0.0	0	8.7	0.007	783.2	3000	0.0	2.0	5.8	14.0
23755	14.0	13.7	18.1	14.7	2.0	5.3	0	0.0	1	0.0	0	0.0	0	9.7	0.004	815.7	3000	0.0	2.0	4.4	14.0
23565	15.8	15.8	20.2	14.3	2.0	6.3	0	0.0	1	0.0	0	0.0	0	8.2	0.007	850.9	3000	0.0	2.0	5.5	14.0
23365	14.0	14.0	18.4	14.3	2.0	5.4	0	0.0	1	0.0	0	0.0	0	8.7	0.004	939.0	3000	0.0	2.0	4.6	14.0
23180	17.5	17.5	21.9	12.6	2.0	7.2	0	0.0	1	0.0	0	0.0	0	8.0	0.005	916.6	3000	0.0	2.0	6.3	14.0
23000	16.9	16.9	22.0	11.3	2.0	7.3	0	0.0	1	0.0	0	0.0	0	8.2	0.010	784.0	3000	0.0	2.0	5.6	14.0
22790	28.2	28.2	17.9	13.0	2.0	5.2	0.9	2.0	1	0.0	0	14.7	0	10.0	0.005	784.0	3000	0.0	2.0	4.3	12.5
22600	15.4	15.4	19.8	12.8	2.0	6.1	0	0.0	1	0.0	0	0.0	0	7.6	0.006	999.0	3000	0.0	2.0	5.3	14.0
22415	16.3	16.3	21.3	10.8	2.0	6.9	0	0.0	1	0.0	0	0.0	0	6.6	0.010	1039.1	3000	0.0	2.0	5.4	14.0
22195	10.0	9.9	13.6	14.0	2.0	3.4	0	0.0	1	0.0	0	0.0	0	8.7	0.003	1309.6	3000	0.0	2.0	2.5	10.0
22010	12.5	11.9	16.1	14.3	2.0	4.4	0	0.0	1	0.0	0	0.0	0	7.6	0.003	1254.1	3000	0.0	2.0	3.5	12.5
21790	15.3	15.3	19.7	11.6	2.0	6.1	0	0.0	1	0.0	0	0.0	0	6.5	0.006	1144.5	3000	0.0	2.0	5.2	14.0
21615	15.1	15.1	21.3	8.5	2.0	6.9	0	0.0	1	0.0	0	0.0	0	5.8	0.011	1163.0	3000	0.0	2.0	4.3	14.0
21440	13.1	13.1	17.5	11.0	2.0	5.0	0	0.0	1	0.0	0	0.0	0	6.9	0.005	1286.1	3000	0.0	2.0	4.1	12.5
21225	14.0	13.6	18.1	11.7	2.0	5.2	0	0.0	1	0.0	0	0.0	0	5.6	0.005	1559.0	3000	0.0	2.0	4.4	14.0
21020	15.2	15.2	20.3	9.7	2.0	6.3	0	0.0	1	0.0	0	0.0	0	7.8	0.007	903.0	3000	0.0	2.0	4.9	14.0
20845	12.5	11.9	15.1	12.7	2.0	3.9	0	0.0	1	0.0	0	0.0	0	6.7	0.003	1583.7	3000	0.0	2.0	3.1	12.5
20595	10.0	9.0	12.4	13.4	2.0	2.9	0	0.0	1	0.0	0	0.0	0	8.3	0.002	1548.8	3000	0.0	2.0	2.1	10.0
20435	10.0	8.7	12.1	14.3	2.0	2.8	0	0.0	1	0.0	0	0.0	0	8.8	0.001	1528.3	3000	0.0	2.0	2.0	10.0
20280	12.5	11.4	15.6	12.8	2.0	4.1	0	0.0	1	0.0	0	0.0	0	6.8	0.003	1531.3	3000	0.0	2.0	3.3	12.5
20070	14.9	14.9	19.3	11.1	2.0	5.9	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1526.6	3000	0.0	2.0	5.0	14.0
19855	15.6	15.6	20.6	10.2	2.0	6.5	0	0.0	1	0.0	0	0.0	0	6.0	0.008	1205.4	3000	0.0	2.0	5.1	14.0
19630	14.9	14.9	20.6	8.9	2.0	6.5	0	0.0	1	0.0	0	0.0	0	6.6	0.009	1060.3	3000	0.0	2.0	4.4	14.0
19440	10.0	9.5	13.1	13.4	2.0	3.2	0	0.0	1	0.0	0	0.0	0	9.2	0.002	1194.5	3000	0.0	2.0	2.3	10.0
19240	12.5	11.7	15.9	11.9	2.0	4.3	0	0.0	1	0.0	0	0.0	0	7.4	0.004	1216.5	3000	0.0	2.0	3.4	12.5
19050	14.4	14.4	18.8	10.5	2.0	5.6	0	0.0	1	0.0	0	0.0	0	5.8	0.009	1321.4	3000	0.0	2.0	4.8	14.0
18830	10.0	9.6	13.3	14.6	2.0	3.2	0	0.0	1	0.0	0	0.0	0	7.4	0.003	1531.5	3000	0.0	2.0	2.4	10.0
18650	10.0	8.7	12.1	15.0	2.0	2.8	0	0.0	1	0.0	0	0.0	0	8.0	0.002	1604.5	3000	0.0	2.0	2.0	10.0
18475	8.0	6.8	8.9	16.9	2.0	1.8	0	0.0	1	0.0	0	0.0	0	9.9	0.001	1621.5	3000	0.0	2.0	1.1	8.0
18290	8.0	7.3	9.8	16.9	2.0	2.0	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1594.2	3000	0.0	2.0	1.3	8.0
18025	8.0	6.3	7.0	16.5	2.0	1.5	0	0.0	1	0.0	0	0.0	0	11.9	0.001	1520.2	17000	0.0	2.0	0.8	8.0
17785	8.0	6.6	8.5	20.2	2.0	1.6	0	0.0	1	0.0	0	0.0	0	12.0	0.001	1398.1	17000	0.0	2.0	1.0	8.0
17510	10.0	8.0	11.0	19.2	2.0	2.4	0	0.0	1	0.0	0	0.0	0	10.2	0.001	1350.7	17000	0.0	2.0	1.6	10.0
17360	12.8	12.8	17.1	15.9	2.0	4.8	0	0.0	1	0.0	0	0.0	0	8.8	0.004	943.2	17000	0.0	2.0	3.9	12.5
17110	18.1	18.1	22.3	15.2	2.0	7.4	0	0.0	1	0.0	0	0.0	0	5.8	0.007	1175.4	17000	0.0	2.0	6.7	14.0
16970	18.6	18.6	23.1	13.6	2.0	7.9	0	0.0	1	0.0	0	0.0	0	5.9	0.010	1067.0	17000	0.0	2.0	6.8	14.0
16720	17.2	17.2	24.4	9.2	2.0	8.6	0	0.0	1	0.0	0	0.0	0	5.2	0.019	1122.9	17000	0.0	2.0	4.6	14.0
16515	15.0	15.0	19.4	10.4	2.0	5.9	0	0.0	1	0.0	0	0.0	0	5.8	0.010	1249.9	17000	0.0	2.0	5.1	14.0
16305	10.0	8.4	11.6	14.6	2.0	2.6	0	0.0	1	0.0	0	0.0	0	9.4	0.002	1380.5	17000	0.0	2.0	1.8	10.0
16130	12.5	11.5	15.7	12.3	2.0	4.2	0	0.0	1	0.0	0	0.0	0	7.1	0.005	1326.5	17000	0.0	2.0	3.3	12.5
15960	13.3	13.3	17.7	11.0	2.0	5.1	0	0.0	1	0.0	0	0.0	0	5.9	0.008	1386.0	17000	0.0	2.0	4.2	12.5
15745	10.0	8.9	12.3	13.3	2.0	2.9	0	0.0	1	0.0	0	0.0	0	8.4	0.003	1363.9	17000	0.0	2.0	2.0	10.0
15540	10.0	7.8	10.6	13.7	2.0	2.3	0	0.0	1	0.0	0	0.0	0	9.4	0.002	1426.6	17000	0.0	2.0	1.5	10.0
15335	12.5	12.0	16.2	12.1	2.0	4.4	0	0.0	1	0.0	0	0.0	0	8.2	0.006	1064.1	17000	0.0	2.0	3.5	12.5
15125	30.9	30.9	17.9	11.6	2.0	5.2	0.9	4.0	1	0.0	0	17.4	0	8.0	0.007	1000.5	17000	0.0	2.0	4.3	12.5
14900	14.7	14.7	19.3	9.8	2.0	5.8	0	0.0	1	0.0	0	0.0	0	6.3	0.009	1626.5	17000	0.0	2.0	4.9	14.0
14720	14.0	13.7	18.1	9.8	2.0	5.3	0	0.0	1	0.0	0	0.0	0	6.0	0.008	1722.3	17000	0.0	2.0	4.4	14.0
14480	14.1	14.1	19.0	8.9	2.0	5.7	0	0.0	1	0.0	0	0.0	0	5.2	0.010	1726.7	17000	0.0	2.0	4.4	14.0
14315	10.1	10.1	14.0	9.9	2.0	3.5	0	0.0	1	0.0	0	0.0	0	5.8	0.005	1881.0	17000	0.0	2.0	2.6	10.0
14090	10.4	10.4	14.3	8.5	2.0	3.6	0	0.0	1	0.0	0	0.0	0	5.6	0.006	1772.8	17000	0.0	2.0	2.8	10.0
13850	10.0	9.1	12.6	9.7	2.0	3.0	0	0.0	1	0.0	0	0.0	0	6.5	0.004	1741.6	17000	0.0	2.0	2.2	10.0
13635	12.5	11.3	15.5	10.3	2.0	4.1	0	0.0	1	0.0	0	0.0	0	6.3	0.004	1705.8	17000	0.0	2.0	3.2	12.5
13425	14.0	13.1	18.0	7.8	2.0	5.2	0	0.0	1	0.0	0	0.0	0	4.3	0.011	1850.7	17000	0.0	2.0	3.9	14.0
13190	10.0	8.8	12.2	9.5	2.0	2.8	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1847.4	17000	0.0	2.0	2.0	10.0
13030	10.3	10.3	14.2	9.6	2.0	3.6	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1763.0	17000	0.0	2.0	2.7	10.0
12835	10.0	9.6	13.3	10.1	2.0	3.2	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	9.0	12.5	10.9	2.0	2.9	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1470.8	17000	0.0	2.0	2.1	10.0
12395	10.0	8.9	12.3	11.5	2.0	2.9	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1438.1	17000	0.0	2.0	2.0	10.0
12195	10.0	7.8	10.8	12.5	2.0	2.3	0	0.0	1	0.0	0	0.0	0	10.3	0.001	1383.7	17000	0.0	2.0	1.5	10.0
11995	10.0	9.3	12.8	13.6	2.0	3.0	0	0.0	1	0.0	0	0.0	0	9.7	0.002	1280.5	17000	0.0	2.0	2.2	10.0
11780	10.0	9.1	12.6	14.4	2.0	3.0	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1422.2	17000	0.0	2.0	2.1	10.0
11605	10.1	10.1	13.9	13.8	2.0	3.5	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1325.5	17000	0.0	2.0	2.6	10.0
11405	10.0	9.5	13.2	15.1	2.0	3.2	0	0.0	1	0.0	0	0.0	0	10.3	0.002	1114.6	17000	0.0	2.0	2.3	10.0
11180	12.5	12.3	16.6	13.9	2.0	4.6	0	0.0	1	0.0	0	0.0	0	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.7	14.7	19.1	13.3	2.0	5.7	0	0.0	1	0.0	0	0.0	0	11.0	0.004	879.4	17000	0.0	2.0	4.9	14.0
10835	16.7	16.7	21.9	10.9	2.0	7.2	0	0.0	1	0.0	0	0.0	0	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	16.2	16.2	24.1	7.5	2.0	8.5	0	0.0	1	0.0	0	0.0	0	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	16.1	16.1	22.7	8.8	2.0	7.7	0	0.0	1	0.0	0	0.0	0	5.8	0.008	1247.0	17000	0.0	2.0	4.4	14.0
10225	13.4	13.4	17.8	9.5	2.0	5.1	0	0.0	1	0.0	0	0.0	0	5.9	0.007	1374.1	17000	0.0	2.0	4.3	12.5
10000	10.9	10.9	14.9	11.1	2.0	3.9	0	0.0	1	0.0	0	0.0	0	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.2	14.2	18.6	10.0	2.0	5.5	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1402.3	17000	0.0	2.0	4.7	14.0
9595	10.6	10.6	14.6	10.3	2.0	3.7	0	0.0	1	0.0	0	0.0	0	6.6	0.005	1619.5	17000	0.0	2.0	2.9	10.0
9385	12.5	11.9	15.8	9.5	2.0	4.2	0	0.0	1	0.0	0	0.0	0	5.3	0.006	1770.4	17000	0.0	2.0	3.4	12.5
9220	12.5	12.1	16.4	8.9	2.0	4.5	0	0.0	1	0.0	0	0.0	0	4.9	0.008	1771.4	17000	0.0	2.0	3.6	12.5
9025	12.5	11.7	15.9	8.9	2.0	4.3	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1736.9	17000	0.0	2.0	3.4	12.5
MAX=	30.9	30.9			8.1	12.0						17.4					17000.0	0.0	2.0	8.3	14.0
MIN=	8.0	5.6			2.0	1.1						0.0					3000.0	0.0	2.0	0.5	8.0

Santa Clara River Fluvial Study

APPENDIX CHAPTER 6.1B

LACH&SM with SAM Toe
Existing & Proposed Conditions
Curved & Straight Reaches

PACIFIC ADVANCED
CIVIL ENGINEERING, INC.

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER EXISTING CONDITIONS OUTSIDE CURVED REACH C_{LAP} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_f+	H/2	Z_{DM}=
46195	14.0	11.1	21.7	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	14.0	12.7	24.1	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	14.0	10.4	20.3	19.2	2.8	0.0	0	0.0	1	0.0	0	0.0	1	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	14.0	13.1	26.1	16.5	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	14.0	9.8	19.2	21.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	14.0	12.5	26.2	15.4	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	15.4	15.4	19.9	19.5	8.1	0.0	0	0.0	1	0.0	0	0.0	1	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	17.0	17.0	26.7	13.8	8.1	0.0	0	0.0	1	0.0	0	0.0	1	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	15.8	15.8	28.8	11.3	8.1	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	16.3	16.3	26.1	12.4	8.1	0.0	0	0.0	1	0.0	0	0.0	1	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	15.5	15.5	26.6	10.8	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	15.4	15.4	24.1	10.6	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.5	0.016	878.5	9000	0.0	2.0	5.3	14.0
42590	21.0	15.0	22.6	8.9	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.1	0.014	1023.2	9000	0.4	2.0	4.5	21.0
42430	21.0	15.1	20.8	9.6	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.9	0.012	940.5	9000	0.2	2.0	4.8	21.0
42215	15.0	13.1	10.4	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	1	8.5	0.002	1310.4	9000	1.5	2.0	1.5	15.0
41940	15.0	13.5	11.6	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	1	7.6	0.002	1321.5	9000	1.6	2.0	1.8	15.0
41730	15.0	13.3	11.8	14.7	8.1	0.0	0	0.0	1	0.0	0	0.0	1	8.0	0.002	1229.5	9000	1.3	2.0	1.9	15.0
41460	15.0	13.8	11.5	16.2	8.1	0.0	0	0.0	1	0.0	0	0.0	1	7.6	0.002	1329.0	9000	1.9	2.0	1.8	15.0
41280	12.5	11.2	16.5	14.3	5.2	0.3	0	0.0	1	0.0	0	0.0	1	8.2	0.004	852.1	9000	0.0	2.0	3.7	12.5
41080	14.0	12.8	19.9	12.1	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.7	0.007	874.2	9000	0.0	2.0	5.3	14.0
40825	21.0	12.4	18.0	11.5	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.2	0.007	1039.9	9000	0.5	2.0	4.4	21.0
40585	18.0	11.8	17.0	11.7	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.8	0.006	1005.9	9000	0.4	2.0	3.9	18.0
40335	15.0	11.4	11.1	14.5	5.2	0.3	0	0.0	1	0.0	0	0.0	1	7.1	0.002	1504.8	9000	2.2	2.0	1.7	15.0
40130	15.0	12.0	11.2	15.1	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.9	0.002	1636.5	9000	2.8	2.0	1.7	15.0
39945	15.0	11.9	10.3	16.1	5.2	0.3	0	0.0	1	0.0	0	0.0	1	7.6	0.001	1648.1	9000	3.0	2.0	1.4	15.0
39755	18.0	12.2	15.4	13.5	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.6	0.003	1251.4	9000	1.5	2.0	3.2	18.0
39605	21.0	13.4	19.4	11.4	5.2	0.3	0	0.0	1	0.0	0	0.0	1	5.8	0.007	1100.6	9000	0.8	2.0	5.1	21.0
39310	18.0	12.2	16.0	12.4	5.2	0.3	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1204.5	9000	1.3	2.0	3.5	18.0
39100	15.0	11.2	12.4	14.1	5.2	0.3	0	0.0	1	0.0	0	0.0	1	7.8	0.002	1294.8	9000	1.6	2.0	2.1	15.0
38925	15.0	10.4	11.4	14.5	5.2	0.3	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1181.3	9000	1.2	2.0	1.8	15.0
38710	15.0	6.9	10.6	15.9	2.7	0.0	0	0.0	1	0.0	0	0.0	1	10.8	0.001	1043.1	9000	0.7	2.0	1.5	15.0
38475	12.5	9.0	17.8	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	8.8	0.004	755.4	9000	0.0	2.0	4.3	12.5
38300	14.0	9.6	22.7	9.8	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.010	688.1	9000	0.0	2.0	4.9	14.0
38065	10.0	7.4	14.1	14.2	2.7	0.0	0	0.0	1	0.0	0	0.0	1	12.0	0.002	678.3	9000	0.0	2.0	2.7	10.0
37810	14.0	9.2	18.2	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	1	10.2	0.004	622.3	9000	0.0	2.0	4.5	14.0
37655	14.0	9.8	21.2	10.3	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.009	735.9	9000	0.0	2.0	5.1	14.0
37390	14.0	7.8	23.9	6.1	2.7	0.0	0	0.0	1	0.0	0	0.0	1	5.4	0.017	892.2	9000	0.0	2.0	3.1	14.0
37135	18.0	9.1	17.0	8.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	6.4	0.006	1088.9	9000	0.5	2.0	3.9	18.0
36930	21.0	9.2	18.3	7.9	2.7	0.0	0	0.0	1	0.0	0	0.0	1	6.0	0.007	1112.0	9000	0.6	2.0	3.9	21.0
36735	18.0	8.6	15.0	9.6	2.7	0.0	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1195.7	9000	0.9	2.0	3.0	18.0
36515	18.0	9.7	16.7	9.6	2.7	0.0	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1306.1	9000	1.2	2.0	3.8	18.0
36265	15.0	8.4	13.9	11.2	2.7	0.0	0	0.0	1	0.0	0	0.0	1	6.4	0.003	1373.1	9000	1.4	2.0	2.3	15.0
36080	15.0	9.5	12.5	11.7	3.2	0.6	0	0.0	1	0.0	0	0.0	1	6.4	0.004	1455.4	9000	1.6	2.0	2.1	15.0
35845	15.0	9.4	10.9	13.5	3.2	0.6	0	0.0	1	0.0	0	0.0	1	7.4	0.002	1496.2	9000	2.1	2.0	1.6	15.0
35725	15.0	10.7	14.7	13.0	3.2	0.6	0	0.0	1	0.0	0	0.0	1	6.3	0.003	1431.2	9000	2.1	2.0	2.9	15.0
35515	18.0	11.4	17.1	11.9	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.7	0.005	1353.4	9000	1.8	2.0	3.9	18.0
35245	15.0	11.0	14.5	12.5	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.8	0.003	1555.5	9000	2.4	2.0	2.8	15.0
35040	21.0	12.6	19.5	10.7	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1355.9	9000	1.7	2.0	5.1	21.0
34860	21.0	11.5	18.1	10.1	3.2	0.6	0	0.0	1	0.0	0	0.0	1	4.8	0.008	1338.9	9000	1.3	2.0	4.4	21.0
34720	21.0	11.6	18.2	9.3	3.2	0.6	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1411.5	9000	1.4	2.0	4.4	21.0
34495	21.0	11.2	18.1	8.9	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.0	0.009	1277.2	9000	1.0	2.0	4.4	21.0
34310	18.0	11.1	17.6	9.0	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.7	0.005	1280.8	9000	1.1	2.0	4.2	18.0
34090	18.0	10.7	17.2	8.6	3.2	0.6	0	0.0	1	0.0	0	0.0	1	5.4	0.007	1267.8	9000	1.0	2.0	4.0	18.0
33880	18.0	9.9	15.8	9.8	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.6	0.005	1310.6	9000	1.2	2.0	3.3	18.0
33710	18.0	10.3	16.5	9.4	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.2	0.007	1355.1	9000	1.3	2.0	3.7	18.0
33500	18.0	10.3	15.8	9.5	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.4	0.006	1474.3	9000	1.5	2.0	3.4	18.0
33310	18.0	10.9	15.9	9.1	3.4	0.0	0	0.0	1	0.0	0	0.0	1	4.2	0.006	1744.5	9000	2.1	2.0	3.4	18.0
33115	18.0	10.1	15.5	8.7	3.4	0.0	0	0.0	1	0.0	0	0.0	1	4.8	0.009	1573.2	9000	1.5	2.0	3.3	18.0
32795	15.0	9.7	12.2	11.0	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.5	0.003	1732.9	9000	2.3	2.0	2.0	15.0
32605	15.0	9.5	14.1	11.5	3.4	0.0	0	0.0	1	0.0	0	0.0	1	6.2	0.004	1344.6	9000	1.4	2.0	2.7	15.0
32265	18.0	10.2	16.7	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.6	0.007	1829.9	9000	2.5	2.0	3.8	18.0
31875	15.0	8.9	10.9	11.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.2	0.004	2482.2	9000	3.3	2.0	1.6	15.0
31585	18.0	10.6	16.6	9.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.0	0.009	2120.3	9000	2.9	2.0	3.7	18.0
31360	12.0	8.3	9.8	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.8	0.001	1884.4	9000	3.0	2.0	1.3	12.0
31060	12.0	7.6	7.9	15.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.5	0.001	1711.5	9000	2.7	2.0	0.8	12.0
30720	12.0	8.1	6.4	18.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.6	0.000	1891.7	9000	3.5	2.0	0.6	12.0
30445	12.0	8.0	6.0	19.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	13.1	0.000	1783.7	9000	3.5	2.0	0.5	12.0
30095	12.0	8.7	6.6	21.7	2.0	0.0	0	0.0	1	0.0	0	0.0	1	12.7	0.000	1730.3	9000	4.1	2.0	0.6	12.0
29815	12.0	9.1	7.7	22.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.7	0.000	1675.2	9000	4.3	2.0	0.8	12.0
29565	12.0	9.4	7.4	23.3	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.8	0.000	1717.4	9000	4.6	2.0	0.7	12.0
29385	12.0	9.8	8.5	24.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.8	0.000	1675.1	9000	4.8	2.0	1.0	12.0
29140	15.1	15.1	10.1	24.3	4.4	2.9	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1557.6	9000	4.4	2.0	1.4	15.0
28895	21.0	16.1	19.7	22.4	4.4	2.9	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1062.3	9000	1.6	2.0	5.2	21.0
28695	17.3	17.3	27.5	16.0	4.4	2.9	0	0.0	1	0.0	0	0.0	1	9.4	0.009	544.9	9000	0.0	2.0	8.0	14.0
28500	16.1	16.1	28.6	13.6	4.4	2.9	0	0.0	1	0.0	0	0.0	1	9.8	0.010	503.7	9000	0.0	2.0	6.8	14.0
28280	15.2	15.2	29.7	11.8	4.4	2.9	0	0.0	1	0.0	0	0.0	1	8.8	0.011	549.3	9000	0.0	2.0	5.9	14.0
28080	15.0	15.0	28.1	11.4	4.4	2.9	0	0.0	1	0.0	0	0.0	1	9.2	0.011	547.6	9000	0.0	2.0	5.7	14.0
27925	13.6	13.6	18.0	17.5	4.4	2.9	0	0.0	1	0.0	0	0.0	1	13.0	0.002	612.7	9000	0.0	2.0	4.3	12.5
27725	15.0	15.0	20.5	16.3	4.4	2.9	0	0.0	1	0.0	0	0.0	1	12.1	0.003	587.1	9000	0.0	2.0	5.7	14.0
27545	15.9	15.9	24.7	13.2	4.4	2.9	0	0.0	1	0.0	0	0.0	1	9.5	0.007	613.0	9000	0.0	2.0	6.6	14.0
27335	15.3	15.3	25.5	12.0	4.4	2.9	0	0.0	1	0.0	0	0.0	1	8.1	0.008	691.0	9000	0.0	2.0	6.0	14.0
27155	15.9	15.9	22.3	13.2	4.4	2.9	0	0.0	1	0.0	0	0.0	1	8.0	0.005	856.6	9000	0.0	2.0	6.6	14.0
26990	21.0	10.5	23.5	11.2	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.0	0.010	1008.2	9000	0.5	2.0	5.6	21.0
26780	21.0	10.9	23.9	11.0	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.6	0.010	1131.7	9000	1.0	2.0	5.5	21.0
26575	21.0	15.2	21.0	11.0	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.5	0.013	1216.4	3000	5.3	2.0	5.5	21.0
26355	18.0	14.8	15.8	13.4	2.0	0.4	0	0.0	1	0.0	0	0.0	1	7.5	0.003	1282.4	3000	7.0	2.0	3.4	18.0
26170	18.0	16.5	18.0	13.0	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.8	0.004	1347.9	3000	7.7	2.0	4.4	18.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET FROM SAM
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_f=LOW-FLOW INCISEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{SS}+	Z+	H/2	Z_{OW}=
25965	18.0	16.1	17.9	13.0	2.0	0.4	0	0.0	1	0.0	0	0.0	1	7.0	0.004	1288.3	3000	7.4	2.0	4.3	18.0
25785	21.0	16.6	19.5	11.7	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.2	0.005	1336.9	3000	7.0	2.0	5.2	21.0
25600	21.0	18.4	20.6	11.3	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1596.5	3000	8.3	2.0	5.6	21.0
25425	21.0	18.5	20.0	11.3	2.0	0.4	0	0.0	1	0.0	0	0.0	1	4.4	0.008	1773.8	3000	8.7	2.0	5.4	21.0
25215	16.3	16.3	14.5	13.6	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.1	0.003	1748.6	3000	9.0	2.0	2.8	15.0
25000	19.0	19.0	17.4	12.2	2.0	0.4	0	0.0	1	0.0	0	0.0	1	4.4	0.006	2103.2	3000	10.5	2.0	4.1	18.0
24795	21.0	19.7	19.0	11.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	3.9	0.007	2311.7	3000	10.8	2.0	4.9	21.0
24550	21.0	19.6	21.3	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	3.8	0.009	2227.0	3000	10.2	2.0	5.4	21.0
24335	17.0	17.0	14.5	13.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.7	0.003	2089.5	3000	10.2	2.0	2.8	15.0
24115	21.0	17.5	18.8	11.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.5	0.008	2015.8	3000	8.7	2.0	4.8	21.0
23975	21.0	16.6	19.0	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.6	0.008	1913.7	3000	7.7	2.0	4.9	21.0
23755	18.0	15.8	16.7	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.1	0.006	1935.4	3000	8.0	2.0	3.8	18.0
23565	16.1	16.1	14.5	12.7	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.6	0.004	2039.5	3000	9.3	2.0	2.8	15.0
23365	18.0	15.3	17.0	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.4	0.006	1781.4	3000	7.4	2.0	3.9	18.0
23180	15.5	15.5	13.2	11.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.6	0.002	2084.2	3000	9.2	2.0	2.3	15.0
23000	13.0	13.0	8.9	13.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.7	0.001	2069.1	3000	7.9	2.0	1.1	12.0
22790	13.0	13.0	9.4	13.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.8	0.001	1949.0	3000	7.8	2.0	1.2	12.0
22600	15.0	15.0	11.4	14.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.9	0.001	1865.2	3000	9.3	2.0	1.7	15.0
22415	15.0	14.6	11.8	14.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.1	0.002	1705.6	3000	8.7	2.0	1.9	15.0
22195	15.0	14.4	14.1	13.7	2.0	0.6	0	0.0	1	0.0	0	0.0	1	7.8	0.003	1322.2	3000	7.1	2.0	2.7	15.0
22010	18.0	16.2	16.0	14.4	2.0	0.6	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1328.0	3000	8.2	2.0	3.5	18.0
21790	21.0	15.7	19.7	11.6	2.0	0.6	0	0.0	1	0.0	0	0.0	1	6.5	0.006	1145.7	3000	5.9	2.0	5.2	21.0
21615	21.0	13.0	21.4	8.5	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.8	0.010	1161.3	3000	4.2	2.0	4.3	21.0
21440	21.0	16.0	20.1	9.7	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.0	0.008	1574.6	3000	6.6	2.0	4.8	21.0
21225	21.0	19.5	19.5	10.6	2.0	0.6	0	0.0	1	0.0	0	0.0	1	3.9	0.008	2217.7	3000	9.7	2.0	5.1	21.0
21020	21.0	15.5	20.8	8.9	2.0	0.6	0	0.0	1	0.0	0	0.0	1	4.6	0.009	1676.4	3000	6.5	2.0	4.4	21.0
20845	18.1	18.1	17.1	10.4	2.0	0.6	0	0.0	1	0.0	0	0.0	1	4.2	0.006	2369.3	3000	9.6	2.0	3.9	18.0
20595	18.0	18.0	15.2	10.9	2.0	0.6	0	0.0	1	0.0	0	0.0	1	4.7	0.003	2463.7	3000	10.3	2.0	3.1	18.0
20435	18.2	18.2	12.9	12.2	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.4	0.002	2582.7	3000	11.3	2.0	2.3	15.0
20280	18.2	18.2	14.0	11.8	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.0	0.003	2589.6	3000	11.0	2.0	2.6	15.0
20070	21.0	15.9	20.2	9.2	2.0	0.6	0	0.0	1	0.0	0	0.0	1	4.7	0.009	1767.5	3000	6.7	2.0	4.6	21.0
19855	18.0	16.2	17.8	9.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.8	0.006	1975.1	3000	7.9	2.0	4.3	18.0
19630	18.0	14.9	17.9	8.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.9	0.006	1836.2	3000	6.6	2.0	4.3	18.0
19440	15.0	14.8	11.9	12.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.5	0.002	2095.3	3000	8.9	2.0	1.9	15.0
19240	15.3	15.3	13.9	11.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.6	0.003	2081.7	3000	8.7	2.0	2.6	15.0
19050	15.0	14.7	11.0	12.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.7	0.002	2160.8	3000	9.1	2.0	1.6	15.0
18830	15.6	15.6	10.7	14.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.1	0.002	2094.4	3000	10.1	2.0	1.5	15.0
18650	15.5	15.5	9.9	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.0	0.001	2022.7	3000	10.1	2.0	1.3	12.0
18475	14.6	14.6	8.1	16.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1944.4	3000	9.7	2.0	0.9	12.0
18290	14.9	14.9	8.7	16.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1843.7	3000	9.9	2.0	1.0	12.0
18025	8.0	4.8	7.8	18.2	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.5	0.001	1610.9	17000	0.0	2.0	0.8	8.0
17785	8.0	5.0	8.7	19.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.6	0.001	1417.5	17000	0.0	2.0	1.0	8.0
17510	10.0	7.8	14.0	18.0	2.0	1.2	0	0.0	1	0.0	0	0.0	1	8.5	0.002	1243.6	17000	0.0	2.0	2.6	10.0
17360	12.5	9.1	17.0	16.9	2.0	1.2	0	0.0	1	0.0	0	0.0	1	8.9	0.004	936.6	17000	0.0	2.0	3.9	12.5
17110	14.0	11.6	21.7	15.4	2.0	1.2	0	0.0	1	0.0	0	0.0	1	5.6	0.006	1274.3	17000	0.0	2.0	6.4	14.0
16970	14.0	12.0	22.9	13.6	2.0	1.2	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1125.6	17000	0.0	2.0	6.8	14.0
16720	14.0	9.7	25.2	9.0	2.0	1.2	0	0.0	1	0.0	0	0.0	1	4.1	0.018	1404.6	17000	0.0	2.0	4.5	14.0
16515	14.0	10.0	21.5	9.5	2.0	1.2	0	0.0	1	0.0	0	0.0	1	4.3	0.012	1622.6	17000	0.0	2.0	4.8	14.0
16305	21.0	10.3	21.5	9.6	2.0	1.2	0	0.0	1	0.0	0	0.0	1	4.2	0.011	1812.8	17000	0.3	2.0	4.8	21.0
16130	18.0	9.2	16.1	10.2	2.0	1.2	0	0.0	1	0.0	0	0.0	1	5.2	0.005	1945.1	17000	0.5	2.0	3.5	18.0
15960	18.0	9.3	15.8	9.3	2.0	1.2	0	0.0	1	0.0	0	0.0	1	4.1	0.011	2180.9	17000	0.7	2.0	3.4	18.0
15745	15.0	7.7	10.9	10.6	2.0	1.2	0	0.0	1	0.0	0	0.0	1	5.7	0.003	2279.0	17000	0.9	2.0	1.6	15.0
15540	15.0	7.8	11.0	10.6	2.0	1.2	0	0.0	1	0.0	0	0.0	1	5.8	0.003	2324.2	17000	1.0	2.0	1.6	15.0
15335	15.0	8.3	12.7	10.5	2.0	1.2	0	0.0	1	0.0	0	0.0	1	4.9	0.005	2302.1	17000	1.0	2.0	2.2	15.0
15125	12.5	8.1	16.2	9.6	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.5	0.007	1618.5	17000	0.0	2.0	3.5	12.5
14900	15.0	7.5	14.5	10.4	2.0	0.6	0	0.0	1	0.0	0	0.0	1	6.1	0.004	1704.5	17000	0.1	2.0	2.9	15.0
14720	18.0	8.6	16.8	9.3	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.1	0.008	1763.5	17000	0.1	2.0	3.8	18.0
14480	15.0	7.6	14.3	10.2	2.0	0.6	0	0.0	1	0.0	0	0.0	1	6.0	0.004	1801.7	17000	0.2	2.0	2.7	15.0
14315	15.0	7.8	14.8	9.4	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1868.1	17000	0.3	2.0	3.0	15.0
14090	15.0	7.3	13.8	9.0	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.9	0.005	1766.8	17000	0.1	2.0	2.6	15.0
13850	18.0	8.0	15.6	8.4	2.0	0.6	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1727.3	17000	0.1	2.0	3.3	18.0
13635	12.5	7.8	15.4	10.3	2.0	0.6	0	0.0	1	0.0	0	0.0	1	6.4	0.004	1691.9	17000	0.0	2.0	3.2	12.5
13425	18.0	8.9	17.3	8.3	2.0	0.6	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1854.4	17000	0.3	2.0	4.0	18.0
13190	15.0	6.9	12.2	9.5	2.0	0.6	0	0.0	1	0.0	0	0.0	1	6.4	0.003	1847.3	17000	0.3	2.0	2.0	15.0
13030	15.0	6.9	14.2	9.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1763.0	17000	0.2	2.0	2.7	15.0
12835	10.0	6.4	13.3	10.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	6.1	12.4	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.7	0.002	1471.0	17000	0.0	2.0	2.1	10.0
12395	10.0	6.0	12.3	11.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1438.4	17000	0.0	2.0	2.0	10.0
12195	10.0	5.5	10.6	12.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.3	0.001	1389.3	17000	0.0	2.0	1.5	10.0
11995	10.0	6.2	12.7	13.7	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.8	0.002	1281.1	17000	0.0	2.0	2.2	10.0
11780	10.0	6.1	12.5	14.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1400.9	17000	0.0	2.0	2.1	10.0
11605	10.0	6.7	14.1	13.7	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.7	0.002	1282.9	17000	0.0	2.0	2.7	10.0
11405	10.0	6.3	13.2	15.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.1	0.002	1130.2	17000	0.0	2.0	2.3	10.0
11180	12.5	7.7	16.6	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.0	10.3	19.1	13.3	2.0	1.4	0	0.0	1	0.0	0	0.0	1	11.0	0.004	679.4	17000	0.0	2.0	4.9	14.0
10835	14.0	10.8	21.9	10.9	2.0	1.4	0	0.0	1	0.0	0	0.0	1	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	14.0	9.1	24.1	7.5	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	14.0	9.8	22.7	8.8	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.8	0.008	1247.1	17000	0.0	2.0	4.4	14.0
10225	12.5	9.7	17.8	9.5	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.9	0.007	1373.8	17000	0.0	2.0	4.3	12.5
10000	10.0	8.4	14.9	11.1	2.0	1.4	0	0.0	1	0.0	0	0.0	1	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.0	10.1	18.6	10.0	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1336.6	17000	0.0	2.0	4.7	14.0
9595	10.0	8.3	14.6	10.3	2.0	1.4	0	0.0	1	0.0	0	0.0	1	6.6	0.005	1619.7	17000	0.0	2.0	2.9	10.0
9385	18.0	8.9	15.8	9.5	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.3	0.006	1770.4	17000	0.2	2.0	3.4	18.0
9220	18.0	9.2	16.4	8.9	2.0	1.4	0	0.0	1	0.0	0	0.0	1	4.9	0.008	1771.4	17000	0.1	2.0	3.6	18.0
9025	18.0	8.9	15.9	8.9	2.0	1.4	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1736.9	17000	0.1	2.0	3.4	18.0
MAX=	21.0	19.7			8.1	2.9						0.0					17000.0	11.3	2.0	8.3	21.0
MIN=	8.0	4.8			2.0	0.0						0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER EXISTING CONDITIONS STRAIGHT-INSIDE CURVED REACH Q_{100} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
46195	14.0	11.1	21.7	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	14.0	12.7	24.1	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	14.0	10.4	20.3	19.2	2.8	0.0	0	0.0	1	0.0	0	0.0	0	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	14.0	13.1	26.1	16.5	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	14.0	9.8	19.2	21.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	14.0	12.5	26.2	15.4	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	15.4	15.4	19.9	19.5	8.1	0.0	0	0.0	1	0.0	0	0.0	0	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	17.0	17.0	26.7	13.8	8.1	0.0	0	0.0	1	0.0	0	0.0	0	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	15.8	15.8	28.8	11.3	8.1	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	16.3	16.3	26.1	12.4	8.1	0.0	0	0.0	1	0.0	0	0.0	0	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	15.5	15.5	26.6	10.8	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	15.4	15.4	24.1	10.6	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.5	0.016	878.5	9000	0.0	2.0	5.3	14.0
42590	14.6	14.6	22.6	8.9	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.1	0.014	1023.2	9000	0.0	2.0	4.5	14.0
42430	14.9	14.9	20.8	9.6	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.9	0.012	1067.5	9000	0.0	2.0	4.8	14.0
42215	11.6	11.6	10.4	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	0	8.5	0.002	1310.4	9000	0.0	2.0	1.5	10.0
41940	11.9	11.9	11.6	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	0	7.6	0.002	1321.5	9000	0.0	2.0	1.8	10.0
41730	12.0	12.0	11.8	14.7	8.1	0.0	0	0.0	1	0.0	0	0.0	0	8.0	0.002	1229.5	9000	0.0	2.0	1.9	10.0
41460	11.9	11.9	11.5	16.2	8.1	0.0	0	0.0	1	0.0	0	0.0	0	7.6	0.002	1329.0	9000	0.0	2.0	1.8	10.0
41280	12.5	11.2	16.5	14.3	5.2	0.3	0	0.0	1	0.0	0	0.0	0	8.2	0.004	852.1	9000	0.0	2.0	3.7	12.5
41080	14.0	12.8	19.9	12.1	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.7	0.007	874.2	9000	0.0	2.0	5.3	14.0
40825	14.0	11.9	18.0	11.5	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.2	0.007	1039.9	9000	0.0	2.0	4.4	14.0
40585	12.5	11.4	17.0	11.7	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.8	0.006	1065.9	9000	0.0	2.0	3.9	12.5
40335	10.0	9.2	11.1	14.5	5.2	0.3	0	0.0	1	0.0	0	0.0	0	7.1	0.002	1504.8	9000	0.0	2.0	1.7	10.0
40130	10.0	9.2	11.2	15.1	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.9	0.002	1636.5	9000	0.0	2.0	1.7	10.0
39945	10.0	8.9	10.3	16.1	5.2	0.3	0	0.0	1	0.0	0	0.0	0	7.6	0.001	1648.1	9000	0.0	2.0	1.4	10.0
39755	12.5	10.7	15.4	13.5	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.6	0.003	1251.4	9000	0.0	2.0	3.2	12.5
39605	14.0	12.6	19.4	11.4	5.2	0.3	0	0.0	1	0.0	0	0.0	0	5.8	0.007	1100.6	9000	0.0	2.0	5.1	14.0
39310	12.5	11.0	16.0	12.4	5.2	0.3	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1204.5	9000	0.0	2.0	3.5	12.5
39100	10.0	9.6	12.4	14.1	5.2	0.3	0	0.0	1	0.0	0	0.0	0	7.8	0.002	1294.8	9000	0.0	2.0	2.1	10.0
38925	10.0	9.3	11.4	14.5	5.2	0.3	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1181.3	9000	0.0	2.0	1.8	10.0
38710	10.0	6.2	10.6	15.9	2.7	0.0	0	0.0	1	0.0	0	0.0	0	10.8	0.001	1043.1	9000	0.0	2.0	1.5	10.0
38475	12.5	9.0	17.8	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	0	8.8	0.004	755.4	9000	0.0	2.0	4.3	12.5
38300	14.0	9.6	22.7	9.8	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.010	688.1	9000	0.0	2.0	4.9	14.0
38065	10.0	7.4	14.1	14.2	2.7	0.0	0	0.0	1	0.0	0	0.0	0	12.0	0.002	678.3	9000	0.0	2.0	2.7	10.0
37810	14.0	9.2	18.2	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	0	10.2	0.004	622.3	9000	0.0	2.0	4.5	14.0
37655	14.0	9.8	21.2	10.3	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.009	735.9	9000	0.0	2.0	5.1	14.0
37390	14.0	7.8	23.9	6.1	2.7	0.0	0	0.0	1	0.0	0	0.0	0	5.4	0.017	892.2	9000	0.0	2.0	3.1	14.0
37135	12.5	8.6	17.0	8.0	2.7	0.0	0	0.0	1	0.0	0	0.0	0	6.4	0.006	1088.9	9000	0.0	2.0	3.9	12.5
36930	14.0	8.6	18.3	7.9	2.7	0.0	0	0.0	1	0.0	0	0.0	0	6.0	0.007	1112.0	9000	0.0	2.0	3.9	14.0
36735	12.5	7.7	15.0	9.6	2.7	0.0	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1195.7	9000	0.0	2.0	3.0	12.5
36515	12.5	8.5	16.7	9.6	2.7	0.0	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1306.1	9000	0.0	2.0	3.8	12.5
36265	10.0	7.0	13.0	11.2	2.7	0.0	0	0.0	1	0.0	0	0.0	0	6.4	0.003	1373.1	9000	0.0	2.0	2.3	10.0
36080	10.0	7.9	12.5	11.7	3.2	0.6	0	0.0	1	0.0	0	0.0	0	6.4	0.004	1455.4	9000	0.0	2.0	2.1	10.0
35845	10.0	7.4	10.9	13.5	3.2	0.6	0	0.0	1	0.0	0	0.0	0	7.4	0.002	1048.2	9000	0.0	2.0	1.6	10.0
35725	10.0	8.7	14.7	13.0	3.2	0.6	0	0.0	1	0.0	0	0.0	0	6.3	0.003	1431.2	9000	0.0	2.0	2.9	10.0
35515	12.5	9.7	17.1	11.9	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.7	0.005	1353.4	9000	0.0	2.0	3.9	12.5
35245	10.0	8.6	14.5	12.5	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.8	0.003	1555.5	9000	0.0	2.0	2.8	10.0
35040	14.0	10.9	19.5	10.7	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1355.9	9000	0.0	2.0	5.1	14.0
34860	14.0	10.2	18.1	10.1	3.2	0.6	0	0.0	1	0.0	0	0.0	0	4.8	0.008	1338.9	9000	0.0	2.0	4.4	14.0
34720	14.0	10.2	18.2	9.3	3.2	0.6	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1411.5	9000	0.0	2.0	4.4	14.0
34495	14.0	10.2	18.1	8.9	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.0	0.009	1277.2	9000	0.0	2.0	4.4	14.0
34310	12.5	9.9	17.6	9.0	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.7	0.005	1280.8	9000	0.0	2.0	4.2	12.5
34090	12.5	9.7	17.2	8.6	3.2	0.6	0	0.0	1	0.0	0	0.0	0	5.4	0.007	1267.8	9000	0.0	2.0	4.0	12.5
33880	12.5	8.7	15.8	9.8	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.6	0.005	1310.6	9000	0.0	2.0	3.3	12.5
33710	12.5	9.1	16.5	9.4	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.2	0.007	1355.1	9000	0.0	2.0	3.7	12.5
33500	12.5	8.7	15.8	9.5	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.4	0.006	1474.3	9000	0.0	2.0	3.4	12.5
33310	12.5	8.8	15.9	9.1	3.4	0.0	0	0.0	1	0.0	0	0.0	0	4.2	0.006	1744.5	9000	0.0	2.0	3.4	12.5
33115	12.5	8.6	15.5	8.7	3.4	0.0	0	0.0	1	0.0	0	0.0	0	4.8	0.009	1573.2	9000	0.0	2.0	3.3	12.5
32795	10.0	7.4	12.2	11.0	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.5	0.003	1732.9	9000	0.0	2.0	2.0	10.0
32605	10.0	8.0	14.1	11.5	3.4	0.0	0	0.0	1	0.0	0	0.0	0	6.2	0.004	1344.6	9000	0.0	2.0	2.7	10.0
32265	12.5	7.8	16.7	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.6	0.007	1829.9	9000	0.0	2.0	3.8	12.5
31875	10.0	5.6	10.9	11.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.2	0.004	2482.2	9000	0.0	2.0	1.6	10.0
31585	12.5	7.7	16.6	9.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.0	0.009	2120.3	9000	0.0	2.0	3.7	12.5
31360	8.0	5.3	9.8	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.8	0.001	1884.4	9000	0.0	2.0	1.3	8.0
31060	8.0	4.8	7.9	15.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.5	0.001	1711.5	9000	0.0	2.0	0.8	8.0
30720	8.0	4.6	6.4	18.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.6	0.000	1891.7	9000	0.0	2.0	0.6	8.0
30445	8.0	4.5	6.0	19.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	13.1	0.000	1783.7	9000	0.0	2.0	0.5	8.0
30095	8.0	4.6	6.6	21.7	2.0	0.0	0	0.0	1	0.0	0	0.0	0	12.7	0.000	1730.3	9000	0.0	2.0	0.6	8.0
29815	8.0	4.8	7.7	22.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.7	0.000	1675.2	9000	0.0	2.0	0.8	8.0
29565	8.0	4.7	7.4	23.3	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.8	0.000	1717.4	9000	0.0	2.0	0.7	8.0
29385	8.0	5.0	8.5	24.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.8	0.000	1675.1	9000	0.0	2.0	1.0	8.0
29140	10.6	10.6	10.1	24.3	4.4	2.9	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1557.6	9000	0.0	2.0	1.4	10.0
28895	14.5	14.5	19.7	22.4	4.4	2.9	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1062.3	9000	0.0	2.0	5.2	14.0
28695	17.3	17.3	27.5	16.0	4.4	2.9	0	0.0	1	0.0	0	0.0	0	9.4	0.009	544.9	9000	0.0	2.0	8.0	14.0
28500	16.1	16.1	28.6	13.6	4.4	2.9	0	0.0	1	0.0	0	0.0	0	9.8	0.010	503.7	9000	0.0	2.0	6.8	14.0
28280	15.2	15.2	29.7	11.8	4.4	2.9	0	0.0	1	0.0	0	0.0	0	8.8	0.011	549.3	9000	0.0	2.0	5.9	14.0
28080	15.0	15.0	28.1	11.4	4.4	2.9	0	0.0	1	0.0	0	0.0	0	9.2	0.011	547.6	9000	0.0	2.0	5.7	14.0
27925	13.6	13.6	18.0	17.5	4.4	2.9	0	0.0	1	0.0	0	0.0	0	13.0	0.002	612.7	9000	0.0	2.0	4.3	12.5
27725	15.0	15.0	20.5	16.3	4.4	2.9	0	0.0	1	0.0	0	0.0	0	12.1	0.003	587.1	9000	0.0	2.0	5.7	14.0
27545	15.9	15.9	24.7	13.2	4.4	2.9	0	0.0	1	0.0	0	0.0	0	9.5	0.007	613.0	9000	0.0	2.0	6.6	14.0
27335	15.3	15.3	25.5	12.0	4.4	2.9	0	0.0	1	0.0	0	0.0	0	8.1	0.008	691.0	9000	0.0	2.0	6.0	14.0
27155	15.9	15.9	22.3	13.2	4.4	2.9	0	0.0	1	0.0	0	0.0	0	8.0	0.005	856.6	9000	0.0	2.0	6.6	14.0
26990	14.0	10.0	23.5	11.2	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.0	0.010	1008.2	9000	0.0	2.0	5.6	14.0
26780	14.0	9.9	23.9	11.0	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.6	0.010	1131.7	9000	0.0	2.0	5.5	14.0
26575	14.0	9.9	21.0	11.0	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.5	0.013	1216.4	3000	0.0	2.0	5.5	14.0
26355	12.5	7.8	15.8	13.4	2.0	0.4	0	0.0	1	0.0	0	0.0	0	7.5	0.003	1282.4	3000	0.0	2.0	3.4	12.5
26170	12.5	8.8	18.0	13.0	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.8	0.004	1347.9	3000	0.0	2.0	4.4	12.5
25965	12.5	8.7	17.9	13.0	2.0	0.4	0	0.0	1	0.0	0	0.0	0	7.0	0.004	1288.3	3000	0.0	2.0	4.3	12.5

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET FROM SAM
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z=FLOW MEASEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25785	14.0	9.6	19.5	11.7	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.2	0.005	1336.9	3000	0.0	2.0	5.2	14.0
25600	14.0	10.0	20.6	11.3	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1596.5	3000	0.0	2.0	5.6	14.0
25425	14.0	9.8	20.0	11.3	2.0	0.4	0	0.0	1	0.0	0	0.0	0	4.4	0.008	1773.8	3000	0.0	2.0	5.4	14.0
25215	10.0	7.2	14.5	13.6	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.1	0.003	1748.6	3000	0.0	2.0	2.8	10.0
25000	12.5	8.5	17.4	12.2	2.0	0.4	0	0.0	1	0.0	0	0.0	0	4.4	0.006	2103.2	3000	0.0	2.0	4.1	12.5
24795	14.0	8.9	19.0	11.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	3.9	0.007	2311.7	3000	0.0	2.0	4.9	14.0
24550	14.0	9.4	21.3	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	3.8	0.009	2227.0	3000	0.0	2.0	5.4	14.0
24335	10.0	6.8	14.5	13.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.7	0.003	2089.5	3000	0.0	2.0	2.8	10.0
24115	14.0	8.8	18.8	11.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.5	0.008	2015.8	3000	0.0	2.0	4.8	14.0
23975	14.0	8.9	19.0	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.6	0.008	1913.7	3000	0.0	2.0	4.9	14.0
23755	12.5	7.8	16.7	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.1	0.006	1935.4	3000	0.0	2.0	3.8	12.5
23565	10.0	6.8	14.5	12.7	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.6	0.004	2039.5	3000	0.0	2.0	2.8	10.0
23365	12.5	7.9	17.0	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.4	0.006	1781.4	3000	0.0	2.0	3.9	12.5
23180	10.0	6.3	13.2	11.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.6	0.002	2084.2	3000	0.0	2.0	2.3	10.0
23000	8.0	5.1	8.9	13.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.7	0.001	2069.1	3000	0.0	2.0	1.1	8.0
22790	8.0	5.2	9.4	13.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.8	0.001	1949.0	3000	0.0	2.0	1.2	8.0
22600	10.0	5.7	11.4	14.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.9	0.001	1865.2	3000	0.0	2.0	1.7	10.0
22415	10.0	5.9	11.8	14.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.1	0.002	1705.6	3000	0.0	2.0	1.9	10.0
22195	10.0	7.3	14.1	13.7	2.0	0.6	0	0.0	1	0.0	0	0.0	0	7.8	0.003	1322.2	3000	0.0	2.0	2.7	10.0
22010	12.5	8.1	16.0	14.4	2.0	0.6	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1328.0	3000	0.0	2.0	3.5	12.5
21790	14.0	9.8	19.7	11.6	2.0	0.6	0	0.0	1	0.0	0	0.0	0	6.5	0.006	1145.7	3000	0.0	2.0	5.2	14.0
21615	14.0	8.9	21.4	8.5	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.8	0.010	1161.3	3000	0.0	2.0	4.3	14.0
21440	14.0	9.4	20.1	9.7	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.0	0.008	1574.6	3000	0.0	2.0	4.8	14.0
21225	14.0	9.7	19.5	10.6	2.0	0.6	0	0.0	1	0.0	0	0.0	0	3.9	0.008	2217.7	3000	0.0	2.0	5.1	14.0
21020	14.0	9.0	20.8	8.9	2.0	0.6	0	0.0	1	0.0	0	0.0	0	4.6	0.009	1676.4	3000	0.0	2.0	4.4	14.0
20845	12.5	8.5	17.1	10.4	2.0	0.6	0	0.0	1	0.0	0	0.0	0	4.2	0.006	2369.3	3000	0.0	2.0	3.9	12.5
20595	12.5	7.7	15.2	10.9	2.0	0.6	0	0.0	1	0.0	0	0.0	0	4.7	0.003	2463.7	3000	0.0	2.0	3.1	12.5
20435	10.0	6.9	12.9	12.2	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.4	0.002	2582.7	3000	0.0	2.0	2.3	10.0
20280	10.0	7.2	14.0	11.8	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.0	0.003	2589.6	3000	0.0	2.0	2.6	10.0
20070	14.0	9.2	20.2	9.2	2.0	0.6	0	0.0	1	0.0	0	0.0	0	4.7	0.009	1767.5	3000	0.0	2.0	4.6	14.0
19855	12.5	8.3	17.8	9.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.8	0.006	1975.1	3000	0.0	2.0	4.3	12.5
19630	12.5	8.3	17.9	8.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.9	0.006	1836.2	3000	0.0	2.0	4.3	12.5
19440	10.0	5.9	11.9	12.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.5	0.002	2095.3	3000	0.0	2.0	1.9	10.0
19240	10.0	6.6	13.9	11.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.6	0.003	2091.7	3000	0.0	2.0	2.6	10.0
19050	10.0	5.6	11.0	12.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.7	0.002	2160.8	3000	0.0	2.0	1.6	10.0
18830	10.0	5.5	10.7	14.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.1	0.002	2094.4	3000	0.0	2.0	1.5	10.0
18650	8.0	5.3	9.9	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.0	0.001	2022.7	3000	0.0	2.0	1.3	8.0
18475	8.0	4.9	8.1	16.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1944.4	3000	0.0	2.0	0.9	8.0
18290	8.0	5.0	8.7	16.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1843.7	3000	0.0	2.0	1.0	8.0
18025	8.0	4.6	7.8	19.2	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.5	0.001	1610.9	17000	0.0	2.0	0.8	8.0
17785	8.0	5.0	8.7	19.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.6	0.001	1417.5	17000	0.0	2.0	1.0	8.0
17510	10.0	7.8	14.0	18.0	2.0	1.2	0	0.0	1	0.0	0	0.0	0	8.5	0.002	1243.6	17000	0.0	2.0	2.6	10.0
17360	12.5	9.1	17.0	16.9	2.0	1.2	0	0.0	1	0.0	0	0.0	0	8.9	0.004	936.6	17000	0.0	2.0	3.9	12.5
17110	14.0	11.6	21.7	15.4	2.0	1.2	0	0.0	1	0.0	0	0.0	0	5.6	0.006	1274.3	17000	0.0	2.0	6.4	14.0
16970	14.0	12.0	22.9	13.6	2.0	1.2	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1125.6	17000	0.0	2.0	6.8	14.0
16720	14.0	9.7	25.2	9.0	2.0	1.2	0	0.0	1	0.0	0	0.0	0	4.1	0.018	1404.6	17000	0.0	2.0	4.5	14.0
16515	14.0	10.0	21.5	9.5	2.0	1.2	0	0.0	1	0.0	0	0.0	0	4.3	0.012	1622.6	17000	0.0	2.0	4.8	14.0
16305	14.0	10.0	21.5	9.6	2.0	1.2	0	0.0	1	0.0	0	0.0	0	4.2	0.011	1812.5	17000	0.0	2.0	4.8	14.0
16130	12.5	8.7	16.1	10.2	2.0	1.2	0	0.0	1	0.0	0	0.0	0	5.2	0.005	1945.1	17000	0.0	2.0	3.5	12.5
15960	12.5	8.6	15.8	9.3	2.0	1.2	0	0.0	1	0.0	0	0.0	0	4.1	0.011	2180.9	17000	0.0	2.0	3.4	12.5
15745	10.0	6.8	10.9	10.6	2.0	1.2	0	0.0	1	0.0	0	0.0	0	5.7	0.003	2279.0	17000	0.0	2.0	1.6	10.0
15540	10.0	6.8	11.0	10.6	2.0	1.2	0	0.0	1	0.0	0	0.0	0	5.8	0.003	2324.2	17000	0.0	2.0	1.6	10.0
15335	10.0	7.4	12.7	10.5	2.0	1.2	0	0.0	1	0.0	0	0.0	0	4.9	0.005	2302.1	17000	0.0	2.0	2.2	10.0
15125	12.5	8.1	16.2	9.6	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.5	0.007	1618.5	17000	0.0	2.0	3.5	12.5
14900	10.0	7.5	14.5	10.4	2.0	0.6	0	0.0	1	0.0	0	0.0	0	6.1	0.004	1704.5	17000	0.0	2.0	2.9	10.0
14720	12.5	8.4	16.8	9.3	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.1	0.008	1763.5	17000	0.0	2.0	3.8	12.5
14480	10.0	7.3	14.3	10.2	2.0	0.6	0	0.0	1	0.0	0	0.0	0	6.0	0.004	1801.7	17000	0.0	2.0	2.7	10.0
14315	10.0	7.6	14.8	9.4	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1868.1	17000	0.0	2.0	3.0	10.0
14090	10.0	7.2	13.8	9.0	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.9	0.005	1766.8	17000	0.0	2.0	2.6	10.0
13850	12.5	7.9	15.6	8.4	2.0	0.6	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1727.3	17000	0.0	2.0	3.3	12.5
13635	12.5	7.8	15.4	10.3	2.0	0.6	0	0.0	1	0.0	0	0.0	0	6.4	0.004	1691.9	17000	0.0	2.0	3.2	12.5
13425	12.5	8.6	17.3	8.3	2.0	0.6	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1854.4	17000	0.0	2.0	4.0	12.5
13190	10.0	6.6	12.2	9.5	2.0	0.6	0	0.0	1	0.0	0	0.0	0	6.4	0.003	1847.3	17000	0.0	2.0	2.0	10.0
13030	10.0	6.7	14.2	9.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1763.0	17000	0.0	2.0	2.7	10.0
12835	10.0	6.4	13.3	10.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	6.1	12.4	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.7	0.002	1471.0	17000	0.0	2.0	2.1	10.0
12395	10.0	6.0	12.3	11.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1438.4	17000	0.0	2.0	2.0	10.0
12195	10.0	5.5	10.6	12.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.3	0.001	1399.3	17000	0.0	2.0	1.5	10.0
11995	10.0	6.2	12.7	13.7	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.8	0.002	1281.1	17000	0.0	2.0	2.2	10.0
11780	10.0	6.1	12.5	14.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1400.9	17000	0.0	2.0	2.1	10.0
11605	10.0	6.7	14.1	13.7	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.7	0.002	1282.9	17000	0.0	2.0	2.7	10.0
11405	10.0	6.3	13.2	15.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.1	0.002	1130.2	17000	0.0	2.0	2.3	10.0
11180	12.5	7.7	16.6	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.0	10.3	19.1	13.3	2.0	1.4	0	0.0	1	0.0	0	0.0	0	11.0	0.004	879.4	17000	0.0	2.0	4.9	14.0
10835	14.0	10.8	21.9	10.9	2.0	1.4	0	0.0	1	0.0	0	0.0	0	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	14.0	9.1	24.1	7.5	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	14.0	9.8	22.7	8.8	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.8	0.008	1247.1	17000	0.0	2.0	4.4	14.0
10225	12.5	9.7	17.8	9.5	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.9	0.007	1373.8	17000	0.0	2.0	4.3	12.5
10000	10.0	8.4	14.9	11.1	2.0	1.4	0	0.0	1	0.0	0	0.0	0	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.0	10.1	18.6	10.0	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1336.6	17000	0.0	2.0	4.7	14.0
9595	10.0	8.3	14.6	10.3	2.0	1.4	0	0.0	1	0.0	0	0.0	0	6.6	0.005	1619.7	17000	0.0	2.0	2.9	10.0
9385	12.5	8.8	15.8	9.5	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.3	0.006	1770.4	17000	0.0	2.0	3.4	12.5
9220	12.5	9.0	16.4	8.9	2.0	1.4	0	0.0	1	0.0	0	0.0	0	4.9	0.008	1771.4	17000	0.0	2.0	3.6	12.5
9025	12.5	8.8	15.9	8.9	2.0	1.4	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1736.9	17000	0.0	2.0	3.4	12.5
MAX=	17.3	17.3			8.1	2.9						0.0					17000.0	0.0	2.0	8.3	14.0
MIN=	8.0	4.5			2.0	0.0						0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER PROPOSED CONDITIONS OUTSIDE CURVED REACH Q_{-AP} n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z_f+	H/2	Z_{DM}=
46195	14.0	11.1	21.7	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	14.0	12.7	24.1	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	14.0	10.4	20.3	19.2	2.8	0.0	0	0.0	1	0.0	0	0.0	1	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	14.0	13.1	26.1	16.5	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	14.0	9.8	19.2	21.1	2.8	0.0	0	0.0	1	0.0	0	0.0	1	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	14.0	12.5	26.2	15.4	2.8	0.0	0	0.0	1	0.0	0	0.0	1	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	15.4	15.4	19.9	19.5	8.1	0.0	0	0.0	1	0.0	0	0.0	1	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	17.0	17.0	26.7	13.8	8.1	0.0	0	0.0	1	0.0	0	0.0	1	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	15.8	15.8	28.8	11.3	8.1	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	16.3	16.3	28.1	12.4	8.1	0.0	0	0.0	1	0.0	0	0.0	1	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	15.5	15.5	26.6	10.8	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	15.5	15.5	23.9	10.7	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.6	0.016	864.3	9000	0.0	2.0	5.4	14.0
42590	21.0	15.1	22.4	9.2	8.1	0.0	0	0.0	1	0.0	0	0.0	1	5.2	0.014	1013.1	9000	0.4	2.0	4.6	21.0
42430	21.0	15.4	19.6	10.7	8.1	0.0	0	0.0	1	0.0	0	0.0	1	6.4	0.009	915.8	9000	0.1	2.0	5.2	21.0
42215	21.0	15.2	18.5	11.2	8.1	0.0	0	0.0	1	0.0	0	0.0	1	6.1	0.009	1019.0	9000	0.5	2.0	4.6	21.0
41940	15.0	13.4	11.6	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	1	7.7	0.002	1284.2	9000	1.4	2.0	1.8	15.0
41730	15.0	13.2	11.8	14.7	8.1	0.0	0	0.0	1	0.0	0	0.0	1	8.2	0.002	1190.9	9000	1.2	2.0	1.9	15.0
41460	15.0	12.8	11.6	16.2	8.1	0.0	0	0.0	1	0.0	0	0.0	1	9.1	0.002	1093.5	9000	0.9	2.0	1.8	15.0
41280	12.5	10.9	16.4	14.4	5.2	0.1	0	0.0	1	0.0	0	0.0	1	8.3	0.004	852.3	9000	0.0	2.0	3.6	12.5
41080	14.0	12.7	19.9	12.1	5.2	0.1	0	0.0	1	0.0	0	0.0	1	6.7	0.008	874.1	9000	0.0	2.0	5.4	14.0
40825	21.0	12.2	18.0	11.5	5.2	0.1	0	0.0	1	0.0	0	0.0	1	6.2	0.007	1040.4	9000	0.5	2.0	4.4	21.0
40585	18.0	11.6	17.0	11.7	5.2	0.1	0	0.0	1	0.0	0	0.0	1	6.8	0.006	1005.8	9000	0.4	2.0	3.9	18.0
40335	15.0	10.2	10.5	15.1	5.2	0.1	0	0.0	1	0.0	0	0.0	1	8.8	0.002	1249.6	9000	1.4	2.0	1.5	15.0
40130	15.0	10.3	11.3	15.5	5.2	0.1	0	0.0	1	0.0	0	0.0	1	8.8	0.002	1195.6	9000	1.3	2.0	1.7	15.0
39945	15.0	10.2	11.0	16.3	5.2	0.1	0	0.0	1	0.0	0	0.0	1	9.3	0.002	1173.3	9000	1.3	2.0	1.6	15.0
39755	12.5	11.0	16.5	13.3	5.2	0.1	0	0.0	1	0.0	0	0.0	1	8.1	0.004	894.5	9000	0.0	2.0	3.7	12.5
39605	14.0	12.5	19.7	11.5	5.2	0.1	0	0.0	1	0.0	0	0.0	1	7.1	0.007	849.7	9000	0.0	2.0	5.2	14.0
39310	18.0	11.2	16.5	12.7	5.2	0.1	0	0.0	1	0.0	0	0.0	1	8.1	0.004	931.1	9000	0.2	2.0	3.7	18.0
39100	14.0	12.5	20.9	10.4	5.2	0.1	0	0.0	1	0.0	0	0.0	1	7.2	0.009	761.1	9000	0.0	2.0	5.2	14.0
38925	10.0	9.5	12.8	14.3	5.2	0.1	0	0.0	1	0.0	0	0.0	1	10.3	0.002	873.5	9000	0.0	2.0	2.2	10.0
38710	10.0	6.7	12.0	15.6	2.7	0.0	0	0.0	1	0.0	0	0.0	1	11.7	0.002	820.3	9000	0.0	2.0	2.0	10.0
38475	12.5	9.0	17.9	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	9.8	0.004	659.7	9000	0.0	2.0	4.3	12.5
38300	14.0	9.8	22.5	10.3	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.7	0.010	666.3	9000	0.0	2.0	5.1	14.0
38065	10.0	7.6	14.5	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	12.0	0.002	658.4	9000	0.0	2.0	2.9	10.0
37810	14.0	9.2	18.2	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	1	10.2	0.004	618.2	9000	0.0	2.0	4.5	14.0
37655	14.0	10.0	20.9	10.5	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.8	0.008	706.7	9000	0.0	2.0	5.3	14.0
37390	14.0	8.0	23.7	6.5	2.7	0.0	0	0.0	1	0.0	0	0.0	1	5.9	0.015	823.8	9000	0.0	2.0	3.3	14.0
37135	12.5	8.4	16.6	9.3	2.7	0.0	0	0.0	1	0.0	0	0.0	1	8.5	0.005	921.4	9000	0.0	2.0	3.7	12.5
36930	14.0	8.8	19.8	8.1	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.2	0.008	812.4	9000	0.0	2.0	4.1	14.0
36735	12.5	8.2	16.1	9.8	2.7	0.0	0	0.0	1	0.0	0	0.0	1	8.0	0.005	896.9	9000	0.0	2.0	3.5	12.5
36515	15.0	7.3	12.9	12.0	2.7	0.0	0	0.0	1	0.0	0	0.0	1	9.0	0.002	994.7	9000	0.4	2.0	2.2	15.0
36265	15.0	7.7	12.3	12.5	2.7	0.0	0	0.0	1	0.0	0	0.0	1	7.9	0.003	1176.0	9000	0.9	2.0	2.1	15.0
36080	22.9	22.9	14.7	11.6	3.2	0.7	0.9	2.0	1	0.0	0	13.3	1	6.7	0.006	1176.0	9000	0.9	2.0	2.9	15.0
35845	15.0	9.2	11.0	13.6	3.2	0.7	0	0.0	1	0.0	0	0.0	1	7.9	0.002	1401.7	9000	1.7	2.0	1.6	15.0
35725	15.0	10.7	15.0	13.0	3.2	0.7	0	0.0	1	0.0	0	0.0	1	6.5	0.004	1377.9	9000	1.8	2.0	3.0	15.0
35515	18.0	11.5	17.1	12.0	3.2	0.7	0	0.0	1	0.0	0	0.0	1	6.0	0.005	1354.8	9000	1.7	2.0	3.9	18.0
35245	18.0	11.4	17.3	11.3	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1328.3	9000	1.5	2.0	4.0	18.0
35040	21.0	12.7	19.6	10.7	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.5	0.006	1354.8	9000	1.7	2.0	5.2	21.0
34860	21.0	11.6	18.4	10.0	3.2	0.7	0	0.0	1	0.0	0	0.0	1	4.9	0.009	1285.7	9000	1.2	2.0	4.6	21.0
34720	21.0	11.8	18.4	9.2	3.2	0.7	0	0.0	1	0.0	0	0.0	1	4.5	0.009	1411.2	9000	1.4	2.0	4.6	21.0
34495	18.0	10.9	17.4	9.0	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.2	0.009	1283.9	9000	1.0	2.0	4.1	18.0
34310	18.0	10.8	16.8	9.3	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.9	0.005	1308.5	9000	1.2	2.0	3.8	18.0
34090	18.0	10.8	17.0	8.6	3.2	0.7	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1295.5	9000	1.0	2.0	3.9	18.0
33880	18.0	10.2	16.6	9.3	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.3	0.007	1318.4	9000	1.2	2.0	3.7	18.0
33710	18.0	9.9	15.4	9.7	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1372.1	9000	1.3	2.0	3.2	18.0
33500	18.0	10.4	16.2	9.3	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.1	0.007	1496.0	9000	1.5	2.0	3.5	18.0
33310	18.0	10.9	15.8	9.0	3.4	0.0	0	0.0	1	0.0	0	0.0	1	4.2	0.006	1770.4	9000	2.1	2.0	3.4	18.0
33115	15.0	9.0	10.4	10.6	3.4	0.0	0	0.0	1	0.0	0	0.0	1	6.1	0.003	1847.3	9000	2.1	2.0	1.4	15.0
32795	15.0	9.9	13.0	10.6	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.2	0.004	1735.6	9000	2.3	2.0	2.3	15.0
32605	15.0	10.5	14.4	11.1	3.4	0.0	0	0.0	1	0.0	0	0.0	1	5.0	0.005	1699.9	9000	2.3	2.0	2.8	15.0
32265	18.0	9.9	15.9	10.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.8	0.006	1853.2	9000	2.5	2.0	3.4	18.0
31875	15.0	9.1	12.4	10.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	4.7	0.005	2409.2	9000	3.0	2.0	2.1	15.0
31585	15.0	8.6	10.9	11.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.9	0.003	2182.2	9000	3.0	2.0	1.6	15.0
31360	15.0	8.3	10.3	13.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.002	1878.7	9000	2.8	2.0	1.4	15.0
31060	12.0	7.5	8.2	15.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.1	0.001	1708.2	9000	2.6	2.0	0.9	12.0
30720	12.0	7.9	6.7	17.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.2	0.001	1888.6	9000	3.3	2.0	0.6	12.0
30445	12.0	7.9	6.3	19.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	12.7	0.000	1779.7	9000	3.3	2.0	0.5	12.0
30095	12.0	8.1	6.7	21.3	2.0	0.0	0	0.0	1	0.0	0	0.0	1	13.4	0.000	1622.7	9000	3.5	2.0	0.6	12.0
29815	12.0	7.7	7.7	21.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	13.5	0.000	1433.2	9000	2.9	2.0	0.8	12.0
29565	12.0	7.1	7.4	22.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	14.8	0.000	1323.8	9000	2.4	2.0	0.7	12.0
29385	12.0	7.0	8.3	23.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	14.4	0.000	1237.4	9000	2.1	2.0	0.9	12.0
29140	12.0	10.4	9.2	24.1	4.4	1.6	0	0.0	1	0.0	0	0.0	1	14.1	0.001	1087.2	9000	1.2	2.0	1.1	12.0
28895	21.0	13.5	18.8	22.5	4.4	1.6	0	0.0	1	0.0	0	0.0	1	9.9	0.002	972.1	9000	0.8	2.0	4.8	21.0
28695	15.0	15.0	28.9	14.9	4.4	1.6	0	0.0	1	0.0	0	0.0	1	5.4	0.025	899.4	9000	0.0	2.0	7.0	14.0
28500	14.7	14.7	22.4	16.1	4.4	1.6	0	0.0	1	0.0	0	0.0	1	11.4	0.006	552.2	9000	0.0	2.0	6.8	14.0
28280	21.0	13.6	29.6	10.8	4.4	1.6	0	0.0	1	0.0	0	0.0	1	5.8	0.013	944.5	9000	0.3	2.0	5.4	21.0
28080	15.0	9.9	11.3	19.1	4.4	1.6	0	0.0	1	0.0	0	0.0	1	14.7	0.001	926.4	9000	0.2	2.0	1.7	15.0
27925	10.3	10.3	13.1	19.3	4.4	1.6	0	0.0	1	0.0	0	0.0	1	13.8	0.001	866.6	9000	0.0	2.0	2.3	10.0
27725	14.0	12.9	19.0	16.7	4.4	1.6	0	0.0	1	0.0	0	0.0	1	10.4	0.003	786.6	9000	0.0	2.0	4.9	14.0
27545	15.0	15.0	22.9	14.1	4.4	1.6	0	0.0	1	0.0	0	0.0	1	9.9	0.005	643.2	9000	0.0	2.0	7.0	14.0
27335	14.1	14.1	24.6	12.3	4.4	1.6	0	0.0	1	0.0	0	0.0	1	8.3	0.008	703.5	9000	0.0	2.0	6.2	14.0
27155	14.0	12.9	19.1	14.8	4.4	1.6	0	0.0	1	0.0	0	0.0	1	9.2	0.003	888.4	9000	0.0	2.0	4.9	14.0
26990	21.0	11.2	22.6	11.5	2.0	1.3	0	0.0	1	0.0	0	0.0	1	6.8	0.011	922.3	9000	0.1	2.0	5.7	21.0
26780	21.0	11.6	23.1	11.3	2.0	1.3	0	0.0	1	0.0	0	0.0	1	6.2	0.009	1043.3	9000	0.6	2.0	5.6	21.0
26575	21.0	16.0	20.7	11.1	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.7	0.012	1187.3	3000	5.2	2.0	5.6	21.0
26355	18.0	15.4	15.9	13.4	2.0	1.3	0	0.0	1	0.0	0	0.0	1	7.5	0.004	1269.4	3000	6.7	2.0	3.4	18.0
26170	18.0	16.6	17.0	13.5	2.0	1.3	0	0.0	1	0.0	0	0.0	1	7.6	0.003	1269.0	3000	7.4	2.0	3.9	18.0
25965	21.0	17.1	18.2	12.9	2.0	1.3	0	0.0	1	0.0	0	0.0	1	6.9	0.004	1281.3	3000	7.3	2.0	4.5	21.0
25785	21.0	16.7	18.9	12.1	2.0	1.3	0	0.0	1	0.0	0	0.0	1	6.9	0.005	1219.7	3000	6.5	2.0	4.8	21.0
25600	21.0	15.9	18.5	12.4	2.0	1.3	0	0.0	1	0.0	0	0.0	1	7.6	0.005	1109.4	3000	6.0	2.0	4.6	21.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET FROM SAM
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z_f=LOW-FLOW INCISEMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATIOI DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06 THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25425	21.0	15.1	18.3	12.5	2.0	1.3	0	0.0	1	0.0	0	0.0	1	7.1	0.007	1082.2	3000	5.3	2.0	4.5	21.0
25215	15.0	14.0	14.3	14.7	2.0	1.3	0	0.0	1	0.0	0	0.0	1	9.0	0.003	1097.3	3000	6.0	2.0	2.7	15.0
25000	15.0	13.7	13.2	15.5	2.0	1.3	0	0.0	1	0.0	0	0.0	1	10.1	0.002	1062.4	3000	6.0	2.0	2.3	15.0
24795	15.0	12.3	14.1	15.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.5	0.002	957.4	3000	5.6	2.0	2.7	15.0
24550	18.0	12.4	15.1	16.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.0	0.003	856.1	3000	5.4	2.0	3.1	18.0
24335	21.0	13.0	18.2	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.1	0.004	764.8	3000	4.5	2.0	4.5	21.0
24115	21.0	13.5	20.0	13.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.4	0.006	754.2	3000	4.1	2.0	5.4	21.0
23975	21.0	13.9	20.8	12.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.7	0.007	783.2	3000	4.1	2.0	5.8	21.0
23755	21.0	13.2	18.1	14.7	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.7	0.004	815.7	3000	4.8	2.0	4.4	21.0
23565	21.0	14.5	20.2	14.3	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.2	0.007	850.9	3000	4.9	2.0	5.5	21.0
23365	21.0	14.3	18.4	14.3	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.7	0.004	939.0	3000	5.7	2.0	4.6	21.0
23180	21.0	15.8	21.9	12.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.0	0.005	916.6	3000	5.5	2.0	6.3	21.0
23000	21.0	13.0	22.0	11.3	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.2	0.010	784.0	3000	3.4	2.0	5.6	21.0
22790	26.8	26.8	17.9	13.0	2.0	0.0	0.9	2.0	1	0.0	0	14.7	1	10.0	0.005	784.0	3000	3.7	2.0	4.3	18.0
22600	21.0	14.8	19.8	12.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.6	0.006	999.0	3000	5.5	2.0	5.3	21.0
22415	21.0	14.0	21.3	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.6	0.010	1039.1	3000	4.6	2.0	5.4	21.0
22195	15.0	13.3	13.6	14.0	2.0	0.2	0	0.0	1	0.0	0	0.0	1	8.7	0.003	1309.6	3000	6.6	2.0	2.5	15.0
22010	18.0	15.3	16.1	14.3	2.0	0.2	0	0.0	1	0.0	0	0.0	1	7.6	0.003	1254.1	3000	7.6	2.0	3.5	18.0
21790	21.0	15.3	19.7	11.6	2.0	0.2	0	0.0	1	0.0	0	0.0	1	6.5	0.006	1144.5	3000	5.9	2.0	5.2	21.0
21615	21.0	12.5	21.3	8.5	2.0	0.2	0	0.0	1	0.0	0	0.0	1	5.8	0.011	1163.0	3000	4.1	2.0	4.3	21.0
21440	18.0	14.1	17.5	11.0	2.0	0.2	0	0.0	1	0.0	0	0.0	1	6.9	0.005	1286.1	3000	5.8	2.0	4.1	18.0
21225	21.0	16.3	18.1	11.7	2.0	0.2	0	0.0	1	0.0	0	0.0	1	5.6	0.005	1559.0	3000	7.7	2.0	4.4	21.0
21020	21.0	12.6	20.3	9.7	2.0	0.2	0	0.0	1	0.0	0	0.0	1	7.8	0.007	903.0	3000	3.6	2.0	4.9	21.0
20845	18.0	15.2	15.1	12.7	2.0	0.2	0	0.0	1	0.0	0	0.0	1	6.7	0.003	1563.7	3000	7.9	2.0	3.1	18.0
20595	15.0	14.1	12.4	13.4	2.0	0.2	0	0.0	1	0.0	0	0.0	1	8.3	0.002	1548.8	3000	7.8	2.0	2.1	15.0
20435	15.0	14.4	12.1	14.3	2.0	0.2	0	0.0	1	0.0	0	0.0	1	8.8	0.001	1528.3	3000	8.3	2.0	2.0	15.0
20280	18.0	15.4	15.6	12.8	2.0	0.2	0	0.0	1	0.0	0	0.0	1	6.8	0.003	1531.3	3000	8.0	2.0	3.3	18.0
20070	21.0	16.8	19.3	11.1	2.0	0.2	0	0.0	1	0.0	0	0.0	1	5.2	0.006	1526.6	3000	7.5	2.0	5.0	21.0
19855	21.0	14.5	20.6	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.0	0.008	1205.4	3000	5.4	2.0	5.1	21.0
19630	21.0	12.3	20.6	8.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.6	0.009	1060.3	3000	3.8	2.0	4.4	21.0
19440	15.0	12.2	13.1	13.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.2	0.002	1194.5	3000	5.9	2.0	2.3	15.0
19240	18.0	13.0	15.9	11.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.004	1216.9	3000	5.6	2.0	3.4	18.0
19050	21.0	14.1	18.8	10.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	5.8	0.009	1321.4	3000	5.4	2.0	4.8	21.0
18830	15.0	14.5	13.3	14.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.4	0.003	1531.5	3000	8.1	2.0	2.4	15.0
18650	15.0	14.7	12.1	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.0	0.002	1604.5	3000	8.8	2.0	2.0	15.0
18475	13.6	13.6	8.9	16.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.9	0.001	1621.5	3000	8.5	2.0	1.1	12.0
18290	14.1	14.1	9.8	16.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.4	0.001	1594.2	3000	8.9	2.0	1.3	12.0
18025	8.0	4.8	7.9	18.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	11.9	0.001	1520.2	17000	0.0	2.0	0.8	8.0
17785	8.0	5.0	8.5	20.2	2.0	0.0	0	0.0	1	0.0	0	0.0	1	12.0	0.001	1398.1	17000	0.0	2.0	1.0	8.0
17510	10.0	6.9	11.0	19.2	2.0	1.3	0	0.0	1	0.0	0	0.0	1	10.2	0.001	1350.7	17000	0.0	2.0	1.6	10.0
17360	12.5	9.2	17.1	15.9	2.0	1.3	0	0.0	1	0.0	0	0.0	1	8.8	0.004	943.2	17000	0.0	2.0	3.9	12.5
17110	14.0	12.0	22.3	15.2	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.8	0.007	1175.4	17000	0.0	2.0	6.7	14.0
16970	14.0	12.1	23.1	13.6	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.9	0.010	1067.0	17000	0.0	2.0	6.8	14.0
16720	14.0	9.9	24.4	9.2	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.2	0.019	1122.9	17000	0.0	2.0	4.6	14.0
16515	14.0	10.4	19.4	10.4	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.8	0.010	1249.9	17000	0.0	2.0	5.1	14.0
16305	10.0	7.1	11.6	14.6	2.0	1.3	0	0.0	1	0.0	0	0.0	1	9.4	0.002	1360.5	17000	0.0	2.0	1.8	10.0
16130	12.5	8.6	15.7	12.3	2.0	1.3	0	0.0	1	0.0	0	0.0	1	7.1	0.005	1326.5	17000	0.0	2.0	3.3	12.5
15960	12.5	9.5	17.7	11.0	2.0	1.3	0	0.0	1	0.0	0	0.0	1	5.9	0.008	1386.0	17000	0.0	2.0	4.2	12.5
15745	10.0	7.3	12.3	13.3	2.0	1.3	0	0.0	1	0.0	0	0.0	1	8.4	0.003	1363.9	17000	0.0	2.0	2.0	10.0
15540	10.0	6.8	10.6	13.7	2.0	1.3	0	0.0	1	0.0	0	0.0	1	9.4	0.002	1426.6	17000	0.0	2.0	1.5	10.0
15335	12.5	8.8	16.2	12.1	2.0	1.3	0	0.0	1	0.0	0	0.0	1	8.2	0.006	1064.1	17000	0.0	2.0	3.5	12.5
15125	26.1	26.1	17.9	11.6	2.0	0.4	0.9	4.0	1	0.0	0	17.4	1	8.0	0.007	1000.5	17000	0.0	2.0	4.3	12.5
14900	14.0	9.3	19.3	9.8	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.3	0.009	1626.5	17000	0.0	2.0	4.9	14.0
14720	21.0	8.9	18.1	9.8	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.0	0.008	1722.3	17000	0.1	2.0	4.4	21.0
14480	21.0	8.9	19.0	8.9	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.2	0.010	1726.7	17000	0.1	2.0	4.4	21.0
14315	15.0	7.4	14.0	9.9	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.8	0.005	1881.0	17000	0.3	2.0	2.6	15.0
14090	15.0	7.3	14.3	8.5	2.0	0.4	0	0.0	1	0.0	0	0.0	1	5.6	0.006	1772.8	17000	0.1	2.0	2.8	15.0
13850	15.0	6.7	12.6	9.7	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.5	0.004	1741.6	17000	0.1	2.0	2.2	15.0
13635	18.0	7.7	15.5	10.3	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.3	0.004	1705.8	17000	0.1	2.0	3.2	18.0
13425	21.0	8.6	18.0	7.8	2.0	0.4	0	0.0	1	0.0	0	0.0	1	4.3	0.011	1850.7	17000	0.2	2.0	3.9	21.0
13190	15.0	6.7	12.2	9.5	2.0	0.4	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1847.4	17000	0.3	2.0	2.0	15.0
13030	15.0	6.9	14.2	9.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	6.5	0.003	1763.0	17000	0.2	2.0	2.7	15.0
12835	10.0	6.4	13.3	10.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	6.1	12.5	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1470.8	17000	0.0	2.0	2.1	10.0
12395	10.0	6.0	12.3	11.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.0	0.002	1438.1	17000	0.0	2.0	2.0	10.0
12195	10.0	5.5	10.6	12.5	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.3	0.001	1383.7	17000	0.0	2.0	1.5	10.0
11995	10.0	6.2	12.8	13.6	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.7	0.002	1280.5	17000	0.0	2.0	2.2	10.0
11780	10.0	6.1	12.6	14.4	2.0	0.0	0	0.0	1	0.0	0	0.0	1	9.3	0.001	1422.2	17000	0.0	2.0	2.1	10.0
11605	10.0	6.6	13.9	13.8	2.0	0.0	0	0.0	1	0.0	0	0.0	1	8.6	0.002	1325.5	17000	0.0	2.0	2.6	10.0
11405	10.0	6.3	13.2	15.1	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.3	0.002	1114.6	17000	0.0	2.0	2.3	10.0
11180	12.5	7.7	16.6	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	1	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.0	10.4	19.1	13.3	2.0	1.5	0	0.0	1	0.0	0	0.0	1	11.0	0.004	679.4	17000	0.0	2.0	4.9	14.0
10835	14.0	10.9	21.9	10.9	2.0	1.5	0	0.0	1	0.0	0	0.0	1	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	14.0	9.2	24.1	7.5	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	14.0	9.9	22.7	8.8	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.8	0.008	1247.0	17000	0.0	2.0	4.4	14.0
10225	12.5	9.8	17.8	9.5	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.9	0.007	1374.1	17000	0.0	2.0	4.3	12.5
10000	10.0	8.5	14.9	11.1	2.0	1.5	0	0.0	1	0.0	0	0.0	1	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.0	10.2	18.6	10.0	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.7	0.008	1402.3	17000	0.0	2.0	4.7	14.0
9595	10.0	8.4	14.6	10.3	2.0	1.5	0	0.0	1	0.0	0	0.0	1	6.6	0.005	1619.5	17000	0.0	2.0	2.9	10.0
9385	18.0	9.0	15.8	9.5	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.3	0.008	1770.4	17000	0.2	2.0	3.4	18.0
9220	18.0	9.3	16.4	8.9	2.0	1.5	0	0.0	1	0.0	0	0.0	1	4.9	0.008	1771.4	17000	0.1	2.0	3.6	18.0
9025	18.0	9.0	15.9	8.9	2.0	1.5	0	0.0	1	0.0	0	0.0	1	5.5	0.005	1736.9	17000	0.1	2.0	3.4	18.0
MAX=	26.8	26.8			8.1	1.6					0.0	17.4					17000.0	8.9	2.0	8.3	21.0
MIN=	8.0	4.8			2.0	0.0					0.0	0.0					3000.0	0.0	2.0	0.5	8.0

CALCULATIONS FOR TOTAL TOE-DOWN BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM W/ SAM -- SANTA CLARA RIVER PROPOSED CONDITIONS STRAIGHT-INSIDE CURVED REACH, n=0.025

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
46195	14.0	11.1	21.7	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	11.7	0.005	453.0	9000	0.0	2.0	6.3	14.0
46020	14.0	12.7	24.1	18.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.2	0.009	520.9	9000	0.0	2.0	7.9	14.0
45545	14.0	10.4	20.3	19.2	2.8	0.0	0	0.0	1	0.0	0	0.0	0	12.7	0.004	446.7	9000	0.0	2.0	5.6	14.0
45030	14.0	13.1	26.1	16.5	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.0	0.011	492.5	9000	0.0	2.0	8.3	14.0
44585	14.0	9.8	19.2	21.1	2.8	0.0	0	0.0	1	0.0	0	0.0	0	11.3	0.004	531.9	9000	0.0	2.0	5.0	14.0
44210	14.0	12.5	26.2	15.4	2.8	0.0	0	0.0	1	0.0	0	0.0	0	9.7	0.009	452.6	9000	0.0	2.0	7.7	14.0
43820	15.4	15.4	19.9	19.5	8.1	0.0	0	0.0	1	0.0	0	0.0	0	12.1	0.004	476.5	9000	0.0	2.0	5.3	14.0
43610	17.0	17.0	26.7	13.8	8.1	0.0	0	0.0	1	0.0	0	0.0	0	9.6	0.010	450.6	9000	0.0	2.0	6.9	14.0
43410	15.8	15.8	28.8	11.3	8.1	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.011	583.4	9000	0.0	2.0	5.7	14.0
43200	16.3	16.3	26.1	12.4	8.1	0.0	0	0.0	1	0.0	0	0.0	0	6.7	0.011	689.2	9000	0.0	2.0	6.2	14.0
42975	15.5	15.5	26.6	10.8	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.9	0.016	735.1	9000	0.0	2.0	5.4	14.0
42815	15.5	15.5	23.9	10.7	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.6	0.016	864.3	9000	0.0	2.0	5.4	14.0
42590	14.7	14.7	22.4	9.2	8.1	0.0	0	0.0	1	0.0	0	0.0	0	5.2	0.014	1013.1	9000	0.0	2.0	4.6	14.0
42430	15.3	15.3	19.6	10.7	8.1	0.0	0	0.0	1	0.0	0	0.0	0	6.4	0.009	915.8	9000	0.0	2.0	5.2	14.0
42215	14.7	14.7	18.5	11.2	8.1	0.0	0	0.0	1	0.0	0	0.0	0	6.1	0.009	1019.0	9000	0.0	2.0	4.6	14.0
41940	11.9	11.9	11.6	14.3	8.1	0.0	0	0.0	1	0.0	0	0.0	0	7.7	0.002	1284.2	9000	0.0	2.0	1.8	10.0
41730	12.0	12.0	11.8	14.7	8.1	0.0	0	0.0	1	0.0	0	0.0	0	8.2	0.002	1190.9	9000	0.0	2.0	1.9	10.0
41460	11.9	11.9	11.6	16.2	8.1	0.0	0	0.0	1	0.0	0	0.0	0	9.1	0.002	1093.5	9000	0.0	2.0	1.8	10.0
41280	12.5	10.9	16.4	14.4	5.2	0.1	0	0.0	1	0.0	0	0.0	0	8.3	0.004	852.3	9000	0.0	2.0	3.6	12.5
41080	14.0	12.7	19.9	12.1	5.2	0.1	0	0.0	1	0.0	0	0.0	0	6.7	0.008	874.1	9000	0.0	2.0	5.4	14.0
40825	14.0	11.7	18.0	11.5	5.2	0.1	0	0.0	1	0.0	0	0.0	0	6.2	0.007	1040.4	9000	0.0	2.0	4.4	14.0
40585	12.5	11.2	17.0	11.7	5.2	0.1	0	0.0	1	0.0	0	0.0	0	6.8	0.006	1005.8	9000	0.0	2.0	3.9	12.5
40335	10.0	8.8	10.5	15.1	5.2	0.1	0	0.0	1	0.0	0	0.0	0	8.8	0.002	1249.6	9000	0.0	2.0	1.5	10.0
40130	10.0	9.0	11.3	15.5	5.2	0.1	0	0.0	1	0.0	0	0.0	0	8.8	0.002	1195.6	9000	0.0	2.0	1.7	10.0
39945	10.0	8.9	11.0	16.3	5.2	0.1	0	0.0	1	0.0	0	0.0	0	9.3	0.002	1173.3	9000	0.0	2.0	1.6	10.0
39755	12.5	11.0	16.5	13.3	5.2	0.1	0	0.0	1	0.0	0	0.0	0	8.1	0.004	894.5	9000	0.0	2.0	3.7	12.5
39605	14.0	12.5	19.7	11.5	5.2	0.1	0	0.0	1	0.0	0	0.0	0	7.1	0.007	849.7	9000	0.0	2.0	5.2	14.0
39310	12.5	11.0	16.5	12.7	5.2	0.1	0	0.0	1	0.0	0	0.0	0	8.1	0.004	931.1	9000	0.0	2.0	3.7	12.5
39100	14.0	12.5	20.9	10.4	5.2	0.1	0	0.0	1	0.0	0	0.0	0	7.2	0.009	761.1	9000	0.0	2.0	5.2	14.0
38925	10.0	9.5	12.8	14.3	5.2	0.1	0	0.0	1	0.0	0	0.0	0	10.3	0.002	873.5	9000	0.0	2.0	2.2	10.0
38710	10.0	6.7	12.0	15.6	2.7	0.0	0	0.0	1	0.0	0	0.0	0	11.7	0.002	820.3	9000	0.0	2.0	2.0	10.0
38475	12.5	9.0	17.9	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	0	9.8	0.004	659.7	9000	0.0	2.0	4.3	12.5
38300	14.0	9.8	22.5	10.3	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.7	0.010	666.3	9000	0.0	2.0	5.1	14.0
38065	10.0	7.6	14.5	14.0	2.7	0.0	0	0.0	1	0.0	0	0.0	0	12.0	0.002	658.4	9000	0.0	2.0	2.9	10.0
37810	14.0	9.2	18.2	12.2	2.7	0.0	0	0.0	1	0.0	0	0.0	0	10.2	0.004	618.2	9000	0.0	2.0	4.5	14.0
37655	14.0	10.0	20.9	10.5	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.8	0.008	706.7	9000	0.0	2.0	5.3	14.0
37390	14.0	8.0	23.7	6.5	2.7	0.0	0	0.0	1	0.0	0	0.0	0	5.9	0.015	823.8	9000	0.0	2.0	3.3	14.0
37135	12.5	8.4	16.6	9.3	2.7	0.0	0	0.0	1	0.0	0	0.0	0	8.5	0.005	821.4	9000	0.0	2.0	3.7	12.5
36930	14.0	8.8	19.8	8.1	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.2	0.008	812.4	9000	0.0	2.0	4.1	14.0
36735	12.5	8.2	16.1	9.8	2.7	0.0	0	0.0	1	0.0	0	0.0	0	8.0	0.005	896.9	9000	0.0	2.0	3.5	12.5
36515	10.0	6.9	12.9	12.0	2.7	0.0	0	0.0	1	0.0	0	0.0	0	9.0	0.002	994.7	9000	0.0	2.0	2.2	10.0
36265	10.0	6.8	12.3	12.5	2.7	0.0	0	0.0	1	0.0	0	0.0	0	7.9	0.003	1176.0	9000	0.0	2.0	2.1	10.0
36080	22.0	22.0	14.7	11.6	3.2	0.7	0.9	2.0	1	0.0	0	13.3	0	6.7	0.006	1176.0	9000	0.0	2.0	2.9	10.0
35845	10.0	7.5	11.9	13.6	3.2	0.7	0	0.0	1	0.0	0	0.0	0	7.9	0.002	1401.7	9000	0.0	2.0	1.6	10.0
35725	10.0	8.9	15.0	13.0	3.2	0.7	0	0.0	1	0.0	0	0.0	0	6.5	0.004	1377.9	9000	0.0	2.0	3.0	10.0
35515	12.5	9.8	17.1	12.0	3.2	0.7	0	0.0	1	0.0	0	0.0	0	6.0	0.005	1354.8	9000	0.0	2.0	3.9	12.5
35245	12.5	9.9	17.3	11.3	3.2	0.7	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1328.3	9000	0.0	2.0	4.0	12.5
35040	14.0	11.0	19.6	10.7	3.2	0.7	0	0.0	1	0.0	0	0.0	0	5.5	0.006	1354.8	9000	0.0	2.0	5.2	14.0
34860	14.0	10.4	18.4	10.0	3.2	0.7	0	0.0	1	0.0	0	0.0	0	4.9	0.009	1285.7	9000	0.0	2.0	4.6	14.0
34720	14.0	10.4	18.4	9.2	3.2	0.7	0	0.0	1	0.0	0	0.0	0	4.5	0.009	1411.2	9000	0.0	2.0	4.6	14.0
34495	12.5	10.0	17.4	9.0	3.2	0.7	0	0.0	1	0.0	0	0.0	0	5.2	0.009	1283.9	9000	0.0	2.0	4.1	12.5
34310	12.5	9.6	16.8	9.3	3.2	0.7	0	0.0	1	0.0	0	0.0	0	5.9	0.005	1308.5	9000	0.0	2.0	3.8	12.5
34090	12.5	9.7	17.0	8.6	3.2	0.7	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1295.5	9000	0.0	2.0	3.9	12.5
33880	12.5	9.1	16.6	9.3	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.3	0.007	1318.4	9000	0.0	2.0	3.7	12.5
33710	12.5	8.6	15.4	9.7	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1372.1	9000	0.0	2.0	3.2	12.5
33500	12.5	8.9	16.2	9.3	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.1	0.007	1496.0	9000	0.0	2.0	3.5	12.5
33310	12.5	8.7	15.8	9.0	3.4	0.0	0	0.0	1	0.0	0	0.0	0	4.2	0.006	1770.4	9000	0.0	2.0	3.4	12.5
33115	10.0	6.8	10.4	10.6	3.4	0.0	0	0.0	1	0.0	0	0.0	0	6.1	0.003	1847.3	9000	0.0	2.0	1.4	10.0
32795	10.0	7.7	13.0	10.6	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.2	0.004	1735.6	9000	0.0	2.0	2.3	10.0
32605	10.0	8.2	14.4	11.1	3.4	0.0	0	0.0	1	0.0	0	0.0	0	5.0	0.005	1699.9	9000	0.0	2.0	2.8	10.0
32265	12.5	7.4	15.9	10.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.8	0.006	1853.2	9000	0.0	2.0	3.4	12.5
31875	10.0	6.1	12.4	10.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	4.7	0.006	2409.2	9000	0.0	2.0	2.1	10.0
31585	10.0	5.6	10.9	11.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.9	0.003	2182.2	9000	0.0	2.0	1.6	10.0
31360	10.0	5.4	10.3	13.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.002	1878.7	9000	0.0	2.0	1.4	10.0
31060	8.0	4.9	8.2	15.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.1	0.001	1708.2	9000	0.0	2.0	0.9	8.0
30720	8.0	4.6	6.7	17.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.2	0.001	1888.6	9000	0.0	2.0	0.6	8.0
30445	8.0	4.5	6.3	19.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	12.7	0.000	1779.7	9000	0.0	2.0	0.5	8.0
30095	8.0	4.6	6.7	21.3	2.0	0.0	0	0.0	1	0.0	0	0.0	0	13.4	0.000	1622.7	9000	0.0	2.0	0.6	8.0
29815	8.0	4.8	7.7	21.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	13.5	0.000	1433.2	9000	0.0	2.0	0.8	8.0
29565	8.0	4.7	7.4	22.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	14.8	0.000	1323.8	9000	0.0	2.0	0.7	8.0
29385	8.0	4.9	8.3	23.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	14.4	0.000	1237.4	9000	0.0	2.0	0.9	8.0
29140	9.1	8.1	9.2	24.1	4.4	1.6	0	0.0	1	0.0	0	0.0	0	14.1	0.001	1087.2	9000	0.0	2.0	1.1	8.0
28895	14.0	12.7	18.8	22.5	4.4	1.6	0	0.0	1	0.0	0	0.0	0	9.9	0.002	972.1	9000	0.0	2.0	4.8	14.0
28695	15.0	15.0	28.9	14.0	4.4	1.6	0	0.0	1	0.0	0	0.0	0	5.4	0.025	899.4	9000	0.0	2.0	7.0	14.0
28500	14.7	14.7	22.4	16.1	4.4	1.6	0	0.0	1	0.0	0	0.0	0	11.4	0.006	552.2	9000	0.0	2.0	6.8	14.0
28280	14.0	13.4	29.6	10.8	4.4	1.6	0	0.0	1	0.0	0	0.0	0	5.8	0.013	944.5	9000	0.0	2.0	5.4	14.0
28080	10.0	9.7	11.3	19.1	4.4	1.6	0	0.0	1	0.0	0	0.0	0	14.7	0.001	926.4	9000	0.0	2.0	1.7	10.0
27925	10.3	10.3	13.1	19.3	4.4	1.6	0	0.0	1	0.0	0	0.0	0	13.8	0.001	866.6	9000	0.0	2.0	2.3	10.0
27725	14.0	12.9	19.0	16.7	4.4	1.6	0	0.0	1	0.0	0	0.0	0	10.4	0.003	786.6	9000	0.0	2.0	4.9	14.0
27545	15.0	15.0	22.9	14.1	4.4	1.6	0	0.0	1	0.0	0	0.0	0	9.9	0.005	643.2	9000	0.0	2.0	7.0	14.0
27335	14.1	14.1	24.6	12.3	4.4	1.6	0	0.0	1	0.0	0	0.0	0	8.3	0.008	703.5	9000	0.0	2.0	6.2	14.0
27155	14.0	12.9	19.1	14.8	4.4	1.6	0	0.0	1	0.0	0	0.0	0	9.2	0.003	888.4	9000	0.0	2.0	4.9	14.0
26990	14.0	11.0	22.6	11.5	2.0	1.3	0	0.0	1	0.0	0	0.0	0	6.8	0.011	922.3	9000	0.0	2.0	5.7	14.0
26780	14.0	10.9	23.1	11.3	2.0	1.3	0	0.0	1	0.0	0	0.0	0	6.2	0.009	1043.3	9000	0.0	2.0	5.6	14.0
26575	14.0	10.9	20.7	11.1	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.7	0.012	1187.3	3000	0.0	2.0	5.6	14.0
26355	12.5	8.7	15.9	13.4	2.0	1.3	0	0.0	1	0.0	0	0.0	0	7.5	0.004	1260.4	3000	0.0	2.0	3.4	12.5
26170	12.5	9.2	17.0	13.5	2.0	1.3	0	0.0	1	0.0	0	0.0	0	7.6	0.003	1269.0	3000	0.0	2.0	3.9	12.5
25965	14.0	9.8	18.2	12.9	2.0	1.3	0	0.0	1	0.0	0	0.0	0	6.9	0.004	1281.3	3000	0.0	2.0	4.5	14.0

DEFINITIONS

V(FPS) =VELOCITY IN FEET PER SECOND
Z_{TOT}=TOTAL POTENTIAL VERTICAL ADJUSTMENT IN FEET
Z_{DEG}=LONG TERM DEGRADATION IN FEET
Z_{GS}=GENERAL SCOUR IN FEET FROM SAM
Z_{LS}=LOCAL SCOUR IN FEET
PIER TYPE=PIER SHAPE FACTOR; IF NO PIERS=**0**
1.0=SQUARE NOSE; **0.9** ROUND NOSE; **0.9** CYLINDER;
0.8 SHARP NOSE; **0.9** GROUP OF CYLINDERS
FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET
B=WIDTH OF PIERS IN FEET; NO PIER=0
ABUT TYPE=VERT WALL FACTOR; IF VERT=**2**; NON VERT=**1**
A=ABUTMENT PROTRUSION INTO FLOW PATH IN FEET
SOFT = SOFT BOTTOM AT A BRIDGE OR AN ABUTMENT
0 = HARD BOTTOM; **1** = SOFT BOTTOM
Z_{BS}=BEND SCOUR IN FEET
BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1
HYD DEPTH=HYDRAULIC DEPTH IN FEET
E SLOPE=ENERGY SLOPE, UNITLESS
TOP WIDTH=CHANNEL TOP WIDTH IN FEET
RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET
Z+=ALLOW ADJUSTMENT IN FEET, MEASURED OR 2'; VALUE **NOT LESS THAN 2'**
H=BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963)
Z_{DM}=CUT OFF DEPTH REQUIRED BY LACFCDDM

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE SCOUR PROTECTION (TOE DOWN) BASED ON LADPW COUNTY HYDROLOGY MANUAL (1991) PAGES 5.2-5.8 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH A MAXIMUM VALUE LIMITED BY THE EQUATION. THE PRESENT VERSION (10/04) WILL CALCULATE UP TO 50 VELOCITIES AT ONE TIME. LONG TERM DEGRADATION IS USER SUPPLIED. GENERAL SCOUR IS TAKEN FROM APPENDIX Q3, INTERPOLATED. LOCAL SCOUR AT BENDS AND ABUTMENTS ARE BASED ON LADWP EQUATIONS FOUND IN APP Q12. BEND SCOUR IS BASED ON EQUATIONS IN APPENDIX Q12. A LONGITUDINAL EXTENT BASED ON SECONDARY CURRENTS IS NOT INCLUDED. BEDFORM HEIGHT IS BASED ON EQUATIONS IN APPENDIX Q13. JULY 2005 REVISION INCLUDES CALCULATION FOR CUT OFF DEPTH BASED ON LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL. THE CALCULATION DOES NOT CONSIDER ADJUSTMENTS TO CUT OFF DEPTH BASED ON TABLE F-06
THE OCTOBER 2005 REVISION INCLUDES ADDITIONAL TOEDOWN AT BRIDGES/ABUTMENTS WITH SOFT BOTTOMS.

COLOR CODES

OUTPUT
DATA FROM HEC-RAS
USER SUPPLIED DATA
INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
OCTOBER, 2004
OCTOBER 2005, REVISED

SECTION	Z_{MAX}=	Z_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Z_{DEG}+	Z_{GS}+	PIER TYPE	B	ABUT TYPE	A	SOFT	Z_{LS}+	BEND COEFF	HYD DEPTH	E SLOPE	TOP WIDTH	RADIUS	Z_{BS}+	Z+	H/2	Z_{DM}=
25785	14.0	10.1	18.9	12.1	2.0	1.3	0	0.0	1	0.0	0	0.0	0	6.9	0.005	1219.7	3000	0.0	2.0	4.8	14.0
25600	14.0	9.9	18.5	12.4	2.0	1.3	0	0.0	1	0.0	0	0.0	0	7.6	0.005	1109.4	3000	0.0	2.0	4.6	14.0
25425	14.0	9.8	18.3	12.5	2.0	1.3	0	0.0	1	0.0	0	0.0	0	7.1	0.007	1082.2	3000	0.0	2.0	4.5	14.0
25215	10.0	8.0	14.3	14.7	2.0	1.3	0	0.0	1	0.0	0	0.0	0	9.0	0.003	1097.3	3000	0.0	2.0	2.7	10.0
25000	10.0	7.6	13.2	15.5	2.0	1.3	0	0.0	1	0.0	0	0.0	0	10.1	0.002	1062.4	3000	0.0	2.0	2.3	10.0
24795	10.0	6.7	14.1	15.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.5	0.002	957.4	3000	0.0	2.0	2.7	10.0
24550	12.5	7.1	15.1	16.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.0	0.003	856.1	3000	0.0	2.0	3.1	12.5
24335	14.0	8.5	18.2	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.1	0.004	764.8	3000	0.0	2.0	4.5	14.0
24115	14.0	9.4	20.0	13.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.4	0.006	754.2	3000	0.0	2.0	5.4	14.0
23975	14.0	9.8	20.8	12.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.7	0.007	783.2	3000	0.0	2.0	5.8	14.0
23755	14.0	8.4	18.1	14.7	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.7	0.004	815.7	3000	0.0	2.0	4.4	14.0
23565	14.0	9.5	20.2	14.3	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.2	0.007	850.9	3000	0.0	2.0	5.5	14.0
23365	14.0	8.6	18.4	14.3	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.7	0.004	939.0	3000	0.0	2.0	4.6	14.0
23180	14.0	10.3	21.9	12.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.0	0.005	916.6	3000	0.0	2.0	6.3	14.0
23000	14.0	9.6	22.0	11.3	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.2	0.010	784.0	3000	0.0	2.0	5.6	14.0
22790	23.0	23.0	17.9	13.0	2.0	0.0	0.9	2.0	1	0.0	0	14.7	0	10.0	0.005	784.0	3000	0.0	2.0	4.3	12.5
22600	14.0	9.3	19.8	12.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.6	0.006	999.0	3000	0.0	2.0	5.3	14.0
22415	14.0	9.4	21.3	10.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.6	0.010	1039.1	3000	0.0	2.0	5.4	14.0
22195	10.0	6.7	13.6	14.0	2.0	0.2	0	0.0	1	0.0	0	0.0	0	8.7	0.003	1309.6	3000	0.0	2.0	2.5	10.0
22010	12.5	7.7	16.1	14.3	2.0	0.2	0	0.0	1	0.0	0	0.0	0	7.6	0.003	1254.1	3000	0.0	2.0	3.5	12.5
21790	14.0	9.4	19.7	11.6	2.0	0.2	0	0.0	1	0.0	0	0.0	0	6.5	0.006	1144.5	3000	0.0	2.0	5.2	14.0
21615	14.0	8.5	21.3	8.5	2.0	0.2	0	0.0	1	0.0	0	0.0	0	5.8	0.011	1163.0	3000	0.0	2.0	4.3	14.0
21440	12.5	8.3	17.5	11.0	2.0	0.2	0	0.0	1	0.0	0	0.0	0	6.9	0.005	1286.1	3000	0.0	2.0	4.1	12.5
21225	14.0	8.6	18.1	11.7	2.0	0.2	0	0.0	1	0.0	0	0.0	0	5.6	0.005	1559.0	3000	0.0	2.0	4.4	14.0
21020	14.0	9.1	20.3	9.7	2.0	0.2	0	0.0	1	0.0	0	0.0	0	7.8	0.007	903.0	3000	0.0	2.0	4.9	14.0
20845	12.5	7.3	15.1	12.7	2.0	0.2	0	0.0	1	0.0	0	0.0	0	6.7	0.003	1583.7	3000	0.0	2.0	3.1	12.5
20595	10.0	6.3	12.4	13.4	2.0	0.2	0	0.0	1	0.0	0	0.0	0	8.3	0.002	1548.8	3000	0.0	2.0	2.1	10.0
20435	10.0	6.2	12.1	14.3	2.0	0.2	0	0.0	1	0.0	0	0.0	0	8.8	0.001	1528.3	3000	0.0	2.0	2.0	10.0
20280	12.5	7.5	15.6	12.8	2.0	0.2	0	0.0	1	0.0	0	0.0	0	6.8	0.003	1531.3	3000	0.0	2.0	3.3	12.5
20070	14.0	9.2	19.3	11.1	2.0	0.2	0	0.0	1	0.0	0	0.0	0	5.2	0.006	1526.6	3000	0.0	2.0	5.0	14.0
19855	14.0	9.1	20.6	10.2	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.0	0.008	1205.4	3000	0.0	2.0	5.1	14.0
19630	14.0	8.4	20.6	8.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.6	0.009	1060.3	3000	0.0	2.0	4.4	14.0
19440	10.0	6.3	13.1	13.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.2	0.002	1194.5	3000	0.0	2.0	2.3	10.0
19240	12.5	7.4	15.9	11.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.004	1216.5	3000	0.0	2.0	3.4	12.5
19050	14.0	8.8	18.8	10.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	5.8	0.009	1321.4	3000	0.0	2.0	4.8	14.0
18830	10.0	6.4	13.3	14.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.4	0.003	1531.5	3000	0.0	2.0	2.4	10.0
18650	10.0	6.0	12.1	15.0	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.0	0.002	1604.5	3000	0.0	2.0	2.0	10.0
18475	8.0	5.1	8.9	16.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.9	0.001	1621.5	3000	0.0	2.0	1.1	8.0
18290	8.0	5.3	9.8	16.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.4	0.001	1594.2	3000	0.0	2.0	1.3	8.0
18025	8.0	4.6	7.0	16.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	11.9	0.001	1520.2	17000	0.0	2.0	0.8	8.0
17785	8.0	5.0	8.5	20.2	2.0	0.0	0	0.0	1	0.0	0	0.0	0	12.0	0.001	1398.1	17000	0.0	2.0	1.0	8.0
17510	10.0	6.9	11.0	19.2	2.0	1.3	0	0.0	1	0.0	0	0.0	0	10.2	0.001	1350.7	17000	0.0	2.0	1.6	10.0
17360	12.5	9.2	17.1	15.9	2.0	1.3	0	0.0	1	0.0	0	0.0	0	8.8	0.004	943.2	17000	0.0	2.0	3.9	12.5
17110	14.0	12.0	22.3	15.2	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.8	0.007	1175.4	17000	0.0	2.0	6.7	14.0
16970	14.0	12.1	23.1	13.6	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.9	0.010	1067.0	17000	0.0	2.0	6.8	14.0
16720	14.0	9.9	24.4	9.2	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.2	0.019	1122.9	17000	0.0	2.0	4.6	14.0
16515	14.0	10.4	19.4	10.4	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.8	0.010	1249.9	17000	0.0	2.0	5.1	14.0
16305	10.0	7.1	11.6	14.6	2.0	1.3	0	0.0	1	0.0	0	0.0	0	9.4	0.002	1380.5	17000	0.0	2.0	1.8	10.0
16130	12.5	8.6	15.7	12.3	2.0	1.3	0	0.0	1	0.0	0	0.0	0	7.1	0.005	1326.5	17000	0.0	2.0	3.3	12.5
15960	12.5	9.5	17.7	11.0	2.0	1.3	0	0.0	1	0.0	0	0.0	0	5.9	0.008	1386.0	17000	0.0	2.0	4.2	12.5
15745	10.0	7.3	12.3	13.3	2.0	1.3	0	0.0	1	0.0	0	0.0	0	8.4	0.003	1363.9	17000	0.0	2.0	2.0	10.0
15540	10.0	6.8	10.6	13.7	2.0	1.3	0	0.0	1	0.0	0	0.0	0	9.4	0.002	1426.6	17000	0.0	2.0	1.5	10.0
15335	12.5	8.8	16.2	12.1	2.0	1.3	0	0.0	1	0.0	0	0.0	0	8.2	0.006	1064.1	17000	0.0	2.0	3.5	12.5
15125	26.1	26.1	17.9	11.6	2.0	0.4	0.9	4.0	1	0.0	0	17.4	0	8.0	0.007	1000.5	17000	0.0	2.0	4.3	12.5
14900	14.0	9.3	19.3	9.8	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.3	0.009	1626.5	17000	0.0	2.0	4.9	14.0
14720	14.0	8.8	18.1	9.8	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.0	0.008	1722.3	17000	0.0	2.0	4.4	14.0
14480	14.0	8.8	19.0	8.9	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.2	0.010	1726.7	17000	0.0	2.0	4.4	14.0
14315	10.0	7.0	14.0	9.9	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.8	0.005	1881.0	17000	0.0	2.0	2.6	10.0
14090	10.0	7.2	14.3	8.5	2.0	0.4	0	0.0	1	0.0	0	0.0	0	5.6	0.006	1772.8	17000	0.0	2.0	2.8	10.0
13850	10.0	6.6	12.6	9.7	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.5	0.004	1741.6	17000	0.0	2.0	2.2	10.0
13635	12.5	7.6	15.5	10.3	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.3	0.004	1705.8	17000	0.0	2.0	3.2	12.5
13425	14.0	8.3	18.0	7.8	2.0	0.4	0	0.0	1	0.0	0	0.0	0	4.3	0.011	1850.7	17000	0.0	2.0	3.9	14.0
13190	10.0	6.4	12.2	9.5	2.0	0.4	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1847.4	17000	0.0	2.0	2.0	10.0
13030	10.0	6.7	14.2	9.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	6.5	0.003	1763.0	17000	0.0	2.0	2.7	10.0
12835	10.0	6.4	13.3	10.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	7.3	0.003	1607.5	17000	0.0	2.0	2.4	10.0
12615	10.0	6.1	12.5	10.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1470.8	17000	0.0	2.0	2.1	10.0
12395	10.0	6.0	12.3	11.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.0	0.002	1438.1	17000	0.0	2.0	2.0	10.0
12195	10.0	5.5	10.8	12.5	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.3	0.001	1383.7	17000	0.0	2.0	1.5	10.0
11995	10.0	6.2	12.8	13.6	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.7	0.002	1280.5	17000	0.0	2.0	2.2	10.0
11780	10.0	6.1	12.6	14.4	2.0	0.0	0	0.0	1	0.0	0	0.0	0	9.3	0.001	1422.2	17000	0.0	2.0	2.1	10.0
11605	10.0	6.6	13.9	13.8	2.0	0.0	0	0.0	1	0.0	0	0.0	0	8.6	0.002	1325.5	17000	0.0	2.0	2.6	10.0
11405	10.0	6.3	13.2	15.1	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.3	0.002	1114.6	17000	0.0	2.0	2.3	10.0
11180	12.5	7.7	16.6	13.9	2.0	0.0	0	0.0	1	0.0	0	0.0	0	10.6	0.003	835.7	17000	0.0	2.0	3.7	12.5
11015	14.0	10.4	19.1	13.3	2.0	1.5	0	0.0	1	0.0	0	0.0	0	11.0	0.004	879.4	17000	0.0	2.0	4.9	14.0
10835	14.0	10.9	21.9	10.9	2.0	1.5	0	0.0	1	0.0	0	0.0	0	8.2	0.007	790.4	17000	0.0	2.0	5.4	14.0
10575	14.0	9.2	24.1	7.5	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.3	0.016	1108.8	17000	0.0	2.0	3.7	14.0
10390	14.0	9.9	22.7	8.8	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.8	0.008	1247.0	17000	0.0	2.0	4.4	14.0
10225	12.5	9.8	17.8	9.5	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.9	0.007	1374.1	17000	0.0	2.0	4.3	12.5
10000	10.0	8.5	14.9	11.1	2.0	1.5	0	0.0	1	0.0	0	0.0	0	6.6	0.004	1488.0	17000	0.0	2.0	3.0	10.0
9820	14.0	10.2	18.6	10.0	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.7	0.008	1402.3	17000	0.0	2.0	4.7	14.0
9595	10.0	8.4	14.6	10.3	2.0	1.5	0	0.0	1	0.0	0	0.0	0	6.6	0.005	1619.5	17000	0.0	2.0	2.9	10.0
9385	12.5	8.9	15.8	9.5	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.3	0.006	1770.4	17000	0.0	2.0	3.4	12.5
9220	12.5	9.1	16.4	8.9	2.0	1.5	0	0.0	1	0.0	0	0.0	0	4.9	0.008	1771.4	17000	0.0	2.0	3.6	12.5
9025	12.5	8.9	15.9	8.9	2.0	1.5	0	0.0	1	0.0	0	0.0	0	5.5	0.005	1736.9	17000	0.0	2.0	3.4	12.5
MAX=	26.1	26.1			8.1	1.6					0.0						17000.0		2.0	8.3	14.0
MIN=	8.0	4.5			2.0	0.0					0.0						3000.0		2.0	0.5	8.0

Santa Clara River Fluvial Study

APPENDIX CHAPTER 6.2

LACH&SM Freeboard
Proposed Condition
Curved & Straight Reaches

PACIFIC ADVANCED
CIVIL ENGINEERING, INC.

CALCULATIONS FOR TOTAL FREEBOARD BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM - SANTA CLARA RIVER PROPOSED CONDITIONS OUTSIDE CURVED REACH Q_{CAP} n=0.085

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
46195	**3.1**	3.1	10.7	28.1	1.0	0.6	2	215.7	750.8	0.0	1	1.5	9000	1.5	2.5
46020	**3.0**	3.0	10.2	30.0	1.0	0.6	2	162.7	570.2	0.0	1	1.5	9000	1.4	2.5
45545	**3.4**	3.4	11.6	27.8	1.0	0.6	2	151.3	524.2	0.0	1	1.5	9000	1.8	2.5
45030	**3.0**	3.0	10.3	29.2	1.0	0.6	2	222.6	558.0	0.0	1	1.5	9000	1.4	2.5
44585	**3.2**	3.2	10.7	28.6	1.0	0.6	2	163.7	654.4	0.0	1	1.5	9000	1.6	2.5
44210	**2.9**	2.9	10.0	27.8	1.0	0.6	2	204.3	620.0	0.0	1	1.5	9000	1.3	2.5
43820	**3.9**	3.9	14.2	24.1	1.0	0.2	2	207.8	528.7	0.0	1	1.5	9000	2.7	2.5
43610	**4.0**	4.0	14.4	21.3	1.0	0.2	2	242.1	536.9	0.0	1	1.5	9000	2.8	2.5
43410	**3.6**	3.6	13.3	19.8	1.0	0.2	2	312.8	729.1	0.0	1	1.5	9000	2.4	2.5
43200	**3.5**	3.5	13.0	19.2	1.0	0.2	2	308.4	779.5	0.0	1	1.5	9000	2.3	2.5
42975	**2.9**	2.9	10.7	19.0	1.0	0.2	2	410.5	955.8	0.1	1	1.5	9000	1.5	2.5
42815	**2.5**	2.4	9.1	18.7	1.0	0.2	2	380.4	1120.8	0.1	1	1.5	9000	1.1	2.5
42590	**2.5**	2.0	7.7	18.4	1.0	0.2	2	451.9	1230.7	0.1	1	1.5	9000	0.8	2.5
42430	**2.5**	2.0	7.6	19.5	1.0	0.2	2	445.9	1334.9	0.1	1	1.5	9000	0.8	2.5
42215	**2.5**	1.8	6.6	20.7	1.0	0.2	2	493.2	1374.6	0.0	1	1.5	9000	0.6	2.5
41940	**2.5**	1.8	6.4	20.6	1.0	0.2	2	454.2	1327.0	0.0	1	1.5	9000	0.5	2.5
41730	**2.5**	1.9	6.9	20.6	1.0	0.2	2	404.1	1221.5	0.0	1	1.5	9000	0.6	2.5
41460	**2.5**	2.0	7.4	21.2	1.0	0.2	2	365.7	1121.0	0.0	1	1.5	9000	0.7	2.5
41280	**2.5**	2.1	8.7	20.8	1.0	0.0	2	342.4	1193.2	0.1	1	1.5	9000	1.0	2.5
41080	**2.5**	2.1	8.6	20.5	1.0	0.0	2	429.5	1136.8	0.1	1	1.5	9000	1.0	2.5
40825	**2.5**	1.8	7.3	19.8	1.0	0.0	2	426.6	1213.0	0.1	1	1.5	9000	0.7	2.5
40585	**2.5**	1.7	7.1	20.3	1.0	0.0	2	404.3	1247.2	0.0	1	1.5	9000	0.7	2.5
40335	**2.5**	1.5	6.1	21.4	1.0	0.0	2	397.2	1288.6	0.0	1	1.5	9000	0.5	2.5
40130	**2.5**	1.6	6.6	21.6	1.0	0.0	2	311.3	1264.5	0.0	1	1.5	9000	0.6	2.5
39945	**2.5**	1.7	6.8	21.9	1.0	0.0	2	293.8	1212.3	0.0	1	1.5	9000	0.6	2.5
39755	**2.5**	2.0	8.6	20.6	1.0	0.0	2	296.7	1088.1	0.1	1	1.5	9000	1.0	2.5
39605	**2.5**	2.0	8.5	20.7	1.0	0.0	2	348.8	1074.7	0.1	1	1.5	9000	1.0	2.5
39310	**2.5**	2.0	8.4	20.2	1.0	0.0	2	323.4	977.3	0.1	1	1.5	9000	1.0	2.5
39100	**2.5**	1.9	8.2	21.1	1.0	0.0	2	436.5	831.5	0.0	1	1.5	9000	0.9	2.5
38925	**2.5**	1.9	7.8	20.8	1.0	0.0	2	422.3	906.7	0.1	1	1.5	9000	0.8	2.5
38710	**2.5**	2.0	8.1	21.2	1.0	0.1	2	394.9	844.1	0.0	1	1.5	9000	0.9	2.5
38475	**2.6**	2.6	10.4	21.0	1.0	0.1	2	375.1	695.3	0.0	1	1.5	9000	1.5	2.5
38300	**2.5**	2.3	9.6	20.3	1.0	0.1	2	407.6	716.8	0.0	1	1.5	9000	1.2	2.5
38065	**2.5**	2.3	9.6	20.1	1.0	0.1	2	569.0	691.3	0.0	1	1.5	9000	1.2	2.5
37810	**2.8**	2.8	11.3	18.4	1.0	0.1	2	546.8	648.4	0.0	1	1.5	9000	1.7	2.5
37655	**2.6**	2.6	10.6	17.9	1.0	0.1	2	348.9	738.9	0.0	1	1.5	9000	1.5	2.5
37390	**2.5**	2.0	8.2	17.5	1.0	0.1	2	803.3	869.1	0.0	1	1.5	9000	0.9	2.5
37135	**2.5**	2.1	8.7	16.8	1.0	0.1	2	564.0	863.7	0.0	1	1.5	9000	1.0	2.5
36930	**2.5**	2.1	8.3	17.7	1.0	0.1	2	708.3	923.7	0.1	1	1.5	9000	0.9	2.5
36735	**2.5**	2.1	8.1	17.6	1.0	0.1	2	633.8	963.2	0.1	1	1.5	9000	0.9	2.5
36515	**2.5**	1.9	7.4	18.6	1.0	0.1	2	532.1	1032.7	0.1	1	1.5	9000	0.7	2.5
36265	**2.5**	1.8	7.1	18.3	1.0	0.1	2	359.0	1176.0	0.0	1	1.5	9000	0.7	2.5
36080	**2.5**	1.9	7.8	17.6	1.0	0.0	2	326.3	1176.0	0.0	1	1.5	9000	0.8	2.5
35845	**2.5**	1.7	7.0	18.1	1.0	0.0	2	376.2	1512.8	0.0	1	1.5	9000	0.7	2.5
35725	**2.5**	1.9	8.0	18.3	1.0	0.0	2	378.2	1488.9	0.1	1	1.5	9000	0.9	2.5
35515	**2.5**	2.0	8.5	17.9	1.0	0.0	2	379.3	1501.0	0.1	1	1.5	9000	1.0	2.5
35245	**2.5**	2.0	8.3	17.0	1.0	0.0	2	414.3	1580.3	0.1	1	1.5	9000	0.9	2.5
35040	**2.5**	2.1	8.8	16.6	1.0	0.0	2	440.9	1491.6	0.1	1	1.5	9000	1.0	2.5
34860	**2.5**	1.9	7.7	16.3	1.0	0.0	2	432.9	1431.5	0.1	1	1.5	9000	0.8	2.5
34720	**2.5**	1.8	7.4	15.8	1.0	0.0	2	545.6	1449.9	0.1	1	1.5	9000	0.7	2.5
34495	**2.5**	1.8	7.2	15.7	1.0	0.0	2	504.6	1461.5	0.1	1	1.5	9000	0.7	2.5
34310	**2.5**	2.0	8.1	15.4	1.0	0.0	2	684.5	1384.9	0.1	1	1.5	9000	0.9	2.5
34090	**2.5**	1.9	7.5	15.0	1.0	0.0	2	787.5	1371.0	0.1	1	1.5	9000	0.8	2.5
33880	**2.5**	2.0	7.3	15.7	1.0	0.2	2	761.0	1482.9	0.1	1	1.5	9000	0.7	2.5
33710	**2.5**	1.9	7.0	15.6	1.0	0.2	2	719.2	1637.9	0.1	1	1.5	9000	0.7	2.5
33500	**2.5**	1.9	7.0	15.3	1.0	0.2	2	666.4	1755.5	0.1	1	1.5	9000	0.7	2.5
33310	**2.5**	1.8	6.2	15.3	1.0	0.2	2	609.9	1828.2	0.1	1	1.5	9000	0.5	2.5
33115	**2.5**	1.7	5.8	15.4	1.0	0.2	2	667.8	1927.1	0.0	1	1.5	9000	0.4	2.5
32795	**2.5**	1.8	6.3	15.7	1.0	0.2	2	697.6	1920.8	0.1	1	1.5	9000	0.5	2.5

DEFINITIONS

Y_{MAX} = GREATER OF THE DM AND S&H HEIGHTS

Y_{TOT}=TOTAL EMBANKMENT PROTECTION IN FEET BASED ON THE H&S

V(FPS) =VELOCITY IN FEET PER SECOND

FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET

Y_{AGG}=LONG TERM AGGRADATION IN FEET

Y_{GA}=GENERAL AGGRADATION IN FEET FROM SAM

CHANNEL TYPE=CHANNEL SHAPE/FLOW FACTOR:
IF Fr<1, RECTANGULAR = 0; IF Fr>1, RECTANGULAR = 1;
IF Fr<1, TRAPEZOIDAL = 2; IF Fr>1, TRAPEZOIDAL = 3.

Y_{SE}=SUPER ELEVATION IN FEET

BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1

SIDE SLOPE=CHANNEL SIDE SLOPE (H:V), UNITLESS

BOTTOM WIDTH=CHANNEL BOTTOM WIDTH IN FEET, $Q_{2\text{-}YEAR}$ TOP WIDTH

RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET

H/2=HALF BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH, AFTER KENNEDY (1963)

Y_{DM} = EMBANKMENT PROTECTION REQUIRED BY THE LACFCDDM IN FEET

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE TOP PROTECTION (FREE BOARD) BASED ON LACDWP COUNTY HYDROLOGY MANUAL (1991) PAGES 5.8-5.9 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH NO MAXIMUM VALUE. THE USER SHOULD CONSIDER A PRACTICAL MAXIMUM OF APPROXIMATELY 20-30 FPS. THE PRESENT VERSION (8/05) WILL CALCULATE UP TO 100 VELOCITIES AT ONE TIME. LONG TERM AGGRADATION IS USER SUPPLIED. GENERAL AGGRADATION IS ALSO USER SUPPLIED. SUPER ELEVATION AT BENDS IS BASED ON LACFCDDM EQUATIONS FOUND IN C-3.1. BEDFORM HEIGHT, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963), IS BASED ON EQUATIONS IN APPENDIX Q13. IF FLOW IS SUPERCRITICAL SPREADSHEET REPORTS LACFCDDM TOTAL WALL HEIGHT INSTEAD OF FREEBOARD. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL (LACFCDDM) VALUES ARE PRESENTED AS A PART OF LACH&SM CALCULATIONS. THE SPREADSHEET CALCULATES THE GREATER OF THE TWO METHODOLOGIES. BOTTOM WIDTH IS BASED ON THE 2-YEAR WATER SURFACE AFTER ACOE PROCEDURES.

COLOR CODES

OUTPUT

DATA FROM HEC-RAS

USER SUPPLIED DATA

INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
AUGUST, 2005

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
32605	2.5	1.7	6.1	16.7	1.0	0.2	2	652.8	2407.4	0.1	1	1.5	9000	0.5	2.5
32265	2.5	2.2	5.5	17.2	1.0	0.8	2	651.0	2840.2	0.0	1	1.5	9000	0.4	2.5
31875	2.5	2.2	5.3	16.6	1.0	0.8	2	562.0	2593.1	0.0	1	1.5	9000	0.4	2.5
31585	2.5	2.2	5.0	18.7	1.0	0.8	2	619.5	2377.5	0.0	1	1.5	9000	0.3	2.5
31360	2.5	2.2	5.5	19.9	1.0	0.8	2	672.2	1959.5	0.0	1	1.5	9000	0.4	2.5
31060	2.5	2.2	5.1	21.2	1.0	0.8	2	955.0	1975.9	0.1	1	1.5	9000	0.3	2.5
30720	2.5	2.1	4.6	22.5	1.0	0.8	2	772.7	1911.5	0.0	1	1.5	9000	0.3	2.5
30445	2.5	2.1	4.6	24.1	1.0	0.8	2	700.9	1841.8	0.0	1	1.5	9000	0.3	2.5
30095	2.5	2.2	5.2	25.5	1.0	0.8	2	617.1	1637.3	0.0	1	1.5	9000	0.4	2.5
29815	2.5	2.3	6.1	25.8	1.0	0.8	2	551.1	1445.2	0.0	1	1.5	9000	0.5	2.5
29565	2.5	2.3	6.0	26.3	1.0	0.8	2	461.8	1334.9	0.0	1	1.5	9000	0.5	2.5
29385	2.5	2.5	6.8	26.6	1.0	0.8	2	381.5	1249.1	0.0	1	1.5	9000	0.6	2.5
29140	2.5	1.9	7.9	26.4	1.0	0.0	2	217.2	1095.0	0.0	1	1.5	9000	0.8	2.5
28895	4.8	4.8	16.5	23.8	1.0	0.0	2	201.9	978.0	0.1	1	1.5	9000	3.7	2.5
28695	2.5	2.3	9.4	24.9	1.0	0.0	2	269.6	951.6	0.1	1	1.5	9000	1.2	2.5
28500	3.1	3.1	12.0	23.0	1.0	0.0	2	326.0	1039.5	0.1	1	1.5	9000	1.9	2.5
28280	2.5	2.1	8.7	23.8	1.0	0.0	2	379.1	1003.9	0.1	1	1.5	9000	1.0	2.5
28080	2.5	2.0	8.3	24.1	1.0	0.0	2	416.6	945.4	0.1	1	1.5	9000	0.9	2.5
27925	2.5	2.2	9.6	24.1	1.0	0.0	2	402.0	884.9	0.0	1	1.5	9000	1.2	2.5
27725	2.9	2.9	11.9	23.1	1.0	0.0	2	386.2	811.8	0.0	1	1.5	9000	1.9	2.5
27545	3.1	3.1	12.4	22.3	1.0	0.0	2	409.6	852.5	0.0	1	1.5	9000	2.1	2.5
27335	2.7	2.7	10.9	22.0	1.0	0.0	2	422.5	937.2	0.1	1	1.5	9000	1.6	2.5
27155	2.9	2.9	11.4	21.0	1.0	0.0	2	452.4	978.1	0.1	1	1.5	9000	1.8	2.5
26990	2.5	2.3	9.4	20.4	1.0	0.0	2	440.9	1020.9	0.1	1	1.5	9000	1.2	2.5
26780	2.5	2.1	8.8	21.3	1.0	0.0	2	527.5	1106.5	0.1	1	1.5	9000	1.0	2.5
26575	2.5	1.9	7.3	21.5	1.0	0.0	2	513.5	1243.6	0.2	1	1.5	3000	0.7	2.5
26355	2.5	2.0	7.4	21.6	1.0	0.0	2	601.4	1294.5	0.2	1	1.5	3000	0.9	2.5
26170	2.5	2.3	7.7	21.9	1.0	0.0	2	457.8	1301.2	0.2	1	1.5	3000	1.1	2.5
25965	2.6	2.6	7.5	22.2	1.0	0.0	2	568.4	1313.2	0.2	1	1.5	3000	1.3	2.5
25785	2.7	2.7	7.5	22.0	1.0	0.0	2	550.9	1256.9	0.3	1	1.5	3000	1.4	2.5
25600	2.5	2.5	7.8	22.3	1.0	0.0	2	478.1	1149.9	0.2	1	1.5	3000	1.3	2.5
25425	2.5	2.5	7.3	23.1	1.0	0.0	2	399.8	1138.3	0.2	1	1.5	3000	1.3	2.5
25215	2.5	2.4	7.3	23.3	1.0	0.0	2	444.6	1133.6	0.2	1	1.5	3000	1.2	2.5
25000	2.5	2.5	7.3	23.5	1.0	0.0	2	453.1	1093.8	0.2	1	1.5	3000	1.3	2.5
24795	3.7	3.7	8.0	23.5	1.9	0.2	2	391.4	986.5	0.3	1	1.5	3000	1.3	2.5
24550	3.6	3.6	8.9	24.1	1.9	0.2	2	334.0	887.1	0.3	1	1.5	3000	1.2	2.5
24335	3.9	3.9	9.9	23.5	1.9	0.2	2	337.2	800.3	0.3	1	1.5	3000	1.5	2.5
24115	3.8	3.8	10.0	23.0	1.9	0.2	2	422.7	793.2	0.3	1	1.5	3000	1.4	2.5
23975	3.5	3.5	9.7	22.6	1.9	0.2	2	354.1	828.2	0.2	1	1.5	3000	1.2	2.5
23755	3.2	3.2	9.9	22.7	1.9	0.2	2	333.9	939.2	0.2	1	1.5	3000	1.0	2.5
23565	3.7	3.7	9.4	23.6	1.9	0.2	2	322.2	941.5	0.3	1	1.5	3000	1.3	2.5
23365	3.5	3.5	9.4	22.4	1.9	0.2	2	329.4	987.4	0.3	1	1.5	3000	1.1	2.5
23180	3.2	3.2	9.6	22.5	1.9	0.2	2	400.7	975.5	0.2	1	1.5	3000	0.9	2.5
23000	3.3	3.3	9.5	22.0	1.9	0.2	2	407.6	784.0	0.3	1	1.5	3000	0.9	2.5
22790	3.1	3.1	10.6	20.0	1.9	0.2	2	425.5	784.0	0.2	1	1.5	3000	0.9	2.5
22600	3.2	3.2	10.2	19.8	1.9	0.2	2	386.7	1050.2	0.3	1	1.5	3000	0.8	2.5
22415	3.2	3.2	9.3	18.9	1.9	0.2	2	422.3	1091.6	0.2	1	1.5	3000	0.8	2.5
22195	2.5	2.4	8.4	19.1	1.4	0.0	2	371.3	1464.0	0.3	1	1.5	3000	0.8	2.5
22010	2.5	2.5	9.8	19.4	1.4	0.0	2	471.8	1735.1	0.3	1	1.5	3000	0.8	2.5
21790	2.6	2.6	9.0	18.4	1.4	0.0	2	549.9	1778.4	0.2	1	1.5	3000	1.0	2.5
21615	2.6	2.6	8.0	16.9	1.4	0.0	2	563.1	1687.7	0.3	1	1.5	3000	0.9	2.5
21440	2.5	2.4	8.2	17.8	1.4	0.0	2	638.9	1653.0	0.2	1	1.5	3000	0.8	2.5
21225	2.5	2.4	8.0	18.7	1.4	0.0	2	352.4	1600.8	0.2	1	1.5	3000	0.7	2.5
21020	2.5	2.3	7.8	18.6	1.4	0.0	2	675.0	1607.4	0.2	1	1.5	3000	0.7	2.5
20845	2.5	2.3	7.9	18.7	1.4	0.0	2	613.7	1605.1	0.2	1	1.5	3000	0.8	2.5
20595	2.5	2.1	7.5	18.6	1.4	0.0	2	744.5	1600.4	0.1	1	1.5	3000	0.6	2.5
20435	2.5	2.1	7.9	18.8	1.4	0.0	2	765.2	1613.5	0.1	1	1.5	3000	0.6	2.5
20280	2.5	2.1	8.7	18.1	1.4	0.0	2	439.6	1636.3	0.1	1	1.5	3000	0.6	2.5
20070	2.5	1.9	8.3	18.6	1.4	0.0	2	602.4	1797.8	0.1	1	1.5	3000	0.5	2.5
19855	3.0	3.0	7.7	19.1	1.0	1.4	2	585.9	1809.6	0.1	1	1.5	3000	0.5	2.5
19630	2.9	2.9	7.4	18.6	1.0	1.4	2	634.2	1833.7	0.0	1	1.5	3000	0.5	2.5
19440	3.0	3.0	7.2	19.9	1.0	1.4	2	536.3	1986.1	0.0	1	1.5	3000	0.6	2.5

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
19240	3.4	3.4	7.6	19.4	1.0	1.4	2	445.4	1738.0	0.0	1	1.5	3000	1.0	2.5
19050	4.1	4.1	6.7	20.2	1.0	1.4	2	418.1	1753.4	0.0	1	1.5	3000	1.7	2.5
18830	4.1	4.1	6.8	21.4	1.0	1.4	2	338.9	1684.0	0.0	1	1.5	3000	1.6	2.5
18650	4.0	4.0	6.7	21.2	1.0	1.4	2	339.7	1686.2	0.0	1	1.5	3000	1.6	2.5
18475	3.4	3.4	5.8	22.3	1.0	1.4	2	336.6	1665.9	0.0	1	1.5	3000	1.0	2.5
18290	3.2	3.2	6.3	22.1	1.0	1.4	2	365.1	1631.9	0.0	1	1.5	3000	0.8	2.5
18025	3.1	3.1	5.8	22.9	1.0	1.4	2	380.4	1557.4	0.0	1	1.5	17000	0.7	2.5
17785	3.2	3.2	6.4	24.0	1.0	1.4	2	389.3	1444.1	0.0	1	1.5	17000	0.8	2.5
17510	2.5	1.7	8.4	22.4	1.0	0.0	2	326.3	1398.9	0.0	1	1.5	17000	0.7	2.5
17360	2.5	1.7	11.1	20.3	1.0	0.0	2	223.6	1303.3	0.0	1	1.5	17000	0.7	2.5
17110	2.5	1.6	11.0	21.5	1.0	0.0	2	228.7	1229.6	0.0	1	1.5	17000	0.6	2.5
16970	2.5	2.1	10.7	20.3	1.0	0.0	2	235.7	1196.0	0.0	1	1.5	17000	1.1	2.5
16720	2.5	2.3	8.5	18.8	1.0	0.0	2	260.0	1182.0	0.0	1	1.5	17000	1.3	2.5
16515	2.5	2.1	7.7	19.2	1.0	0.0	2	296.5	1303.8	0.0	1	1.5	17000	1.1	2.5
16305	2.5	2.0	7.1	20.4	1.0	0.0	2	304.6	1395.5	0.0	1	1.5	17000	1.0	2.5
16130	2.5	1.7	7.7	19.4	1.0	0.0	2	323.4	1368.9	0.0	1	1.5	17000	0.7	2.5
15960	2.5	1.6	7.1	19.6	1.0	0.0	2	294.6	1437.6	0.0	1	1.5	17000	0.6	2.5
15745	2.5	1.6	7.0	19.6	1.0	0.0	2	295.8	1401.3	0.0	1	1.5	17000	0.6	2.5
15540	2.5	1.6	6.6	19.2	1.0	0.0	2	344.9	2361.2	0.0	1	1.5	17000	0.6	2.5
15335	2.5	1.7	8.9	18.8	1.0	0.0	2	348.6	1064.1	0.0	1	1.5	17000	0.7	2.5
15125	2.5	1.4	9.8	18.0	1.0	0.0	2	437.3	1053.5	0.0	1	1.5	17000	0.4	2.5
14900	2.5	1.4	8.8	16.7	1.0	0.0	2	584.1	2233.1	0.0	1	1.5	17000	0.4	2.5
14720	2.5	1.5	8.5	16.4	1.0	0.0	2	532.9	2020.9	0.0	1	1.5	17000	0.5	2.5
14480	2.5	1.5	7.4	16.4	1.0	0.0	2	819.8	1851.8	0.0	1	1.5	17000	0.5	2.5
14315	2.5	1.6	6.8	16.0	1.0	0.0	2	1014.4	1944.1	0.0	1	1.5	17000	0.6	2.5
14090	2.5	1.6	6.7	14.8	1.0	0.0	2	787.4	1816.2	0.0	1	1.5	17000	0.6	2.5
13850	2.5	1.6	6.6	15.6	1.0	0.0	2	582.7	1774.9	0.0	1	1.5	17000	0.6	2.5
13635	2.5	1.8	7.3	16.5	1.0	0.0	2	631.2	1818.0	0.0	1	1.5	17000	0.7	2.5
13425	2.5	1.8	5.7	16.8	1.0	0.0	2	576.3	1936.1	0.0	1	1.5	17000	0.7	2.5
13190	2.5	1.9	5.6	17.1	1.0	0.0	2	713.9	1911.1	0.0	1	1.5	17000	0.8	2.5
13030	4.2	4.2	6.0	17.6	1.0	2.1	2	712.9	1863.7	0.1	1	1.5	17000	1.0	2.5
12835	4.7	4.7	6.2	18.0	1.0	2.1	2	799.4	1775.1	0.1	1	1.5	17000	1.5	2.5
12615	5.2	5.2	6.5	18.3	1.0	2.1	2	741.8	1566.5	0.0	1	1.5	17000	2.1	2.5
12395	5.1	5.1	6.7	18.7	1.0	2.1	2	738.1	1543.0	0.0	1	1.5	17000	2.0	2.5
12195	4.2	4.2	6.5	19.1	1.0	2.1	2	990.8	1463.7	0.0	1	1.5	17000	1.1	2.5
11995	4.1	4.1	7.4	20.3	1.0	2.1	2	589.4	1448.5	0.0	1	1.5	17000	1.0	2.5
11780	4.0	4.0	7.3	20.6	1.0	2.1	2	590.4	1460.8	0.0	1	1.5	17000	0.9	2.5
11605	4.0	4.0	7.9	20.3	1.0	2.1	2	587.6	1417.5	0.0	1	1.5	17000	0.9	2.5
11405	3.9	3.9	8.7	20.6	1.0	2.1	2	579.7	1144.9	0.0	1	1.5	17000	0.8	2.5
11180	3.9	3.9	10.7	19.7	1.0	2.1	2	580.2	1009.2	0.0	1	1.5	17000	0.8	2.5
11015	3.8	3.8	12.6	18.7	3.1	0.0	2	519.8	851.0	0.0	1	1.5	17000	0.7	2.5
10835	3.7	3.7	12.2	17.1	3.1	0.0	2	510.4	1073.0	0.0	1	1.5	17000	0.6	2.5
10575	3.8	3.8	9.1	16.1	3.1	0.0	2	534.5	1322.2	0.0	1	1.5	17000	0.7	2.5
10390	3.1	3.1	8.6	17.1	3.1	0.0	2	598.1	1517.0	0.0	1	1.5	17000	0.0	2.5
10225	3.1	3.1	8.0	16.6	3.1	0.0	2	606.9	1543.4	0.0	1	1.5	17000	0.0	2.5
10000	3.1	3.1	8.1	16.6	3.1	0.0	2	685.3	1626.0	0.0	1	1.5	17000	0.0	2.5
9820	3.1	3.1	7.9	17.4	3.1	0.0	2	773.4	1648.8	0.0	1	1.5	17000	0.0	2.5
9595	3.1	3.1	7.8	16.1	3.1	0.0	2	698.1	1719.6	0.0	1	1.5	17000	0.0	2.5
9385	3.1	3.1	7.2	15.6	3.1	0.0	2	694.0	1799.3	0.0	1	1.5	17000	0.0	2.5
9220	3.1	3.1	6.8	15.6	3.1	0.0	2	645.1	1853.4	0.0	1	1.5	17000	0.0	2.5
9025	3.1	3.1	7.0	15.6	3.1	0.0	2	537.6	1822.9	0.0	1	1.5	17000	0.0	2.5
MAX=	**5.2**	5.2			3.1					0.3				3.7	2.5
MIN=	**2.5**	1.4			1.0					0.0				0.0	2.5

CALCULATIONS FOR TOTAL FREEBOARD BY INDIVIDUAL ADJUSTMENT COMPONENT BASED ON LACH&SM - SANTA CLARA RIVER PROPOSED CONDITIONS STRAIGHT-INSIDE CURVED REACH Q_{CAP} n=0.085

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
46195	**3.1**	3.1	10.7	28.1	1.0	0.6	2	215.7	750.8	0.0	0	1.5	9000	1.5	2.5
46020	**3.0**	3.0	10.2	30.0	1.0	0.6	2	162.7	570.2	0.0	0	1.5	9000	1.4	2.5
45545	**3.4**	3.4	11.6	27.8	1.0	0.6	2	151.3	524.2	0.0	0	1.5	9000	1.8	2.5
45030	**3.0**	3.0	10.3	29.2	1.0	0.6	2	222.6	558.0	0.0	0	1.5	9000	1.4	2.5
44585	**3.2**	3.2	10.7	28.6	1.0	0.6	2	163.7	654.4	0.0	0	1.5	9000	1.6	2.5
44210	**2.9**	2.9	10.0	27.8	1.0	0.6	2	204.3	620.0	0.0	0	1.5	9000	1.3	2.5
43820	**3.9**	3.9	14.2	24.1	1.0	0.2	2	207.8	528.7	0.0	0	1.5	9000	2.7	2.5
43610	**4.0**	4.0	14.4	21.3	1.0	0.2	2	242.1	536.9	0.0	0	1.5	9000	2.8	2.5
43410	**3.6**	3.6	13.3	19.8	1.0	0.2	2	312.8	729.1	0.0	0	1.5	9000	2.4	2.5
43200	**3.5**	3.5	13.0	19.2	1.0	0.2	2	308.4	779.5	0.0	0	1.5	9000	2.3	2.5
42975	**2.7**	2.7	10.7	19.0	1.0	0.2	2	410.5	955.8	0.0	0	1.5	9000	1.5	2.5
42815	**2.5**	2.3	9.1	18.7	1.0	0.2	2	380.4	1120.8	0.0	0	1.5	9000	1.1	2.5
42590	**2.5**	2.0	7.7	18.4	1.0	0.2	2	451.9	1230.7	0.0	0	1.5	9000	0.8	2.5
42430	**2.5**	2.0	7.6	19.5	1.0	0.2	2	445.9	1334.9	0.0	0	1.5	9000	0.8	2.5
42215	**2.5**	1.8	6.6	20.7	1.0	0.2	2	493.2	1374.6	0.0	0	1.5	9000	0.6	2.5
41940	**2.5**	1.7	6.4	20.6	1.0	0.2	2	454.2	1327.0	0.0	0	1.5	9000	0.5	2.5
41730	**2.5**	1.8	6.9	20.6	1.0	0.2	2	404.1	1221.5	0.0	0	1.5	9000	0.6	2.5
41460	**2.5**	1.9	7.4	21.2	1.0	0.2	2	365.7	1121.0	0.0	0	1.5	9000	0.7	2.5
41280	**2.5**	2.0	8.7	20.8	1.0	0.0	2	342.4	1193.2	0.0	0	1.5	9000	1.0	2.5
41080	**2.5**	2.0	8.6	20.5	1.0	0.0	2	429.5	1136.8	0.0	0	1.5	9000	1.0	2.5
40825	**2.5**	1.7	7.3	19.8	1.0	0.0	2	426.6	1213.0	0.0	0	1.5	9000	0.7	2.5
40585	**2.5**	1.7	7.1	20.3	1.0	0.0	2	404.3	1247.2	0.0	0	1.5	9000	0.7	2.5
40335	**2.5**	1.5	6.1	21.4	1.0	0.0	2	397.2	1288.6	0.0	0	1.5	9000	0.5	2.5
40130	**2.5**	1.6	6.6	21.6	1.0	0.0	2	311.3	1264.5	0.0	0	1.5	9000	0.6	2.5
39945	**2.5**	1.6	6.8	21.9	1.0	0.0	2	293.8	1212.3	0.0	0	1.5	9000	0.6	2.5
39755	**2.5**	2.0	8.6	20.6	1.0	0.0	2	296.7	1088.1	0.0	0	1.5	9000	1.0	2.5
39605	**2.5**	2.0	8.5	20.7	1.0	0.0	2	348.8	1074.7	0.0	0	1.5	9000	1.0	2.5
39310	**2.5**	2.0	8.4	20.2	1.0	0.0	2	323.4	977.3	0.0	0	1.5	9000	1.0	2.5
39100	**2.5**	1.9	8.2	21.1	1.0	0.0	2	436.5	831.5	0.0	0	1.5	9000	0.9	2.5
38925	**2.5**	1.8	7.8	20.8	1.0	0.0	2	422.3	906.7	0.0	0	1.5	9000	0.8	2.5
38710	**2.5**	2.0	8.1	21.2	1.0	0.1	2	394.9	844.1	0.0	0	1.5	9000	0.9	2.5
38475	**2.6**	2.6	10.4	21.0	1.0	0.1	2	375.1	695.3	0.0	0	1.5	9000	1.5	2.5
38300	**2.5**	2.3	9.6	20.3	1.0	0.1	2	407.6	716.8	0.0	0	1.5	9000	1.2	2.5
38065	**2.5**	2.3	9.6	20.1	1.0	0.1	2	569.0	691.3	0.0	0	1.5	9000	1.2	2.5
37810	**2.8**	2.8	11.3	18.4	1.0	0.1	2	546.8	648.4	0.0	0	1.5	9000	1.7	2.5
37655	**2.6**	2.6	10.6	17.9	1.0	0.1	2	348.9	738.9	0.0	0	1.5	9000	1.5	2.5
37390	**2.5**	2.0	8.2	17.5	1.0	0.1	2	803.3	869.1	0.0	0	1.5	9000	0.9	2.5
37135	**2.5**	2.1	8.7	16.8	1.0	0.1	2	564.0	863.7	0.0	0	1.5	9000	1.0	2.5
36930	**2.5**	2.0	8.3	17.7	1.0	0.1	2	708.3	923.7	0.0	0	1.5	9000	0.9	2.5
36735	**2.5**	2.0	8.1	17.6	1.0	0.1	2	633.8	963.2	0.0	0	1.5	9000	0.9	2.5
36515	**2.5**	1.8	7.4	18.6	1.0	0.1	2	532.1	1032.7	0.0	0	1.5	9000	0.7	2.5
36265	**2.5**	1.8	7.1	18.3	1.0	0.1	2	359.0	1176.0	0.0	0	1.5	9000	0.7	2.5
36080	**2.5**	1.8	7.8	17.6	1.0	0.0	2	326.3	1176.0	0.0	0	1.5	9000	0.8	2.5
35845	**2.5**	1.7	7.0	18.1	1.0	0.0	2	376.2	1512.8	0.0	0	1.5	9000	0.7	2.5
35725	**2.5**	1.9	8.0	18.3	1.0	0.0	2	378.2	1488.9	0.0	0	1.5	9000	0.9	2.5
35515	**2.5**	2.0	8.5	17.9	1.0	0.0	2	379.3	1501.0	0.0	0	1.5	9000	1.0	2.5
35245	**2.5**	1.9	8.3	17.0	1.0	0.0	2	414.3	1580.3	0.0	0	1.5	9000	0.9	2.5
35040	**2.5**	2.0	8.8	16.6	1.0	0.0	2	440.9	1491.6	0.0	0	1.5	9000	1.0	2.5
34860	**2.5**	1.8	7.7	16.3	1.0	0.0	2	432.9	1431.5	0.0	0	1.5	9000	0.8	2.5
34720	**2.5**	1.7	7.4	15.8	1.0	0.0	2	545.6	1449.9	0.0	0	1.5	9000	0.7	2.5
34495	**2.5**	1.7	7.2	15.7	1.0	0.0	2	504.6	1461.5	0.0	0	1.5	9000	0.7	2.5
34310	**2.5**	1.9	8.1	15.4	1.0	0.0	2	684.5	1384.9	0.0	0	1.5	9000	0.9	2.5
34090	**2.5**	1.8	7.5	15.0	1.0	0.0	2	787.5	1371.0	0.0	0	1.5	9000	0.8	2.5
33880	**2.5**	1.9	7.3	15.7	1.0	0.2	2	761.0	1482.9	0.0	0	1.5	9000	0.7	2.5
33710	**2.5**	1.9	7.0	15.6	1.0	0.2	2	719.2	1637.9	0.0	0	1.5	9000	0.7	2.5
33500	**2.5**	1.9	7.0	15.3	1.0	0.2	2	666.4	1755.5	0.0	0	1.5	9000	0.7	2.5
33310	**2.5**	1.7	6.2	15.3	1.0	0.2	2	609.9	1828.2	0.0	0	1.5	9000	0.5	2.5
33115	**2.5**	1.6	5.8	15.4	1.0	0.2	2	667.8	1927.1	0.0	0	1.5	9000	0.4	2.5
32795	**2.5**	1.7	6.3	15.7	1.0	0.2	2	697.6	1920.8	0.0	0	1.5	9000	0.5	2.5

DEFINITIONS

Y_{MAX} = GREATER OF THE DM AND S&H HEIGHTS

Y_{TOT}=TOTAL EMBANKMENT PROTECTION IN FEET BASED ON THE H&S

V(FPS) =VELOCITY IN FEET PER SECOND

FLOW DEPTH=WATER DEPTH IN CHANNEL IN FEET

Y_{AGG}=LONG TERM AGGRADATION IN FEET

Y_{GA}=GENERAL AGGRADATION IN FEET FROM SAM

CHANNEL TYPE=CHANNEL SHAPE/FLOW FACTOR:
IF Fr<1, RECTANGULAR = 0; IF Fr>1, RECTANGULAR = 1;
IF Fr<1, TRAPEZOIDAL = 2; IF Fr>1, TRAPEZOIDAL = 3.

Y_{SE}=SUPER ELEVATION IN FEET

BEND COEFF=BEND COEFFICIENT; IF NO BEND=0, BEND=1

SIDE SLOPE=CHANNEL SIDE SLOPE (H:V), UNITLESS

BOTTOM WIDTH=CHANNEL BOTTOM WIDTH IN FEET, $Q_{2\text{-}YEAR}$ TOP WIDTH

RADIUS=RADIUS OF CURVATURE TO CENTERLINE IN FEET

H/2=HALF BEDFORM HEIGHT IN FEET, LIMITED TO FLOW DEPTH,
AFTER KENNEDY (1963)

Y_{DM} = EMBANKMENT PROTECTION REQUIRED BY THE LACFCDDM IN FEET

GENERAL

THIS SPREADSHEET IS DESIGNED TO CALCULATE TOP PROTECTION (FREE BOARD) BASED ON LACDWP COUNTY HYDROLOGY MANUAL (1991) PAGES 5.8-5.9 AND ASSOCIATED APPENDICES (SEDIMENTATION MANUAL). ALL VELOCITIES ARE IN FPS, WITH NO MAXIMUM VALUE. THE USER SHOULD CONSIDER A PRACTICAL MAXIMUM OF APPROXIMATELY 20-30 FPS. THE PRESENT VERSION (8/05) WILL CALCULATE UP TO 100 VELOCITIES AT ONE TIME. LONG TERM AGGRADATION IS USER SUPPLIED. GENERAL AGGRADATION IS ALSO USER SUPPLIED. SUPER ELEVATION AT BENDS IS BASED ON LACFCDDM EQUATIONS FOUND IN C-3.1. BEDFORM HEIGHT, LIMITED TO FLOW DEPTH AFTER KENNEDY (1963), IS BASED ON EQUATIONS IN APPENDIX Q13. IF FLOW IS SUPERCRITICAL SPREADSHEET REPORTS LACFCDDM TOTAL WALL HEIGHT INSTEAD OF FREEBOARD. LOS ANGELES COUNTY FLOOD CONTROL DISTRICT DESIGN MANUAL (LACFCDDM) VALUES ARE PRESENTED AS A PART OF LACH&SM CALCULATIONS. THE SPREADSHEET CALCULATES THE GREATER OF THE TWO METHODOLOGIES. BOTTOM WIDTH IS BASED ON THE 2-YEAR WATER SURFACE AFTER ACOE PROCEDURES.

COLOR CODES

OUTPUT

DATA FROM HEC-RAS

USER SUPPLIED DATA

INTERMEDIATE CALCULATIONS (INDIVIDUAL SHEETS ONLY)

DESIGNED BY DAVID A JAFFE, PHD, PE
PACIFIC ADVANCED CIVIL ENGINEERING, INC
AUGUST, 2005

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
32605	2.5	1.7	6.1	16.7	1.0	0.2	2	652.8	2407.4	0.0	0	1.5	9000	0.5	2.5
32265	2.5	2.2	5.5	17.2	1.0	0.8	2	651.0	2840.2	0.0	0	1.5	9000	0.4	2.5
31875	2.5	2.2	5.3	16.6	1.0	0.8	2	562.0	2593.1	0.0	0	1.5	9000	0.4	2.5
31585	2.5	2.1	5.0	18.7	1.0	0.8	2	619.5	2377.5	0.0	0	1.5	9000	0.3	2.5
31360	2.5	2.2	5.5	19.9	1.0	0.8	2	672.2	1959.5	0.0	0	1.5	9000	0.4	2.5
31060	2.5	2.1	5.1	21.2	1.0	0.8	2	955.0	1975.9	0.0	0	1.5	9000	0.3	2.5
30720	2.5	2.1	4.6	22.5	1.0	0.8	2	772.7	1911.5	0.0	0	1.5	9000	0.3	2.5
30445	2.5	2.1	4.6	24.1	1.0	0.8	2	700.9	1841.8	0.0	0	1.5	9000	0.3	2.5
30095	2.5	2.2	5.2	25.5	1.0	0.8	2	617.1	1637.3	0.0	0	1.5	9000	0.4	2.5
29815	2.5	2.3	6.1	25.8	1.0	0.8	2	551.1	1445.2	0.0	0	1.5	9000	0.5	2.5
29565	2.5	2.3	6.0	26.3	1.0	0.8	2	461.8	1334.9	0.0	0	1.5	9000	0.5	2.5
29385	2.5	2.4	6.8	26.6	1.0	0.8	2	381.5	1249.1	0.0	0	1.5	9000	0.6	2.5
29140	2.5	1.8	7.9	26.4	1.0	0.0	2	217.2	1095.0	0.0	0	1.5	9000	0.8	2.5
28895	4.7	4.7	16.5	23.8	1.0	0.0	2	201.9	978.0	0.0	0	1.5	9000	3.7	2.5
28695	2.5	2.2	9.4	24.9	1.0	0.0	2	269.6	951.6	0.0	0	1.5	9000	1.2	2.5
28500	2.9	2.9	12.0	23.0	1.0	0.0	2	326.0	1039.5	0.0	0	1.5	9000	1.9	2.5
28280	2.5	2.0	8.7	23.8	1.0	0.0	2	379.1	1003.9	0.0	0	1.5	9000	1.0	2.5
28080	2.5	1.9	8.3	24.1	1.0	0.0	2	416.6	945.4	0.0	0	1.5	9000	0.9	2.5
27925	2.5	2.2	9.6	24.1	1.0	0.0	2	402.0	884.9	0.0	0	1.5	9000	1.2	2.5
27725	2.9	2.9	11.9	23.1	1.0	0.0	2	386.2	811.8	0.0	0	1.5	9000	1.9	2.5
27545	3.1	3.1	12.4	22.3	1.0	0.0	2	409.6	852.5	0.0	0	1.5	9000	2.1	2.5
27335	2.6	2.6	10.9	22.0	1.0	0.0	2	422.5	937.2	0.0	0	1.5	9000	1.6	2.5
27155	2.8	2.8	11.4	21.0	1.0	0.0	2	452.4	978.1	0.0	0	1.5	9000	1.8	2.5
26990	2.5	2.2	9.4	20.4	1.0	0.0	2	440.9	1020.9	0.0	0	1.5	9000	1.2	2.5
26780	2.5	2.0	8.8	21.3	1.0	0.0	2	527.5	1106.5	0.0	0	1.5	9000	1.0	2.5
26575	2.5	1.7	7.3	21.5	1.0	0.0	2	513.5	1243.6	0.0	0	1.5	3000	0.7	2.5
26355	2.5	1.9	7.4	21.6	1.0	0.0	2	601.4	1294.5	0.0	0	1.5	3000	0.9	2.5
26170	2.5	2.1	7.7	21.9	1.0	0.0	2	457.8	1301.2	0.0	0	1.5	3000	1.1	2.5
25965	2.5	2.3	7.5	22.2	1.0	0.0	2	568.4	1313.2	0.0	0	1.5	3000	1.3	2.5
25785	2.5	2.4	7.5	22.0	1.0	0.0	2	550.9	1256.9	0.0	0	1.5	3000	1.4	2.5
25600	2.5	2.3	7.8	22.3	1.0	0.0	2	478.1	1149.9	0.0	0	1.5	3000	1.3	2.5
25425	2.5	2.3	7.3	23.1	1.0	0.0	2	399.8	1138.3	0.0	0	1.5	3000	1.3	2.5
25215	2.5	2.2	7.3	23.3	1.0	0.0	2	444.6	1133.6	0.0	0	1.5	3000	1.2	2.5
25000	2.5	2.3	7.3	23.5	1.0	0.0	2	453.1	1093.8	0.0	0	1.5	3000	1.3	2.5
24795	3.4	3.4	8.0	23.5	1.9	0.2	2	391.4	986.5	0.0	0	1.5	3000	1.3	2.5
24550	3.3	3.3	8.9	24.1	1.9	0.2	2	334.0	887.1	0.0	0	1.5	3000	1.2	2.5
24335	3.6	3.6	9.9	23.5	1.9	0.2	2	337.2	800.3	0.0	0	1.5	3000	1.5	2.5
24115	3.5	3.5	10.0	23.0	1.9	0.2	2	422.7	793.2	0.0	0	1.5	3000	1.4	2.5
23975	3.3	3.3	9.7	22.6	1.9	0.2	2	354.1	828.2	0.0	0	1.5	3000	1.2	2.5
23755	3.1	3.1	9.9	22.7	1.9	0.2	2	333.9	939.2	0.0	0	1.5	3000	1.0	2.5
23565	3.4	3.4	9.4	23.6	1.9	0.2	2	322.2	941.5	0.0	0	1.5	3000	1.3	2.5
23365	3.2	3.2	9.4	22.4	1.9	0.2	2	329.4	987.4	0.0	0	1.5	3000	1.1	2.5
23180	3.0	3.0	9.6	22.5	1.9	0.2	2	400.7	975.5	0.0	0	1.5	3000	0.9	2.5
23000	3.0	3.0	9.5	22.0	1.9	0.2	2	407.6	784.0	0.0	0	1.5	3000	0.9	2.5
22790	3.0	3.0	10.6	20.0	1.9	0.2	2	425.5	784.0	0.0	0	1.5	3000	0.9	2.5
22600	2.9	2.9	10.2	19.8	1.9	0.2	2	386.7	1050.2	0.0	0	1.5	3000	0.8	2.5
22415	2.9	2.9	9.3	18.9	1.9	0.2	2	422.3	1091.6	0.0	0	1.5	3000	0.8	2.5
22195	2.5	2.2	8.4	19.1	1.4	0.0	2	371.3	1464.0	0.0	0	1.5	3000	0.8	2.5
22010	2.5	2.2	9.8	19.4	1.4	0.0	2	471.8	1735.1	0.0	0	1.5	3000	0.8	2.5
21790	2.5	2.4	9.0	18.4	1.4	0.0	2	549.9	1778.4	0.0	0	1.5	3000	1.0	2.5
21615	2.5	2.3	8.0	16.9	1.4	0.0	2	563.1	1687.7	0.0	0	1.5	3000	0.9	2.5
21440	2.5	2.2	8.2	17.8	1.4	0.0	2	638.9	1653.0	0.0	0	1.5	3000	0.8	2.5
21225	2.5	2.1	8.0	18.7	1.4	0.0	2	352.4	1600.8	0.0	0	1.5	3000	0.7	2.5
21020	2.5	2.1	7.8	18.6	1.4	0.0	2	675.0	1607.4	0.0	0	1.5	3000	0.7	2.5
20845	2.5	2.2	7.9	18.7	1.4	0.0	2	613.7	1605.1	0.0	0	1.5	3000	0.8	2.5
20595	2.5	2.0	7.5	18.6	1.4	0.0	2	744.5	1600.4	0.0	0	1.5	3000	0.6	2.5
20435	2.5	2.0	7.9	18.8	1.4	0.0	2	765.2	1613.5	0.0	0	1.5	3000	0.6	2.5
20280	2.5	2.0	8.7	18.1	1.4	0.0	2	439.6	1636.3	0.0	0	1.5	3000	0.6	2.5
20070	2.5	1.9	8.3	18.6	1.4	0.0	2	602.4	1797.8	0.0	0	1.5	3000	0.5	2.5
19855	2.9	2.9	7.7	19.1	1.0	1.4	2	585.9	1809.6	0.0	0	1.5	3000	0.5	2.5
19630	2.9	2.9	7.4	18.6	1.0	1.4	2	634.2	1833.7	0.0	0	1.5	3000	0.5	2.5
19440	3.0	3.0	7.2	19.9	1.0	1.4	2	536.3	1986.1	0.0	0	1.5	3000	0.6	2.5

SECTION	Y_{MAX}	Y_{TOT}=	V (FPS)	FLOW DEPTH (FT)	Y_{AGG}+	Y_{GA}+	CHANNEL TYPE	BOTTOM WIDTH (FT)	TOP WIDTH (FT)	Y_{SE}+	BEND COEFF	SIDE SLOPE	RADIUS	H/2	Y_{DM}
19240	3.4	3.4	7.6	19.4	1.0	1.4	2	445.4	1738.0	0.0	0	1.5	3000	1.0	2.5
19050	4.1	4.1	6.7	20.2	1.0	1.4	2	418.1	1753.4	0.0	0	1.5	3000	1.7	2.5
18830	4.0	4.0	6.8	21.4	1.0	1.4	2	338.9	1684.0	0.0	0	1.5	3000	1.6	2.5
18650	4.0	4.0	6.7	21.2	1.0	1.4	2	339.7	1686.2	0.0	0	1.5	3000	1.6	2.5
18475	3.4	3.4	5.8	22.3	1.0	1.4	2	336.6	1665.9	0.0	0	1.5	3000	1.0	2.5
18290	3.2	3.2	6.3	22.1	1.0	1.4	2	365.1	1631.9	0.0	0	1.5	3000	0.8	2.5
18025	3.1	3.1	5.8	22.9	1.0	1.4	2	380.4	1557.4	0.0	0	1.5	17000	0.7	2.5
17785	3.2	3.2	6.4	24.0	1.0	1.4	2	389.3	1444.1	0.0	0	1.5	17000	0.8	2.5
17510	2.5	1.7	8.4	22.4	1.0	0.0	2	326.3	1398.9	0.0	0	1.5	17000	0.7	2.5
17360	2.5	1.7	11.1	20.3	1.0	0.0	2	223.6	1303.3	0.0	0	1.5	17000	0.7	2.5
17110	2.5	1.6	11.0	21.5	1.0	0.0	2	228.7	1229.6	0.0	0	1.5	17000	0.6	2.5
16970	2.5	2.1	10.7	20.3	1.0	0.0	2	235.7	1196.0	0.0	0	1.5	17000	1.1	2.5
16720	2.5	2.3	8.5	18.8	1.0	0.0	2	260.0	1182.0	0.0	0	1.5	17000	1.3	2.5
16515	2.5	2.1	7.7	19.2	1.0	0.0	2	296.5	1303.8	0.0	0	1.5	17000	1.1	2.5
16305	2.5	2.0	7.1	20.4	1.0	0.0	2	304.6	1395.5	0.0	0	1.5	17000	1.0	2.5
16130	2.5	1.7	7.7	19.4	1.0	0.0	2	323.4	1368.9	0.0	0	1.5	17000	0.7	2.5
15960	2.5	1.6	7.1	19.6	1.0	0.0	2	294.6	1437.6	0.0	0	1.5	17000	0.6	2.5
15745	2.5	1.6	7.0	19.6	1.0	0.0	2	295.8	1401.3	0.0	0	1.5	17000	0.6	2.5
15540	2.5	1.6	6.6	19.2	1.0	0.0	2	344.9	2361.2	0.0	0	1.5	17000	0.6	2.5
15335	2.5	1.7	8.9	18.8	1.0	0.0	2	348.6	1064.1	0.0	0	1.5	17000	0.7	2.5
15125	2.5	1.4	9.8	18.0	1.0	0.0	2	437.3	1053.5	0.0	0	1.5	17000	0.4	2.5
14900	2.5	1.4	8.8	16.7	1.0	0.0	2	584.1	2233.1	0.0	0	1.5	17000	0.4	2.5
14720	2.5	1.5	8.5	16.4	1.0	0.0	2	532.9	2020.9	0.0	0	1.5	17000	0.5	2.5
14480	2.5	1.5	7.4	16.4	1.0	0.0	2	819.8	1851.8	0.0	0	1.5	17000	0.5	2.5
14315	2.5	1.6	6.8	16.0	1.0	0.0	2	1014.4	1944.1	0.0	0	1.5	17000	0.6	2.5
14090	2.5	1.6	6.7	14.8	1.0	0.0	2	787.4	1816.2	0.0	0	1.5	17000	0.6	2.5
13850	2.5	1.6	6.6	15.6	1.0	0.0	2	582.7	1774.9	0.0	0	1.5	17000	0.6	2.5
13635	2.5	1.7	7.3	16.5	1.0	0.0	2	631.2	1818.0	0.0	0	1.5	17000	0.7	2.5
13425	2.5	1.7	5.7	16.8	1.0	0.0	2	576.3	1936.1	0.0	0	1.5	17000	0.7	2.5
13190	2.5	1.8	5.6	17.1	1.0	0.0	2	713.9	1911.1	0.0	0	1.5	17000	0.8	2.5
13030	4.1	4.1	6.0	17.6	1.0	2.1	2	712.9	1863.7	0.0	0	1.5	17000	1.0	2.5
12835	4.6	4.6	6.2	18.0	1.0	2.1	2	799.4	1775.1	0.0	0	1.5	17000	1.5	2.5
12615	5.2	5.2	6.5	18.3	1.0	2.1	2	741.8	1566.5	0.0	0	1.5	17000	2.1	2.5
12395	5.1	5.1	6.7	18.7	1.0	2.1	2	738.1	1543.0	0.0	0	1.5	17000	2.0	2.5
12195	4.2	4.2	6.5	19.1	1.0	2.1	2	990.8	1463.7	0.0	0	1.5	17000	1.1	2.5
11995	4.1	4.1	7.4	20.3	1.0	2.1	2	589.4	1448.5	0.0	0	1.5	17000	1.0	2.5
11780	4.0	4.0	7.3	20.6	1.0	2.1	2	590.4	1460.8	0.0	0	1.5	17000	0.9	2.5
11605	4.0	4.0	7.9	20.3	1.0	2.1	2	587.6	1417.5	0.0	0	1.5	17000	0.9	2.5
11405	3.9	3.9	8.7	20.6	1.0	2.1	2	579.7	1144.9	0.0	0	1.5	17000	0.8	2.5
11180	3.9	3.9	10.7	19.7	1.0	2.1	2	580.2	1009.2	0.0	0	1.5	17000	0.8	2.5
11015	3.8	3.8	12.6	18.7	3.1	0.0	2	519.8	851.0	0.0	0	1.5	17000	0.7	2.5
10835	3.7	3.7	12.2	17.1	3.1	0.0	2	510.4	1073.0	0.0	0	1.5	17000	0.6	2.5
10575	3.8	3.8	9.1	16.1	3.1	0.0	2	534.5	1322.2	0.0	0	1.5	17000	0.7	2.5
10390	3.1	3.1	8.6	17.1	3.1	0.0	2	598.1	1517.0	0.0	0	1.5	17000	0.0	2.5
10225	3.1	3.1	8.0	16.6	3.1	0.0	2	606.9	1543.4	0.0	0	1.5	17000	0.0	2.5
10000	3.1	3.1	8.1	16.6	3.1	0.0	2	685.3	1626.0	0.0	0	1.5	17000	0.0	2.5
9820	3.1	3.1	7.9	17.4	3.1	0.0	2	773.4	1648.8	0.0	0	1.5	17000	0.0	2.5
9595	3.1	3.1	7.8	16.1	3.1	0.0	2	698.1	1719.6	0.0	0	1.5	17000	0.0	2.5
9385	3.1	3.1	7.2	15.6	3.1	0.0	2	694.0	1799.3	0.0	0	1.5	17000	0.0	2.5
9220	3.1	3.1	6.8	15.6	3.1	0.0	2	645.1	1853.4	0.0	0	1.5	17000	0.0	2.5
9025	3.1	3.1	7.0	15.6	3.1	0.0	2	537.6	1822.9	0.0	0	1.5	17000	0.0	2.5
MAX=	**5.2**	5.2			3.1					0.0				3.7	2.5
MIN=	**2.5**	1.4			1.0					0.0				0.0	2.5

Santa Clara River Fluvial Study

APPENDIX CHAPTER 6.3

Summary of Appendix 6
Toedown & Freeboard
Proposed Condition
Curved & Straight Reaches

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

Table A6.3: Santa Clara River Appendix 6 Summary of Proposed Toe-down & Freeboard (ft)

Subreach	HEC-RAS Station	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Total Degradation (H&S w/ SAM) [3]	Proposed Toe-down Elevation [1,4]	Total Degradation (H&S w/ SAM) [3]	Proposed Toe-down Elevation [1,4]		Total Freeboard (H&S w/ SAM) [3]	Proposed Top of Levee Elevation [2]	Total Freeboard (H&S w/ SAM) [4]	Proposed Top of Levee Elevation [1]
SRA1	46195	1035.0	11.1	1023.9	11.1	1023.9	1063.1	3.1	1066.3	3.1	1066.3
	46020	1032.0	12.7	1019.3	12.7	1019.3	1062.0	3.0	1065.0	3.0	1065.0
	45545	1030.0	10.4	1019.6	10.4	1019.6	1057.9	3.4	1061.3	3.4	1061.3
	45030	1025.0	13.1	1011.9	13.1	1011.9	1054.2	3.0	1057.3	3.0	1057.3
	44585	1022.0	9.8	1012.2	9.8	1012.2	1050.6	3.2	1053.8	3.2	1053.8
	44210	1020.0	12.5	1007.5	12.5	1007.5	1047.8	2.9	1050.8	2.9	1050.8
SRA2	43820	1018.0	15.4	1002.6	15.4	1002.6	1042.1	3.9	1046.0	3.9	1046.0
	43610	1017.0	17.0	1000.0	17.0	1000.0	1038.3	4.0	1042.2	4.0	1042.2
	43410	1016.0	15.8	1000.2	15.8	1000.2	1035.8	3.6	1039.4	3.6	1039.4
	43200	1014.0	16.3	997.7	16.3	997.7	1033.2	3.5	1036.7	3.5	1036.7
	42975	1012.0	15.5	996.5	15.5	996.5	1031.0	2.9	1033.8	2.7	1033.7
	42815	1011.0	15.5	995.5	15.5	995.5	1029.7	2.5	1032.2	2.5	1032.2
	42590	1010.0	15.1	994.9	14.7	995.3	1028.4	2.5	1030.9	2.5	1030.9
	42430	1008.0	15.4	992.6	15.3	992.7	1027.5	2.5	1030.0	2.5	1030.0
	42215	1006.0	15.2	990.8	14.7	991.3	1026.7	2.5	1029.2	2.5	1029.2
	41940	1005.0	13.4	991.6	11.9	993.1	1025.6	2.5	1028.1	2.5	1028.1
	41730	1004.0	13.2	990.8	12.0	992.0	1024.6	2.5	1027.1	2.5	1027.1
	41460	1002.0	12.8	989.2	11.9	990.1	1023.2	2.5	1025.7	2.5	1025.7
SRA3	41280	1001.0	10.9	990.1	10.9	990.1	1021.8	2.5	1024.3	2.5	1024.3
	41080	1000.0	12.7	987.3	12.7	987.3	1020.5	2.5	1023.0	2.5	1023.0
	40825	999.5	12.2	987.3	11.7	987.8	1019.3	2.5	1021.8	2.5	1021.8
	40585	998.0	11.6	986.4	11.2	986.8	1018.3	2.5	1020.8	2.5	1020.8
	40335	996.0	10.2	985.8	8.8	987.2	1017.4	2.5	1019.9	2.5	1019.9
	40130	995.0	10.3	984.7	9.0	986.0	1016.6	2.5	1019.1	2.5	1019.1
	39945	994.0	10.2	983.8	8.9	985.1	1015.9	2.5	1018.4	2.5	1018.4
	39755	994.0	11.0	983.0	11.0	983.0	1014.6	2.5	1017.1	2.5	1017.1
	39605	993.0	12.5	980.5	12.5	980.5	1013.7	2.5	1016.2	2.5	1016.2
	39310	992.0	11.2	980.8	11.0	981.0	1012.2	2.5	1014.7	2.5	1014.7
	39100	990.0	12.5	977.5	12.5	977.5	1011.1	2.5	1013.6	2.5	1013.6
	38925	989.5	9.5	980.0	9.5	980.0	1010.3	2.5	1012.8	2.5	1012.8
SRA4	38710	988.0	6.7	981.3	6.7	981.3	1009.2	2.5	1011.7	2.5	1011.7
	38475	986.0	9.0	977.0	9.0	977.0	1007.0	2.6	1009.5	2.6	1009.5
	38300	985.5	9.8	975.7	9.8	975.7	1005.8	2.5	1008.3	2.5	1008.3
	38065	984.0	7.6	976.4	7.6	976.4	1004.1	2.5	1006.6	2.5	1006.6
	37810	983.0	9.2	973.8	9.2	973.8	1001.4	2.8	1004.2	2.8	1004.2
	37655	982.0	10.0	972.0	10.0	972.0	999.9	2.6	1002.5	2.6	1002.5
	37390	981.0	8.0	973.0	8.0	973.0	998.5	2.5	1001.0	2.5	1001.0
	37135	980.0	8.4	971.6	8.4	971.6	996.8	2.5	999.3	2.5	999.3
	36930	978.0	8.8	969.3	8.8	969.3	995.7	2.5	998.2	2.5	998.2
	36735	977.0	8.2	968.8	8.2	968.8	994.6	2.5	997.1	2.5	997.1
	36515	975.0	7.3	967.7	6.9	968.1	993.6	2.5	996.1	2.5	996.1
	36265	974.0	7.7	966.3	6.8	967.2	992.3	2.5	994.8	2.5	994.8
SRB1	36080	973.0	22.9	950.1	22.0	951.0	990.6	2.5	993.1	2.5	993.1
	35845	971.0	9.2	961.8	7.5	963.5	989.1	2.5	991.6	2.5	991.6
	35725	970.0	10.7	959.3	8.9	961.1	988.3	2.5	990.8	2.5	990.8
	35515	969.0	11.5	957.5	9.8	959.2	986.9	2.5	989.4	2.5	989.4
	35245	968.0	11.4	956.6	9.9	958.1	985.0	2.5	987.5	2.5	987.5
	35040	967.0	12.7	954.3	11.0	956.0	983.6	2.5	986.1	2.5	986.1
	34860	966.0	11.6	954.4	10.4	955.6	982.3	2.5	984.8	2.5	984.8
	34720	965.5	11.8	953.7	10.4	955.1	981.3	2.5	983.8	2.5	983.8
	34495	964.0	10.9	953.1	10.0	954.0	979.7	2.5	982.2	2.5	982.2
	34310	963.0	10.8	952.2	9.6	953.4	978.4	2.5	980.9	2.5	980.9
	34090	962.0	10.8	951.2	9.7	952.3	977.0	2.5	979.5	2.5	979.5
SRB2	33880	960.0	10.2	949.8	9.1	950.9	975.7	2.5	978.2	2.5	978.2
	33710	959.0	9.9	949.1	8.6	950.4	974.6	2.5	977.1	2.5	977.1
	33500	958.0	10.4	947.6	8.9	949.1	973.3	2.5	975.8	2.5	975.8
	33310	957.0	10.9	946.1	8.7	948.3	972.3	2.5	974.8	2.5	974.8
	33115	956.0	9.0	947.0	6.8	949.2	971.4	2.5	973.9	2.5	973.9
	32795	954.0	9.9	944.1	7.7	946.3	969.7	2.5	972.2	2.5	972.2
	32605	952.0	10.5	941.5	8.2	943.8	968.7	2.5	971.2	2.5	971.2
SRC1	32265	950.0	9.9	940.1	7.4	942.6	967.2	2.5	969.7	2.5	969.7
	31875	949.0	9.1	939.9	6.1	942.9	965.6	2.5	968.1	2.5	968.1
	31585	946.0	8.6	937.4	5.6	940.4	964.7	2.5	967.2	2.5	967.2
	31360	944.0	8.3	935.7	5.4	938.6	963.9	2.5	966.4	2.5	966.4
	31060	942.0	7.5	934.5	4.9	937.1	963.2	2.5	965.7	2.5	965.7
	30720	940.0	7.9	932.1	4.6	935.4	962.5	2.5	965.0	2.5	965.0
	30445	938.0	7.9	930.1	4.5	933.5	962.1	2.5	964.6	2.5	964.6
	30095	936.0	8.1	927.9	4.6	931.4	961.5	2.5	964.0	2.5	964.0
	29815	935.0	7.7	927.3	4.8	930.2	960.8	2.5	963.3	2.5	963.3
	29565	934.0	7.1	926.9	4.7	929.3	960.3	2.5	962.8	2.5	962.8
	29385	933.0	7.0	926.0	4.9	928.1	959.6	2.5	962.1	2.5	962.1
SRC2	29140	932.0	10.4	921.6	9.1	922.9	958.4	2.5	960.9	2.5	960.9
	28895	930.0	13.5	916.5	12.7	917.3	953.8	4.8	958.6	4.7	958.5
	28695	928.0	15.0	913.0	15.0	913.0	952.9	2.5	955.4	2.5	955.4
	28500	927.5	14.7	912.8	14.7	912.8	950.5	3.1	953.5	2.9	953.4
	28280	926.0	13.6	912.4	13.4	912.6	949.8	2.5	952.3	2.5	952.3
	28080	925.0	9.9	915.1	9.7	915.3	949.1	2.5	951.6	2.5	951.6
	27925	924.0	10.3	913.7	10.3	913.7	948.1	2.5	950.6	2.5	950.6
	27725	923.0	12.9	910.1	12.9	910.1	946.1	2.9	949.0	2.9	949.0
	27545	922.0	15.0	907.0	15.0	907.0	944.3	3.1	947.4	3.1	947.4
	27335	921.0	14.1	906.9	14.1	906.9	943.0	2.7	945.7	2.6	945.6
	27155	920.5	12.9	907.6	12.9	907.6	941.5	2.9	944.4	2.8	944.2
SRC3	26990	920.0	11.2	908.8	11.0	909.0	940.4	2.5	942.9	2.5	942.9
	26780	918.0	11.6	906.4	10.9	907.1	939.3	2.5	941.8	2.5	941.8
	26575	917.0	16.0	901.0	10.9	906.1	938.5	2.5	941.0	2.5	941.0
	26355	916.0	15.4	900.6	8.7	907.3	937.6	2.5	940.1	2.5	940.1
	26170	915.0	16.6	898.4	9.2	905.8	936.9	2.5	939.4	2.5	939.4
	25965	914.0	17.1	896.9	9.8	904.2	936.2	2.6	938.8	2.5	938.7
	25785	913.5	16.7	896.8	10.1	903.4	935.5	2.7	938.2	2.5	938.0
	25600	912.5	15.9	896.6	9.9	902.6	934.8	2.5	937.3	2.5	937.3
	25425	911.0	15.1	895.9	9.8	901.2	934.1	2.5	936.7	2.5	936.6
	25215	910.0	14.0	896.0	8.0	902.0	933.3	2.5	935.8	2.5	935.8
	25000	909.0	13.7	895.3	7.6	901.4	932.5	2.5	935.0	2.5	935.0
SRC4	24795	908.0	12.3	895.7	6.7	901.3	931.5	3.7	935.2	3.4	934.9
	24550	906.0	12.4	893.6	7.1	898.9	930.1	3.6	933.6	3.3	933.4
	24335	905.0	13.0	892.0	8.5	896.5	928.5	3.9	932.4	3.6	932.1
	24115	904.0	13.5	890.5	9.4	894.6	927.0	3.8	930.8	3.5	930.5
	23975	903.5	13.9	889.6	9.8	893.7	926.1	3.5	929.7	3.3	929.4
	23755	902.0	13.2	888.8	8.4	893.6	924.7	3.2	927.9	3.1	927.8
	23565	900.0	14.5	885.5	9.5	890.5	923.6	3.7	927.3	3.4	927.0
	23365	900.0	14.3	885.7	8.6	891.4	922.4	3.5	925.9	3.2	925.6
	23180	899.0	15.8	883.2	10.3	888.7	921.5	3.2	924.6	3.0	924.4
	23000	898.0	13.0	885.0	9.6	888.4	920.0	3.3	923.3	3.0	923.0
	22790	897.5	26.8	870.7	23.0	874.5	917.5	3.1	920.6	3.0	920.5
	22600	896.0	14.8	881.2	9.3	886.7	915.8	3.2	919.0	2.9	918.7
	22415	895.5	14.0	881.5	9.4	886.1	914.4	3.2	917.6	2.9	917.4

1 - Phase 1 Analysis

2 - Minimum 1999 Bed Elevation

3 - Toe-down based on LA County Hydrology & Sedimentation Manual; Freeboard based on max of LA County Hydrology & Sedimentation Manual and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Final design of levee will include detailed bridge analysis

Table A6.3: Santa Clara River Summary of Proposed Toe-down & Freeboard (ft) continued

Subreach	HEC-RAS Station	Z_{99} [2]	Outside Curved Reach		Straight-Inside Curved Reach		WSE	Outside Curved Reach		Straight-Inside Curved Reach	
			Total Degradation (H&S w/ SAM) [3]	Proposed Toe-down Elevation [1,4]	Total Degradation (H&S w/ SAM) [3]	Proposed Toe-down Elevation [1,4]		Total Freeboard (H&S w/ SAM) [3]	Proposed Top of Levee Elevation [2]	Total Freeboard (H&S w/ SAM) [4]	Proposed Top of Levee Elevation [1]
SRD1	22195	894.0	13.3	880.7	6.7	887.3	913.1	2.5	915.6	2.5	915.6
	22010	892.0	15.3	876.7	7.7	884.3	911.4	2.5	913.9	2.5	913.9
	21790	891.5	15.3	876.2	9.4	882.1	909.9	2.6	912.6	2.5	912.4
	21615	892.0	12.5	879.5	8.5	883.5	908.9	2.6	911.5	2.5	911.4
	21440	890.0	14.1	875.9	8.3	881.7	907.8	2.5	910.3	2.5	910.3
	21225	888.0	16.3	871.7	8.6	879.4	906.7	2.5	909.2	2.5	909.2
	21020	887.0	12.6	874.4	9.1	877.9	905.6	2.5	908.1	2.5	908.1
	20845	886.0	15.2	870.8	7.3	878.7	904.7	2.5	907.2	2.5	907.2
	20595	885.0	14.1	870.9	6.3	878.7	903.6	2.5	906.1	2.5	906.1
	20435	884.0	14.4	869.6	6.2	877.8	902.8	2.5	905.3	2.5	905.3
	20280	883.7	15.4	868.3	7.5	876.2	901.8	2.5	904.3	2.5	904.3
	20070	882.0	16.8	865.2	9.2	872.8	900.6	2.5	903.1	2.5	903.1
SRD2	19855	880.5	14.5	866.0	9.1	871.4	899.6	3.0	902.6	2.9	902.5
	19630	880.0	12.3	867.7	8.4	871.6	898.6	2.9	901.5	2.9	901.5
	19440	878.0	12.2	865.8	6.3	871.7	897.9	3.0	900.8	3.0	900.8
	19240	877.5	13.0	864.5	7.4	870.1	896.9	3.4	900.3	3.4	900.2
	19050	876.0	14.1	861.9	8.8	867.2	896.2	4.1	900.3	4.1	900.3
	18830	874.0	14.5	859.5	6.4	867.6	895.4	4.1	899.4	4.0	899.4
	18650	873.5	14.7	858.8	6.0	867.5	894.7	4.0	898.7	4.0	898.7
	18475	872.0	13.6	858.4	5.1	866.9	894.3	3.4	897.6	3.4	897.6
	18290	871.5	14.1	857.4	5.3	866.2	893.6	3.2	896.8	3.2	896.8
	18025	870.0	4.8	865.2	4.8	865.2	892.9	3.1	895.9	3.1	895.9
	17785	868.0	5.0	863.0	5.0	863.0	892.0	3.2	895.2	3.2	895.2
SRD3	17510	868.0	6.9	861.1	6.9	861.1	890.4	2.5	892.9	2.5	892.9
	17360	868.0	9.2	858.8	9.2	858.8	888.3	2.5	890.8	2.5	890.8
	17110	864.0	12.0	852.0	12.0	852.0	885.5	2.5	888.0	2.5	888.0
	16970	863.7	12.1	851.6	12.1	851.6	884.0	2.5	886.5	2.5	886.5
	16720	863.5	9.9	853.6	9.9	853.6	882.3	2.5	884.8	2.5	884.8
	16515	862.0	10.4	851.6	10.4	851.6	881.2	2.5	883.7	2.5	883.7
	16305	860.0	7.1	852.9	7.1	852.9	880.4	2.5	882.9	2.5	882.9
	16130	860.0	8.6	851.4	8.6	851.4	879.4	2.5	881.9	2.5	881.9
	15960	859.0	9.5	849.5	9.5	849.5	878.6	2.5	881.1	2.5	881.1
	15745	858.0	7.3	850.7	7.3	850.7	877.6	2.5	880.1	2.5	880.1
	15540	857.5	6.8	850.7	6.8	850.7	876.7	2.5	879.2	2.5	879.2
	15335	856.0	8.8	847.2	8.8	847.2	874.8	2.5	877.3	2.5	877.3
SRE1	15125	854.0	26.1	827.9	26.1	827.9	872.0	2.5	874.5	2.5	874.5
	14900	853.0	9.3	843.7	9.3	843.7	869.7	2.5	872.2	2.5	872.2
	14720	852.0	8.9	843.1	8.8	843.2	868.4	2.5	870.9	2.5	870.9
	14480	850.5	8.9	841.6	8.8	841.7	866.9	2.5	869.4	2.5	869.4
	14315	850.0	7.4	842.6	7.0	843.0	866.0	2.5	868.5	2.5	868.5
	14090	850.0	7.3	842.7	7.2	842.8	864.8	2.5	867.3	2.5	867.3
	13850	848.0	6.7	841.3	6.6	841.4	863.6	2.5	866.1	2.5	866.1
	13635	846.0	7.7	838.3	7.6	838.4	862.5	2.5	865.0	2.5	865.0
	13425	845.0	8.6	836.4	8.3	836.7	861.8	2.5	864.3	2.5	864.3
	13190	844.0	6.7	837.3	6.4	837.6	861.1	2.5	863.6	2.5	863.6
SRE2	13030	843.0	6.9	836.1	6.7	836.3	860.6	4.2	864.8	4.1	864.8
	12835	842.0	6.4	835.6	6.4	835.6	860.0	4.7	864.7	4.6	864.7
	12615	841.0	6.1	834.9	6.1	834.9	859.3	5.2	864.6	5.2	864.6
	12395	840.0	6.0	834.0	6.0	834.0	858.7	5.1	863.8	5.1	863.8
	12195	839.0	5.5	833.5	5.5	833.5	858.1	4.2	862.3	4.2	862.3
	11995	837.0	6.2	830.8	6.2	830.8	857.3	4.1	861.4	4.1	861.4
	11780	836.0	6.1	829.9	6.1	829.9	856.6	4.0	860.5	4.0	860.5
	11605	835.5	6.6	828.9	6.6	828.9	855.8	4.0	859.8	4.0	859.8
	11405	834.0	6.3	827.7	6.3	827.7	854.6	3.9	858.6	3.9	858.6
	11180	833.0	7.7	825.3	7.7	825.3	852.7	3.9	856.6	3.9	856.6
SRE3	11015	831.5	10.4	821.1	10.4	821.1	850.2	3.8	854.0	3.8	854.0
	10835	831.0	10.9	820.1	10.9	820.1	848.1	3.7	851.8	3.7	851.8
	10575	830.0	9.2	820.8	9.2	820.8	846.1	3.8	849.9	3.8	849.9
	10390	828.0	9.9	818.1	9.9	818.1	845.1	3.1	848.2	3.1	848.2
	10225	827.5	9.8	817.7	9.8	817.7	844.1	3.1	847.2	3.1	847.2
	10000	826.0	8.5	817.5	8.5	817.5	842.6	3.1	845.7	3.1	845.7
	9820	824.0	10.2	813.8	10.2	813.8	841.4	3.1	844.5	3.1	844.5
	9595	823.8	8.4	815.4	8.4	815.4	839.9	3.1	843.0	3.1	843.0
	9385	823.0	9.0	814.0	8.9	814.1	838.6	3.1	841.7	3.1	841.7
	9220	822.0	9.3	812.7	9.1	812.9	837.6	3.1	840.7	3.1	840.7
	9025	821.0	9.0	812.0	8.9	812.1	836.6	3.1	839.7	3.1	839.7

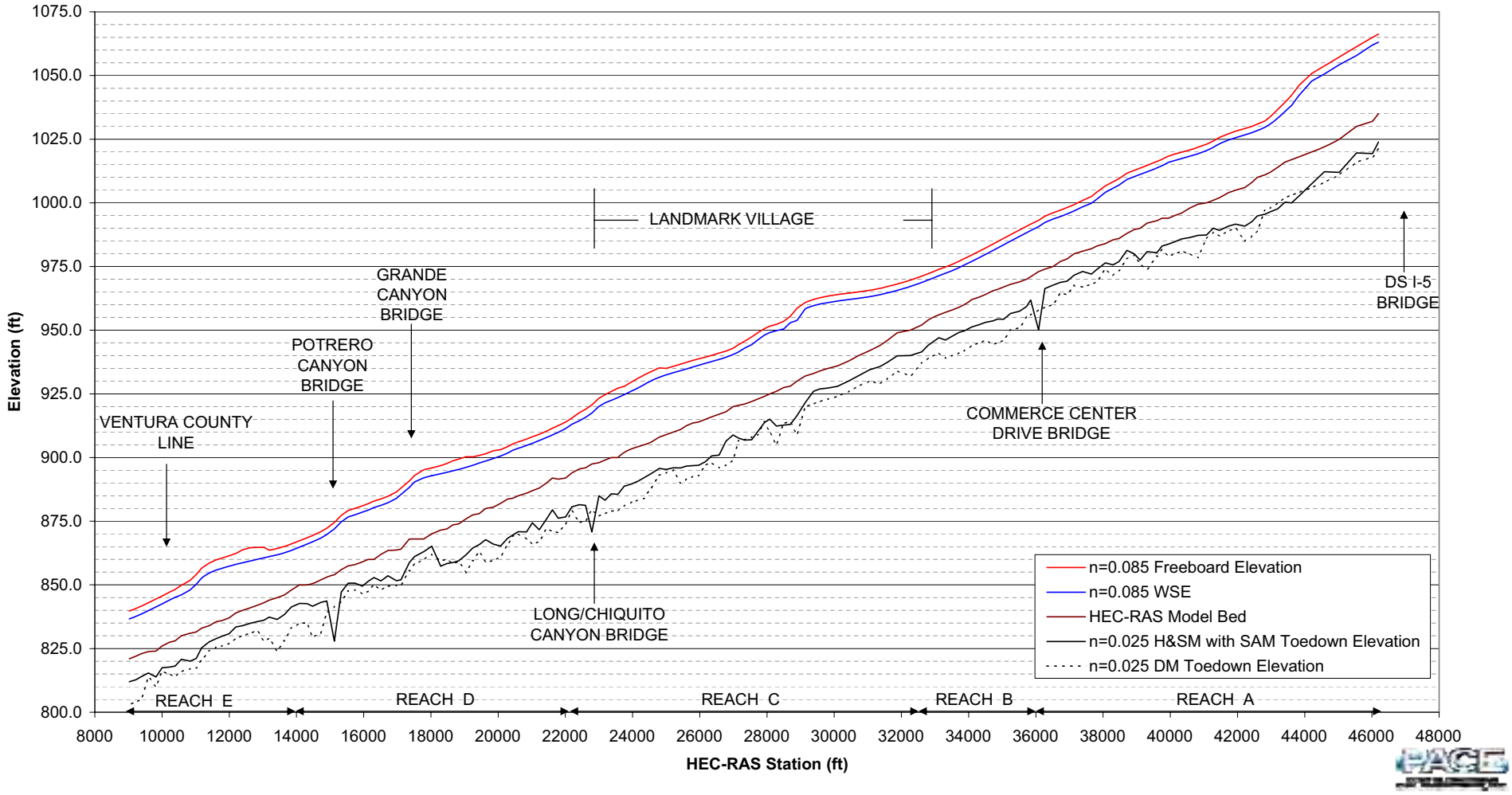
1 - Phase 1 Analysis

2 - Minimum 1999 Bed Elevation

3 - Toe-down based on LA County Hydrology & Sedimentation Manual; Freeboard based on max of LA County Hydrology & Sedimentation Manual and LA County Design Manual, as per Hydrology & Sedimentation Manual

4 - Final design of levee will include detailed bridge analysis

Figure A6.3: Santa Clara River Appendix 6 Summary of Proposed Conditions Outside Curved Reach Toedown & Freeboard



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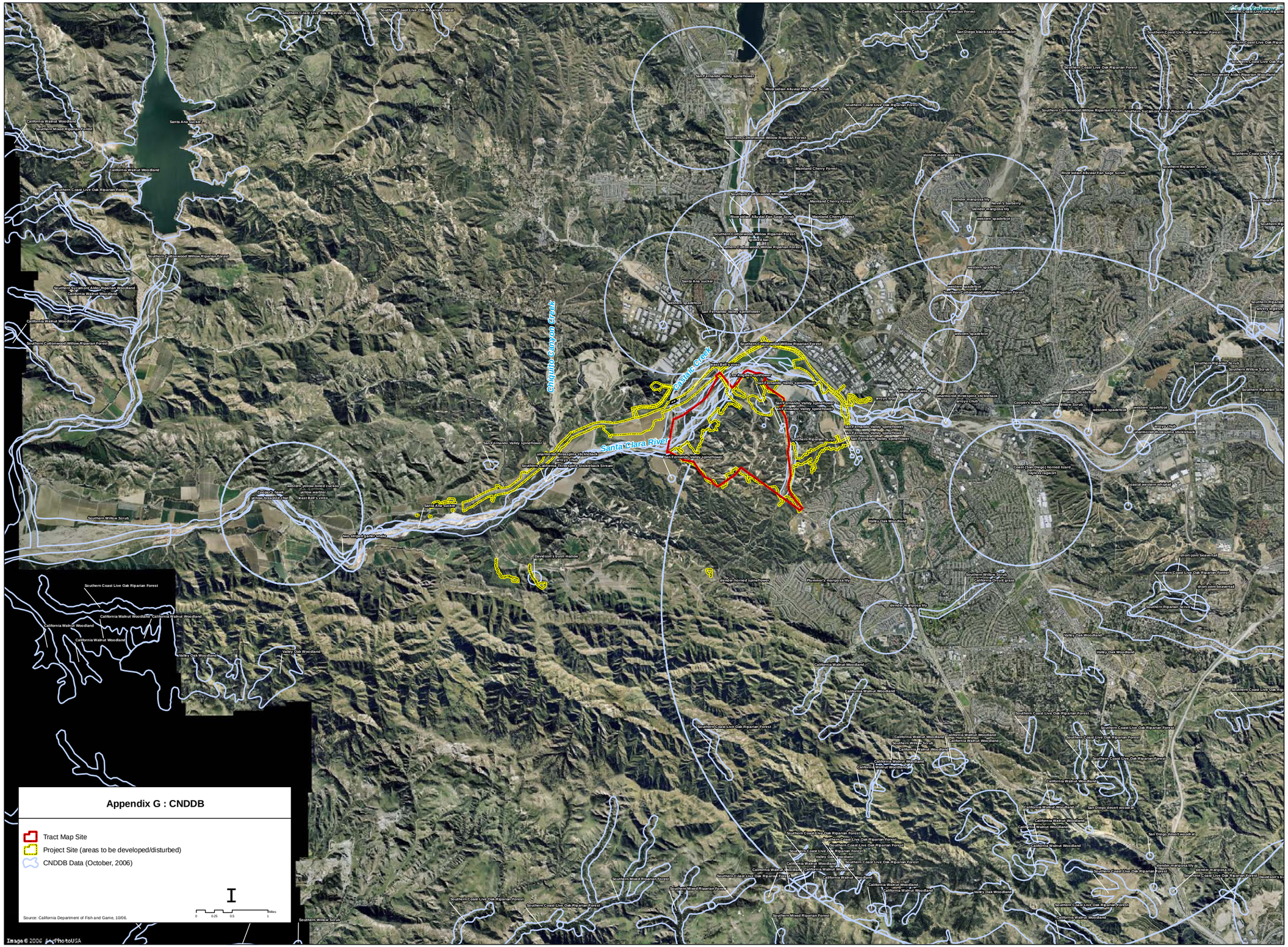
APPENDIX 4.3

Biological Reports



A full-size reproduction of this figure can be found at Impact Sciences.

Compliance Biology, Inc., "Results of the Focused Western Spadefoot Toad Surveys on the Mission Village Project Site" (2006)

May 26, 2006

Mr. Matt Carpenter
Newhall Land Company
23823 Valencia Boulevard
Valencia, CA 91355

Subject: Results of Focused Western Spadefoot Toad Surveys on the Mission Village Project Site

Dear Mr. Carpenter,

The purpose of this letter report is to provide you with the results of focused surveys for the western spadefoot (*Spea* [Scaphiopus] *hammondii*) conducted on the Mission Village project site located in an unincorporated area of Los Angeles County, California.

BACKGROUND

The western spadefoot is a small toad that is currently considered by California Department of Fish and Game (CDFG) as a California Species of Special Concern. This status does not afford the species protection under the state Endangered Species Act, but project-related impacts to the species must be considered when those projects are reviewed under the California Environmental Quality Act (CEQA).

Western spadefoot toad adults only enter aquatic habitats for breeding. They spend most of the year in a dormant to semi-dormant state in small mammal burrows in upland habitat adjacent to seasonal rainpools. This species requires seasonal rainpools that last a minimum of four weeks as eggs take from 1 to 6 days to hatch and metamorphosis can be completed within 3 to 11 weeks (Jennings and Hayes 1994). Breeding habitat must be seasonal such that predators including bullfrogs and predatory fish do not become established. Breeding adults typically emerge during and/or immediately following relatively warm rains in late winter to early spring. Female

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western spadefoot toads deposit small clusters of 10 to 42 eggs to plant stems or other debris in the pool (Jennings and Hayes 1994).

In spring 2004, around the time of these surveys, breeding populations of western spadefoot toads were identified in three areas of Newhall Land holdings. Three populations were identified on the River Village project site approximately 5.2 miles to the east, one population was identified on the West Creek project site approximately 4 miles to the northeast, and one population was identified on the Valencia Commerce Center site approximately 1.5 miles to the north.

In an effort to ensure impacts to this species are avoided or minimized, Newhall Land directed Compliance Biology to perform focused surveys throughout the remaining project areas within their holdings. The Mission Village project site is one of those areas.

METHODOLOGY

On March 10 and March 23, 2004 Compliance Biology biologists surveyed the Mission Village project site. The entire site was systematically transected for the purpose of evaluating the potential presence of western spadefoot toad. All of the flat lowland portions of the site were methodically walked and hilltops were utilized as vantage points to survey remaining areas for standing water. Additionally, all dirt roads were surveyed as western spadefoot toads are known to utilize deep road ruts that fill with rainwater (personal observation).

Surveys were conducted during the known breeding season for this species as evidenced by the identification of other breeding populations in the region. Although temperatures following the last rain of the season had increased dramatically, resulting in the rapid evaporation of potentially suitable breeding pools, it was expected that if western spadefoot were present on site, visible evidence of their presence would still be detectable at the time of surveys.

EXISTING CONDITIONS

The project area is located in Los Angeles County (**Exhibit 1**). The Mission Village project site is situated south of SR 126 along the north side of the Santa Clara River, west of the Magic Mountain amusement park (**Exhibit 2**).

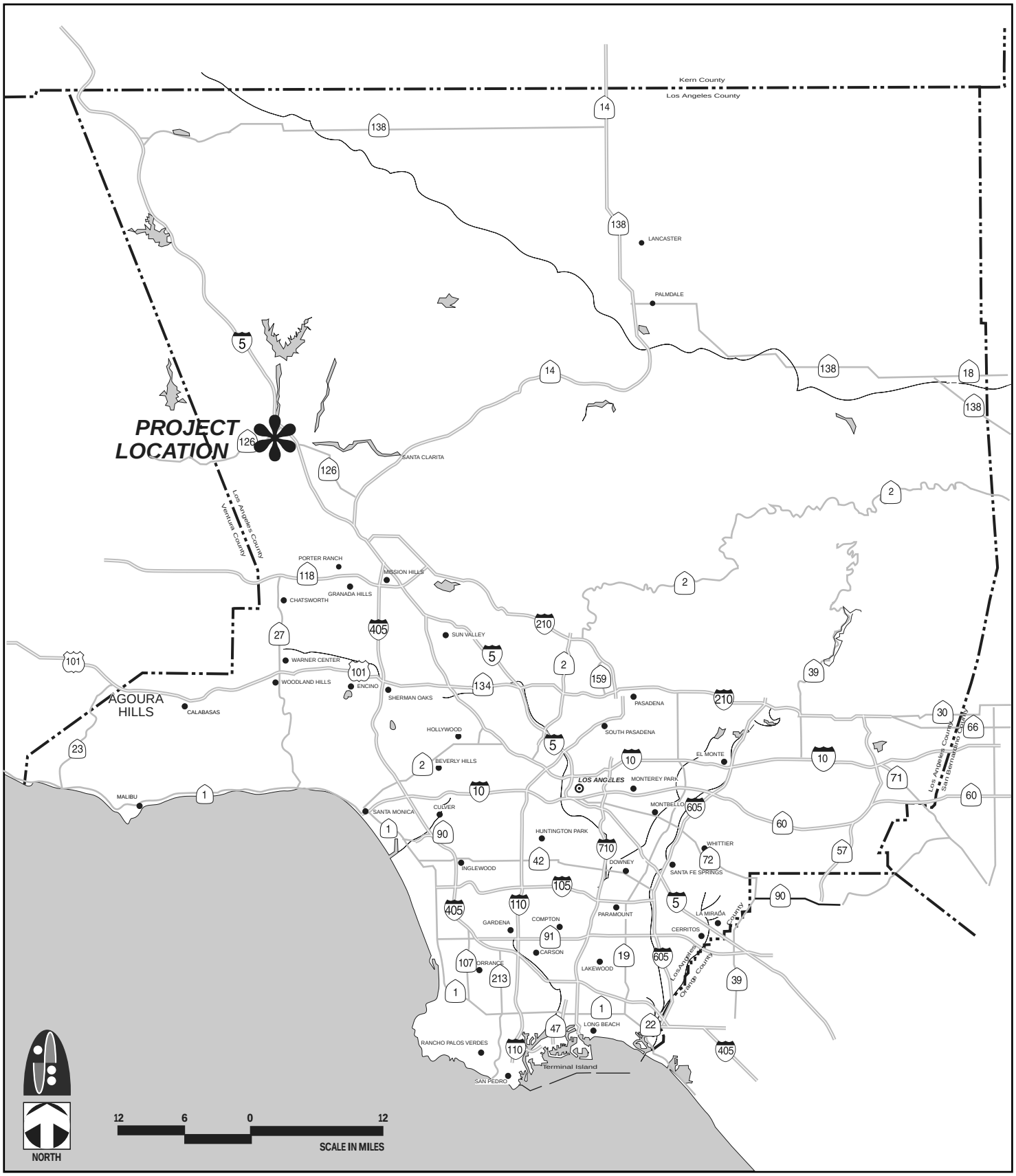
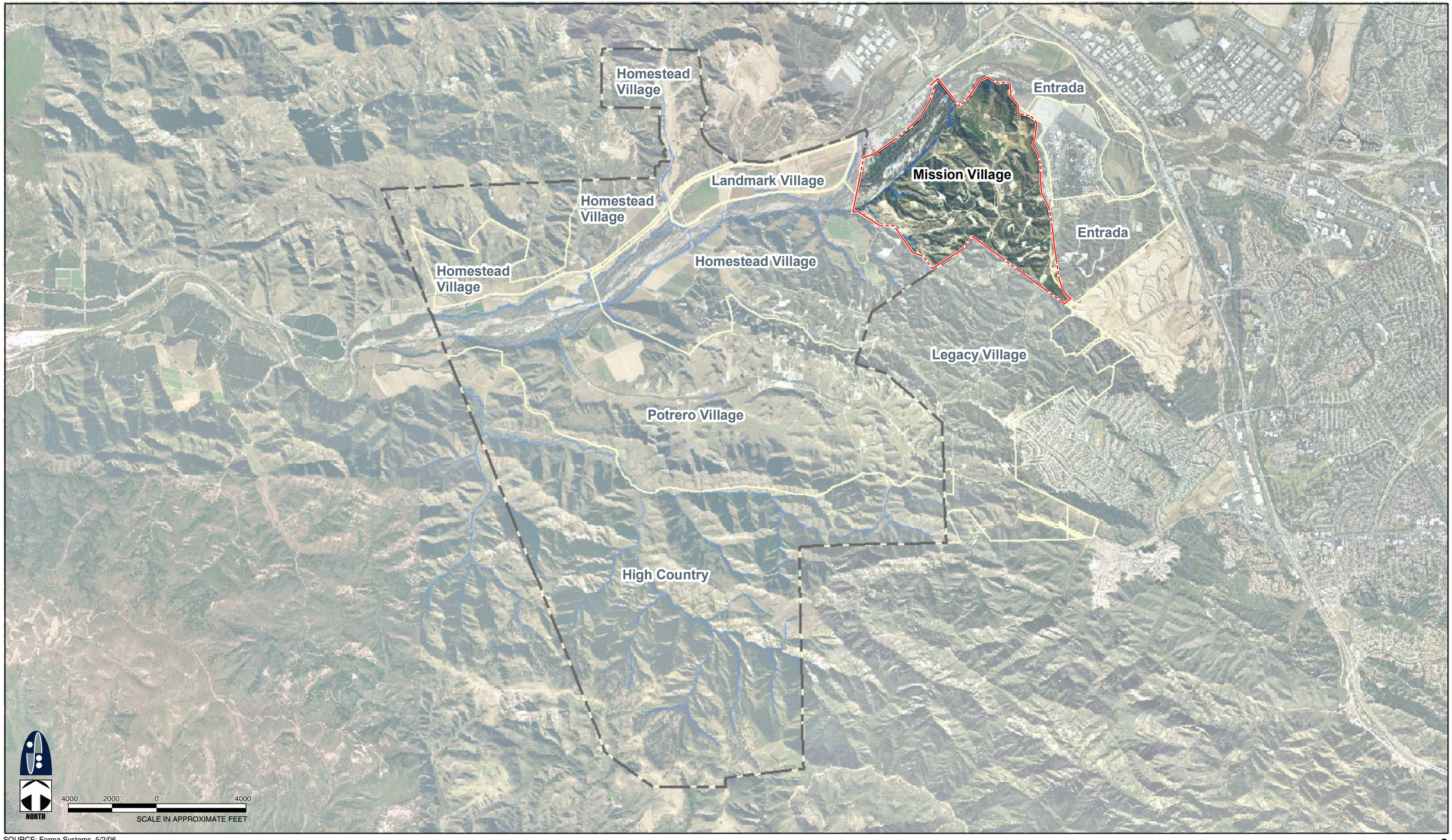


exhibit **1**
Regional Location



SOURCE: Forma Systems, 5/2/06.

exhibit 2

MISSION VILLAGE PROJECT LOCATION

The project site totals approximately 1,252 acres and supports a mosaic of scrub habitats including chaparral and coastal sage scrub with varying dominant species including chamise (*Adenostoma fasciulatum*), California sagebrush (*Artemisia californica*), purple sage (*Salvia leucophylla*), and black sage (*S. mellifera*). An extensive network of dirt roads occurs throughout the site as evidenced in **Exhibit 3**

RESULTS

One drying rainpool observed on the project site had indications of the presence of western spadefoot toad. The pool was nearly dry from the warm weather, but had several dead and drying tadpoles clustered in the lowest areas. A few of the tadpoles, though dead, were hydrated enough to make a positive identification. Another drying pool with desiccated tadpoles was identified just outside the western boundary of the Mission Village site. **Exhibit 4** illustrates the location of both occupied sites. Both of these pools appear to be the result of human activity including road construction and other earth movement.

Two additional depressions were observed on the Mission Village project site that supported cryptogammic soils (crusting layer with indications of algae and/or silt sediments), suggesting that they held standing water in the recent past. There were no direct observations or indications of the presence of western spadefoot at either of these depressions. However, because one location on site was determined to support spadefoot, and because there are suitable conditions elsewhere on site, there is a high potential for this species to occur throughout most of the lower and flatter areas within the Mission Village project boundaries.

CONCLUSIONS

The results of the focused surveys indicate that western spadefoot toad does occur within the boundaries of the Mission Village project site. One specific location was identified on site and one adjacent to the site. Two additional seasonal rainpools that may provide suitable breeding habitat in wetter years were also observed.

SOURCE: Forma Systems, 5/2/06.

exhibit 3

MISSION VILLAGE EXISTING CONDITIONS

SOURCE: Base and Aerial-Forma Systems, 5/2/06.

LEGEND

Occupied Pool

exhibit 4

OCCUPIED RAINPOOLS

Because the western spadefoot toad is considered a species of special concern by the California Department of Fish and Game, impacts to western spadefoot toad must be considered when evaluating proposed project impacts pursuant to the California Environmental Quality Act. Elimination of breeding and upland seasonal habitats for this special-status species would be considered potentially significant without mitigation.

RECOMMENDED ACTIONS

To impacts to western spadefoot toads would be reduced, prior to grading or other site preparations, a final focused survey should be conducted on the project site during the last breeding season (late winter to early spring) prior to any grading activities. Any egg masses and/or tadpoles discovered within the subject area should be collected, with the permission of CDFG, such that they can be maintained at an appropriate rearing facility for possible relocation of the animals to approved mitigation areas. Any such relocation or other potential mitigation would require approval from CDFG and the lead agency.

Please feel free to contact me if you have any questions regarding the information provided in this report.

Sincerely,

Dave Crawford
President/Principal Biologist

REFERENCES

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Entrix, Inc., "Focused Special-Status Aquatic Species Assessment – Santa Clara River, Mission Village Project, Newhall Ranch, California" (2006)

ENTRIX

SPECIAL STATUS AQUATIC SPECIES HABITAT ASSESSMENT - SANTA CLARA RIVER

MISSION VILLAGE PROJECT
NEWHALL RANCH, CALIFORNIA

Prepared for:
Newhall Land
Valencia, CA

Prepared by:
ENTRIX, Inc.
Ventura, CA

Project No. 3109005

November 27, 2006

Special Status Aquatic Species Habitat Assessment
Santa Clara River

Mission Village Project
Newhall Ranch, California

Prepared for:
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Project No. 3109005

November 27, 2006

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1. INTRODUCTION

This report summarizes the focused assessment of potential effects of the Mission Village Project (Project) on threatened or endangered aquatic species inhabiting the Newhall Ranch reach of the Santa Clara River, from the Castaic Creek confluence through the boundary of the proposed Mission Village Project. Specifically, this report focused on potential impacts to unarmored threespine stickleback (UTS), arroyo toad, and California red-legged frog (CRLF) as these species are listed as threatened or endangered by the State and Federal Endangered Species Act. In addition, this assessment includes discussion of potential impacts to southwestern pond turtle and two-stripe garter snake designated by the State as "Species of Concern." The primary focus of this assessment is to examine potential impacts to the habitat of the above species resulting from alterations to local hydrology and corresponding habitat areas through implementation of the Project.

1.1 MISSION VILLAGE PROJECT

The Newhall Land and Farming Company (Newhall) plans to develop approximately 1,250 acres of property in Los Angeles County (Figure 1, Mission Village Project Location) east of Castaic Creek along the southern terrace of the Santa Clara River. The Project site is currently used for agricultural and oil production, and is the second phase of the Newhall Ranch Specific Plan. Newhall retained ENTRIX to assess the potential effects of the Project on selected special-status aquatic species, including UTS, arroyo toad, CRLF, southwestern pond turtle, and two-stripe garter snake. The primary features examined in this assessment include buried soil cement bank stabilization along the south bank of the Santa Clara River at San Jose Flats and construction of the Commerce Center Bridge over the river, which would include bridge abutments and piers, and exposed rock rip rap (Figure 2. Mission Village Existing Conditions, Proposed Project Elements and Land Use). Additional features examined include a utility corridor that will be placed adjacent to Highway 126 and a regional water quality basin that will be located on a terrace above the south bank of the Santa Clara River. The footprint of the buried bank stabilization will be placed at the toe of the existing San Jose Flats cliff or terrace along the margin of the active channel. The bridge abutments will be placed at the extreme north and south banks of the Santa Clara River and the piers will be placed strategically within the floodplain. This assessment addresses the construction footprint of the bank protection, the bridge abutments and piers, the utility corridor, regional water quality basin, as well as the anticipated hydrologic influences of the Project on in-stream habitat utilization of aquatic species.

1.2 SPECIAL STATUS SPECIES BACKGROUND AND DISTRIBUTION

1.2.1 Unarmored Threespine Stickleback

The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) was designated a federally endangered species in 1970 under the Endangered Species Conservation Act of 1969 (the precursor to the Endangered Species Act of 1973), and a state endangered species in 1971. Populations are restricted to three sections of the upper Santa Clara River including the Newhall Ranch reach, which represents the downstream demarcation of the unarmored subspecies. UTS are small, primarily annual fish that require shallow, slow, marginal stream flows with abundant aquatic vegetation for cover. The male guards territories and builds a small nest of decaying vegetation where he guards the eggs until they hatch. Large numbers of stickleback can exist in the summer and fall with the long breeding season in southern California, and breeding can be almost all year in dry years when a stream is minimally disrupted by storm flows. Under optimum conditions, up to a few hundred stickleback can exist within approximately 10 meters of stream. Strong storm flows can severely reduce localized populations until the streams stabilize in spring and the numbers can build up again. Backwater habitats within the Santa Clara River are utilized by UTS as refugia during storm events.

Populations are restricted to three sections of the upper Santa Clara River including the Newhall Ranch reach, which represents the downstream demarcation of the unarmored subspecies. Although UTS are found within the Mission Village project area of the Santa Clara River, larger populations occur upstream of the Project site both in Soledad Canyon above Lang Station (about 8 miles upstream) and in San Francisquito Canyon from just below Drinkwater Reservoir to the vicinity of the old St. Francis Dam location upstream (about 7.5 miles upstream of the river). Recently, a population was discovered in upper Bouquet Canyon (Jonathan Baskin, pers. comm.) about 11 miles above its mouth at the Santa Clara River.

1.2.2 Southwestern Arroyo Toad

Arroyo toads (*Bufo californicus*) occupy the margins of permanent and seasonal streams in coastal foothill canyons and valleys and to a limited extent in the desert, but they require extremely specialized and limited microhabitat within that general habitat type. Most spawning occurs in shallow overflow pools adjacent to inflow channels of third and higher-order streams that lack suspended silt, aquatic predators, and dense woody bordering vegetation (Sweet 1993). During the remainder of the year, adults occupy adjacent sandbars and sandy terraces, nearly always within 100 meters of suitable spawning pools. Suitable bordering sandbars are usually dampened by capillarity and often include sparse emergent vegetation. The moist substratum keeps metamorphosing juveniles from desiccating during warm summer weather (Sweet 1993; Jennings and Hayes 1994). Suitable terrace habitat includes at least some dense

overgrowth, such as California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), and willows (*Salix* sp.), but the understory is usually barren except for layers of dead leaves (Sweet 1993). Adult and metamorphosed juvenile arroyo toads are known to forage for various invertebrates around the drip line of large oaks (*Quercus*). They also forage extensively on ants (Sweet 1992, 1993). Little is known of arroyo toad winter hibernaculum requirements, but these toads are believed to hibernate exclusively in the riverine terrace, above the level of frequent winter floods (USFWS 1999a).

The 2001 Critical Habitat designation for the arroyo toad was vacated by court order, but the U.S. Fish and Wildlife Service (2004b) proposed substantially revised Critical Habitat on 28 April 2004 which would place three reaches (6a, 6b and 6c) of the upper Santa Clara River as Critical Habitat. On April 13, 2005 the U.S. Fish and Wildlife Service redesignated Critical Habitat for Arroyo Toad. Under this new rule, the Santa Clara River proposed Critical Habitat designations were withdrawn due to economic reasons. The 2004 proposed Subunit 6b would have included approximately 6 miles of the Santa Clara River from its confluence with the South Fork of the Santa Clara River down to its confluence with Castaic Creek, and San Francisquito Creek from the Newhall Ranch Road bridge, downstream to its confluence with the Santa Clara River (subject study area) (Federal Register, Final Rule, Vol. 70, No. 70, April 13, 2005).

1.2.3 California Red-legged Frog

California red-legged frog (*Rana aurora draytonii*) habitat components include spawning pools and their terrestrial borders, spring/summer refuges, and subterranean hibernation sites. These may be combined at single sites or they may be separated by aquatic or terrestrial “dispersal corridors” (Hayes & Jennings 1989; Jennings & Hayes 1994). Spawning pools are the ecologically central components of CRLF habitat, because they support all elements of the species’ reproductive biology and also provide forage for all red-legged frog life stages. Spawning pools are typically permanent or extended seasonal ponds (through August), or stream/spring pools of 0.7-1.2 meters in depth, with dense bordering, emergent, and surface vegetation. Such pools may be as small as $1m^2$ in surface area, with no known upper area limit. Always present at spawning habitat is a large complex invertebrate fauna for juvenile forage, extensive submerged herbaceous and algal vegetation for tadpole forage, and small terrestrial mammals such as voles (*Microtus*) that are an important component of adult frog forage (Jennings & Hayes 1994). Most suitable ponds are also partially to fully sunlit with mud or silt substrata, environmental factors essential to promote dense floating and emergent vegetation. Known CRLF spawning pools, where these frogs are successful, are usually absent of large populations of exotic predators such as bullfrogs and exotic centrarchid fish. Nearly all of the known CRLF populations have been documented below 1,050 meters (3,500 feet) (USFWS 2002b). Its known elevational range extends from near sea level to around 1500 meters (Hayes and Jennings 1989).

Riparian vegetation that structurally appears to be most suitable for this species is described as arroyo willow (*Salix lasiolepis*), cattails (*Typha* sp.), and bulrushes (*Scirpus* sp.) that provide shade over a large portion of the water's surface. The California red-legged frog can occur in both ephemeral and permanent streams or in ponds. However, populations of this species cannot be maintained in areas in which all surface water disappears. Water salinity should be at or below 4.5 percent to ensure the survival of embryonic stages (Jennings and Hayes 1989). Water quality and water flow regimes are important to maintain this species. CRLF appear to be absent when temperatures exceed 22 degrees Celsius (70 degrees Fahrenheit), particularly when the temperature throughout a pool was high, and there are no cool, deep portions (USFWS 2002b).

Newly constructed or impounded ponds rarely support CRLF populations and most spawning sites have existed in stable, relatively undisturbed form for decades (Hayes & Jennings 1989). Likewise, red-legged frog spawning habitat is usually absent from river bottomland, presumably because high springtime flows would disrupt spawning success by scouring spawning pools and discouraging long-term aquatic vegetative growth. California red-legged frogs are vulnerable to early season floods because they spawn in early to mid-winter.

Adult California red-legged frogs may migrate in late spring and summer to shaded pools along streams where undercut banks and exposed root masses offer secure refuges. However, an isolated summer refuge component appears not to be critical to population survival because many adult frogs may be found throughout the summer at spawning pools. Hibernaculum preferences probably include lentic substrata (pond bottoms) or any secure subterranean site near spawning or summer refuge habitat, such as rodent burrows, vegetation mats, and root channels.

California red-legged frog “dispersal habitat” refers usually to stream courses that do not offer spawning or summer habitat but could be dispersal corridors between populations (USFWS 2002b). “Dispersal habitat” discussed in this report refers to any habitat that could be occupied temporarily by California red-legged frogs; it does not necessarily imply that California red-legged frogs might use such habitat to disperse or move among spawning pool habitats.

The 2001 Critical Habitat designation for the CRLF was vacated by court order, but the U.S. Fish and Wildlife Service (2004a) reproposed Critical Habitat with substantially the same boundaries on 13 April 2004. The Final Rule was issued on April 13, 2006 that included a newly recognized ranching activities exemption (USFWS 2006). The final Critical Habitat designations for the Santa Clara River watershed include Piru Creek (VEN-3) and San Francisquito Creek (LOS-1). Neither the 2001 nor 2006 Critical Habitat designation included any part of the Santa Clara River or tributaries in the Mission Village Project Area.

1.2.4 Two-striped Garter Snake

The two-striped garter snake (*Thamnophis hammondii*) occurs from southern Baja California north to central Monterey and western Fresno Counties (Rossman and Stewart 1987). These snakes are found most frequently along the margins of rocky and sandy streams with fairly fast water, and they were formerly ubiquitous and abundant in association with such habitat throughout coastal southern California (Jennings and Hayes 1994). The two-striped garter snake is a California Species of Concern because most of its characteristic habitat in the lowlands of Southern California has been severely degraded and consequently this species has disappeared from substantial portions of its range (Jennings and Hayes 1994). Two striped garter snakes are believed to feed almost exclusively on fish and tadpoles, which they catch in shallow water by stalking, ambushing, or by cornering against submerged rocks or root masses (Jennings and Hayes 1994). Thus, even though they are fundamentally terrestrial, they depend entirely on aquatic habitat for forage.

Although the preferred microhabitat for this species is poorly understood, the greatest numbers seemingly occur in areas along stream courses where the combination of in-stream rocky cover, terrestrial vegetative cover, and easy access to aquatic forage species of the appropriate size range exists. For example, along relatively undisturbed reaches of the San Gabriel River in the San Gabriel Mountains these snakes are frequently found along relatively shallow rocky pools that laterally border somewhat deeper reaches, and they also frequent exposed root masses associated with pools created by the fallen trees. Smaller fish and tadpoles are typically abundant and easy for the snakes to capture in the shallow sections and the root mass pools, and larger fish occur in the adjacent deeper sections. Shoreline rocks, burrows, and dense vegetation (including root masses) offer excellent terrestrial cover, and submerged rocky aggregations offer aquatic refugia. Thus, although these wary snakes are often abundant and easily observed in such habitat, they are difficult to capture because they rarely stray far from secure cover and they flee rapidly into the water when approached.

Two-striped garter snakes are active nearly year-round in the Southern California lowlands, but in higher elevations they hibernate for a variable time span during the winter, and emerge as early as February. They usually mate soon after emergence, but females of this species can become gravid with sperm stored from matings that occurred as long as two years previously (Stewart 1972). Two-striped garter snakes bear live young in litters that average 8-10, usually in late July (Rossman and Stewart 1987). Mortality in newborns is probably fairly high, in particular because newborns may have difficulty securing small amphibian or fish prey in disturbed waterways (Jennings and Hayes 1994).

1.2.5 Southwestern Pond Turtle

Southwestern pond turtles (*Clemmys (Emys) marmorata pallida*), a California Species of Concern, require exposed permanent or extended seasonal (through August) slow or still water, bordered by or in the vicinity of suitable upland oviposition (egg deposition) habitat. Suitable oviposition areas are usually gently sloping treeless hillsides well above floodplains, with southern or southwestern exposure and clay or possibly sandy soil (Holland 1991). Eggs are deposited in flask-shaped vertical excavations from late spring through summer, and hatchlings apparently remain in the nest until the following spring (Holland 1991). All life history stages of post-emergent pond turtles are highly aquatic. Suitable aquatic habitat for adult pond turtles usually includes relatively deep water (at least 0.5 meter) with secure basking sites (logs, exposed banks, etc) within reach of secure subsurface concealment. The aquatic substratum may be silty, muddy, or rocky. Juveniles are generally more secretive than adults and may favor more secure basking habitat such as densely vegetated sections of ponds and stream pools. A complex invertebrate fauna and relatively high primary productivity typically also characterize southwestern pond turtle aquatic habitat (Jennings and Hayes 1994). The most important forage for hatchlings is nektonic plankton, but adults utilize a variety of plant and animal forage sources (Bury 1986).

1.3 STUDY SCOPE

The scope of this assessment is on the potential effects of the Mission Village Project on the target aquatic species described above. The assessment is based on a review of technical and regulatory documents provided by Newhall Land (Section 2.1) and a field reconnaissance level habitat survey of the Project site. Additionally, the preparers of this assessment have relied upon their extensive knowledge and experience on this subject. See Section 6, below, for a list of the preparers of this assessment. In addition, please refer to Appendix B for copies of the resumes of the preparers. No new quantitative surveys or analyses were conducted as part of this study.

1.4 ORGANIZATION OF DOCUMENT

The remainder of this report is organized as follows:

- **Section 2** describes the methods used in the development of the assessment.
- **Section 3** discusses the results of this assessment.
- **Section 4** discusses project related impacts to habitats of special status species

- **Section 5** cites literature and technical references used in the preparation of this assessment.

- **Section 6** includes a list of preparers of this assessment.

- **Appendix A** includes figures and field survey photographs.

- **Appendix B** includes the preparers' resumes.

2. METHODS

The methods used to conduct this assessment are based on review of technical and regulatory documentation provided by Newhall, and field reconnaissance surveys of the Project area. The methods are described in greater detail below.

2.1 REVIEW OF EXISTING PROJECT REPORTS AND DOCUMENTATION

The following technical reports and supporting documentation were reviewed in assessing the potential effects of the Mission Village Project on sensitive aquatic species inhabiting the Santa Clara River and their habitat:

These documents are listed in chronological order.

- *Biological Resources of the Upland Areas of the West Ranch. Newhall Land and Farming Company, Valencia, California, Dames and Moore, Santa Barbara, California, July 1993.*

- *Biota Report, Newhall Ranch Specific Plan, Los Angeles County Department of Regional Planning, Los Angeles, California, September 7, 1995, July 1996 revision.*

- *Final EIS/EIR: 404 Permit and 1603 Streambed Alteration Agreement for Portions of the Santa Clara River and its Tributaries, Los Angeles County. Valencia Company, August 1998.*

- *SEATAC Biota Report, Combined San Francisquito Canyon Projects (West Creek (VTTM 52455) and East Creek (VTTM 44831, 52667), Newhall Land and Farming Company, Significant Ecological Area 19, San Francisquito Canyon, Los Angeles County, California, Los Angeles County Department of Regional Planning, Frank Hovore & Associates, San Marino Environmental Associates, Planning Consultants Research, August 19, 1998.*

- *Natural River Management Plan: Permitted Projects and Activities. Santa Clara River and tributaries. Valencia Company, November 1998.*

- *Survey for arroyo southwestern toad for Newhall Ranch. Newhall Ranch Company, July 12, 1999.*

- *Biological Resources Assessment of the Proposed Santa Clara River Significant Ecological Area. Los Angeles County Department of Regional Planning. PCR Services Corporation, Frank Hovore and Associates, FORMA Systems, November 2000.*

- *Letter from David Crawford (Impact Science, Inc, Agoura Hills, CA) to Mark Subbotin, Newhall Land and Farming, Subject: Brief summary of arroyo toad survey results in NRMP area, June 18, 2001.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Rick Farris, U.S. Fish and Wildlife Service, Ventura, CA, Subject: Permit submittal requirements, TE 808242, arroyo toad surveys, Los Angeles County, California, August 2, 2001.*

- *Results of Focused Surveys for Arroyo Toad and Special-Status Aquatic Reptiles and Amphibians within the Newhall Ranch Area, Los Angeles County, California. Newhall Land and Farming,* Impact Sciences, Inc., *September 19, 2001.*

- *Results of Focused Surveys for Arroyo Toad and Special-Status Aquatic Reptiles and Amphibians within the Natural River Management Plan Area, Valencia, California.* Impact Sciences, September 2001.

- *Aquatic Surveys Along the Santa Clara River Part I: Castaic Junction Project Area, Los Angeles County, California.* Aquatic Consulting Services, Inc., April 2002.

- *Aquatic Surveys Along the Santa Clara River Part III: West of Commerce Center Bridge to the Ventura County Line, California.* Aquatic Consulting Services, Inc., June 2002.

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of focused arroyo toad surveys, Auto Center Expansion Project and Hart Baseball and Softball Complex (Hart Complex Area), Santa Clarita, California, June 24, 2002.*

- *Biological Opinion for the Natural River Management Plan, Santa Clarita, Los Angeles County, California (1-8-02-F-4R) (File No. 940050400-BAH)*. U.S. Fish and Wildlife Service, November 2002.

- *Results of Focused Surveys for Unarmored Threespine Stickleback and Other Special-Status Fish Species, Newhall Ranch, Valencia California.* Impact Sciences, Inc., January 2003.

- *Amended 404 Permit (No. 940050400-BAH) for Natural River Management Plan.* U.S. Army Corps of Engineers, June 2003.

- *Revised Additional Analysis to the Newhall Ranch Specific Plan and Water Reclamation Plant Final Program EIR, Volume VIII (May 2003), Section 2.3, Floodplain Modifications.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Hart/Pony Commercial Site, Santa Clarita, California, August 21, 2003.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Soledad Site, Santa Clarita, California, August 23, 2003.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Round Mountain Site, Santa Clarita, California, August 25, 2003.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Castaic Reservoir Site, Santa Clarita, California, August 27, 2003.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, NRMP Project Area, Santa Clarita, California, August 31, 2003.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Castaic Creek, Santa Clarita, California, August 31, 2003.*

- *Proposed Designation of Critical Habitat for the California red-legged frog (Rana aurora draytonii), U.S. Fish and Wildlife Service, April 13, 2004, 69 FR 19620-19642.*

- *Proposed Designation of Critical Habitat for the Arroyo Toad, U.S. Fish and Wildlife Service, April 28, 2004, 69 FR 23254-23328.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Castaic Creek, Santa Clarita, California, August 11, 2004.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Portions of Santa Clara River/South Fork, Santa Clarita, California, August 21, 2004.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Mark Subbotin, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, San Francisquito Creek, Santa Clarita, California, August 25, 2004.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Susan Tebo, Impact Sciences, Camarillo, CA, Subject: Results of Focused Arroyo Toad Surveys, NRMP Solodad/Riverpark Area, Santa Clarita, California, August 29, 2004.*

- *Results of Focused Surveys for Arroyo Toad and Special-Status Aquatic Reptiles and Amphibians, River Village Project; Newhall Ranch, Valencia, California. Newhall Ranch Company, Compliance Biology, Inc, Camarillo, CA, October 2004.*

- *Special Status Aquatic Species Habitat Assessment Santa Clara River, Landmark Village Project, Newhall Ranch, California. ENTRIX, Inc. 2005*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Sam Rojas, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, Castaic Creek, Santa Clarita, California, August 17, 2005.*

- *Letter from Scott Cameron (Ecological Sciences, Oxnard, CA) to Sam Rojas, Newhall Ranch Co, Valencia, CA, Subject: Results of Focused Arroyo Toad Surveys, San Francisquito Creek, Santa Clarita, California, August 21, 2005.*

- *Balance Hydrologics, Inc. 2005. Assessment of Potential Impacts Resulting From Cumulative Hyromodification Effects, selected Reaches of The Santa Clara River, Los Angeles County, California.*

- *U.S. Fish and Wildlife Service. 2005. 50 CFR, Federal Register, Final Rule, Vol. 70, No. 70, April 13, 2005. Final Designation of Critical Habitat for the Arroyo Toad.*

- *U.S. Fish and Wildlife Service. 2006. 50 CFR, Federal Register, Final Rule, Vol. 71, No. 71, April 13, 2006. Designation of Critical Habitat for the California Red-Legged Frog and Special Rule Exemption Associated with Final Listing for Existing Routine Ranching Activities.*

- *Flood Technical Report for the Mission Village Project (2006). Pacific Advanced Civil Engineering, Inc. (PACE)*

- *Results of Focused Western Spadefoot Toad Surveys on the Mission Village Project Site. Compliance Biology, Inc. May 26, 2006*

2.2 REVIEW OF RECORDS AND LITERATURE

Information on the special-status wildlife of the proposed Mission Village Project Area was obtained through a search of the *California Natural Diversity Database* (CNDDB; CDFG, 2004); from searches of the specimen catalogues of the major California vertebrate museum collections (detailed below); from the U.S. Fish and Wildlife Service (USFWS), Ventura Office, Endangered Species Division's species list (http://www.fws.gov/ventura/es/spplists/spplists.html); and from reports on biological studies completed in the Project vicinity. Preliminary identification of potential habitat for sensitive aquatic species within the Project site was determined by reviewing aerial photography provided by Newhall Land. The site visit on February 22, 2005 verified the presence or absence of sensitive habitats.

The first step to evaluate Project effects on potential populations of the target special-status aquatic species is to determine the historical presence of these species within the Project area. ENTRIX biologists queried the California Natural Diversity Database (CDFG 2004), the collection catalogue of the Los Angeles County Museum of Natural History (LACM), and the online collection databases of the Museum of Vertebrate Zoology, University of California, Berkeley (UC Berkeley 2004); and the California Academy of Sciences (CAS 2004), to obtain this information. Various literature sources were also used. (Disclaimer: CNDDB and museum records always carry some degree of uncertainty because of potential misidentifications or incorrect locality data. Further, the absence of species records from any given site does not imply that the species is absent from the site).

The ENTRIX and Ecological Sciences biologists then examined maps and aerial photographs to locate aquatic habitat within and near the banks of the Santa Clara River within the Project site. Aquatic habitat suitability for any of the reptile and amphibian species was determined by comparison with previously published assessments (e.g., Holland 1991; Jennings and Hayes 1994; Sweet 1992, 1993; USFWS 1999b, 2002), as well as by the ENTRIX and Ecological Sciences biologists' extensive experience with the species in various parts of California. To assess the potential effects of the proposed Project on unarmored threespine stickleback, arroyo toad, California red-legged frogs, southwestern pond turtles, and two-striped garter snakes, ENTRIX and Ecological Sciences biologists consulted the USFWS Biological Opinion for the Natural River Management Plan (NRMP), Santa Clarita, Los Angeles County, California

(1-8-02-F-4R), dated 15 November 2002; various natural history accounts for these species (e.g., Jennings and Hayes 1994; Holland 1991; Sweet 1992; Swift et al. 1993; Stebbins 1951); Revised Additional Analysis to the Newhall Ranch Specific Plan and Water Reclamation Plant Final Program EIR, Volume VIII (May 2003), Section 2.3, Floodplain Modifications; and the PACE Flood Technical Report for the Mission Village Project (2006).

2.3 FIELD RECONNAISSANCE HABITAT SURVEY METHODS

ENTRIX biologists, Dr. Camm Swift and Steve Howard and Scott Cameron from Ecological Sciences, Inc. conducted a reconnaissance-level habitat survey that focused on the habitats of unarmored threespine stickleback, arroyo toad, California red-legged frog, southwestern pond turtle and two-striped garter snake. This survey was conducted on February 22 2005. The Santa Clara River channel was surveyed from just upstream of the mouth of Middle Canyon to the downstream extent of San Jose Flats. Middle Canyon and Long Canyon were surveyed by direct observation at various spots visible from the road or within the channel when access was possible. The purpose of the field survey was to analyze the potential effects of the Mission Village Project on these species and their associated habitats. The survey focused mainly on evaluating habitat conditions within this reach and in establishing the relative proximity of proposed floodplain enhancement structures to instream habitats. Water temperature was taken with a hand held thermometer in degrees Celsius. Photos were taken of representative habitats with a digital camera.

3. RESULTS

This section discusses the results of the Special Status Aquatic Species Habitat Assessment of the Mission Village Project area. First, analyses of historic and recent records are summarized for each species. Finally, the results of the field habitat assessment are summarized for each species. The results of this assessment are described further below:

3.1 SANTA CLARA RIVER FISH ASSEMBLANGES

Historically, the local fish fauna in this reach of the Santa Clara River was typical of southern California but appears to have had only one species of freshwater fish (Swift et al. 1993). This was the unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*). Steelhead are not known to migrate to the upper Santa Clara River, likely not ascending above the system beyond Piru Creek. However, several native species from elsewhere in southern California became established in the Santa Clara River in the late 1920s and the 1930s. These include the currently established arroyo chub and Santa Ana sucker. Records of speckled dace from upper Castaic Creek are considered to be introductions. The Owens sucker is also found in the drainage from the mouth of Piru Creek downstream. Owens suckers are not, however, reported to be in the Mission Village area. The most common fish in the Santa Clara River is the Arroyo chub, which became established in 1930's around the time when brown trout were commonly planted by the California Department of Fish and Game. Fisherman who used them as bait for trout supposedly introduced this native fish of the Los Angeles basin to the Santa Clara River. Currently the river in the Mission Village area consists of a subset of a typical Los Angeles Basin native fish community.

Several other fishes occur as introductions that have been widespread in southern California as well as the southwestern United States. These include green sunfish, largemouth bass, and mosquitofish, which have been recently reported in the Mission Village area. Several other non-native fish species are known to occur both up and downstream of this immediate area, most of which are found downstream of the mouth of Castaic Creek, suggesting it may be the local source of these fish. These fish are known to adversely affect unarmored threespine stickleback and should be controlled or managed for the benefit of native species.

Another non-native predator in the area is the clawed frog, which can prey on stickleback but its complete effect is not well known.

3.2 HISTORICAL PRESENCE/ABSENCE SURVEY RESULTS

This section summarizes historic and recent survey results from studies conducted in the Mission Village area and within the entire Newhall Reach of the Santa Clara River.

3.2.1 Unarmored Threespine Stickleback

Historical and Recent Vicinity Records

Unarmored threespine stickleback collections have been few and widely scattered in the Del Valle Zone of the Santa Clara River with a few notable exceptions (Aquatic Consulting Services, Inc. 2002a and Impact Sciences 2003a). One exception is the refuge area identified during the surveys for the Mobil and Arco 1994 oil spill investigations. This is an area of marshy habitat just north-northeast of Magic Mountain that is typically wetted and contains numerous stickleback. During the oil spill, this refuge area was not affected due to the main river flow directing the contamination away from this area. Thus, it was also considered a site for relocating rescued stickleback that could not be returned to the main river immediately because of the oil contamination. A stickleback survey conducted by ENTRIX of the entire Newhall reach of the Santa Clara River in September 2005 found stickleback only in this refuge area (ENTRIX 2006 in production).

3.2.2 Southwestern Arroyo Toad

Historical and Recent Vicinity Records

Neither of the museum database queries (CAS 2004; UC Berkeley 2004) yielded records of the arroyo toad from the main channel of the Santa Clara River. However, mainstem Santa Clara River CNDDB records for the arroyo toad exist from the “Santa Clara River, just east of Interstate 5” (1994), which is about two miles east of the Project site, and from “Bear Canyon at the Santa Clara River, six miles upstream of Solemint” (2001), which is about eleven miles east of the Project site. Arroyo toads were also found recently at the confluence of San Francisquito Creek and the Santa Clara River (Impact Sciences 2001). Further, the Aquatic Consulting surveys (2002a) reported arroyo toad tadpoles from pools adjacent to the Valencia Water Treatment Plant and from a pool just upstream of the Project site (site 26). Among north tributaries to the Santa Clara River, arroyo toads are well-known from the Blue Point area along Piru Creek (CNDDB, LACM, and CAS records); from several sites along Sespe Creek (Ventura County) (CNDDB and LACM records and Sweet (1992)); and from at least one location along Castaic Creek north of Castaic Lake (CNDDB 2004; Compliance Biology 2004; U.S. Fish and Wildlife Service 2004b). The existence of tributary records upstream and downstream of the Project area, as well as the in-channel Santa Clara River records west of Interstate 5, indicate

that arroyo toad has the potential to occur within the project site. However, standardized USFWS "protocol" surveys conducted on the project site as recently as 2004 (Compliance Biology 2004) failed to document the occurrence of arroyo toads even though components of its habitat exist within the project reach.

3.2.3 California Red-legged Frog

Historical and Recent Vicinity Records

There are no California Natural Diversity Database records for the California red-legged frog from the Santa Clara River watershed, Los Angeles and Ventura Counties. However, the Museum of Vertebrate Zoology (UC Berkeley 2004) lists 17 specimens from Soledad Canyon (Santa Clara River channel) in its collection, from as recently as 1953. More precise locality data are unavailable. The California Academy of Sciences (CAS 2004) also lists a Soledad Canyon specimen, from 1950. The nearest specific locality to the Project site is some 15 miles upstream near the Santa Clara River's confluence with Agua Dulce Creek. Jennings and Hayes (1994) and the CNDDB indicate that this species still occurs in the Santa Clara River watershed, in sites along San Francisquito Creek 5-10 miles northeast of the Project site, and in tributaries to the Santa Clara River in Ventura County. The closest documented Ventura County occurrence is in Piru Creek 4.5 miles north of Piru, about 10 airline miles west to north-west of the Project site (USFWS 2002a). The species is also in decline in Piru Creek due to changes in flow regimes since the construction of Pyramid Dam (USFWS 2002a).

3.2.4 Two-striped Garter Snake

Historical and Recent Vicinity Records

Santa Clara River records for the two-striped garter snake in the Newhall Ranch region are absent from the CNDDB and the museum collections, yet the various reports reviewed for this document and personal communications with local biologists indicate that this species occurs somewhat commonly along this reach of the river. Impact Sciences (2001) report states that during surveys conducted within the NRMP survey area, two-striped garter snakes were observed numerous times at unspecified sites within the NRMP reaches. In addition, Ecological Sciences reports observing two-stripe garter snakes during various focused arroyo toad surveys within the NRMP survey area. Species was observed in the River Corridor within Newhall Ranch in 2004 (Compliance Biology).

3.2.5 Southwestern Pond Turtle

Historical and Recent Vicinity Records

Southwestern pond turtles are probably distributed throughout the Santa Clara River watershed, wherever there are sufficient permanent or near-permanent water and oviposition sites to support populations. However, the CNDDB includes only two Santa Clara River records of southwestern pond turtles, from near Castaic Junction (2000) and from downstream near the Ventura County line (1998). Neither of the museum databases includes records for southwestern pond turtle within the Santa Clara River watershed. Conversely, the Impact Sciences (2001) report states that during surveys conducted within the NRMP survey area, pond turtles were observed numerous times at unspecified sites within the NRMP reaches, presumably where sufficient water existed to satisfy the aquatic habitat requirements discussed previously. Compliance Biology Survey in 2004 indicated its presence within the Newhall Ranch River Corridor.

3.3 HABITAT SURVEY RESULTS

The following section describes the results for field reconnaissance habitat surveys conducted on February 22, 2006.

3.3.1 Environmental Setting

The Santa Clara River along the north edge of the Mission Village project consists of a wide, flat sandy floodplain. Extensive temporal meandering of the river has deposited sand and gravel creating long elevated bars and terraces within the active channel. Depending on the flow, lateral side channels exist that can provide good habitat for stickleback and other fish species. Typically most of the smaller side channels do not carry water during the dry season although some do persist from upwelling ground water. In some cases larger isolated pools have formed on the order of tens of yards in length and up to 3-6 feet deep. These pools can remain year-round if they are deep enough and near areas of upwelling.

Beyond the typical active floodplain that usually contains the high flows; elevated terraces of varying heights exist and represent the 20 to 100 year floodplain zones only rarely inundated by the river. On the north side of the channel these represent the wide flat areas that are presently farmed. On the south side of the channel and along the north side of Mission Village these are much smaller due to the uplifting of the steep cliffs. These terraces typically support a more mature forest of oaks and sycamores with soil development rather than sand and gravel.

Sparse aquatic vegetation has developed along the main river channel, probably because short-term fluctuations in water level discourage growth of marginal vegetation and because of the 2004/2005 flood events that scoured and deposited excessive amounts of sediment throughout the Newhall Reach of the Santa Clara River. Smaller spring-fed wetted channels are choked with vegetation since they have been nearly constant in flow or change only slowly with the

seasons and are usually on the margins of the floodplain hidden from the effects of high flow events. The fluctuation in treated wastewater effluent can probably be determined by examination of their records but variation in ground water flow may not be known. In addition, various wells exist along the river and their activity certainly affects ground flow. At least four water supply agencies can affect the flows in the Santa Clara River within the Mission Village area. The Metropolitan Water District (MWD) can and has released water into San Francisquito Canyon from their pipeline. The Department of Water and Power (DWP) of the City of Los Angeles can release water from Drinkwater Reservoir and Bouquet Reservoir down San Francisquito and Bouquet canyons, respectively. In addition the DWP pipeline crosses the main Santa Clara River and has valves for releasing water on occasion. Finally, perennial flow is present from the Los Angeles County Sanitation Districts' Water Reclamation Plant in the reach (No. 32), as well as from the upstream plant (No. 26). All of these releases disrupt the natural hydrograph to some extent depending on the time of year and the volume of discharge. Historically this area of the river in the Castaic Junction vicinity was known to have permanent flows and was the site of some of the first settlements in the area. In addition the early train depot depended on the water supply for stage lines that went through the area between Los Angeles and northern destinations.

3.3.2 Unarmored Threespine Stickleback Habitat

The Santa Clara River floodplain during the survey was largely open and sandy and the wetted channel was located 300 yards or more north of the base of the cliffs on the south side of the floodplain. The flow was approximately 35 cubic feet per second (cfs) and contained a mixture of sand, gravel, and cobble substrate depending on gradient within mesohabitat units (i.e. pools, riffles, runs). The water was clear and 18º C. at 1000 hours. Pool depths averaged approximately 2 feet along the approximate 300 meters of river examined. South and somewhat parallel to the wetted channel were two small spring fed side channels attached to the main channel that ranged from 1-6 inches deep. The flow was less than 0.5 cfs or less. These small spring channels were choked with green algae and were 15º C. at 1015 hours. No fish were seen in the main wetted channel or the adjacent side channels.

Along the southern margin of the floodplain a small isolated spring fed side channel existed within the upper one third of the San Lose Flats area. The isolated side channel had less than 0.1 cfs and water temperatures ranging from 11-14º C. at 1130 to 1230 hours. This small channel was choked with aquatic grass, watercress, and marginal herbaceous vegetation for about another 150 meters upstream where it was bordered by low willows and mule fat. Farther upstream the banks consisted of mostly bare mud and sand within a forest of larger willows, cottonwoods, and Arundo. The upper extent of the side channel near Middle Canyon originates within a thick forest of mostly mature trees and blackberries bushes. Two springs appear to feed the side channel. This source flow was clear and 15º C. About 150 fish were observed at

various locations along this spring fed side channel. The majority of these fish appeared to be arroyo chubs; however, a few may have been mosquito fish. Unarmored Threespine Stickelback were not observed. Further, no fish were observed in the relatively lower shallows, approximately 50 yards or so in the agricultural reclaim area. Farther upstream the channel was better defined with greater flow and many areas were approximately to 8-12 inches deep. Groups of small arroyo chubs (up to 40 mm Standard Length) were intermittently scattered in these areas.

3.3.3 **Southwestern Arroyo Toad Habitat**

The survey area within the river channel supports a mosaic of riparian and terrace habitats, barren sandbars, and various densities of riparian scrub that are consistent with arroyo toad primary constituent elements. This reach supports multiple small channels that range from shallow open and braided to relatively deep (±2 feet) and under dense cover. Due to higher than average rainfall during the 2005 season, the river had been extensively scoured and much of the relatively overgrown and dense vegetation from previous years had been removed by major water flow. Perennial flow is present from the Los Angeles County Sanitation Districts' Water Reclamation Plant in the reach (No. 32), as well as from the upstream plant (No. 26).

As described above, the survey area was largely open and sandy with the wetted channel located 300 yards or more north of the base of the cliffs on the south side of the floodplain. Along the southern margin of the floodplain, a small isolated spring fed side channel that was choked with aquatic and herbaceous vegetation and was bordered by low willows and mule fat. Farther upstream the banks consisted of mostly bare mud and sand within a forest of larger willows, cottonwoods, and giant reed. Amphibians detected included Pacific chorus frog (*Pseudacris regilla*). The river provided sufficient low gradient segments to support shallow pools with suitable substrates for arroyo toad. There are also some suitable upland terrace habitats between the banks of the river to support foraging and over-wintering arroyo toad. There are no manmade barriers present in this reach that could completely or substantially impede upland movement of arroyo toads. However, some stretches of the riverbank in the survey area are near vertical (e.g., southern cliff areas) and of a height that would significantly impede migration out of the stream channel.

3.3.4 California Red-legged Frog Habitat

Based on known correlative habitat information for CRLF, suitable habitat for CRLF does not appear to be present within the subject study area. Habitat for CRLF is extremely limited due to the overall absence of deep water (e.g., greater than 10 inches), lack of emergent vegetation throughout the project site, and absence of a consistent hydrological regime throughout the year (hydro-geomorphologic characteristics of the River). Floods periodically scour vegetation in the

active channel where low flows are present. This reduces necessary cover around pools needed by CRLF. The small freshwater spring area on the southern floodplain could potentially serve as habitat for the species (e.g., water was relatively deep in small isolated areas), but this area is likely affected by cattle grazing and scouring, and the occurrence potential would nonetheless be considered extremely low. Accordingly, habitat appropriate for the red-legged frog did not appear to be present within the proposed development area.

3.3.5 Two-striped Garter Snake Habitat

Suitable habitat for the two-striped garter snake is present within portions of the study area. Accordingly, this species has a high potential to occur near freshwater and riparian habitats throughout the study area where water is present most of the year.

3.3.6 Southwestern Pond Turtle Habitat

Potentially suitable habitat is present for the southwestern pond turtle within portions of the study area where ponded or flowing water is present. As such, it is reasonable to predict that the length of the river adjacent to the project site may contain southwestern pond turtles at any given time, as well as some of the moist canyons leading away from the River.

4. PROJECT RELATED IMPACTS

The majority of development will be upslope of the Santa Clara River floodplain. Two floodplain modifications within the Santa Clara River floodplain are proposed for the Mission Village project. These two modification structures are the San Jose Flats Bank Stabilization and the Commerce Center Drive Bridge (including the bridge piers and southern abutment).

4.1 PROPOSED FLOODPLAIN MODIFICATIONS

Please refer to Figure 2, Mission Village Existing Conditions, Proposed Project Elements and Land Use, for a view of the proposed floodplain modifications and their locations with the Mission Village project area.

4.1.1 San Lose Flats Bank Stabilization

The bank stabilization structure will be placed at the toe of the cliff at San Jose Flats on the Santa Clara River. San Jose Flats is located just west of Middle Canyon on the south bank of the Santa Clara River. This structure will be constructed of buried soil cement.

4.1.2 Commerce Center Drive Bridge

The Commerce Center Drive Bridge will include the southerly extension of Commerce Center Drive from the approved Commerce Center Interchange. The bridge will begin from the northerly abutment (which was approved in conjunction with the interchange) and will traverse the river and connect with the south bank just east of Middle Canyon. The southerly bridge abutment will be constructed of rip rap and gunite.

4.1.3 Utility Corridor

The utility corridor will be located outside of the river channel adjacent to Highway 126 on the north side of the Santa Clara River. The utilities will either be attached to bridges or placed under tributary drainage crossings. Due to its location, set back in most cases from the river corridor, no impacts to fish species including unarmored threespine stickleback are expected.

4.1.4 Regional Water Quality Basin

A regional water quality basin will be placed outside of the Santa Clara River channel on the south side of the Santa Clara River. Water will discharge from this basin only during high flow events.

4.2 POTENTIAL PROJECT RELATED IMPACTS

The Santa Clara River is a dynamic, episodic system that experiences ”re-set” flood events that can be expected every 5-15 years (Balance Hydraulics, Inc. 2005). This re-set condition occurred in 2005 resulting from the 2004-2005 flood events. Impacts to aquatic habitats from floodplain modification due to the implementation of the project are minimal as compared to a re-set event. This section summarizes potential impacts to the special status species covered in this report based on the results from hydraulic modeling conducted by PACE in 2006 and the water quality technical report by GeoSyntec 2006.

4.2.1 Unarmored Threespine Stickleback

Project Impacts

The potential impacts to unarmored threespine stickleback (UTS) due to the construction and persistence of the Project's bank stabilization features and the bridge construction are expected to range from no impact to a less than significant impact (Table 1).

Based on hydraulic modeling conducted by PACE 2006, there will be no impact to stickleback during the 2-year and 5-year flood frequency occurrences. This means that no increase in water velocities or loss of rearing habitat will occur during those events. During the 10, 20, 50, and 100 year flood frequency occurrences there will be minimal localized increases in water velocity due to the implementation of the project; however this impact is not anticipated to be significant. When high flood flows occur in rivers, stickleback either become washed downstream and/or migrate to backwater habitats for shelter. Hydraulic modeling results, found in Table 1.0, indicate sufficient backwater habitat for stickleback exists during these events as the project improvements are set back from the existing riparian corridor. In summary, the hydrologic influence of the project on UTS will essentially be transparent when viewed in conjunction with flood flow conditions.

UTS are known to inhabit the Newhall Ranch reach of the Santa Clara River adjacent to the Mission Village Project area. Based on reconnaissance surveys conducted following recent flood events (January and February 2005), high flow conditions appear to have dislocated and dispersed aquatic organisms downstream.

The Flood Technical Report (PACE 2006) found that there would be no significant impacts in water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the Project site as a result of the proposed Project improvements. These hydraulic effects were also found to be insufficient to alter the amount, location and nature of aquatic and riparian

habitats in the Project area and downstream into Ventura County. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue; and, as a result, the mosaic of habitats in the river that support various sensitive species would be maintained, and the population of the species within and immediately adjacent to the river corridor would not be significantly affected. Based on that technical assessment, no significant impacts to UTS populations are expected.

TABLE 1 – Impact Matrix by flood occurrence for the south bank stabilization structure and the Commerce Center Bridge.

Locale	Feature	Potential UTS Impacts By Flood Event Occurrence											
		2-yr		5-yr		10-yr		20-yr		50-yr		100-yr	
		Rearing Habitat	Water Velocity	Rearing Habitat	Water Velocity	Rearing Habitat	Water Velocity	Rearing Habitat	Water Velocity	Rearing Habitat	Water Velocity	Rearing Habitat	Water Velocity
Mission Village Reach of the Santa Clara River													
South Bank	Buried, Gunite Bank Stabilization	NI	NI	NI	NI	G	LS*	G	LS	G	LS*	G	LS*
Commerce Center Bridge	Bridge, Rip Rap, Gunite Bank Stabilization	NI	NI	NI	NI	G	LS*	G	LS	G	LS*	G	LS*

PI = Potential Impact
NI = No impact
LS = Less Than Significant Impact
G = Gain in Backwater Habitat resulting from the project (Project design features will have an effect on the hydraulics within the floodplain. The gain in backwater habitat is assumed to occur as a result of the project design features at certain flood event occurrences)

* Increase in flow velocity less than significant due to already high velocity conditions that exist during high flow events.

Impact Matrix is based on loss of backwater habitats and increased velocities from proposed floodplain modification features. Hydraulic modeling results produced by PACE, Inc (2006).

The Mission Village Water Quality Technical Report (GeoSyntec 2006) indicates that the modeled concentrations in runoff from developed areas with Project Design Features (PDFs) are below all benchmark water quality objectives and criteria and TMDL waste load allocations for the Santa Clara River and are addressed by a comprehensive site design, source control, and treatment control strategy. These water quality objectives are established to protect various beneficial uses including general wildlife, sensitive, rare and endangered species. Therefore, potential impacts from the Project on receiving water quality and beneficial uses in the Santa Clara River are not significant. Based upon that Report, no impacts to adjacent or downstream populations of UTS are expected.

4.2.2 Southwestern Arroyo Toad

Project Impacts

Although the arroyo toad has not been recorded within the Project area, suitable habitat exists within the Project boundaries in the Santa Clara River. It is not anticipated that the proposed Project's bank stabilization feature or bridge structure will substantially alter the local sediment transport regime or otherwise affect in-stream habitat (spawning, foraging) for arroyo toad. The Project area falls within an extremely dynamic reach of the Santa Clara River where high disturbance flood events occur every 5 to 15 years and change the existing stream structure.

An EIR/EIS for the NRMP, located adjacent to and upstream of the project, stated that the widening of the river channels within the areas of bank protection (i.e., stabilization) would not cause system-wide channel or bed erosion, or aggradation. In its 1998 and 2002 Biological Opinions on the NRMP (page 30 of the 1998/2002 NRMP), the U.S. Fish and Wildlife Service accepted the NRMP's findings, and stated further that the NRMP would not affect arroyo toad habitat negatively within the Santa Clara River mainstem.

The Flood Technical Report (PACE 2006) for Mission Village found that there would be no significant impacts in water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the Project site as a result of the proposed Project improvements. These hydraulic effects were also found to be insufficient to alter the amount, location and nature of aquatic and riparian habitats in the Project area and downstream into Ventura County. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue; and, as a result, the mosaic of habitats in the river that support various sensitive species would be maintained, and the population of the species within and immediately adjacent to the river corridor would not be significantly affected. Based on that technical assessment, no impacts to downstream populations of the arroyo toad are expected.

The Mission Village Water Quality Technical Report (GeoSyntec 2006) indicates that the modeled concentrations in runoff from developed areas with Project Design Features (PDFs) are below all benchmark water quality objectives and criteria and TMDL waste load allocations for the Santa Clara River and are addressed by a comprehensive site design, source control, and treatment control strategy. These water quality objectives are established to protect various beneficial uses including general wildlife, sensitive, rare and endangered species. Therefore, potential impacts from the Project on receiving water quality and beneficial uses in the Santa Clara River are not significant. Based upon that Report, no impacts to potential adjacent or downstream populations of arroyo toad are expected.

4.2.3 California Red-legged Frog

Project Impacts

Suitable habitat for CRLF does not appear to be present within the subject study area. Habitat for CRLF is extremely limited due to the overall absence of deep water (e.g., greater than 10 inches), lack of emergent vegetation throughout the project site, and absence of a consistent hydrological regime throughout the year (hydro-geomorphologic characteristics of the River).

The Flood Technical Report (PACE 2006) found that there would be no significant impacts in water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the Project site as a result of the proposed Project improvements. These hydraulic effects were also found to be insufficient to alter the amount, location and nature of aquatic and riparian habitats in the Project area and downstream into Ventura County. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue; and, as a result, the mosaic of habitats in the river that support various sensitive species would be maintained, and the population of the species within and immediately adjacent to the river corridor would not be significantly affected. Based on that technical assessment, no impacts to downstream populations of the California red-legged frog are expected.

The Mission Village Water Quality Technical Report (GeoSyntec 2006) indicates that the modeled concentrations in runoff from developed areas with Project Design Features (PDFs) are below all benchmark water quality objectives and criteria and TMDL waste load allocations for the Santa Clara River and are addressed by a comprehensive site design, source control, and treatment control strategy. These water quality objectives are established to protect various beneficial uses including general wildlife, sensitive, rare and endangered species. Therefore, potential impacts from the Project on receiving water quality and beneficial uses in the Santa Clara River are not significant. Based upon that Report, no impacts to potential adjacent or downstream populations of California red-legged frogs are expected.

4.2.4 Two-striped Garter Snake

Project Impacts

Project impacts on two-stripe garter snake will be less than significant since the proposed Project's bank stabilization feature and bridge abutments will be constructed at the toe of steep cliffs, outside of the riparian corridor and away from existing snake habitat. No adverse change to foraging habitat is expected from implementation of the Project.

The Flood Technical Report (PACE 2006) found that there would be no significant impacts in water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the Project site as a result of the proposed Project improvements. These hydraulic effects were also found to be insufficient to alter the amount, location and nature of aquatic and riparian habitats in the Project area and downstream into Ventura County. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue; and, as a result, the mosaic of habitats in the river that support various sensitive species would be maintained, and the population of the species within and immediately adjacent to the river corridor would not be significantly affected. Based on that technical assessment, no impacts to downstream populations of the two-striped garter snake are expected.

The Mission Village Water Quality Technical Report (GeoSyntec 2006) indicates that the modeled concentrations in runoff from developed areas with Project Design Features (PDFs) are below all benchmark water quality objectives and criteria and TMDL waste load allocations for the Santa Clara River and are addressed by a comprehensive site design, source control, and treatment control strategy. These water quality objectives are established to protect various beneficial uses including general wildlife, sensitive, rare and endangered species. Therefore, potential impacts from the Project on receiving water quality and beneficial uses in the Santa Clara River are not significant. Based upon that Report, no impacts to potential adjacent or downstream populations of two-striped garter snakes are expected.

4.2.5 Southwestern Pond Turtle

Project Impacts

Project impacts on southwestern pond turtles will probably include temporary or permanent alteration of aquatic channel foraging habitat consequent to construction activities (primarily related to the construction of bridge piers) and possible loss of basking areas. However, no long-term effects from bank stabilization are expected as long as adjacent channels continue to exist. Oviposition habitat on the south bank and downstream will likely not be affected by bank stabilization or bridge abutments.

The Flood Technical Report (PACE 2006) found that there would be no significant impacts in water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the Project site as a result of the proposed Project improvements. These hydraulic effects were also found to be insufficient to alter the amount, location and nature of aquatic and riparian habitats in the Project area and downstream into Ventura County. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue; and, as a result, the mosaic of habitats in the river that support various sensitive species would be maintained, and the population of the species within and immediately adjacent

to the river corridor would not be significantly affected. Based on that technical assessment, no impacts to downstream populations of the southwestern pond turtle are expected.

The Mission Village Water Quality Technical Report (GeoSyntec 2006) indicates that the modeled concentrations in runoff from developed areas with Project Design Features (PDFs) are below all benchmark water quality objectives and criteria and TMDL waste load allocations for the Santa Clara River and are addressed by a comprehensive site design, source control, and treatment control strategy. These water quality objectives are established to protect various beneficial uses including general wildlife, sensitive, rare and endangered species. Therefore, potential impacts from the Project on receiving water quality and beneficial uses in the Santa Clara River are not significant. Based upon that Report, no impacts to potential adjacent or downstream populations of southwestern pond turtles are expected.

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6. LIST OF PREPARERS

ENTRIX, Inc. and Ecological Sciences, Inc.

- Camm Swift, Ph.D., Senior Fisheries Scientist, ENTRIX, Inc: conducted field reconnaissance survey and background document review; prepared technical discussion of issues related to stickleback and fish.

- Steve Howard, Project Manager and Project Fisheries Scientist, ENTRIX, Inc: coordination and management of ENTRIX and Ecological Sciences technical staff, assisted field reconnaissance survey and background document review; supported technical discussion of issues related to stickleback and fish.

- Scott Cameron, Principal Biologist, Ecological Sciences, Inc: assisted field reconnaissance survey and background document review; supported technical discussion of issues related to special-status amphibians and reptiles.

- Resumes for these preparers are included in Appendix B.

APPENDIX A

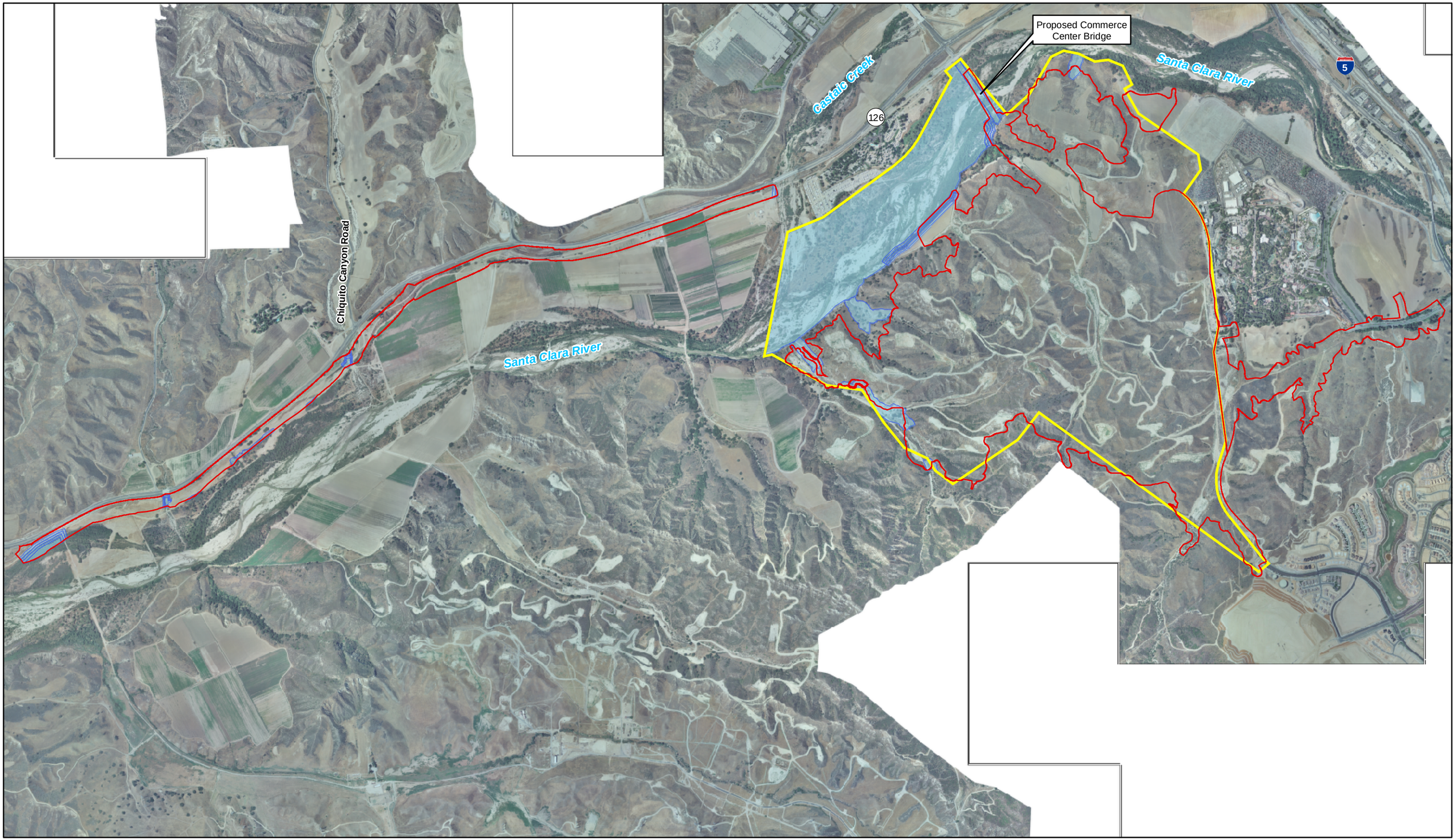
FIGURES

0 0.125 0.25 0.5 Miles

Figure 1 - Newhall Ranch
Mission Village Project

Mission Village Planning Boundary
Mission Village Grading Limit Line

Source: Imagery - 2003, Grading Limit and Planning Bnd. - 2006, PSOMAS.



0 0.25 0.5 1 Miles

Figure 2
Mission Village Project Floodplain Modification Features

Mission Village Grading Limit Line
Mission Village Planning Boundary
Bank Stablization Areas

Source: Imagery - 2003, Grading Limit and Planning Bnd. - 2006, PSOMAS.
Bank Stabilization Areas - (d2-05_BankStab_pc042505.shp) - 2006, PACE.

APPENDIX B

RESUMES OF PREPARERS

ENTRIX
ENVIRONMENTAL CONSULTANTS

Camm Churchill Swift, Ph.D.

Sr. Project Scientist

Discipline/Specialty

- Ichthyology
- Fishery Biology
- Estuarine Biology

Education

- Ph.D., Department of Biology, Florida State University, Tallahassee, 1970
- M.A., Department of Zoology, University of Michigan, Ann Arbor, 1965
- A.B., Department of Zoology, University of California, Berkeley, 1963

Professional Affiliations

- American Fisheries Society, including California-Nevada Chapter
- Estuarine Research Federation, including California Estuarine Research Society
- Southern California Academy of Sciences
- Western Field Ornithologists, and California Native Plant Society

Summary of Qualifications

Swift is one of the leading authorities on the biology, management, and conservation of the fresh and brackish water fishes of coastal southern California. He has worked with a wide variety of public and private agencies for many years to conserve these species and advise on habitat restoration for their benefit. He was appointed to the Unarmored Threespine Stickleback Recovery Team and currently serves on the Technical Recovery Teams for tidewater goby (U. S. Fish and Wildlife Service) and southern steelhead (National Marine Fisheries Service).

Relevant Experience

Research Interests

The biology, conservation, and paleontology of freshwater and estuarine fishes, recently in coastal southern California, including the federally endangered brackish water species, the tidewater goby, *Eucyclogobius newberryi*, the migratory (anadromous) and federally listed steelhead (*Oncorhynchus mykiss*), and the federally threatened Santa Ana sucker (*Catostomus santaanae*). Of about eight species of freshwater fishes native to the Los Angeles Basin, the Santa Ana sucker, Santa Ana speckled dace (*Rhinichthys csculus ssp*.), and arroyo chub (*Gila orcutti*) are endemic here and have been highly impacted by man. The tidewater goby, narrowly adapted to the upper brackish estuarine zone of the aquatic habitat continuum, contributes to the understanding of the evolution of organisms into the estuarine habitat, and the evolution of north Pacific marine faunas in general. The severe alteration of freshwater and estuarine habitat in much of California has led to most of the freshwater and brackish water species having special conservation status. For years several of my studies on the biology, distribution, and conservation of all four of these species have helped shape management and recovery strategies for them

Contracts and Consulting

Freshwater fishes of southern California.

Supervised crews of three to six graduate students surveying the estuarine and freshwaters of southern California for fishes for four months and prepared report for the California Department of Fish and Game on the status and distribution of these fishes, at Natural History Museum of Los Angeles County.

Status of the native freshwater fishes of southern California, including the status of the estuarine tidewater goby, *Eucyclogobius newberryi*, with recommendations for preserves to maintain their existence. California Department of Fish and Game Contract FG-7455, one year. Compiled data bases on fish records collaborating with Peter Moyle, U. C. Davis, to incorporate data into the California Department of Fish and Game's Natural Heritage Data Base, at Natural History Museum of Los Angeles County.

Cooperative Agreement between National Biological Service (now part of USGS) and Loyola Marymount University for study of the biology of the federally endangered tidewater goby on Vandenberg Air Force Base, Santa Barbara County. Included three to four paid undergraduate research assistants at Loyola Marymount University.

Analyzed bottom samples from Delta Mendota Canal, central California, for invertebrate densities of the Asiatic clam, *Corbicula fluminea*, as a research assistant Zoology Department, University of California, Berkeley.

Identified freshwater and coastal fish habitats to determine Significant Ecological Areas for Regional Planning Department, Los Angeles County, via contract to Natural History Museum of Los Angeles County.

Co-author, U.S. Fish and Wildlife Service Recovery Plan for Endangered Unarmored Threespine Stickleback, as member of Unarmored Threespine Stickleback Endangered Species Recovery Team.

Expert panel, habitat suitability criteria and curves for three native cyprinoid fishes (state species of special concern) of the Santa Ana River, southern Calif., EA Engineering and Technology (Lafayette, CA) for Southern California Edison Company.

Surveyed for freshwater fishes of the Los Angeles River. Field work and report writing, as part of contract from the California Department of Fish and Game to the Natural History Museum of Los Angeles County, to assess the fauna and flora of the river.

Monitored populations of native federally endangered fish species during streambed alterations in the Santa Clara River, southern California with San Marino Environmental Associates, San Marino, CA. Both field work and report writing.

Advised Six Agency committee [of southern California water and power purveyors, including Metropolitan Water District of Southern California] on the quality and rationale for U.S. Fish and Wildlife Service Critical Habitat designations for endangered big river fishes of the Colorado River, southwestern United States, with San Marino Environmental Associates, San Marino, CA. Literature research, report writing.

Surveyed for the proposed endangered fish, the tidewater goby, in coastal estuaries of Camp Pendleton Marine Base, southern California, contract through San Marino Environmental Associates, San Marino, CA. Field work and report preparation.

Surveyed for the federally endangered tidewater goby in the estuarine Shuman Lagoon, Vandenberg Air Force Base, Santa Barbara County, CA. for U.S. Fish and Wildlife Service, Ventura Field Office,

Analyzed diet of the endangered bird, the least tern, with Patricia Baird, Department of Biology, California State University, Long Beach. Under U.S. Navy contract (to P. Baird) at Long Beach, with three undergraduate research participants at Loyola Marymount University.

Prepared draft recovery plan for tidewater goby, with U. S. Fish and Wildlife Service, Ecological Services, Ventura California.

Prepared historical analysis of coastal estuaries, habitat change, and restoration options for the estuary at the mouth of the Santa Maria River, Santa Barbara County, CA for California Department of Fish and Game Oil

Response Team, for its contribution to the Trustees of Guadalupe Site, through Hagler-Bailly Inc., Boulder, Co. Field work, research and report writing.

Surveyed for the endangered fish species, the tidewater goby on Marine Corps Base Camp Pendleton, coastal southern California, and provide recommendations for maintenance and improvement of habitat for the species on the Base. With Dan Holland, Camp Pendleton Amphibian and Reptile Survey, Fallbrook, CA for Marine Corps Base Camp Pendleton

Prepared management plan for exotic fishes on Marine Corps Base Camp Pendleton, including methods for removal of exotics and for prevention or minimizing their impact on native aquatic species. With Dan Holland (Principal Investigator), Camp Pendleton Amphibian and Reptile Survey, Fallbrook, CA.

Surveyed for native and introduced freshwater fishes in the middle Santa Ana River in the Prado Dam vicinity with special reference to Santa Ana sucker and arroyo chub. For U. S. Army Corps of Engineers, Los Angeles through Larry Muncey International, Tustin, CA.

Survey, downstream trapping, and analysis of habitat quality for the three endangered fishes (southern steelhead, tidewater goby, and unarmored threespine stickleback) in San Antonio Creek, Santa Barbara County for Vandenberg Air Force Base, with Tetra Tech, Inc., Santa Barbara.

Survey, downstream trapping, and food habit studies of Santa Ana suckers in the Santa Ana River to document movements into diversions and impact of exotic species on suckers. Phase II for Santa Ana Water Project Authority, Riverside, through Larry Muncey International, Tustin, CA.

Expert witness on Southern California Minnow/sucker community for California Department of Fish and Game in their arbitration with Foothill Golf and Development, State Superior Court, Los Angeles, No. 99-0600-DW (This fish community consists of Santa Ana sucker, Santa Ana speckled dace, and arroyo chub).

Prepared preliminary assessment of impacts of shore dredging on the fisheries of Big Bear Lake, for Big Bear Municipal Water District with Montgomery and Watson, Pasadena.

Surveyed and estimated population sizes of endangered unarmored threespine stickleback and tidewater goby, and analyze steelhead habitat on several drainages on Vandenberg Air Force Base with Tetra Tech, Inc., Santa Barbara.

Monitored population of tidewater goby in San Luis Obispo Creek Lagoon in relation to Avila Beach clean up site. For Unocal through Essex Environmental, San Luis Obispo.

Surveyed for tidewater gobies in Santa Clara River Lagoon, Ventura County. For City of Ventura with Entrix, Inc., Oxnard, CA.

Surveyed for populations of sensitive native freshwater fish in the Santa Ana River near Colton and Loma Linda for ENSR, Camarillo, CA.

Surveyed for populations of native fishes in the Santa Ana River in the vicinity of the Interstate 210 crossing. For Cal Trans with Sapphos Environmental, Pasadena, CA.

Monitored for Santa Ana suckers and assess effects of bridge maintenance, sand mining, and alternative bridge design on this fish. For Riverside County Transportation Department, through Tierra Madre Associates and Ogden Environmental (now AMEC Earth and Environmental, Ltd.), Riverside, CA.

Surveyed for the federally endangered tidewater goby in lower San Luis Rey River, CA. with Camp Pendleton Amphibian and Reptile Survey, Fallbrook, CA and MBC Applied Environmental Sciences, Inc., Costa Mesa, CA.

Surveyed and monitoring for the federally endangered tidewater goby in San Mateo Lagoon, Camp Pendleton Marine Corps Base with recommendations for restoration and recovery with Merkel and Associates, San Diego CA.

Interaction of native and exotic freshwater fishes during El Nino disturbance in the Santa Margarita River, southern California. With USGS Laboratory, San Diego State University with partial support of the Nature Conservancy.

Determined possible effects on steelhead of UNOCAL remediation of soil contamination in the vicinity of the lower Santa Maria River. With Jordan Environmental Services, Atascadero, CA.

Reviewed and assessed mitigation features for Seven Oaks Dam on the Santa Ana River in relation to populations of Santa Ana sucker downstream. For the U. S. Army Corps of Engineers via MEC Analytical Inc., Carlsbad, CA.

Reviewed and assessed mitigation plans and Biological Assessments for tidewater goby and steelhead in relation to Lower Mission Flood Control Project of U. S. Army Corps of Engineers. For City of Santa Barbara, CA.

Surveyed for fishes and assess possible impacts of the construction of a pipeline crossing over Dominguez Channel in Wilmington. With RAM Environmental Engineering Services, Inc., Bakersfield.

Directed surveys for Santa Ana speckled dace in lower Fremont, Blackstar, and Silverado canyons, Orange County. With Harmsworth and Associates, Inc., Dove Canyon, CA.

Surveyed for native freshwater fishes and advise on mitigation for quarry operations at the mouth of Fish Canyon, near Azusa, CA. For Cal Mat Corporation through Chambers Group, Irvine, CA.

Implemented eradication plan for exotic fishes in Los Angeles County Public Works mitigation area of lower Big Tujunga Canyon-Haines Creek area. With Camp Pendleton Amphibian and Reptile Survey, Fallbrook, CA, subcontract with Chambers Group, Irvine, CA, for Los Angeles County Department of Public Works.

Identified freshwater fossil fish remains from a variety of late Pleistocene freshwater sites in Riverside County. With L and L Environmental, Riverside, CA and Paleo Environmental Associates, Pasadena, CA .

Monitored, rescued, and transferred federally threatened Santa Ana suckers from diversion of Santa Ana River, Orange County. For U. S. Corps of Engineers through San Marino Environmental Associates, San Marino, CA.

Provideed assessment of impacts of changes in water flow from San Bernardino Infiltration and Extraction Wastewater Treatment Facility (RIX) on populations of Santa Ana sucker. For City of San Bernardino with Albert Webb Associates, Riverside.

Surveyed for native fishes in relation to highway crossing of streams at Temecula Creek, San Diego County and Chino Creek, San Bernardino county. For CalTrans with AMEC Earth and Environmental, Ltd., Riverside, CA.

Provided assessment of impacts and mitigation possibilities for native sensitive fish species in lower San Juan Creek, Orange County and lower San Mateo Creek, northern San Diego County for various alternatives of the proposed new highways. For Foothill/Eastern Transportation Corridor Agency with P and D Consultants, Orange, CA.

Provided expertise and field work to study steelhead in Topanga Creek including snorkel surveys, habitat assessment, and up and downstream migrant trapping. With Resource Conservation District of the Santa Monica Mountains, Topanga, CA.

Employment History

- ENTRIX, Inc., Senior Project Scientist, Ventura, CA, September, 2003-present
- Emeritus Associate Curator, Natural History Museum of Los Angeles County, January, 1993-present
- Part-time instructor, Mount San Antonio College, 1993-1994
- Visiting Assistant Professor of Biology, Loyola Marymount University, Los Angeles, 1994-1998.
- Part-time instructor, East Los Angeles, Rio Hondo, and Valley colleges, 1993-1994, 1998-1999.
- Associate Curator of Fishes, Natural History Museum of Los Angles County; and Adjunct Assistant Professor of Biology, University of Southern California, 1970-1993.

Publications

Peer-Reviewed, Published Papers

- 1993. Swift, T. H. Haglund, M. Ruiz, and R. Fisher. Status and distribution of the freshwater fishes of southern California. Bull. S. Calif. Acad. Sci., 92(3):101-168.
- 1996. Chapter 30. Distribution and migration. Pp. 595-630. (excluding literature cited in single collection at end of book). In: Carl Bond. Biology of Fishes, (textbook) Second Edition. Harcort, Brace, and Co., Philadelphia.
- 1996. Lafferty, K., R. Swenson, and C. C. Swift. Tidewater goby; endangered species profile. Environmental Biology of Fishes, 46:254.
- 1998. The fish fauna of Ballona Marsh, an urban estuary on the western of the Los Angeles Basin. p. 1427 (Abst). In: Orville T. Magoon, et al. Eds, California and the World Ocean ’97. 2 vols. American Society Civil Engineers, Reston, VA
- 1999. K. Lafferty, C. C. Swift and R. Ambrose. Postflood persistence and recolonization of endangered tidewater goby populations. North American Journal of Fisheries Management, 19(2):618-622.

- 1999. Lafferty, K., C. C. Swift, and R. Ambrose. Extirpation and recolonization in a metapopulation of an endangered fish, the tidewater goby. Conservation Biology, 13(6):1447-1453.
- 2002. Swift, K. Hieb, and R. Swenson. Family Gobiidae. pp. 7-9. IN: William S. Leet, Christopher M. Dewees, Richard Klingbeil, and Eric J. Larson (editors), California's Living Marine Resources: A status report. The Errata. California Department of Fish and Game, Sacramento, CA (December, 2001) (www.dfg.ca.gov/mrd) [The larger work appeared in hard copy in earliest 2002 minus this Gobies article later added to an electronic Errata on the web site for inclusion in the Section on Bay and Estuarine Finfish Resources]
- 2002. M. N. Dawson, K. D. Louie, M. Barlow, D. K. Jacobs, and C. C. Swift. Comparative phylogeography of sympatric sister species, *Clevelandia ios* and *Eucyclogobius newberryi* (Teleostei, Gobiidae), across the California transition zone. Molecular Ecology, 11, 1065-1075.
- 2002. Swift and D. C. Holland. Exotic Fish species and their impacts on small costal lagoons in southern California. (Abst.) Bull. S. Calif. Acad. Sci., 101(2), Supplement, p. 32
- 2002. Interaction between native fish, habitat, and exotic fish species in the middle Santa Ana River, southern California. (Abst.) Bull. S. Calif. Acad. Sci., 101(2), Supplement, p. 32.
- 2002. Chapter 29. Distribution. Pp. 601-638. In: Michael Barton. Bond's Biology of Fishes. 3rd Edition. Thompson Brooks/Cole, Belmont, CA (publication date of 2007 mistakenly printed inside cover)
- (In preparation) with Richard Feeney. Description and ecology of free-swimming larvae and juveniles of Santa Ana sucker, Santa Ana speckled dace, and arroyo chub.

Grants

- Research collaborator with Dr. George Dales. Use of freshwater, estuarine, and marine fishes by the Harappan Culture of coastal Pakistan. Smithsonian Foreign Currency Program, 3 years.
- Co-principal investigator with Lawrence Barnes and Edward D. Mitchell. NSF EAR-7916508, Paleoecology of the Sharktooth Hill Bonebed. 2 years.
- Research collaborator with Drs. Brent Berlin and James L. Patton. (co-principal investigators). NSF BSN-7916746. Field research in ethnobiological anthropology in the Peruvian Amazon, 3 years.
- Co-principal investigator with Robert J. Lavenberg. NSF DEB-8008088. Development of Ichthyological Resources (at the Natural History Museum of Los Angeles County), 3 years.
- Co-principal investigator (with Judith Chovan). A national traveling exhibition on the biology of sharks. NSF Pre-College Education Grant MDR-8751868, 2 years.

Curatorial and Field Experience

- Curated wet fish specimens and dry fish skeletons in the collections of the Museum of Zoology, University of Michigan; Florida State University; and Section of Fishes, Natural History Museum of Los Angeles County. Expeditionary work in Caribbean Honduras; Pacific coastal Mexico and Costa Rica; Indus Delta, Pakistan; Amazonian foothills, northern Peru; and Miocene Sharktooth Hill Bonebed, California. Numerous smaller trips for recent freshwater and estuarine fishes, particularly in the southeastern United States and coastal California.

Professional Activities

- Various elected and appointive positions in the California-Nevada Chapter of the American Fisheries Society, Southern California Academy of Sciences, and American Society of Ichthyologists and Herpetologists. Secretary, Vice-president, and President of the Academy; elected President-elect, and proceeded to President, and past President of California Nevada Chapter, 1997-1999. Served on host committees for Los Angeles meetings of the American Society of Ichthyologists and Herpetologists (twice), Society of Vertebrate Paleontology, California-Nevada Chapter of the AFS, and the Southern California Academy of Sciences (three times).

- Member, Unarmored Threespine Stickleback Endangered Species Recovery Team (1972-1995), the Technical Recovery Team for the Tidewater Goby (2003-present), both for U.S. Fish and Wildlife Service, and member of the Southern Steelhead Technical Recovery Team (2003-present) for the National Marine Fisheries Service.

Awards, Honors

- Elected Fellow of the Southern California Academy of Sciences, 1991; Emeritus Associate Curator of Fishes, Natural History Museum of Los Angeles County, 1993; Award of Excellence from California Nevada Chapter of the American Fisheries Society, 1997.

Presentations (1999 onward, Swift presented unless otherwise noted)

- The disappearing fishes of southern California. In: Swimming Upstream: Restoring California's rivers and streams for salmon, steelhead and other species. Educational Workshop sponsored by the Sierra Club and California Trout, 12 June 1999, Los Angeles Zoo, Los Angeles, CA

- Biodiversity and conservation of the freshwater fishes of southern California. (with Jonathan Baskin) In: Planning for Biodiversity: Bringing research and management together. A symposium sponsored by the USDA Forest Service and USGS Western Ecological Research Center. California State Polytechnic University, Pomona, 29 February-2 March 2000.

- Dramatic effects of rainfall on species distributions in the Santa Margarita River. (with Manna Warburton [presenter] and Robert N. Fisher), California-Nevada Chapter, American Fisheries Society, 34th Annual Meeting, Ventura, CA 31 March-1 April 2000.

- Freshwater fishes of the Los Angeles River, southern California. (with Jeffrey Seigel and Dan Holland), and Fish population fluctuations 1997-2000 in small lagoons on Marine Corps Base Camp Pendleton. (with Dan Holland), Annual Meeting, Southern California Academy of Sciences, University of Southern California, Los Angeles, CA 19-20 May 2000.

- El Nino effects on the native and exotic fish populations of the Santa Margarita River southern California. (with Robert N. Fisher [presenter] and Manna Warburton). Society for Conservation Biology Annual Meeting, Hilo Hawaii, 29 July-Aug. 1, 2001.

- El Nino effects on estuarine fish populations associated with the southernmost populations of tidewater goby, 1990-2001 (with Dan Holland), and The federally threatened Santa Ana sucker in the Santa Ana River-Distribution, habitat, and exotic predators. Ann. Meeting, California Nevada Chapter American Fisheries Society, Tahoe City, CA April 19-20, 2002

- Exotic fish species and their impacts on small coastal lagoons in southern California (with Dan Holland, presenter), and Interaction between native fish, habitat, and exotic fish species in the middle Santa Ana

River, southern California. Annual. Meeting, Southern California Academy of Sciences, Claremont, CA June 7-8, 2002.

- Fish populations of small coastal lagoons in southern California. California Estuarine Research Society, Inaugural Meeting, Hubbs Sea World Research Institute, San Diego, CA, April 14, 2003

- Status of and prognosis for the freshwater fishes of coastal southern California. Swift [presenter], Jonathan N. Baskin, Robert Fisher, and Thomas Haglund; Status, Habitat, and restoration of southern Steelhead in Topanga Creek and State Park, just south of Malibu Creek. Rosi Dagit [presenter] and Swift; Visual Display of stream habitat survey profiles using GIS: An example from Topanga Creek, coastal Southern California. Kevin Reagan [presenter], Rosi Dagit, and Swift; and a Poster: Genetic structure in the staghorn sculpin from Alaska to southern California. Kristina D. Louie [presenter], K. P. Kloepfli, D. K. Jacobs, and Swift. Western Division/Cal-Neva Chapter of American Fisheries Society, Joint Annual Meeting, San Diego, April 14-17, 2003. In addition Swift organized two days of symposia on the freshwater fish, amphibian, and aquatic reptile fauna of coastal southern California.

Professional Societies

- American Fisheries Society, including California Nevada Chapter, Estuarine Research Foundation, American Society of Ichthyologists and Herpetologists, Desert Fishes Council, Southeastern Fishes Council, Society of Vertebrate Paleontology, Sigma Xi (Loyola Marymount University Chapter), American Association for the Advancement of Science, Southern California Academy of Sciences, Society for Conservation Biology, Society of Systematic Biology, Biological Society of Washington, Japanese Ichthyological Society, Western Field Ornithologists, and California Native Plant Society

ENTRIX
ENVIRONMENTAL CONSULTANTS

Steven R. Howard

Project Scientist

Discipline/Specialty

- Aquatic Invertebrate Ecology
- Fisheries Biology
- Habitat Assessments and Mapping
- IFIM/PHABSIM
- Limnology
- Salmonid Biology
- Stream and Estuarine Ecology
- Water Quality Assessment
- Environmental Monitoring

Education

- B.S., Fisheries: Humboldt State University, Arcata, CA, 1999

Training/Certifications

- California Department of Fish and Game. Resident Scientific Collecting Permit No. 801226-04
- USFWS Project Permitted Tidewater Goby Specialist in Ventura and Santa Cruz Counties
- Theory and Application of the Physical Habitat Simulation System, Utah State University, May 2002
- Sampling Theory and Design Workshop, Humboldt State University, March 2002
- Aquatic Ecological Assessment Workshop, CDFG, March 2002

Affiliations

- American Fisheries Society, Oregon and Cal-Neva Chapters since 1998

Summary of Qualifications

Mr. Howard is an interdisciplinary scientist with an emphasis on aquatic studies including fishery habitat assessment and population surveys, fish species identification, fisheries techniques, fish passage assessment, fish and aquatic invertebrate population analysis, water quality assessment, and wildlife population and escapement surveys. Mr. Howard has preformed numerous projects in aquatic habitats ranging from high elevation lakes and streams to coastal estuaries. Mr. Howard has also conducted projects including subsurface soil and groundwater investigations, environmental impact studies, environmental monitoring, and site closure and remediation. Mr. Howard has been involved in permitting large power projects and smaller instream projects throughout California.

Mr. Howard has conducted numerous fish population studies throughout many of the western states. Representative projects include chinook, steelhead and bull trout studies in northern California and Oregon, steelhead studies in central and southern California, various trout species studies in California, Oregon and Idaho, and native fish studies in Oregon and southern California. Mr. Howard has also conducted fish population surveys in southern and central California estuaries for the endangered tidewater goby.

Mr. Howard manages the majority of the aquatic projects in southern California. Proven management skills along with technical expertize with special status aquatic species, instream flow studies and mitigation compliance has been a key factor in the retention of on-call services contracts with several clients in southern California.

Relevant Experience

Fish and Wildlife Studies

McKenzie River Watershed Spring Chinook Population Study – Lane County, Oregon

Mr. Howard conducted chinook salmon spawning surveys, obtained biological samples from spawned-out salmon, collected downstream migrants, monitored fish passage though leaburg dam, and monitored bull trout migration under the Western Oregon Research and Monitoring Program. Mr. Howard conducted these projects for the Oregon Department of Fish and Wildlife.

Oregon State Elk Population Study – Lane County, Oregon

Mr. Howard managed an initial statewide effort to obtain elk teeth and tissue samples throughout the state of Oregon. This effort was successful and set precedent for future Oregon Department of Fish and Wildlife elk tissue collection efforts.

United Water Conservation District FERC Relicensing Project – Ventura County, California

ENTRIX, Inc. designed multiple studies under agency consultation during the FERC application process. Mr. Howard conducted fish population studies and identified fish species present in Piru Creek below Santa Felecia Dam, within Piru Lake and above the lake in Piru Creek.

United Water Conservation District Steelhead Migration Project – Ventura County, California

ENTRIX, Inc. directed fish passage monitoring and fish rescue consultation involving steelhead on the lower Santa Clara River. Mr. Howard was the lead fisheries biologist for the project. The Vern Freeman Diversion fish passage facility includes a fish ladder, fish screens, and a downstream migrant fish trap. During steelhead migration, facilities at the diversion were inspected for stranded steelhead and resident rainbow trout for relocation to the appropriate habitat. These operations were interim mitigation measures for section 10 incidental steelhead take.

PacifiCorp FERC Relicensing Project – Jackson County, Oregon

ENTRIX, Inc. conducted numerous aquatic studies under agency consultation during the FERC reliscencing application process. Mr. Howard analyzed fish population data in the upper Rogue River watershed to estimate salmonid population densities above and below dams.

Moyie River Fish Population Study – Bonner County, Idaho

ENTRIX, Inc. conducted a salmonid relative abundance survey in the Moyie River in Idaho. The survey was performed utilizing four divers at several gas pipeline river crossings. This was conducted in conjunction with past monitoring and a proposed expansion of the pipeline at the crossings in the Moyie River. Mitigation for each crossing consisted of installing Riprap wings to prevent bank Scour and rock-drop structures to form rearing and holding pools.

Ventura County Flood Control Tidewater Goby Project – Ventura County, California

ENTRIX, Inc. served as fisheries professional to the Ventura County Flood Control District during pipe maintenance in the Hueneme drain. A temporary impoundment was placed around the work area which trapped numerous fish including tidewater gobies. Mr. Howard identified fish species within the impoundment and relocated all fish away from the work area.

Ventura County Flood Control Bank Stabilization Project – Ventura County, California

ENTRIX, Inc. served as fisheries professional for Ventura County Flood Control District during a bank stabilization and habitat restoration project on the Sespe River. Mr. Howard was in charge of identifying fish species for relocation outside of the project boundary.

San Clemente Dam Retrofit Drawdown Project – Monterey County, California

ENTRIX, Inc. is conducting annual fish rescues upstream of San Clemente Dam and fish trapping and relocation activities to appropriate habitats downstream of San Clemente Dam for California-American Water Company. Water quality monitoring was also an important part of this project during the drawdown activities. Dissolved oxygen can drop dramatically during these types of projects. Aerators were installed throughout the reservoir to maintain adequate DO levels during the project. A low percentage of steelhead mortalities occurred during this project. Mr. Howard conducted fish rescues and relocations and water quality monitoring during this project. Mr. Howard was one of a few biologists permitted by NOAA Fisheries to conduct electrofishing and fish relocation activities during this project.

Haines Creek Native Fish Population Monitoring and Exotic Species Removal Project – Los Angeles County, California

ENTRIX, Inc. is involved in a multi-year fish population monitoring project on Haines Creek. Haines Creek is one of a few creeks that has sustaining populations of Santa Ana suckers and Santa Ana speckled dace. Numerous exotic species are also found in Haines Creek such as largemouth bass, green sunfish, mosquito fish and crawfish. Sampling is conducted by a 2-pass seining method in 200-meter sample sites.

San Lorenzo River Steelhead and Tidewater Goby Relocation Project – Santa Cruz County, California

ENTRIX, Inc. conducted steelhead and tidewater goby rescue and relocation activities during a bank stabilization project in the tidally influenced reach of the San Lorenzo River. A portadam was constructed around the work area and water was pumped out the impoundment. During fish rescue operations, Mr. Howard discovered the first known tidewater goby in the San Lorernzo River, which prompted further consultation to complete the project. Entrix, Inc. assisted in expediting this consultation process with the USFWS and NOAA Fisheries by monitoring water quality within the impoundment and describing tidewater goby habitat and in the San Lorenzo River.

Habitat Assessment Studies

Habitat Typing Projects – California and Oregon

ENTRIX, Inc. performs numerous habitat typing investigations for multiple clients throughout the United States. Mr. Howard has performed habitat typing field projects in northern California coastal rivers and in mountain streams in southern California and Oregon.

Steelhead Habitat and Passage Assessment – Ventura County, California

ENTRIX, Inc. conducted a steelhead habitat and passage assessment for the City of Ventura to be included in the Ventura River Habitat Conservation Plan. Mr. Howard was the lead fisheries biologist in charge of assessing steelhead habitat on North Fork Matilija Creek. A diversion facility on the Ventura River currently blocks access to headwater steelhead habitat in North Fork Matilija Creek and its tributaries. A fish passage facility is planned for construction in the near future allowing upstream migration to important steelhead habitat in the North Fork Matilija. This habitat assessment quantified spawning and rearing habitat for southern California steelhead trout.

Matilija Creek Steelhead Habitat Evaluation – Ventura County, California

ENTRIX, Inc. conducted a steelhead habitat evaluation for the Matilija Dam Ecosystem Restoration Project. Mr. Howard assisted a project team during this evaluation. The report supplemented the F3 Feasibility Study prepared by the US Army Corps of Engineers and Ventura County Flood Control District. The Matilija Dam project is the largest dam removal and restoration activity ever proposed in California. Restoration will connect endangered southern California ESU steelhead with nearly 50 percent of its historic Ventura River basin spawning and rearing habitat.

Salsipuedes Creek Fish Passage Project – Santa Barbara County, California

ENTRIX, Inc. modified an existing concrete apron to provide for fish passage along Salsipuedes Creek near Lompoc, California. Responsibilities included surveying, conducting site reconnaissance studies, preparing design drawings, permit information, and a grant application, and construction oversight. Mr. Howard assisted the project engineer on anadromous fish passage criteria for the project.

Bioassessment and Invertebrate Studies

Olympic View Sanitary Landfill Wetland Evaluation – Kitsap County,Washington

ENTRIX, Inc. conducted statistical analysis of previously collected data to evaluate relationships between chemical and physical water parameters and the abundance and diversity of macroinvertebrates in a wetland adjacent to the landfill. Stepwise regression analysis attempted to correlate species abundance and richness with water quality and chemistry to assess localized impacts. Mr. Howard conducted this statistical analysis and assisted the project team with the final report.

Santa Clara River Estuary Bioassessment – Ventura County, California

ENTRIX, Inc. designed and conducted this bioassessment study which involved stratified sampling of several estuarine habitats for benthic macroinvertebrates in the Santa Clara River Estuary. Mr. Howard was the lead field biologist on this project. The macroinvertebrate data characterized the assemblage diversity and develops relationships between species abundance, density, richness and microhabitat preferences (grain size, salinity tolerances, etc.). The objective of this study was to support the City and LAWRQCB in the development of defensible site-specific NPDES limits for metals discharged to the estuary.

Big Creek FERC Relicensing Bioassessment Project - Sierra National Forest, California

ENTRIX, Inc. performed this study under agency consultation for the SCE Big Creek FERC relicensing application process. Mr. Howard was a lead biologist on this bioassessment project. The project was conducted in a large portion of the South Fork San Joaquin River watershed. Macroinvertebrate sampling occurred above and below large dams and small diversions to assess Southern California Edison project impacts.

Instream Flow Studies/PHABSIM Modeling

United Water Conservation District FERC Relicensing IFIM Project – Ventura County, California

ENTRIX, Inc. conducted an instream flow study to determine the impacts of Santa Felicia Dam on the steelhead habitat in Piru Creek. Mr. Howard lead a crew comprised of client staff and sub-contractors.

United Water Conservation District FERC Relicensing Steelhead Migration Project– Ventura County, California

ENTRIX, Inc. conducted a migration study on the Santa Clara River downstream of Piru Creek to determine adequate flow releases that would facilitate steelhead upstream migration to Piru Creek.

Ventura River IFIM Project – Ventura County, California

ENTRIX, Inc. conducted this instream flow study to determine the impacts of dams and diversions on the steelhead habitat in the Ventura River. The results of this study will assist in the identification of factors potentially limiting fish populations in the effected reaches of the Ventura River and to determine appropriate minimum instream flows. Mr. Howard conducted the field investigation, PHABSIM Modeling and produced the final report. Instream Flow Incremental Methodology (IFIM) studies in Oregon and California including the Ventura River. These projects use multiple flow regimes in determining fish habitat suitability downstream from dams and diversions.

Matilija Creek IFIM Project – Ventura County, California

ENTRIX, Inc. conducted this instream flow study to determine the impacts of releases from Matilija Dam on Steelhead rearing and spawning habitat from the dam to the Robles Diversion on the Ventura River. The

results of this study will assist in the identification of factors potentially limiting fish populations in the effected reach and to determine appropriate release flows and ramping rates. Mr. Howard conducted the field investigation, data collection, and modeling setup.

PacifiCorp FERC IFIM Project – Jackson County, Oregon

ENTRIX, Inc. conducted this instream flow study to determine the impacts of dams and diversions on fisheries habitat in the upper Rogue River watershed. Mr. Howard assisted in the field investigation and data collection.

Water Quality Studies

Santa Clara River Estuary Metals Translator Study – Ventura County, California

ENTRIX, Inc. conducted a yearlong investigation focused on determining the metals translators for copper, nickel, zinc, and lead in the Santa Clara River Estuary. There are chemical differences between the Ventura Water Reclamation Facilities (VWRF) discharged effluent and the receiving Santa Clara River water. The Metals Translator Study determined what fraction of metals in the VWRF effluent were dissolved in the receiving water, and therefore bioavailable. Mr. Howard was the lead investigator on the Santa Clara River Estuary Metals Translator Study for the City of San Buenaventura.

Big Creek FERC Relicensing Water Quality Project – Sierra national Forest, California

ENTRIX, Inc. conducted a water quality study related to the hydroelectric relicensing of Southern California Edison's Big Creek system in the San Joaquin River watershed. Study sites were selected by ENTRIX and a combined agency working group targeting large reservoirs, small impoundments, and streams below project facilities. Mr. Howard was in charge of multiple sampling teams working throughout the San Joaquin watershed.

Environmental Monitoring

360 Networks Fiber Optics Project – Modoc, Lassen, Tehama, Glenn, Butte, Yuba, and Sutter Counties, California

ENTRIX, Inc. monitored fiber optic installation that occurred within a variety of sensitive habitats including rivers, wetlands, vernal pools, caves, and cultural resource areas. Many species listed under the California and Federal endangered species acts were of special concern on this project. Mr. Howard was the lead environmental monitor on this fiber optics project for the California Public Utilities Commission. No significant environmental impacts, under the adopted environmental mitigation measures, occurred on this project.

Southern Trails Gas Pipeline Project – Riverside County, California

ENTRIX, Inc. monitored fiber optic installation that occurred within a variety of sensitive dessert habitats including rivers, washes, reptile and bird habitats, and cultural resource areas in the Mojave Dessert near Palm Springs, California. Mr. Howard was the Lead Field Coordinator for the California State Lands Commission on this project. The pipeline right-of-way was 8 miles long which crossed numerous washes including the San Gorgonio River. No significant environmental impacts, under the adopted environmental mitigation measures, occurred on this project.

Ventura County Water Protection District Sediment Removal- Ventura County, California

ENTRIX, Inc. monitored a sediment removal and channel maintenance project on Pole Creek in Fillmore, California. Mr. Howard served as fisheries professional and Environmental Monitor to the Ventura County Flood Control District on this project. This creek is a tributary to the Santa Clara River which supports a small population of endangered southern California steelhead trout. Mr. Howard assessed steelhead habitat quality and steelhead migration barriers. Additionally, Mr. Howard monitored construction to eliminate the possibility of project related steelhead impacts.

Ventura County Water Protection District Emergency Instream Restoration Projects- Ventura County, California

ENTRIX, Inc. assisted the County of Ventura during and following the floods events that caused extensive damage to private property, flood control and fish passage facilities, and the agricultural communities throughout Ventura County in 2004 and 2005. Mr. Howard managed 15 projects for the county following the flood events. Mr Howard, along with other ENTRIX biologists permitted to work with local endangered fish species including steelhead and tidewater gobies captured and relocated fish species prior to instream construction activities. Construction monitoring was also conducted to ensure emergency permit compliance and to minimise potential take of endangered species and their habitat.

El Paso Natural Gas Conversion Project- San Berbardino County, California

ENTRIX, Inc. monitored pipeline installation that occurred within a variety of sensitive desert habitats including rivers, washes, reptile and bird habitats, and cultural resource areas near Blythe, California. Mr. Howard was the Lead Field Coordinator for the California State Lands Commission and the BLM on this project. The pipeline right-of-way was 80 miles long. This project had multiple compliance challenges that were identified and managed onsite with oversite by the Lead Field Coordinator and Project Manager. No significant environmental impacts, under the adopted environmental mitigation measures, occurred on this project.

ECOLOGICAL SCIENCES, inc.

CURRICULUM VITAE

Scott Cameron, Principal Biologist

Overview of Professional Experience

Mr. Cameron is the Principal Biologist of Ecological Sciences, Inc. Mr. Cameron has extensive experience in sensitive biological resources inventories, endangered species surveys, general wildlife biology, environmental mitigation monitoring, and wildlife and botanical habitat evaluations in the California counties of Riverside, San Bernardino, Los Angeles, Kern, San Diego, Orange, Fresno, Kings, Tulare, Santa Barbara, Alameda, Ventura, Santa Barbara, Monterey, Imperial, Del Norte, Sacramento, and San Joaquin. Mr. Cameron has extensive survey experience in Wyoming and Nevada as well. He provides project management and direction, preparation of environmental documents under the Endangered Species Act (ESA) and California Environmental Quality Act (CEQA), endangered species expertise, biological resources consultation, biological construction monitoring and sensitive biological resources educational training for a wide range of projects. He develops and implements mitigation and monitoring plans, permitting strategies, manages construction monitoring, and provides endangered species permitting assistance. Mr. Cameron also conducts wetland delineations and permitting per U.S. Army Corps of Engineers (USACOE) and California Department of Fish and Game (CDFG) requirements.

Documentation experience includes preparation of numerous environmental and biological assessments, biology sections of Environmental Impact Reports (EIRs), and mitigation/monitoring plans. Mr. Cameron also has extensive experience in CEQA compliance, preparation of Habitat Conservation Plans, federal Section 7 consultations, and Riverside County Multiple Species Habitat Conservation Plan (MSHCP) documents. Mr. Cameron has handled thousands of small mammals (55,000+ cumulative trapnights and over 5,000+ individual captures) in California and Wyoming, and has been included in multiple Memoranda of Understanding (MOUs) throughout California and Nevada. He has designed numerous study plans to evaluate the presence/absence of special-status invertebrates, birds, reptiles, amphibians, and small mammals. He has also handled and/or surveyed for sensitive, threatened, and endangered birds, reptiles, and mammals under federal and state permits.

Mr. Cameron currently holds five federal Section 10(a) permits to conduct focused surveys for Pacific pocket mouse, coastal California gnatcatcher, arroyo toad, California red-legged frog and Delhi sands flower-loving fly (1996-2008). Mr. Cameron is also certified to conduct surveys for the flat-tailed horned lizard by the Arizona Department of Fish and Game and approved by USFWS to conduct desert tortoise surveys. Mr. Cameron also holds a State of California Scientific Collectors Permit (SC-6864).

Selected Herpetological Experience (1994-2005)

Principal Investigator for conducting focused surveys for, and translocation of, ±1,000 arroyo toads (*Bufo microscaphus californicus*) for a river diversion (Santa Margarita River) project on USMC Camp Pendleton. Established numerous pitfall trap lines and drift fencing within extensive areas of arroyo toad habitat over a several month period.

Principal Permitted Investigator for conducting numerous focused arroyo toad surveys along portions of the Santa Clara River in 2001-2005 for Newhall Land.

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email: scameron@ecosciencesinc.com

Principal Investigator for management and implementation of The Southern California Gas Company's Programmatic Permit/Biological Opinion, Northern Service Territory. Responsible for environmental compliance throughout the permit area, which includes Fresno, Kings, Kern, and Tulare counties. Performed focused surveys for arroyo toad and California red-legged frog (*Rana aurora draytonii*) in portions of the Cherry Creek watershed, Ventura County.

Project Ecologist for numerous surveys for arroyo toad in Orange and San Diego counties, primarily along San Mateo Creek. Surveys were conducted per USFWS protocol and involved identifying toads by vocalization and direct observation (including juveniles and tadpoles). Additionally, all arroyo toad locations were mapped for future population estimates and distributional information. Observed hundreds of arroyo toads during the course of these surveys including adults, juveniles, and tadpoles.

Project Ecologist for conducting numerous focused and/or habitat evaluations surveys over a two-year period along the proposed Foothill Transportation Corridor (FTC) located in Orange and San Diego counties, California. Focused surveys included those for arroyo toad, spadefoot toad, silvery legless lizard, coastal rosy boa, orange-throated whiptail, San Bernardino ring-necked snake, coast patch-nosed snake, southwestern pond turtle, San Diego horned lizard, and red diamond rattlesnake. Recorded and observed numerous arroyo toads during the survey efforts.

Principal Investigator for conducting focused sensitive amphibian surveys including California red-legged frog for Ventura County Flood Control.

Senior Biologist for herpetological surveys associated with several Newhall Ranch projects located in the Santa Clara River and San Francisquito Creek area. Conducted focused nighttime surveys for arroyo toad, southwestern pond turtle, and two-striped garter snake. Documented presence of arroyo toad.

Principal Investigator for evaluating habitats potentially suitable to support sensitive amphibians, reptiles, and mammals at the Playa Vista project site. Conducted mammal inventory on the project site located in the Playa del Rey area, Los Angeles County, California. Tasks included designing formal study plan for surveys for western spadefoot toad, southwestern pond turtle, coastal western whiptail (*Cnemidophorus tigris multiscutatus*), silvery legless lizard, coast patch-nosed snake, and two-striped garter snake.

Project Ecologist for a California Department of Corrections electrified fence EIR project. Duties included evaluating correctional facilities throughout California that involved evaluating wildlife mortality along perimeter fences. Observed hundreds of northern red-legged frogs (*Rana aurora aurora*) and tadpoles during the surveys conducted in northern California. Developed various methods to prevent or reduce "take" of special-status wildlife species.

Staff Biologist for baseline biological inventories for wildlife and botanical resources, including sensitive wildlife species surveys for the proposed Elsmere Solid Waste Facility landfill site in Los Angeles County. Fieldwork involved surveys for foothill yellow-legged frog (*Rana boylii*) and California red-legged frog.

Principal Investigator for the performance of habitat-based investigations performed to evaluate aquatic habitats potentially suitable to support California red-legged frog in portions of the Arroyo Conejo, Conejo, and Calleguas Creek drainage system for the Camrosa Water District (CWD).

Senior Biologist for the performance of surveys for potentially occurring sensitive amphibian species such as the California red-legged frog on portions of Tejon Ranch, California.

Senior Biologist for focused surveys in Calleguas Creek for special-status amphibians and reptiles including: California red-legged frog, southwestern pond turtle (*Clemmys marmorata pallida*), two-striped garter snake (*Thamnophis hammondii*), and south coast garter snake (*Thamnophis sirtalis* sp.). Habitat characterization included an evaluation of riparian vegetation, flow regimes, and salinity measurements.

Principal Investigator for evaluating suitable habitat to support the mountain yellow-legged frog, San Bernardino mountain kingsnake, southern rubber boa, two-striped garter snake, and southwestern pond turtle in the Big Bear area of the San Bernardino Mountains.

Senior Biologist for Greystone Homes' Dos Vientos project located in Newberry Park, Ventura County. Conducted focused surveys for California red-legged frog, southwestern pond turtle, and two-striped garter snake. Captured and translocated individual pond turtles and garter snakes away from areas proposed for impacts.

Senior Biologist for conducted surveys for the western spadefoot toad on the Parker Ranch site located in Simi Valley, California. Identified tadpoles, juveniles, and adult toads.

Research Biologist for the capture, electronic passive infrared transmitter tagging (P.I.T.T.), and release of blunt-nosed leopard lizard (*Gambelia silus*) on the Elkhorn and Carrizo Plains. Worked with San Joaquin Endangered Species Recovery Program Team, and the CSU Stanislaus Foundation. The dispersal and reproductive data gathered was used to develop future species recovery plans for sensitive reptiles.

Project Biologist for a sensitive biological resources study on 6,250 acres of land between the Algodones Dunes and the Chocolate Mountains. Directed six biologists conducting surveys for desert tortoise (*Gopherus agassizii*), flat-tailed horned lizard (*Phrynosoma mccallii*), and Colorado Desert fringe-toed lizard (*Uma notata*). Acquired certification from the Arizona Department of Game and Fish to survey for the flat-tailed horned lizard.

Principal Investigator for conducting surveys for the flat-tailed horned lizard in the LaQuinta area of southern California.

Staff Biologist for preconstruction surveys to evaluate areas that support desert tortoise in Nevada and California along the 900 mile-long Kern River natural gas pipeline ROW. Evaluations based upon presence/ abundance of burrows, scat, tracks, drinking depressions, and carapace remains, as well as the use of fiber-optic scopes to visually inspect deep burrows for tortoise occupation. Monitored all phases of construction throughout known tortoise habitat. Documented all tortoise encounters, removed tortoises from the construction site, and performed handling procedures following USFWS protocol, which included marking scutes, painting and numbering, photographing, and monitoring overnight before release. Included on the MOU for the Kern River Pipeline project and was certified to handle and inventory desert tortoises by USFWS.

Selected Small Mammal Experience (1994-2005)

Senior Biologist/Principal Investigator for the performance of general small mammal live-trapping survey efforts on portions of Tejon Ranch, Los Angeles County, California.

Principal Investigator/**Senior Biologist** for conducting focused small mammal trapping surveys for sensitive biological resources including the Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), near the City of Chatsworth, Los Angeles County. Project is located in a Significant Ecological Area (SEA), and as such involved preparation of a Biota Report and subsequent planning meetings with the SEA Technical Advisory Committee (SEATAC).

Staff Biologist for trapping project for the Trust for Public Lands in Los Angeles County. Species captured, weighed, measured, and released include California mouse, brush mouse, Pinion mouse (*Peromyscus truei*), deer mouse, Pacific kangaroo rat, California pocket mouse, dusky-footed woodrat, desert woodrat, and California meadow vole.

Principal Investigator for evaluating habitats potentially suitable to support Pacific pocket mouse (*Perognathus longimembris pacificus*) at the Playa Vista project site in Los Angeles County. Conducted

mammal inventory on the project site located in the Playa del Rey area, Los Angeles County, California (a type locality for the Pacific pocket mouse). Tasks included designing and submitting a formal study plan to USFWS and conducting a focused field survey effort for the Pacific pocket mouse and other sensitive small mammal species. Principal investigator for the 3,000+ trapnight effort utilizing both Sherman live-traps and pitfall trapping arrays. Performed these surveys under the authority of federal permit (PRT-808242).

Project Ecologist/Trap Manager for 45,000+ trapnight program to evaluate the presence/absence of the Pacific little pocket mouse (*Perognathus longimembris pacificus*). Trap manager for 9,900 trapnights, and supervised trap assistants involved in the project. Species captured, identified, measured, weighed, and released include the endangered Pacific pocket mouse, California pocket mouse (*Chaetodipus californicus*), San Diego desert woodrat (*Neotoma lepida intermedius*), dusky-footed woodrat (*Neotoma fuscipes*), deer mouse (*Peromyscus maniculatus*), California mouse (*Peromyscus californicus*), brush mouse (*Peromyscus boylii*), cactus mouse (*Peromyscus eremicus*), pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), harvest mouse (*Reithrodontomys megalotis*), pacific kangaroo rat (*Dipodomys agilis*), house mouse (*Mus musculus*), and Virginia opossum (*Didelphis virginiana*).

Principal Investigator for Section 7 consultation regarding the San Bernardino kangaroo rat (*Dipodomys merriami parvus*) for a project located in Redlands, California.

Principle Investigator/Project Biologist for a small mammal inventory program conducted in the northeastern portion of Wyoming. Permitted as Principal Investigator to conduct the trapping program by Wyoming Department of Game and Fish (WDGF). The trapping program was a component of a Gap Analysis project that was a cooperative effort between WDFG, Bureau of Land Management (BLM), The Nature Conservancy (TNC), and the University of Wyoming (UW). Specific job related duties included conducting over 8,500+ trapnights, ground-truthing GIS vegetation polygons for accuracy, evaluating habitat quality, and identifying dominant and subdominant plant communities occurring in a tri-county area. All small mammals captured were measured and identified to species. Species captured and identified include olive-backed pocket mouse (*Perognathus fasciatus*), plains pocket mouse (*Perognathus flavescens flavescens*), deer mouse, western harvest mouse, least chipmunk (*Tamias minimus*), Southern red-backed vole (*Clethrionomys gapperi*), prairie vole (*Microtus ochrogaster*), montane vole (*Microtus montanus*), masked shrew (*Sorex cinereus cinereus*), Merriam's shrew (*Sorex merriami*), Northern grasshopper mouse (*Onychomys leucogaster*), Ord's kangaroo rat (*Dipodomys ordii*), and white-footed mouse (*Peromyscus leucopus aridulus*). Additional work involved hantavirus research, collection for museum specimens, and raptor rehabilitation. Responsible for supervising trapping assistants and producing final report for journal publication.

Senior Biologist for numerous biological studies in the Newhall area of Los Angeles County, California. Tasks included designing and implementing small mammal live-trapping programs and evaluating small mammal habitat usage of selected study areas. Study evaluated small mammal home range size and movement patterns to determine appropriate buffer widths for development projects located adjacent to sensitive resources.

Principal Investigator for a small mammal live-trapping program to evaluate the presence/absence of the federal-listed endangered Pacific pocket mouse in the Del Mar area, San Diego County, California. Performed these surveys under the authority of federal permit (PRT-808242).

Principal Investigator for a small mammal live-trapping program to evaluate the presence/absence of the federal-listed endangered Pacific pocket mouse in the Silver Strand area, San Diego County, California. Performed these surveys under the authority of federal permit (PRT-808242).

Principal Investigator for a small mammal live-trapping program to evaluate the presence/absence of the federal-listed endangered Pacific pocket mouse in Crystal Cove State Park, Orange County, California. Performed these surveys under the authority of federal permit (PRT-808242).

Senior Biologist/Trap Manager for evaluating habitats potentially suitable to support Pacific pocket mouse on USMC Camp Pendleton (Base). Directed trap assistants, established trapping transects, and handled endangered Pacific pocket mice during the course of a large trapping study conducted throughout the Base located in San Diego County, California.

Staff Biologist for baseline biological inventories for wildlife and botanical resources, including sensitive wildlife species surveys for a proposed Los Angeles County landfill site. Fieldwork involved small mammal trapping for Los Angeles little pocket mouse (*Perognathus longimembris brevinasus*), and sensitive bat surveys using mist nets, night-vision scopes, and hand-held bat echolocation detectors.

Staff Biologist for baseline inventory of flora and fauna for multiple Caltrans highway projects in the Fresno and Coalinga areas. Surveys included small mammal trapping [included in MOU for short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*)], scent station monitoring for San Joaquin kit fox (*Vulpes macrotus mutica*), spotlighting, and focused reptile and avian surveys.

Senior Biologist for conducting biological assessment on over 700 acres located in Ventura County, California. Conducted general wildlife surveys, special-status species surveys, vegetation mapping, and conducting a focused small mammal sampling program effort.

Senior Biologist for performing a biological assessment of an approximately 100-acre site located in the Mountaingate area of Los Angeles County. Conducted a small mammal live-trapping program, performed general avian and reptile surveys of the project site, developed a plant compendium of the site, mapped vegetation communities, and established scent stations.

Project Ecologist for California Department of Corrections (CDC) involving mitigation monitoring of a Pacific Gas and Electric (PG&E) along a pipeline corridor. Included on MOU to trap and translocate short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*) in Kern and Fresno counties.

Research Biologist for the capture, electronic passive infrared transmitter tagging (P.I.T.T.), and release giant kangaroo rats (*Dipodomys ingens*) on the Elkhorn and Carrizo Plains. Worked with San Joaquin Endangered Species Recovery Program Team, and the CSU Stanislaus Foundation. The dispersal and reproductive data gathered was used to develop future species recovery plans for sensitive small mammals and reptiles.

Project Ecologist for barn owl (*Tyto alba*) pellet analysis to provide information on the presence and relative distribution of the Pacific pocket mouse. Individually examined and identified over 500 small mammal skulls and bone fragments of various species occurring in Orange and San Diego counties that included Botta's pocket gopher, San Diego desert woodrat, dusky-footed woodrat, white-footed mouse (*Peromyscus* sp.), harvest mouse, California meadow vole, pocket mice (*Chaetodipus* sp.), Pacific kangaroo rat, desert shrew (*Notiosorex crawfordi*), ornate shrew (*Sorex ornatus*), Audubon's cottontail (*Sylvilagus audubonii*), old world rat (*Rattus* sp.), house mouse, and mole (*Scapanus* sp.).

Staff Biologist for over 35 proposed small energy development projects, including linear facilities, such as pipelines and transmission lines, for the Westside Development Program and Kern River Oilfield Development Program, Kern and Monterey Counties. As staff biologist, was responsible for inventory of rare, threatened, and endangered plant and animal species using various field and literature search techniques, including transect surveys, small mammal trapping surveys under MOU with CDFG, and scent station and burrow monitoring, and evaluations based on animal sign, such as scat, tracks, claw marks, diggings, prey remains, dust baths, hay stacking, and nesting. Evaluated presence of sensitive habitat. Also responsible for training and management of field biologists and coordination of field activities.

Biological Technician for black-footed ferret (*Mustela nigripes*) trapping project in Medicine Bow, Wyoming for the Wyoming Department of Game and Fish. Conducted spot-light surveys for captive-bred introduced ferrets, and assisted biologists set live-traps, bar-code scan, and release captured ferrets.

Selected Avian Experience (1994-2005)

Project Ecologist/Principal Investigator for over 200 field days of California gnatcatcher surveys conducted in San Diego, Orange, San Bernardino, Riverside, Ventura, and Los Angeles counties for various clients throughout southern California. Observed hundreds of gnatcatchers during the course of these surveys over the past 10 years. Mapped nesting territories and documented numerous fledglings.
Principal Investigator for over 30 western burrowing owl surveys conducted in San Bernardino, Riverside, Imperial, Kern, Sacramento, Ventura, and Los Angeles counties for various clients throughout southern California. Observed hundreds of owls during the course of these surveys. Mapped nesting territories and documented/photographed numerous fledglings. Employed passive relocation techniques.

Project Ecologist for conducting numerous focused and/or habitat evaluations surveys over a two-year period along the proposed Foothill Transportation Corridor (FTC) located in Orange and San Diego counties. Focused surveys included, but were not limited to: coastal California gnatcatcher, grasshopper sparrow, tricolored blackbird, Bell's sage sparrow, California horned lark, coastal cactus wren, loggerhead shrike, northern harrier, western burrowing owl, and southern California rufous-crowned sparrow.

Project Ecologist/Principal Investigator for numerous nesting bird surveys conducted in San Bernardino, Imperial, Ventura, Orange, San Diego, Los Angeles, and Riverside counties. Mapped nesting territories and documented numerous fledglings.

Senior Biologist/Principal Investigator for several least Bell's vireo surveys conducted in San Bernardino, Riverside, Ventura, and Los Angeles counties.

Selected Delhi Sands Flower-loving Fly Experience (1996-2005)

Senior Biologist/Principal Investigator for 70+ focused USFWS protocol survey efforts to determine the presence/absence of the endangered Delhi Sands flower-loving fly (DSF) for numerous public and private sector clients located in Riverside and San Bernardino counties. Conducted focused surveys following USFWS protocol under the authority of federal Section 10(a) permit TE-808242-4 issued to Scott Cameron. Measured and recorded characteristics of occupied Delhi Sands flower-loving fly habitat at sites known to support this species in all Recovery Units in the region. Observed and documented numerous DSF during the course of these surveys.

Senior Biologist/Principal Investigator for conducting 50+ habitat-based surveys for Delhi sands flower-loving fly located in San Bernardino and Riverside counties. Survey efforts included habitat evaluations based on existing site conditions. Existing documentation pertinent to the distribution and habitat requirements of the DSF in the vicinity of each project area was reviewed and analyzed. Field visits to each site were conducted to note the habitat characteristics of each site. Comparative analysis of currently occupied DSF habitat was also completed for each habitat-based evaluation. Habitat characteristics were documented (e.g., soils, plant species, percentage ground cover, percentage vegetative cover, etc.), and photographs of each site were taken in an attempt to discern any differences in biological characteristics, which may relate to habitat suitability for the endangered fly species.

Principal Investigator for the preparation of a Habitat Conservation Plan (HCP) in support of a Section 10(a) permit application. Plan involves the federally endangered Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) located in the City of Ontario.

Professional History

Ecological Sciences, Inc. – Principal Biologist
EcoSciences – Principal Biologist
Impact Sciences, Inc. - Senior Biologist
Michael Brandman Associates - Project Ecologist/Manager
The Nature Conservancy - Project Biologist/Principle Investigator
Wyoming Department of Game and Fish - Biological Technician

Professional History-*continued*

Dames and Moore - Staff Biologist
San Joaquin Endangered Species Recovery Program/CSU Stanislaus Foundation-Research Assistant
County of Santa Barbara, Department of Environmental Review – Intern

Education/Permits/Certifications

- B.A., Environmental Studies (Natural Resource Management Emphasis; graduate-level courses in Ecology), University of California, Santa Barbara
- Certification, ***Flat-tailed Horned Lizard*** Survey Techniques, Arizona Department of Game and Fish
- Certification, ***Desert Tortoise*** Handling, burrow construction, and egg handling Techniques, U.S. Fish and Wildlife Service
- Certification, Marine Sciences Program, Santa Barbara City College
- Certification, Rescue Diver, PADI
- CDFG agreement to trap and release ***small mammal California Species of Special Concern***
- CDFG Scientific Collecting Permit, 2003-2005
- Federal Section 10(a) Permit to capture and release an endangered small mammal species, ***Pacific pocket mouse***, 1996-2008 (TE-808242-4).
- Federal Section 10(a) Permit for performance of ***Delhi sands flower-loving fly*** surveys (TE-808242-4), 1997-2008
- Federal Section 10(a) Permit to capture and release threatened and endangered amphibian species, ***arroyo toad***, 1996-2008 (TE-808242-4)
- Federal Section 10(a) Permit to capture and release threatened and endangered amphibian species, ***California red-legged frog***, 1996-2008 (TE-808242-4)
- Federal Section 10(a) Permit for performance of ***coastal California Gnatcatcher*** surveys, 1994-2008 (TE-808242-4)

Professional Affiliations

The Wildlife Society
American Society of Mammalogists
Society for the Study of Reptiles and Amphibians
California Native Plant Society

Publications/Submittals

Cameron, S. D. and C. S. Garber. *Inventory and Monitoring of Small Mammal Distribution in the Bureau of Land Management's Casper District, Buffalo Resource Area.* The Nature Conservancy, Wyoming Natural Diversity Database. Cooperative Agreement Number K910-A4-0011, Task Order TO-002.

Cameron, S. D. and R. W. Hanson. 1994. *Range Extension of the Western Patchnose Snake* (*Salvadora hexalepis mojavensis*). Herpetological Review, 25 (1): 34-35.

Impact Sciences, Inc., "Oak Tree Report: Mission Village VTTM 61105 Los Angeles County, California, March 2010 update" (2010)

Oak Tree Report: Mission Village VTTM 61105
Los Angeles County, California
March 2010 update

Prepared for:

The Newhall Land and Farming Company
23823 Valencia Boulevard
Valencia, California 91355

Prepared by:

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C Richard Johnson and Associates' Letter Summarizing Fire Damage to Trees within Homestead and Potrero Valley Projects

D Richard Johnson and Associates' Boxing Specifications and Recommendations

SUMMARY

- Number of oak trees surveyed 517
  - Number of dead trees surveyed 16
  - Number of trees surveyed subject to the Los Angeles County Oak Tree Ordinance (i.e., protected oaks).....501
- Number of oak trees proposed for removal.....147
  - Non heritage.....139
  - Heritage 8
- Number of oak trees proposed for encroachment 49
  - Non heritage.....47
  - Heritage 2
- Total number of oak trees requiring a County of Los Angeles Oak Tree Permit 196
  - Non heritage.....186
  - Heritage 10
- Number of protected oak trees surveyed not impacted by the proposed project 305

INTRODUCTION

Pursuant to the Los Angeles County Oak Tree Ordinance (Ordinances 82-0168 Section 2, 88-0157 Section 1; County Zoning Code Section 22.56.2060.A), it is illegal to remove or damage any tree of the oak genus (*Quercus*), measuring 25 inches in circumference (8 inches in diameter), or has a combined trunk circumference of any two trunks of at least 38 inches (12 inches in diameter), as measured 4.5 feet above the mean natural grade (i.e., diameter at breast height [DBH]) without first obtaining an oak tree permit. Damage is defined as any act causing or tending to cause injury to the root system or other parts of an oak tree, including, but not limited to, burning, application of toxic substances, operation of equipment or machinery, paving, changing of natural grade, and trenching or excavating within the protected zone (the area within the dripline of an oak tree and extending to a point at least 5 feet outside the dripline, or 15 feet from the trunk[s] of a tree, whichever distance is greater) of an oak tree.

An oak tree with a trunk DBH equal to, or greater than, 36 inches is considered a heritage tree, as defined in the Los Angeles County Oak Tree Ordinance (County Code Section 22.56.2090.F.1.e).

Purpose

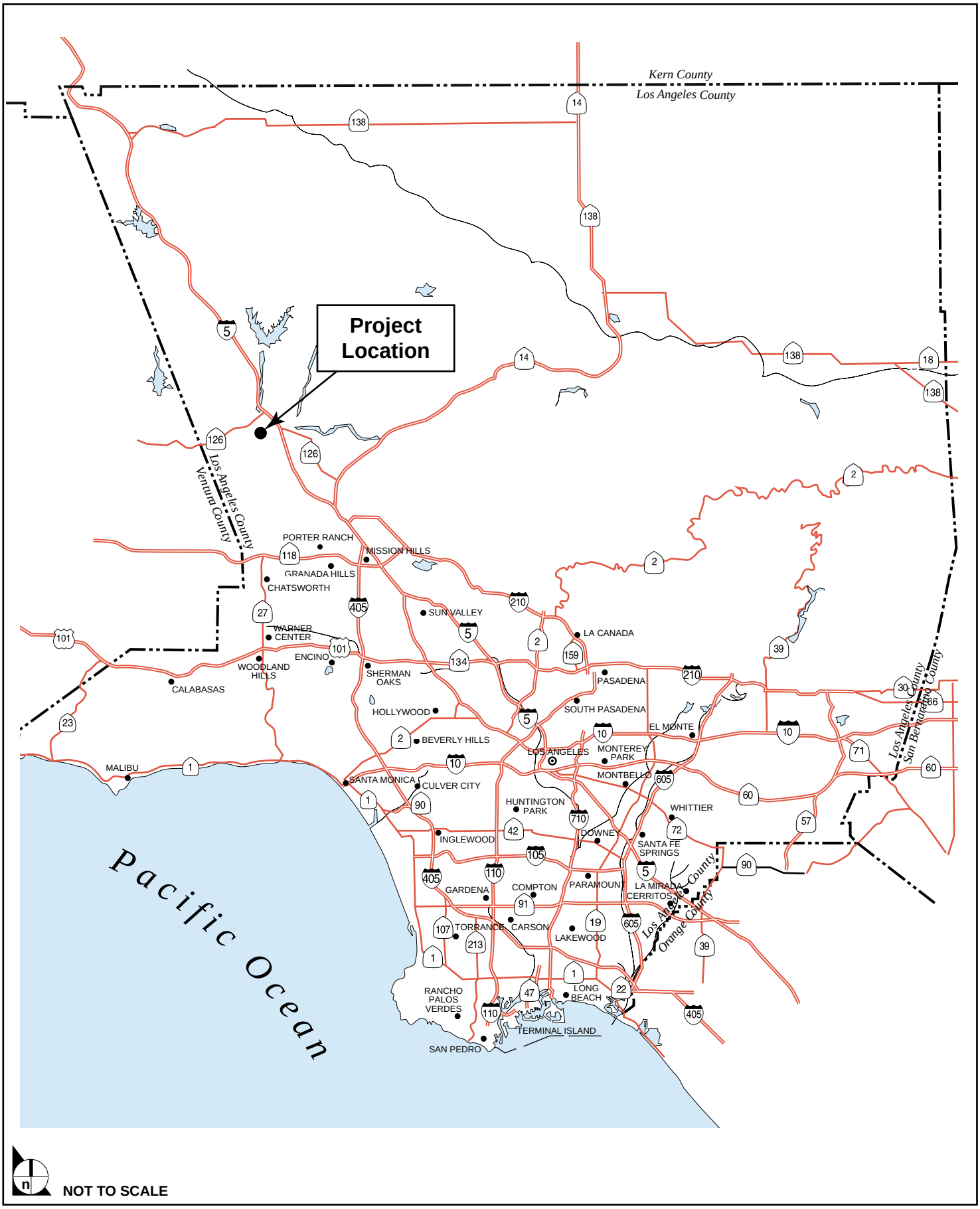
As required by the County of Los Angeles and pursuant to Section 22.56.2090.F of the Los Angeles County Code, the purpose of this oak tree report is to provide information to the County on oak trees that may be removed or damaged/encroached by the development of the Mission Village VTTM 61105 project (County Project 04-181). The parameters used to evaluate each tree that was surveyed are described on the following pages in the **Methods** section. A spreadsheet showing data collected for each oak tree surveyed is provided in **Appendix A**.

Site Location and Project Description

The project site is located in an unincorporated portion of northwestern Los Angeles County, approximately 30 miles northwest of downtown Los Angeles, in the Santa Clarita Valley. The project site is part of the approved Newhall Ranch Specific Plan, which was adopted by the Los Angeles County Board of Supervisors on May 27, 2003. The Specific Plan will guide the long-term development of the 11,963-acre Newhall Ranch community, including the goals, policies, and objectives of the County of Los Angeles General Plan and Santa Clarita Valley Area-wide Plan. The Specific Plan is regulatory in nature and serves as the zoning for Newhall Ranch.

The project grading is consistent with, and implements the Specific Plan's approved Conceptual grading plan, and the applicable Specific Plan Design Guidelines (Specific Plan Chapter 4, Section 4.8) for grading and hillside management. In addition, the environmental effects of grading the entire Specific Plan site were evaluated as part of the certified Newhall Ranch Specific Plan Program EIR.

The project boundary comprises 1,261.8 acres, of which approximately 900.4 acres would be disturbed by proposed development. On-site disturbances would comprise 860.1 acres of permanent impacts and 40.3 acres of temporary impacts. The project site is bounded to the north by California State Highway 126 and the Travel Village RV Park; to the west by the remaining undeveloped portions of Newhall Ranch planned for future residential and commercial uses; to the south and southwest by vacant property proposed for residential and commercial uses [i.e., the proposed Legacy Village (Stevenson Ranch Phase V]); and to the east by the Six Flags Magic Mountain theme park, beyond which lies Interstate 5. A regional location map (**Figure 1, Regional location**) and a site vicinity map (**Figure 2, Site vicinity**) illustrate the project site in a regional and local context, respectively. Currently, oak woodland, coastal sage scrub, chaparral, and grassland dominate the vegetative cover on the project site.

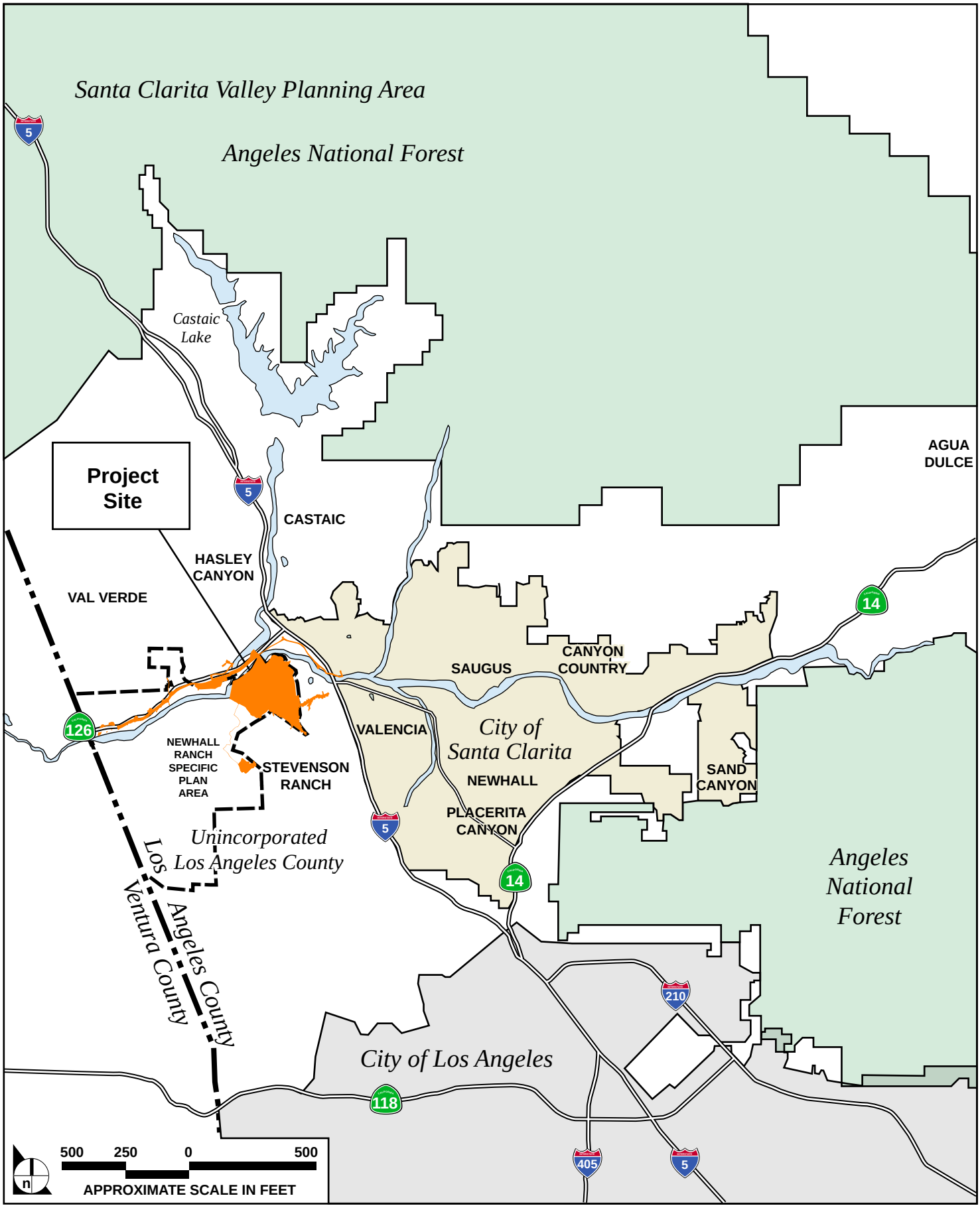


SOURCE: Impact Sciences, Inc. – February 2010

FIGURE **1**

Regional Location

32-207•02/10



SOURCE: Impact Sciences, Inc. – February 2010

FIGURE **2**

Site Vicinity

32-207•02/10

The Mission Village project is proposed on 1,261.8 acres of land (i.e., the tract map site: see **Figure 3, Mission Village VTTM 61105 Project Boundary, Grading Limit Line, and Overview Map** and **Appendix B—Oak Tree Maps**) located within the northeastern portion of the approved Specific Plan. To facilitate development and operation of the project, several off-site, project-related components would be implemented on an additional 592.3 acres of land, including 290.2 acres of permanent impacts and 302.1 acres of temporary impacts. These project-related components include an underground utility corridor proposed along the south side of State Route (SR)-126 extending from the Valencia Water Reclamation Plant (WRP) (Plant 32) on the east to the proposed Newhall Ranch WRP on the west, which would serve to extend municipal services to the tract map site; an extension of Magic Mountain Parkway to the east; two water tanks (reclaimed and potable); and portions of a water quality basin and access road. Oak tree impacts resulting from the construction of the Mission Village project and utility corridor are discussed in this report. Additional impacts to oak trees resulting from the Magic Mountain Parkway extension (Oak Tree Permit No. T200500043) are discussed in a separate report, dated November, 2006[1]

METHODS

Impact Sciences biologists conducted on-site surveys and evaluations of the oak trees during 2005 and 2006. Only oak trees protected under the Los Angeles County Oak Tree Ordinance were surveyed. The project site was traversed on foot through areas where oak trees occur. Oak tree locations and attribute data were collected from the base of each tree with a Trimble Global Positioning System (GPS) mapping grade system. The GPS stores the spatial data with the evaluation criteria and attribute information required per the County's Oak Tree Ordinance. The locations of trees that occur on or immediately adjacent to the grading limit line were surveyed by Psomas Engineering with "professional survey grade equipment" to map trees to a sub-centimeter level of accuracy.

In addition, while conducting tree surveys, biologists identified all oak trees that have the potential to be successfully relocated to undisturbed open space areas within the Newhall Ranch Specific Plan boundary. Trees identified as candidates for relocation based on the current assessments (e.g., health, vigor, aesthetics, balance) are identified in **Table 2** in the **Results** section.

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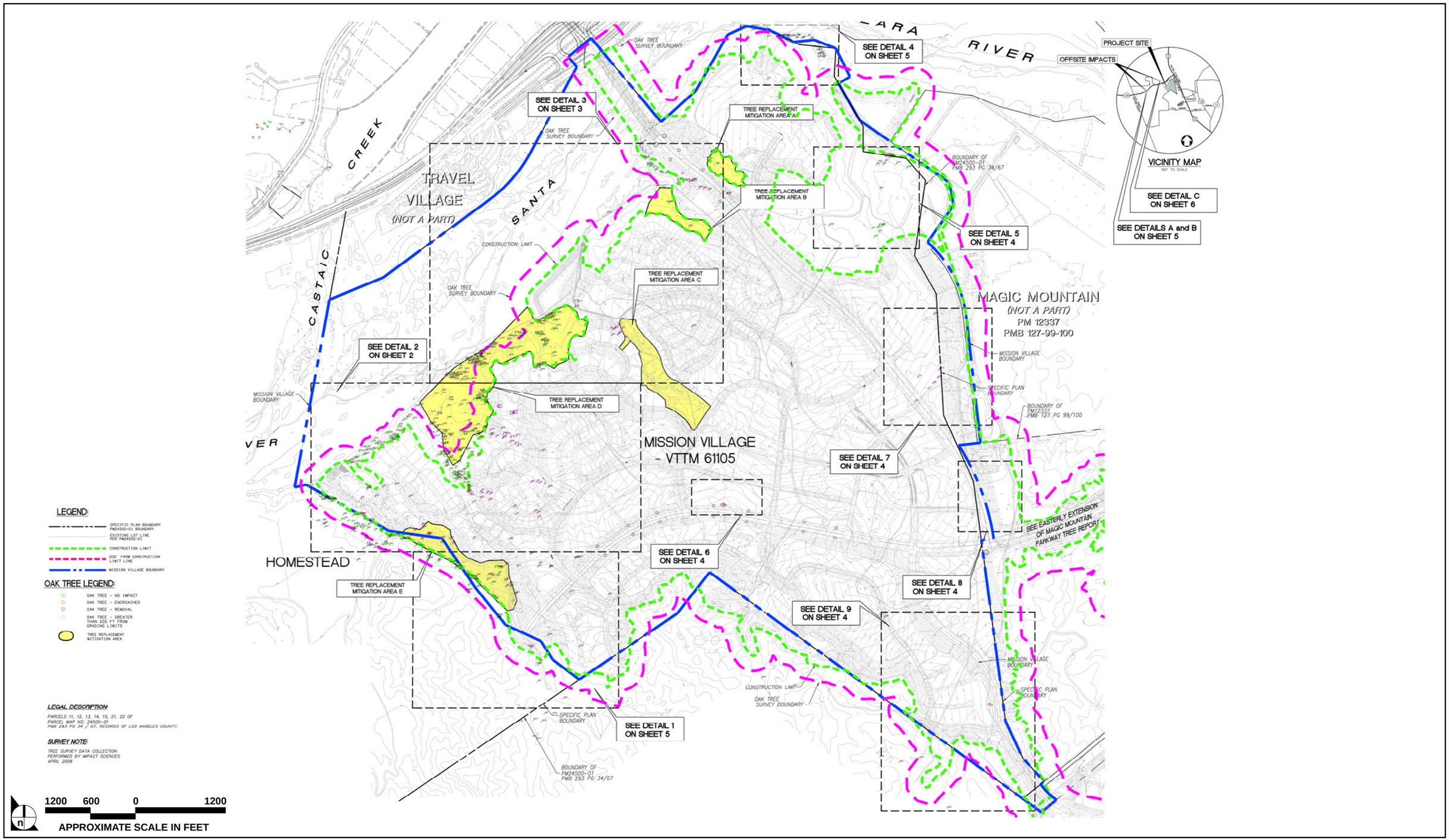
1 Impact Sciences, Inc. 2006. Easterly Extension of Magic Mountain Parkway Oak Tree Report, Los Angeles County, California. Prepared for the Newhall Land and Farming Company.



SOURCE: PSOMAS – March 2010

FIGURE **3**

Mission Village VTTM 61105 Project Boundary, Grading Limit Line, and Overview Map

32-207•03/10

Field evaluations of all oak trees surveyed included the following:

- **Tree characteristics**
  - Diameter of the trunk of each (ordinance size) oak tree was measured using a forester's steel diameter-equivalent tape measure. Trees with multiple trunks were measured at breast height and measurements for up to five trunks were recorded in the field. The total number of trunks of trees with more than five trunks were noted in the comment section of the data spreadsheet (**Appendix A**);
  - Height and crown radius for each tree in each cardinal direction (north, south, east, and west);
  - Balance or symmetry of each oak tree based on the crown radius measurements and whether or not the tree was leaning or appeared unstable; and
  - Identification of trees classified as heritage oak trees.
- **Physical Condition**
  - Identification of damage caused by pathogens or insect pests, by natural causes such as lightning, or from human activity;
  - Evaluation of vigor based on such parameters as amount of new growth, leaf color, abnormal bark, dead wood, evidence of wilt, excessive necrosis or leaf necrosis, thinning of crown, etc.; and
  - Assessment of overall health based on the evaluation of vigor, presence of damage, and comparison of typical archetype tree of same species.
- **Recommended Measures**—Identification of whether the tree requires safety pruning, such as the removal of dead or weak branches, and if a cable or brace should be installed if the tree is a save and would not be impacted by proposed development.
- **Grade**—A subjective alphabetical ranking ("A" being highest quality and "F" being dead) was assigned for vigor, overall health, aesthetic value, and balance for each tree based on the criteria described below. Photographic examples of the alphabetical rankings for each of the four aforementioned survey parameters are shown below in **Figures 4** through **6**.
  - "A": Excellent—A healthy and vigorous tree characteristic of its species and reasonably free of any visible signs of stress, disease, or pest infestation.
  - "B": Good—A healthy and vigorous tree with minor visible signs of stress, disease, and/or pest infestation. Some maintenance measures may need to be implemented such as, pruning of dead wood or broken branches.
  - "C": Fair—Although healthy in overall appearance, there is abnormal amount of stress or disease/insect infestation, and a substantial amount of maintenance may be needed.

Photo 1 – Photo of Oak Tree with an “A” (Excellent) Letter Grade

Photo 2 – Photo of Oak Tree with an “B” (Good) Letter Grade

SOURCE: Impact Sciences, Inc. – February 2010

FIGURE **4**

Site Photos

Photo 3 – Photo of Oak Tree with an “C” (Fair) Letter Grade

Photo 4 – Photo of Oak Tree with an “D” (Poor) Letter Grade

SOURCE: Impact Sciences, Inc. – February 2010

FIGURE **5**

Site Photos

Photo 5 – Photo of Oak Tree with an “E” (Almost Dead) Letter Grade

Photo 6 – Photo of Oak Tree with an “F” (Dead) Letter Grade

SOURCE: Impact Sciences, Inc. – February 2010

FIGURE **6**

Site Photos

- "D": Poor—A tree that may be exhibiting a substantial amount of stress, disease, or insect damage than what the amount that is expected for the species. The tree may be in a state of rapid decline, which may vary greatly in sings of dieback, necrosis, or other symptoms caused by pathogens or insect pests.

- "E": Nearly dead—An unhealthy tree in which mortality is inevitable. Examples of such trees include those that may show signs of disease and/or pest infestation, have a substantial amount of defoliation, and appear to be a safety hazard.

- "F": Dead—This tree has no foliage and exhibits no sign of life or vigor.

All oak trees surveyed within the Mission Village planning Area are displayed on attached engineering plans prepared by Psomas Engineering (Sheets 1 through 5). All exhibits show oak trees surveyed within the proposed grading limits and within 200 feet of the grading limit line, as well as proposed on-site oak tree mitigation areas.

RESULTS

A total of 501 oak trees subject to the Los Angeles County Oak Tree Ordinance were surveyed within the Mission Village Project Site, which includes the VTTM 61105 boundary, the proposed on- and off-site grading limit lines, and all areas within 200 feet of the grading limit line (see attached maps). An additional 16 dead oak trees were included in the survey, but these are not subject to permitting requirements of the Los Angeles County Oak Tree Ordinance[2]. Of the 501 protected oak trees surveyed, a total of 147 oak trees (29.3 percent of all live trees surveyed) are planned for permanent removal, 8 of which are heritage trees. Of the 147 oak trees planned for permanent removal, 28 (22 coast live oaks [*Quercus agrifolia*], 5 valley oaks [*Q. lobata*] and 1 MacDonald's oak [*Q.* x*macdonaldii*, a hybrid of valley oak and scrub oak]) are identified as candidates for relocation to undisturbed open space areas or other areas within the Specific Plan boundary (see **Tables 1** and **2**). Of the 147 oak trees planned for removal, 126 are coast live oaks; 16 are valley oaks; 4 are scrub oaks (*Q. berberidifolia*); and 1 is a MacDonald's oak. Of the 8 heritage oak trees planned for removal, 7 are coast live oaks and 1 is a valley oak.

Proposed grading and construction activities may encroach on the protected zones of 46 coast live oak trees (2 of which are heritage trees), 1 valley oak, and 2 ordinance-sized scrub oaks. There are 305 oak trees (60.9 percent of all live trees surveyed) within 200 feet from the grading limit line which would not be removed or encroached upon by construction-related activities. Of the 305 oak trees not impacted by

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2 Trees numbered 81, 106, 133, 134, 135, 160, 162, 163, 251, 902, 904, 4110, 4125, 4155, 4220, and 4293 are dead. These trees are shown on the grading plans because they were included in the survey, and GPS locations were recorded; however, they are not included in the totals of encroachments or removals and do not require permits from the County of Los Angeles.

proposed grading and construction activities, 19 are heritage trees, 17 are coast live oaks, and 2 are valley oaks.

A summary of the field data collected from the 2005 to 2006 oak tree survey is shown in **Table 1, Summary of Mission Village Project Area Oak Tree Survey Data**. **Table 2, Type of Project-Related Impact Proposed for each Oak Tree Planned for Removal**, describes the type of project-related impact proposed on each oak tree planned for removal or that would be encroached during grading activities.

Table 1
Summary of Mission Village Project Area Oak Tree Survey Data

Category	Species				Total Number	Proportion of Total* [%]
	Coast Live Oak	Valley Oak	Scrub Oak	Macdonald Oak		
Surveyed trees*	470	39	7	1	517	100.0
Heritage Trees						
Removed	7	1	0	0	8	1.5
Encroached	2	0	0	0	2	0.4
Not impacted	17	2	0	0	19	3.7
Dead	1	0	0	0	1	0.2
Non-Heritage Trees						
Removed	119	15	4	1	139	26.9
Encroached	44	1	2	0	47	9.1
Not impacted	265	20	1	0	286	55.3
Dead	15	0	0	0	15	2.9
TOTALS						
Protected trees	454	39	7	1	501	96.9
Removals	126	16	4	1	147	28.4
Encroachments	46	1	2	0	49	9.5
Trees requiring an Oak Tree Permit	172	17	6	1	196	37.9

—Dead trees are included in the total trees surveyed (517); are displayed on all exhibits, and are included in **Appendix A, but are not considered in the total counts for trees that would require a permit for proposed impacts (removal + encroachment). In addition, the "Proportion of Total" column is based on a total of 517 trees.*

Subsequent to oak tree surveys conducted for this report, two trees (numbers 963 and 990) were damaged by fire in October 2007 and pruned by fire fighters during the fire containment process. It is likely that both trees will survive. Please see **Appendix C** for details of these trees.

To reduce the permanent loss of mature oak trees and the habitat they provide to indigenous plant and animal species, as well as migrating birds, Newhall Land and Farming has retained Richard Johnson and Associates to develop boxing, planting, and maintenance procedures for candidate trees for relocation within the Newhall Ranch Specific Plan boundary. As shown in **Table 2**, 28 of the oak trees that are proposed for removal have been identified as candidates for relocation. Attached to this report as **Appendix D**, is the Richard Johnson and Associates' Boxing Specifications and Recommendations for transplanting and maintaining trees selected for relocation.

Table 2
Type of Project-Related Impact Proposed for each Oak Tree Planned for Removal

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
7	Valley oak	—	—	Removal	Road	Detail 8, Sheet 4 of 6
139	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
161	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
164	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
165	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
166	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
167	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
168	Coast live oak	—	—	Encroachment	Road	Sheet 2 of 6
169	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
170	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
171	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
172	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
173	Coast live oak	—	Y	Removal	Road	Sheet 2 of 6
175	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
176	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
179	Coast live oak	—	Y	Removal	Road	Sheet 2 of 6
180	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
181	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
182	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
183	Coast live oak	—	Y	Removal	Road	Sheet 2 of 6
184	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
185	Coast live oak	Y	—	Removal	Road	Sheet 2 of 6
186	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
189	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
190	Coast live oak	—	—	Removal	Road	Sheet 2 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
191	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
192	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
197	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
214	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
218	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
219	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
220	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
225	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
241	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
242	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
243	Coast live oak	—	—	Encroachment	Road	Detail 1, Sheet 5 of 6
254	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
255	Coast live oak	Y	—	Removal	Building Pad	Sheet 2 of 6
396*	Coast live oak	—	—	Removal	Utility Corridor	Detail B, Sheet 5 of 6
397*	Coast live oak	—	—	Removal	Chiquito Canyon Culvert Outlet	Detail B, Sheet 5 of 6
398*	Coast live oak	—	—	Removal	Chiquito Canyon Culvert Outlet	Detail B, Sheet 5 of 6
400*	Coast live oak	—	—	Removal	Utility Corridor	Detail B, Sheet 5 of 6
401*	Coast live oak	—	—	Removal	Utility Corridor	Detail B, Sheet 5 of 6
434	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
511	Coast live oak	—	Y	Removal	Road	Sheet 3 of 6
512	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
513	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
514	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
515	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
516	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
523	Coast live oak	—	Y	Removal	Building Pad	Sheet 3 of 6
524	Coast live oak	—	Y	Removal	Building Pad	Sheet 3 of 6
525	Coast live oak	—	Y	Removal	Road	Sheet 3 of 6
592*	Coast live oak	—	—	Removal	Utility Corridor	Detail B, Sheet 5 of 6
604	Coast live oak	—	—	Removal	Road	Sheet 3 of 6
605	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
606	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
607	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
608	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
609	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
610	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
611	Coast live oak	Y	Y	Removal	Basin	Sheet 3 of 6
612	Coast live oak	—	—	Encroachment	Road	Sheet 3 of 6
626	Coast live oak	—	—	Removal	Bank stabilization	Sheet 3 of 6
627	Coast live oak	—	—	Removal	Bank stabilization	Sheet 3 of 6
659	Scrub oak	—	—	Encroachment	Road	Sheet 2 of 6
713	Valley oak	—	—	Removal	Building Pad	Detail 4, Sheet 5 of 6
714	Valley oak	Y	—	Removal	Building Pad	Detail 7, Sheet 4 of 6
716	Valley oak	—	Y	Removal	Park	Detail 7, Sheet 4 of 6
717	Valley oak	—	—	Removal	Park	Detail 7, Sheet 4 of 6
718	Valley oak	—	Y	Removal	Park	Detail 7, Sheet 4 of 6
719	Valley oak	—	—	Removal	Park	Detail 7, Sheet 4 of 6
761	Macdonald oak	—	Y	Removal	Road	Detail 9, Sheet 4 of 6
762	Scrub oak	—	—	Removal	Road	Detail 9, Sheet 4 of 6
796	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
797	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
798	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
799	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
800	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
801	Coast live oak	—	Y	Removal	Building Pad	Detail 1, Sheet 5 of 6
802	Coast live oak	—	Y	Removal	Building Pad	Detail 1, Sheet 5 of 6
803	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
805	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
806	Coast live oak	—	Y	Removal	Building Pad	Detail 1, Sheet 5 of 6
807	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
813	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
814	Coast live oak	—	—	Removal	Bank Stabilization	Detail 1, Sheet 5 of 6
816	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
817	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
818	Coast live oak	Y	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
819	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
822	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
823	Coast live oak	Y	—	Encroachment	Road	Detail 1, Sheet 5 of 6
824	Coast live oak	—	Y	Removal	Road	Detail 1, Sheet 5 of 6
825	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
826	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
828	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
829	Coast live oak	—	—	Removal	Road	Detail 1, Sheet 5 of 6
845	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
851	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
853	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
854	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
855	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
856	Coast live oak	Y	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
862	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
863	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
865	Coast live oak	Y	—	Removal	Slope Protection	Sheet 2 of 6
867	Coast live oak	—	—	Removal	Slope Protection	Sheet 2 of 6
868	Coast live oak	—	—	Removal	Slope Protection	Sheet 2 of 6
869	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
870	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
871	Coast live oak	—	—	Removal	Basin	Sheet 2 of 6
893	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
894	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
895	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
896	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
926	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
927	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
928	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
929	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
930	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
931	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
932	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
957	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
958	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Sheet 2 of 6
961	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
962	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Sheet 2 of 6
2246	Coast live oak	—	—	Removal	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
2320	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
2325	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
2354	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
2424	Coast live oak	—	—	Removal	Road/Building Pad	Detail 1, Sheet 5 of 6
2458	Scrub oak	—	—	Encroachment	Road	Detail 9, Sheet 4 of 6
2461	Scrub oak	—	—	Removal	Road	Detail 9, Sheet 4 of 6
4111	Coast live oak	—	—	Encroachment	Lion Canyon Stream Restoration	Detail 1, Sheet 5 of 6
4118	Coast live oak	—	Y	Removal	Road	Detail 1, Sheet 5 of 6
4122	Coast live oak	—	—	Removal	Building Pad	Detail 1, Sheet 5 of 6
4123	Coast live oak	—	—	Removal	Basin	Sheet 2 of 6
4124	Coast live oak	—	—	Removal	Basin	Sheet 2 of 6
4161	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4172	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
4174	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
4175	Coast live oak	—	Y	Removal	Road	Sheet 2 of 6
4176	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4177	Coast live oak	—	—	Removal	Road	Sheet 2 of 6
4178	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4179	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4180	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4181	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4182	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
4183	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4184	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
4200	Coast live oak	—	—	Encroachment	Building Pad	Sheet 2 of 6
4214	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4215	Coast live oak	—	Y	Removal	Building Pad	Sheet 2 of 6
4216	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4217	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4218	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4219	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4273	Coast live oak	—	—	Encroachment	Building Pad	Sheet 3 of 6
4296	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
4297	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
4298	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
4299	Coast live oak	—	—	Removal	Building Pad	Sheet 3 of 6
4300	Coast live oak	—	—	Encroachment	Building Pad	Sheet 3 of 6
4307	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4308	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4309	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4310	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4311	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4312	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4321	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4322	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4325	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4326	Coast live oak	—	—	Encroachment	Basin	Sheet 3 of 6
4327	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
4328	Coast live oak	Y	—	Removal	Park	Sheet 3 of 6
4329	Coast live oak	—	—	Removal	Park	Sheet 3 of 6
4330	Coast live oak	—	—	Removal	Park	Sheet 3 of 6
4331	Coast live oak	Y	—	Removal	Building Pad	Sheet 3 of 6
4333	Valley oak	—	—	Removal	Basin	Sheet 3 of 6
4334	Coast live oak	—	—	Removal	Basin	Sheet 3 of 6
4341	Valley oak	—	—	Removal	Basin	Detail 5, Sheet 4 of 6
4342	Valley oak	—	—	Removal	Basin	Detail 5, Sheet 4 of 6
4343	Valley oak	—	—	Removal	Basin	Detail 5, Sheet 4 of 6
4344	Valley oak	—	—	Removal	Basin	Detail 5, Sheet 4 of 6
4345	Valley oak	—	—	Encroachment	Basin	Detail 5, Sheet 4 of 6

Tree #	Species	Heritage	Candidate for Relocation	Impact Type	Reason for Impact	Map Location
4351	Valley oak	—	Y	Removal	Park	Detail 7, Sheet 4 of 6
4352	Valley oak	—	Y	Removal	Park	Detail 7, Sheet 4 of 6
4353	Valley oak	—	—	Removal	Park	Detail 7, Sheet 4 of 6
4361	Valley oak	—	Y	Removal	Road	Detail 9, Sheet 4 of 6
4363	Coast live oak	—	—	Removal	Slope Protection	Sheet 2 of 6
4366	Scrub oak	—	—	Removal	Building Pad	Detail 6, Sheet 4 of 6
4368	Scrub oak	—	—	Removal	Road	Detail 6, Sheet 4 of 6
4376	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6
4377	Coast live oak	—	—	Removal	Building Pad	Sheet 2 of 6

**—Trees 396, 397, 398, 400, 401, and 592 were also included in the analysis of impacts for Oak Tree Permit OTP 00-196 (Tentative Tract Map 53108 [Landmark Village]).*

CONCLUSION

As indicated above, 139 non-heritage and 8 heritage oak trees will be removed; 47 non-heritage and 2 heritage oak trees will be encroached. Thus, 196 oak trees (37.9 percent of all protected and non-protected trees surveyed) will require an oak tree permit from the County of Los Angeles.

SUGGESTED MITIGATION MEASURES

Pursuant to Section 22.56.2090.F.1.d of the Los Angeles County Oak Tree Ordinance, the following mitigation measures are proposed to preserve and protect the oak trees addressed in this report. These mitigation and maintenance measures are suggested to mitigate the loss or impacts to the 196 oak trees proposed to be removed or encroached, and to preserve and protect the remaining oak trees and their habitat on the site.

MM-1 **Replacement trees:** Consistent with the Newhall Ranch Specific Plan, oak trees removed or damaged shall be replaced by a tree of the same species at a ratio of 2:1.

All replacement trees shall be at least a 15-gallon specimen in size and measure 1 inch or more in diameter, as measured from 1 foot above the base. Free-form trees with multiple stems are permissible; the combined diameter of the two largest stems of such trees shall measure a minimum of 1 inch in diameter, as measured 1 foot above the base. Replacement trees shall consist exclusively of indigenous oak trees and be certified as being grown from a seed source collected in Los Angeles or Ventura Counties.

MM-2 **Protective fencing:** A plan shall be developed for protecting oak trees on the subject property during and after development. This plan shall be approved by the Forestry Division of the County of Los Angeles.

Equipment damage to limbs, trunks, and roots of all remaining trees shall be avoided during project construction and development. Even slight trunk injuries can result in susceptibility to long-term pathogenic maladies.

Protective fencing not less than 4 feet in height shall be placed at the limits of the protective zone of any individual oak tree or dense stand of oak trees within 200 feet of the grading limits, and shall be inspected by the forester and/or fire warden prior to commencement of any activity on the subject property, and shall remain in place until construction is completed.

MM-3 **Grading restrictions near protective zones:** Care must be taken to limit grade changes near the protective zone of an oak tree. Grade changes can lead to plant stress from oxygen deprivation or oak root fungus at the root collar of oaks. Minor grade changes further from the trunk are not as critical but can negatively affect the health of the tree if not carefully monitored by a County-approved certified arborist.

The grade shall not be lowered or raised around the trunks (i.e., within the protective zone) of any oak tree without the approval of the Los Angeles County forester or a County-certified arborist. A certified arborist shall supervise all excavation or grading proposed within the protective zone of a tree.

Trenching, excavation, or clearance of vegetation within the protective zone of an oak tree shall be accomplished by the use of hand tools or small hand-held power tools. Any major roots encountered shall be conserved to the greatest extent possible and treated as recommended by the certified arborist.

No utility trenches shall be routed within the protective zone of an oak tree unless no feasible alternative locations are available, and shall be approved by the County forester.

MM-4 **Equipment storage:** No storage of equipment, supplies, vehicles, or debris shall be permitted within the protective zone of an oak tree.

No dumping of construction wastewater, paint, stucco, concrete, or any other clean-up waste shall occur within the protective zone of an oak tree.

No temporary structures shall be placed within the protective zone of any remaining oak tree.

MM-5 **Maintenance:** Healthy trees, if not maintained, often grow beyond their ability to support themselves and fail at their most naturally occurring weak point. This is typically at a branch union at or near the main crotch of the tree. Weight-reduction pruning and/or cabling is important in any tree preservation program. Pruning of oak trees within residential neighborhoods is recommended every four to six years, based on a County-certified arborist's determination.

Pruning of replacement oak trees and preserved oak trees shall include the removal of dead wood, stubs, and medium pruning of branches 2 inches in diameter or less.

Pruning of replacement oak trees and preserved oak trees shall be in accordance with the guidelines published by the National Arborist Association. In no case shall more than 20 percent of the tree canopy of any oak tree be removed. Cuts over 2 inches in diameter shall require a pruning permit from the County. After pruning, installation of support cables to prevent future main crotch failures may be necessary based on a County-certified arborist's determination.

All replacement oak trees shall be maintained in accordance with the principles set forth in the publication, *Oak trees: Care and Maintenance* prepared by the Forestry Division of the County of Los Angeles.

A two-year maintenance period shall begin upon the start of planting the replacement trees. All replacement trees failing to survive within this period shall be replaced. A new two-year maintenance period shall start for each tree that failed to survive and required a replacement tree to be planted.

MM-6 **Frequency of watering:** Care should be taken to avoid placing any irrigation devices within watering distance of the protected zone of oak trees. Too much moisture near the base of an oak tree is generally believed to be the leading cause of death of oak trees in residential settings, and oak root fungus can occur as a result of over watering. Oak trees survive and thrive on annual rainfall alone and generally do not require supplemental irrigation except during periods of extreme drought or for establishment of newly planted trees (i.e., replacement trees).

Irrigation water shall not reach within 15 feet of any oak trunk.

Neither grass nor ground covers shall be planted under the canopy of oak trees.

MM-7 **Control of diseases and pests:** oak trees generally have an acceptable level of common insect pests. During the visual inspection of the trees assessed, no evidence of sudden oak death (*Phytophthora ramorum*) or bleeding canker (*Phytophthora cactorum*) was observed. However, oak wilt fungus (*Ceratocystis fagacearum)* was observed on two trees on the project site. The parasite, mistletoe (*Phoradendron villosum* ssp. *villosum*), is a common threat to oak trees; however, despite the negative effect mistletoe has on its tree hosts, both mistletoe and oaks are native to California and have coexisted and coevolved for hundreds of years. Mistletoe was observed on several of the oak trees surveyed.

A County-certified arborist shall evaluate the effects of mistletoe, pathogens, and insect pests on the remaining preserved and planted oak trees periodically (about every five to seven years), in addition to the overall health and structural integrity of the trees, to ensure longevity of remaining oak trees.

MM-8 **Construction monitoring:** Damage to remaining trees must be avoided by workers and equipment during construction activities.

A qualified biologist or County-certified arborist shall monitor on-site construction and grading activities occurring near all identified oak tree protection zones to ensure that damage to oak trees does not occur.

Prior to initiation of construction activities, the qualified biologist or County-certified arborist shall schedule a field meeting to inform personnel (involved in construction) where all protective zones are located and the importance of avoiding encroachment within the protective zones.

APPENDIX A

Oak Tree Survey Data

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	7	81	87	90	91	92	93	96	97	98	99	100	101	102	103	105	106	107	108	110	111	112	115	116	117	126	127
Tree Characteristics	**Species**																											
	Coast Live Oak		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak	X		X																								
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak		X	X						X																		
	Trunk Diameter	8.5,6.5,5.5,5	52,14	51	27	15,13,7,7	18,10	17	8,6,6,5	39	23,22	15	19,13,8,6	14,10,5	13,4	17,14,14,4	20,16	0	10,8.5	11.5	8,9	11,11,10,10	11	15,14,6	12,11.5,9	7,5,5,4	15,13,12,5,4	19,7.5,4
	Tree Height	17	20	50	28	40	32	32	30	55	42	22	41	32	37	40	38	20	25	17	16	21	22	42	32	20	35	20
	Canopy North	15	0	30	19	22	20	15	12	41	30	15	26	25	25	25	21	0	17	17	6	18	16	11	14	10	18	12
	Canopy West	12	0	29	16	23	18	17	15	40	27	10	26	22	26	29	22	0	16	8	5	18	6	22	18	13	11	12
	Canopy South	15	0	31	16	21	20	20	14	40	18	11	29	21	27	25	22	0	5	4	10	25	1	20	12	15	20	19
	Canopy East	14	0	29	18	22	17	21	15	36	21	11	28	20	24	27	19	0	17	5	9	22	12	12	11	15	25	18
Physical Conditions	**Tree Declining**			X	X																	X						
	Broken/Dead Limbs										X					X				X	X	X		X				
	Sparse Foliage			X							X						X			X	X	X						
	Excessive Chlorsis\Necrosis			X	X												X											
	Mainstem Dieback																					X						
	Poor tip Growth			X	X						X																	
	Cavity				X					X	X					X												
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage				X															X								
	Diseased																											
	Mistletoe																											
	Leaning										X									X								
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar				X					X	X				X	X				X	X	X		X				
	Safety Hazard																			X								
Measures	**Safety Prune**			X	X						X									X		X		X				
	Remove Deadwood										X									X	X	X		X				
	Cable/Brace	X									X											X		X				
Rating	**Vigor**	A	F	D	D	B	B	A	A	C	C	B	A	B	B	B	C	F	B	D	B	C	B	B	B	B	B	A
	Health	A	F	D	D	B	B	A	B	B	C	B	A	B	B	B	B	F	B	D	C	D	B	B	B	A	B	A
	Aesthetics	A	F	C	C	B	B	B	B	B	B	B	A	B	B	B	B	F	B	D	C	C	C	B	B	B	C	B
	Balance	A	F	B	C	B	B	B	A	A	C	B	A	A	C	B	A	F	C	C	C	C	D	B	B	A	B	A
Impact	**Removal**	X	Dead																									
	Encroached						X	X			X	X	X															
	200ft from Grading			X	X	X			X	X				X	X	X	X	Dead	X	X	X	X	X	X	X	X	X	X
Comments		10 trunks total			NT. BH.																							

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	128	129	130	131	132	133	134	135	137	138	139	140	142	143	145	146	147	148	150	152	153	154	155	156	157	158	159
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak		X																									
	Trunk Diameter	21	36	16,3	28,21,12,5	19	7,6.5	14	19	9,8,6	18,5	18,9	16,15	10,8,3	9,7	20,8,8	13	14	10	13,8.5,6.5	21	22	9	22	26	19,14.5	9,7.5,5.5,5	15,11
	Tree Height	42	35	32	50	42	20	20	20	20	28	23	34	35	35	28	36	35	36	33	30	32	26	27	47	32	32	37
	Canopy North	18	25	10	26	14	0	0	0	7	15	16	21	2	2	3	11	15	16	20	21	13	2	19	28	22	20	14
	Canopy West	17	16	15	25	17	0	0	0	14	16	15	17	12	21	20	4	16	7	21	18	9	7	21	17	11	21	30
	Canopy South	17	14	16	30	10	0	0	0	12	12	11	16	7	18	17	16	15	6	12	24	21	17	20	27	21	11	15
	Canopy East	20	30	18	27	8	0	0	0	9	14	21	18	7	15	25	12	5	5	17	17	20	10	18	21	25	16	17
Physical Conditions	**Tree Declining**		X																									
	Broken/Dead Limbs									X																		
	Sparse Foliage										X												X	X				
	Excessive Chlorsis\Necrosis										X	X											X	X				
	Mainstem Dieback																											X
	Poor tip Growth																											
	Cavity		X																					X				
	Weak Crotch		X																									
	Hollow Trunk		X																									
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark		X								X	X												X				
	Insect Damage		X								X																	
	Diseased																											
	Mistletoe																											
	Leaning																											
	Excessive Water Shoots																											
	Surface Roots		X																									
	Fire Scar		X																									
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																			X								X
	Cable/Brace		X																									
Rating	**Vigor**	A	D	B	B	B	F	F	F	B	D	C	B	B	B	A	B	A	B	B	B	B	C	C	B	B	B	C
	Health	A	D	B	A	B	F	F	F	C	D	C	A	A	A	A	A	B	A	B	A	A	C	C	A	B	B	C
	Aesthetics	A	D	B	A	C	F	F	F	C	C	C	A	A	A	A	A	B	A	B	A	A	C	B	A	B	B	B
	Balance	B	D	B	B	D	F	F	F	C	C	C	A	C	D	D	C	C	C	C	B	C	D	B	B	B	B	B
Impact	**Removal**																											
	Encroached											X																
	200ft from Grading	X	X	X	X	X	Dead	Dead	Dead	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Comments																												

	Tree Number	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak																										X	
	Trunk Diameter	12	16,11	16	12,11,10.5	6.5,5.5,5,4	12	13,5	13	14,13	24,11	12	20	20	26	10.5	14.5	16,8,6,6,4,4	12.5,12	20,19,17,16	19	10.5,6.5	16,15,13,13,12	20,12,7	30	26,8	42	17,16
	Tree Height	20	35	20	20	20	16	40	22	16	40	18	42	38	37	20	20	33	38	35	43	28	38	33	43	39	35	35
	Canopy North	0	25	0	0	10	8	14	12	14	22	14	24	13	16	11	14	16	6	25	22	3	24	17	25	17	23	11
	Canopy West	0	30	0	0	14	2	11	9	6	30	8	13	31	20	15	13	18	23	27	26	22	21	26	28	22	22	23
	Canopy South	0	10	0	0	15	10	17	11	0	18	11	22	27	19	13	14	16	27	8	20	20	25	21	26	23	24	21
	Canopy East	0	18	0	0	12	16	16	15	3	16	13	20	16	22	7	16	14	9	10	22	7	27	18	23	26	26	22
Physical Conditions	**Tree Declining**									X										X								
	Broken/Dead Limbs									X							X											X
	Sparse Foliage									X						X				X								
	Excessive Chlorsis\Necrosis						X			X										X								X
	Mainstem Dieback									X										X								
	Poor tip Growth									X										X								
	Cavity						X	X		X							X						X			X	X	X
	Weak Crotch																						X					
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark									X							X			X						X	X	X
	Insect Damage									X																	X	X
	Diseased																											
	Mistletoe																											
	Leaning						X															X						
	Excessive Water Shoots																											
	Surface Roots						X	X																				X
	Fire Scar						X			X							X									X	X	X
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood									X																		X
	Cable/Brace																						X					
Rating	**Vigor**	F	C	F	F	B	C	B	A	D	A	B	B	B	A	C	B	B	B	E	B	B	B	A	A	A	C	B
	Health	F	B	F	F	B	C	B	A	E	A	B	B	A	B	B	C	B	A	E	B	B	B	B	A	B	C	C
	Aesthetics	F	B	F	F	B	D	B	A	E	A	B	B	B	A	B	D	A	B	E	A	D	A	B	A	A	C	C
	Balance	F	C	F	F	B	D	C	A	E	B	B	B	B	A	B	C	B	D	E	B	D	C	B	A	D	C	C
Impact	**Removal**										X	X	X	X	X		X	X			X	X	X	X	X	X	X	X
	Encroached		X			X	X	X	X	X																		
	200ft from Grading	Dead		Dead	Dead											X			X	X								
Comments																												

	Tree Number	189	190	191	192	197	214	218	219	220	225	226	227	228	229	230	232	234	235	239	240	241	242	243
Tree Characteristics	**Species**																							
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																							
	Scrub Oak																							
	Valley Oak Hybrid																							
	Heritage Oak																							
	Trunk Diameter	9,8,7.5,6	24	24,13.5,11,8.5	21	15,14	7,5	17	15	24,21	25,7,5	19,12	9,4,4,3	21	30	13	19,13	18,11	22	14	17	19,12	18,9,5	26,23,20
	Tree Height	30	28	38	25	40	11	35	33	45	40	38	20	16	45	26	40	40	37	16	33	33	40	50
	Canopy North	13	13	18	16	17	13	15	10	32	21	14	12	4	27	11	17	14	18	8	13	21	12	30
	Canopy West	17	20	28	19	18	10	12	18	31	11	18	10	17	26	18	14	24	21	12	17	19	16	31
	Canopy South	12	16	23	18	18	4	16	22	27	18	17	12	8	31	13	14	22	20	8	21	29	24	38
	Canopy East	13	15	26	16	19	9	15	19	30	25	16	12	1	32	1	23	27	27	6	19	30	25	36
Physical Conditions	**Tree Declining**																					X	X	
	Broken/Dead Limbs			X	X								X	X						X		X	X	
	Sparse Foliage																					X	X	
	Excessive Chlorsis\Necrosis				X									X		X						X	X	
	Mainstem Dieback													X									X	
	Poor tip Growth																						X	
	Cavity		X	X	X									X				X		X		X	X	
	Weak Crotch																					X		
	Hollow Trunk																			X				
	Trunk Exudation										X			X										
	Regrown Stump												X											
	Exfoliating Bark		X	X	X						X			X						X				
	Insect Damage													X				X		X		X	X	
	Diseased																							
	Mistletoe																							
	Leaning													X										
	Excessive Water Shoots																					X		
	Surface Roots			X															X					
	Fire Scar			X	X					X	X		X	X						X				
	Safety Hazard																							
Measures	**Safety Prune**					X																		
	Remove Deadwood				X									X										
	Cable/Brace																					X		
Rating	**Vigor**	B	B	B	B	B	B	B	B	A	B	B	B	B	A	C	B	B	A	B	B	C	D	A
	Health	A	B	B	C	B	B	B	A	A	B	A	B	C	A	C	A	A	A	C	B	D	D	A
	Aesthetics	B	C	B	C	B	C	B	B	A	B	A	C	D	A	C	B	A	A	C	B	D	D	A
	Balance	B	C	B	B	A	C	B	C	A	B	B	C	D	A	D	B	B	A	C	C	D	D	A
Impact	**Removal**	X	X	X	X	X	X	X	X	X												X	X	
	Encroached										X													X
	200ft from Grading											X	X	X	X	X	X	X	X	X	X			
Comments						LHB																		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	244	245	251	252	253	254	255	257	377	381	382	384	385	387	388	389	390	391	392	393	396	397	398	400	401	434	438
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak	X						X																				
	Trunk Diameter	36,7	13,11	20	14.5,9.5,8	24	19,18,17,11	39	24	26	10.5,8	16	34,13	3,16	12.5,3	8.5,4	17	14	14	19	19	26,13,13,11	16	16	26	33,25,11,7	13,11	8,7.5
	Tree Height	44	32	20	38	35	45	38	40	38	30	42	20	45	28	18	18	38	38	41	33	40	38	28	39	43	30	17
	Canopy North	33	20	0	23	19	32	25	21	29	11	27	28	27	10	15	13	20	27	30	15	25	5	20	28	30	30	16
	Canopy West	28	26	0	21	11	30	26	22	27	3	22	30	23	10	6	4	10	10	12	30	28	17	19	27	30	18	7
	Canopy South	35	21	0	11	5	32	28	22	15	13	22	24	18	11	5	0	10	7	13	12	26	21	15	25	33	16	5
	Canopy East	27	19	0	23	6	27	28	24	28	32	32	6	31	13	12	11	8	19	12	14	39	21	3	27	36	17	14
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs					X		X								X	X										X	
	Sparse Foliage															X	X										X	
	Excessive Chlorsis\Necrosis					X											X											
	Mainstem Dieback																X											
	Poor tip Growth																											
	Cavity	X			X	X		X						X		X											X	
	Weak Crotch						X							X														
	Hollow Trunk				X									X														
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark				X	X		X																		X		
	Insect Damage				X	X		X						X												X		
	Diseased																											
	Mistletoe																											
	Leaning										X												X	X				
	Excessive Water Shoots																											
	Surface Roots										X		X	X														
	Fire Scar				X	X		X																				
	Safety Hazard																											
Measures	**Safety Prune**																					X						
	Remove Deadwood					X		X								X												
	Cable/Brace						X																					
Rating	**Vigor**	A	B	F	B	C	A	B	A	A	B	A	B	B	B	B	C	B	B	B	B	A	A	A	A	B	C	C
	Health	A	B	F	C	C	A	B	B	A	B	A	A	B	A	C	D	B	B	B	B	A	A	A	A	B	C	C
	Aesthetics	A	C	F	B	C	A	A	A	A	C	A	B	B	B	C	D	C	B	B	B	B	B	B	A	A	D	C
	Balance	A	B	F	C	C	C	B	B	C	D	B	C	C	B	C	D	C	C	C	C	B	C	C	A	B	C	C
Impact	**Removal**							X														X	X	X	X	X	X	
	Encroached						X																					
	200ft from Grading	X	X	Dead	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X							X
Comments																												

	Tree Number	511	512	513	514	515	516	523	524	525	592	593	595	596	597	598	599	602	603	604	605	606	607	608	609	610	611	612
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
	Valley Oak																	X										
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak												X		X				X								X	
	Trunk Diameter	21	25,14	23,7	11.5,7.5,6,5	29	19,19	32,15	14,10	14,13,12,10,8	21,14,10,7	18	52	21	42,20	28,8,3.5	17	19	48	14	17,15	13,11,11	32	11.5	14.5,13.5	28	37	22
	Tree Height	28	28	35	33	35	25	30	27	34	23	30	60	40	48	37	38	37	24	37	37	38	42	38	33	39	40	39
	Canopy North	16	24	15	14	16	22	18	17	15	35	21	36	15	13	15	10	17	28	23	13	14	27	11	22	25	26	0
	Canopy West	12	22	12	8	24	18	15	18	16	22	20	32	13	34	14	14	16	20	17	15	13	28	7	4	23	28	15
	Canopy South	16	23	11	23	27	26	23	10	18	17	20	38	22	37	10	23	18	22	22	23	20	32	10	25	27	31	30
	Canopy East	17	25	15	18	27	27	20	16	17	16	26	33	10	37	23	20	14	28	26	26	12	30	14	27	22	29	14
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs						X								X													
	Sparse Foliage																		X			X						
	Excessive Chlorsis\Necrosis																		X	X								
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity																											
	Weak Crotch						X																					
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage																											
	Diseased																											
	Mistletoe																											
	Leaning										X																	X
	Excessive Water Shoots										X																	
	Surface Roots																											
	Fire Scar																											
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood						X																					
	Cable/Brace						X			X																		
Rating	**Vigor**	A	A	B	B	B	B	B	A	A	C	A	B	C	B	B	B	B	B	B	A	B	A	A	B	A	A	B
	Health	B	B	B	B	B	B	B	B	A	C	A	A	B	B	A	B	A	C	C	B	B	A	B	B	B	B	B
	Aesthetics	A	A	C	B	B	B	B	A	A	D	B	A	C	B	B	B	A	D	B	B	C	A	C	B	A	A	C
	Balance	A	A	B	C	B	C	C	B	A	D	B	A	B	C	B	B	A	C	B	B	B	A	B	C	B	A	D
Impact	**Removal**	X	X	X	X	X	X	X	X	X					X					X	X	X	X	X	X	X	X	X
	Encroached										X		X															
	200ft from Grading											X		X		X	X	X	X									
Comments					8 trunks total																							

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	613	614	615	616	617	618	619	620	621	623	624	625	626	627	642	651	652	653	654	655	656	657	658	659	660	663	704
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Valley Oak																X	X	X	X	X	X	X	X		X	X	X
	Scrub Oak																								X			
	Valley Oak Hybrid																											
	Heritage Oak				X					X		X				X												
	Trunk Diameter	17,13	31	8	49	30	30	24,20,15,6,5	18	43	22	41	30,13,11.5	29	22	48	18	18	21	12	24	17,5.5	15	14	6.5,5.5,5,4.5	16	17	24
	Tree Height	30	43	12	45	40	32	43	45	25	25	57	42	28	40	55	30	30	27	18	18	20	23	23	20	24	32	34
	Canopy North	23	27	5	40	30	0	20	14	38	8	38	26	23	25	30	15	12	17	6	10	17	14	16	8	15	16	21
	Canopy West	13	17	8	25	22	28	28	9	18	0	35	25	4	8	28	4	15	12	7	13	13	14	12	16	14	14	21
	Canopy South	17	25	21	31	7	36	27	13	0	31	27	32	32	10	34	8	15	17	13	14	12	16	15	10	15	17	21
	Canopy East	19	17	13	30	21	20	30	16	14	27	23	14	37	28	34	17	13	16	15	10	15	15	15	15	16	16	19
Physical Conditions	**Tree Declining**						X			X															X			
	Broken/Dead Limbs									X											X							
	Sparse Foliage																								X			
	Excessive Chlorsis\Necrosis					X			X	X					X										X			
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity																X				X							
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage																				X							
	Diseased																											
	Mistletoe																											
	Leaning					X	X			X	X			X														
	Excessive Water Shoots									X																		
	Surface Roots		X							X																		
	Fire Scar																											
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																											
	Cable/Brace							X											X									
Rating	**Vigor**	B	B	B	A	B	A	A	C	B	A	B	B	A	C	B	C	B	A	B	B	A	A	B	C	B	B	B
	Health	B	A	B	A	B	C	A	C	D	B	A	A	B	B	A	C	B	A	B	D	B	A	B	C	A	A	B
	Aesthetics	B	A	C	A	B	D	A	C	D	C	A	A	C	B	A	C	A	A	C	D	B	B	A	C	B	A	B
	Balance	B	B	D	A	C	E	B	B	E	D	C	B	D	C	A	B	B	A	C	D	B	B	B	C	B	B	B
Impact	**Removal**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Encroached																								X			
	200ft from Grading																X	X	X	X	X	X	X	X		X	X	X
Comments							Fallen tree			Fallen tree																		

	Tree Number	713	714	716	717	718	719	761	762	796	797	798	799	800	801	802	803	805	806	807	808	809	810	813	814	816	817	818
Tree Characteristics	**Species**																											
	Coast Live Oak									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak	X	X	X	X	X	X																					
	Scrub Oak								X																			
	Valley Oak Hybrid							X																				
	Heritage Oak		X																									X
	Trunk Diameter	19	36	30	12.5	16	27	18,14	10,9.5	22	22	21	26	25	24	8,8	11,9,9,9,5	28,14	18,17	15,11,7	14	21,19	16	19	17,9,8,7,6	22,20,18,17,17	21,16,9	37
	Tree Height	35	40	42	25	23	22	26	18	35	30	28	40	40	37	22	30	44	33	37	30	38	26	33	22	41	41	37
	Canopy North	18	23	21	11	18	21	23	15	18	23	19	27	29	30	17	10	22	22	24	0	6	23	17	14	25	25	17
	Canopy West	15	18	23	14	15	15	20	12	15	25	5	27	25	22	16	23	25	23	26	14	11	17	21	16	26	16	22
	Canopy South	19	15	28	12	13	23	22	11	16	24	10	29	15	21	7	25	27	25	26	36	33	15	18	18	36	18	31
	Canopy East	14	13	29	15	16	17	23	17	18	18	22	27	27	29	12	18	24	23	30	17	31	13	18	16	32	20	27
Physical Conditions	**Tree Declining**				X																							
	Broken/Dead Limbs				X																	X	X					
	Sparse Foliage				X																							
	Excessive Chlorsis\Necrosis				X						X	X																
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity		X							X			X	X				X				X		X				X
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation													X														
	Regrown Stump																											
	Exfoliating Bark		X		X							X	X	X										X				
	Insect Damage				X																							
	Diseased																											
	Mistletoe																											
	Leaning																				X							X
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar									X		X	X	X				X						X				
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																					X						
	Cable/Brace																	X	X									X
Rating	**Vigor**	B	A	A	E	B	A	A	A	A	B	B	B	B	A	A	A	B	A	A	C	C	A	A	A	A	A	A
	Health	B	B	A	E	A	B	A	A	B	C	C	B	B	A	A	A	C	A	A	C	C	B	B	A	A	A	A
	Aesthetics	B	B	A	E	A	B	A	B	A	B	C	B	B	A	A	A	B	A	A	C	C	B	A	A	A	A	A
	Balance	A	C	B	E	B	B	A	B	A	B	C	B	B	B	B	B	C	A	A	D	D	C	A	A	A	A	C
Impact	**Removal**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X			
	Encroached																			X						X	X	X
	200ft from Grading																				X	X	X					
Comments																	9 trunks total								7 trunks total			

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	819	821	822	823	824	825	826	828	829	832	833	834	835	836	837	838	839	840	841	842	843	844	845	851	853	854	855
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X																							
	Trunk Diameter	19,19,16,16	17,12,11,9,9	20,20,18,17,12	49,16,13	14,12,10,5	16,4	25,21,18,14	20,15,14,14	21,20,16,15	13,14	8,5	15,14,12,11,10	14	30,20	19	8,6	12	14	11	14,14,10,9	8.5,8	9,5,3	15,14,12,12,11	28,12,10,8	11,11,10,10	12,11,8,8	22,20,19,19
	Tree Height	40	50	48	47	27	35	40	42	40	28	18	37	38	30	27	25	50	40	40	45	33	25	41	44	30	26	38
	Canopy North	28	21	21	30	27	15	27	26	30	13	6	24	20	28	16	17	2	27	16	22	21	19	22	20	25	22	34
	Canopy West	33	25	28	42	18	20	31	19	32	15	8	23	8	40	23	18	22	3	10	32	22	18	23	27	26	5	32
	Canopy South	32	23	31	39	28	14	26	24	33	22	10	24	28	22	28	10	30	5	3	30	8	15	25	27	24	10	28
	Canopy East	36	21	33	25	21	15	27	19	26	17	9	25	21	18	25	3	3	26	7	21	17	17	24	18	25	17	30
Physical Conditions	**Tree Declining**											X															X	
	Broken/Dead Limbs																										X	X
	Sparse Foliage											X															X	
	Excessive Chlorsis\Necrosis											X																
	Mainstem Dieback																											
	Poor tip Growth																										X	
	Cavity														X						X						X	X
	Weak Crotch																											
	Hollow Trunk														X													
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark				X											X												
	Insect Damage																										X	
	Diseased										X	X								X								
	Mistletoe																											
	Leaning															X		X										
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar														X	X						X					X	
	Safety Hazard																											
Measures	**Safety Prune**				X													X										
	Remove Deadwood																										X	
	Cable/Brace								X								X	X										
Rating	**Vigor**	A	A	B	A	A	A	A	A	A	C	B	A	B	B	B	B	A	B	B	A	B	A	A	B	A	D	B
	Health	A	A	B	B	B	A	B	A	A	C	D	A	A	A	B	B	B	B	B	A	B	A	A	B	A	D	B
	Aesthetics	A	A	A	B	A	A	A	A	A	C	D	A	B	B	C	B	B	B	B	A	B	B	A	A	A	D	B
	Balance	A	A	A	B	A	A	B	A	A	C	C	A	C	C	B	D	D	D	D	B	B	B	A	A	A	D	B
Impact	**Removal**			X		X	X	X	X	X															X	X	X	
	Encroached	X			X																			X				X
	200ft from Grading		X								X	X	X	X	X	X	X	X	X	X	X	X	X					
Comments		12 trunks total			LHB			12 trunks total	8 trunks total	8 trunks total			7 trunks total							Oak wilt fungus						12 trunks total		11 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	856	861	862	863	865	867	868	869	870	871	872	873	892	893	894	895	896	897	898	899	900	901	902	903	904	907	908
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak	X				X																						
	Trunk Diameter	42,24,9,6	20,17,17,14	25	21,13,12,12,11	82	16,13,13,12	15,5,5	17,11,9	18,17,15,15	20,16,16	19	17,15,14,14,14	12,7	26,17,16,14,14	17,15,11	13,13	18,9,6	12	11	9,5	12,9,8,6	9,6	0	22	20	19,17,8	10,6,6
	Tree Height	41	41	37	31	39	35	28	30	31	27	30	40	20	41	36	27	35	38	32	22	33	26	20	40	0	37	17
	Canopy North	22	32	20	20	23	21	15	7	23	21	11	30	14	29	23	17	13	21	15	2	15	14	0	20	0	20	14
	Canopy West	21	31	22	17	32	17	20	17	25	23	23	31	12	28	26	22	15	6	1	3	17	10	0	23	0	22	15
	Canopy South	25	30	26	24	33	18	12	23	32	30	24	32	13	20	25	13	23	5	15	23	18	10	0	26	0	27	14
	Canopy East	30	33	25	25	29	19	8	20	30	18	10	29	10	30	20	21	21	16	26	22	16	15	0	24	0	23	14
Physical Conditions	**Tree Declining**	X																										
	Broken/Dead Limbs																											
	Sparse Foliage									X																		
	Excessive Chlorsis\Necrosis									X																		
	Mainstem Dieback																											
	Poor tip Growth	X								X																		
	Cavity	X										X				X									X			
	Weak Crotch		X																									
	Hollow Trunk																											
	Trunk Exudation																										X	
	Regrown Stump																											
	Exfoliating Bark											X																
	Insect Damage							X	X																			
	Diseased					X		X																				
	Mistletoe																											
	Leaning							X													X							
	Excessive Water Shoots																											
	Surface Roots														X													
	Fire Scar	X																										
	Safety Hazard																											
Measures	**Safety Prune**					X					X																	
	Remove Deadwood																											
	Cable/Brace	X	X				X																					
Rating	**Vigor**	C	A	A	B	A	B	C	B	D	B	B	B	B	A	B	B	A	B	B	B	B	B	F	B	F	B	A
	Health	C	A	A	B	B	B	B	B	C	B	B	A	A	A	A	B	A	B	B	B	A	B	F	A	F	A	A
	Aesthetics	C	A	A	B	B	B	B	B	C	B	C	A	B	A	B	C	A	B	C	C	A	C	F	A	F	A	A
	Balance	C	A	A	B	A	B	B	B	B	B	C	A	B	A	B	C	B	C	D	D	B	C	F	C	F	B	A
Impact	**Removal**	X			X	X	X	X	X	X	X							X										
	Encroached			X											X	X	X											
	200ft from Grading		X									X	X	X					X	X	X	X	X	Dead	X	Dead	X	X
Comments			13 trunks total			Canker. LHB			white fly infest-ation		LHB															NT. NTg. NA. DE.		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	910	911	912	913	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	949	951	953	954	957
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X																							
	Trunk Diameter	20	17	7,6,5	42,18, 15	27,6	8,7,4	20,10	19	16	16	31	9,5.5,2.5	25,25	18,15,13,	15,11,10,10	12,4,3	8,7	13,13,10	15,14,10,9	16,15,14,13,9	19,18,15,9,9	26	17,16,16,15,12	17,15,14,13,10	21,20,17,15,15	12	17,15,13,13,11
	Tree Height	47	37	18	42	45	23	36	38	23	31	50	16	45	35	28	27	26	30	35	43	40	40	42	44	40	32	32
	Canopy North	20	24	10	27	23	16	22	25	13	16	32	7	26	23	27	10	14	21	26	28	16	27	26	32	26	9	25
	Canopy West	24	28	9	27	20	8	27	26	10	16	25	10	24	27	26	12	18	16	14	21	22	26	25	15	25	15	26
	Canopy South	27	26	10	17	18	14	27	27	27	13	27	9	27	30	23	22	9	22	10	30	32	21	35	31	31	12	33
	Canopy East	21	25	8	25	15	16	21	16	23	17	27	10	28	18	12	16	7	20	24	24	22	24	24	30	28	12	18
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs														X	X					X							
	Sparse Foliage									X		X		X														
	Excessive Chlorsis\Necrosis												X															
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity														X		X	X	X	X		X			X	X		
	Weak Crotch														X				X		X							
	Hollow Trunk																											
	Trunk Exudation														X													
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage															X				X								
	Diseased											X	X	X								X						
	Mistletoe																											
	Leaning																											
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar														X													
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood														X	X												
	Cable/Brace																					X				X		X
Rating	**Vigor**	B	B	A	B	B	B	A	A	C	A	B	C	B	B	A	A	A	B	B	B	B	A	A	B	B	B	A
	Health	A	A	A	A	B	B	B	A	C	B	C	C	C	C	B	B	A	B	B	B	B	A	A	B	B	B	A
	Aesthetics	A	B	A	A	A	C	A	A	C	B	C	C	B	D	C	B	B	B	B	B	C	A	A	B	A	B	A
	Balance	A	A	A	A	A	C	A	A	C	A	B	C	B	C	B	D	B	B	B	B	B	A	A	B	B	B	B
Impact	**Removal**														X	X	X	X	X	X								
	Encroached																				X							X
	200ft from Grading	X	X	X	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	
Comments																								10 trunks total		8 trunks total		10 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	958	961	962	963	964	965	969	970	971	972	973	974	976	977	978	980	981	986	988	990	991	993	994	995	2222	2246	2317
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X	X															X							
	Trunk Diameter	19,18,15,14	21,20,9,4	25,23	51	36,14	22,14,11,5,4	18,16,15,14	8	19,17,12,10	13	19,4.5	18,8.5	13,12	22	8,6.5,4	17,14,14,12	17,15,14,14	15	21,16,15,14	39	15,12,11,8	28,22,12	21,11,6,5,5	21,19,17,12	15	16	25,17,12,10,2
	Tree Height	41	44	45	40	39	34	45	20	43	37	52	49	27	35	11	35	37	28	45	50	25	44	45	50	28	35	27
	Canopy North	30	21	30	27	17	24	32	12	28	34	20	27	14	25	15	34	12	15	30	37	13	24	25	26	12	14	19
	Canopy West	29	30	31	26	16	23	37	12	15	2	30	30	1	26	2	36	27	22	35	32	25	31	24	34	15	15	20
	Canopy South	27	20	32	18	37	29	32	18	26	3	33	10	30	30	0	15	32	21	27	31	20	33	24	33	7	16	14
	Canopy East	30	27	29	27	31	17	30	6	33	22	21	11	28	20	25	31	32	25	26	31	18	30	17	24	14	15	15
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs		X					X													X							
	Sparse Foliage																					X						
	Excessive Chlorsis\Necrosis																					X						
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity		X		X		X	X												X		X	X		X			
	Weak Crotch		X																			X						
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																					X						
	Insect Damage																											
	Diseased																											
	Mistletoe																											
	Leaning								X		X	X	X	X		X												
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar		X			X	X	X														X	X					
	Safety Hazard																					X						
Measures	**Safety Prune**																								X			
	Remove Deadwood																											
	Cable/Brace		X					X								X				X	X	X						
Rating	**Vigor**	A	A	B	A	A	A	A	B	A	A	A	A	B	A	A	A	A	B	B	A	C	A	A	A	C	A	C
	Health	A	A	B	A	A	A	A	B	A	A	A	A	B	A	B	A	A	B	A	A	C	A	A	A	C	A	C
	Aesthetics	A	A	B	A	A	A	A	C	A	B	B	B	C	B	B	A	A	A	A	A	C	A	A	A	C	A	C
	Balance	B	B	B	B	C	B	C	D	B	D	D	C	D	C	D	B	C	A	B	B	C	B	B	B	D	A	C
Impact	**Removal**	X																									X	
	Encroached		X	X																								
	200ft from Grading				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Comments		9 trunks total						Soil build up at base.									SBB	Total of 9 trunks, SBB		Total of 6 trunks.	Total of 5 trunks.				LHB			Ntg. NA. DE. 6 trunks

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak																											
	Trunk Diameter	12,3,3,2,2	13,12,12	25	14,11,10	11,4	9	15	34	27	14	8	14	20,14,11.5,10	12,9	20	15,8	11	13,10	19	15,13	19	12,8,6	8,8,4	18,12,7	10	13,13,11	14,10,12
	Tree Height	22	28	40	30	24	23	25	26	18	27	19	20	30	22	28	16	18	25	33	28	31	15	20	30	23	41	26
	Canopy North	8	35	15	25	21	6	18	20	12	14	12	0	23	11	18	15	10	17	23	16	17	15	12	17	10	24	17
	Canopy West	13	22	21	18	16	21	20	19	10	16	8	8	24	10	15	12	10	17	17	21	21	12	10	18	6	23	16
	Canopy South	12	12	22	8	3	0	20	20	14	12	6	36	23	11	15	8	11	28	15	20	18	9	10	22	14	21	17
	Canopy East	21	17	25	25	22	2	17	18	15	17	12	10	20	12	18	10	8	10	15	20	6	10	9	17	19	24	15
Physical Conditions	**Tree Declining**												X															
	Broken/Dead Limbs									X			X		X					X								
	Sparse Foliage									X																		
	Excessive Chlorsis\Necrosis																											
	Mainstem Dieback																											
	Poor tip Growth														X			X						X				
	Cavity								X				X	X	X					X	X						X	X
	Weak Crotch									X				X														
	Hollow Trunk								X																			
	Trunk Exudation																										X	
	Regrown Stump																											
	Exfoliating Bark												X		X					X								
	Insect Damage												X		X													
	Diseased																											
	Mistletoe																											
	Leaning												X															
	Excessive Water Shoots												X															
	Surface Roots																				X							
	Fire Scar								X						X				X	X								
	Safety Hazard																											
Measures	**Safety Prune**									X																		
	Remove Deadwood									X			X							X								
	Cable/Brace													X														
Rating	**Vigor**	C	B	B	C	B	B	A	C	C	B	B	B	B	B	B	B	B	B	B	B	B	D	C	B	B	B	B
	Health	C	B	B	C	B	B	B	C	C	B	A	C	B	B	B	B	B	B	B	B	B	D	C	B	B	B	B
	Aesthetics	D	C	B	C	B	C	A	B	C	B	B	D	B	C	B	C	B	B	B	B	B	D	C	C	C	B	C
	Balance	D	C	B	C	B	D	B	C	C	B	C	D	B	C	C	C	B	B	C	C	C	D	C	C	C	B	B
Impact	**Removal**																											
	Encroached			X					X																			
	200ft from Grading	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Comments		Ntg. NA. DE.	Ntg. NA. DE.	Ntg. NA. DE.	Ntg. NA. DE.											Ntg. NA. DE.	Ntg. NA. DE.						NT. Ntg. NA. DE		NT. Ntg. NA. DE	NT. Ntg. NA. DE		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	2345	2346	2347	2348	2350	2351	2353	2354	2424	2455	2458	2461
Tree Characteristics	**Species**												
	Coast Live Oak	X	X	X	X	X	X	X	X	X			
	Valley Oak												
	Scrub Oak										X	X	X
	Valley Oak Hybrid												
	Heritage Oak												
	Trunk Diameter	15,14,10	14	16,6,5	24,15,13	9,7	8.5	17	21	14,11,7,5	8.5,6,4.5,3	8,8,6,6	7,6.5,6.5,5.5
	Tree Height	29	20	23	37	20	16	19	23	25	12	14	15
	Canopy North	17	10	20	25	2	3	13	18	20	15	17	15
	Canopy West	17	10	18	22	11	12	9	19	21	14	15	15
	Canopy South	26	10	10	25	7	12	17	18	18	15	16	10
	Canopy East	25	10	21	18	3	6	12	16	19	12	15	13
Physical Conditions	**Tree Declining**					X	X						
	Broken/Dead Limbs				X	X							
	Sparse Foliage				X	X	X		X				
	Excessive Chlorsis\Necrosis					X	X						
	Mainstem Dieback					X	X						
	Poor tip Growth				X	X	X	X	X				
	Cavity					X	X	X			X		
	Weak Crotch												
	Hollow Trunk												
	Trunk Exudation				X								
	Regrown Stump												
	Exfoliating Bark				X	X		X					
	Insect Damage					X		X					
	Diseased												
	Mistletoe												
	Leaning												
	Excessive Water Shoots												
	Surface Roots												
	Fire Scar					X		X					
	Safety Hazard												
Measures	**Safety Prune**												
	Remove Deadwood				X	X							
	Cable/Brace				X								X
Rating	**Vigor**	C	B	B	D	D	D	C	C	A	A	A	A
	Health	C	B	B	C	D	D	C	C	A	B	A	A
	Aesthetics	C	B	B	C	E	D	C	B	A	A	A	A
	Balance	B	C	B	C	D	C	C	B	A	A	A	B
Impact	**Removal**									X			X
	Encroached								X				
	200ft from Grading	X	X	X	X	X	X	X			X	X	
Comments		NT. Ntg. NA. DE	NT. Ntg. NA. DE										8 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4007	4009	4018	4022	4101	4108	4109	4110	4111	4113	4114	4118	4122	4123	4124	4125	4131	4132	4133	4149	4152	4155	4156	4157	4158
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									X
	Trunk Diameter	6,6,5,5,4	13	8	7,6,4	19,17,12,11	13	14,9	10	28,13	11	15,11,10	11	16,6,4.5	23,10	32	26,16,16	17,11	15	32	15,5,4,3,3	18,16,13,13	0	17,13	12,11,9,8,7	41
	Tree Height	23	25	23	25	37	25	40	18	40	15	25	23	24	30	32	28	22	22	41	21	37	20	35	28	41
	Canopy North	12	16	20	17	31	16	25	0	15	11	18	15	21	21	22	0	15	14	21	16	16	0	17	7	14
	Canopy West	12	16	13	11	33	16	10	0	21	12	16	17	17	23	27	0	17	13	20	17	23	0	23	20	18
	Canopy South	13	17	8	11	30	17	16	0	27	12	2	12	23	23	26	0	14	15	30	16	24	0	26	18	6
	Canopy East	11	17	13	17	30	17	14	0	27	9	14	11	12	22	25	0	13	11	30	16	20	0	19	20	21
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs																X									
	Sparse Foliage									X																
	Excessive Chlorsis/Necrosis															X	X									
	Mainstem Dieback																									
	Poor tip Growth																									
	Cavity					X				X	X	X		X				X								
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation													X												
	Regrown Stump																									
	Exfoliating Bark										X				X		X									
	Insect Damage	X				X					X	X														
	Diseased																									
	Mistletoe														X											
	Leaning																									
	Excessive Water Shoots																									
	Surface Roots															X										
	Fire Scar					X					X	X		X				X								
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood																									
	Cable/Brace							X		X																
Rating	**Vigor**	B	B	B	B	B	B	B	F	B	B	B	A	C	C	C	F	B	B	A	B	A	F	A	B	B
	Health	C	A	B	B	A	A	B	F	B	B	B	A	C	C	B	F	B	B	A	B	A	F	A	B	B
	Aesthetics	B	B	B	B	B	B	B	F	C	C	C	A	C	C	B	F	B	B	A	B	A	F	A	B	B
	Balance	B	B	B	B	B	B	C	F	B	C	C	B	C	C	C	F	B	B	A	B	B	F	B	C	C
Impact	**Removal**			X	X								X	X	X	X										
	Encroached	X								X																
	200ft from Grading		X			X	X	X	Dead		X	X					Dead	X	X	X	X	X	Dead	X	X	X
Comments		Multiple trunks.		Soil build up at base.																					Soil build up at base.	

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4159	4160	4161	4162	4163	4164	4165	4166	4167	4168	4169	4170	4171	4172	4174	4175	4176	4177	4178	4179	4180	4181	4182	4183	4184
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									
	Trunk Diameter	33	13,12	34,12,5	21	15,11	13.5,11	19,11,6	15,12,12,11	25	21,15	19,13	24,20	16,10	24	19,12,12,11,9	17,11.5,10	13.5,6.5	22,16	15,12,12,6.5	15,11.5	21,21,20,12.5	24	13,7,7,6,5.5	32	18,18,17,9.5
	Tree Height	32	18	30	40	30	35	35	31	43	40	38	45	28	43	35	31	25	35	34	30	29	42	28	36	43
	Canopy North	13	10	27	22	12	15	15	17	25	15	19	25	15	27	25	17	15	25	21	10	30	24	25	26	27
	Canopy West	14	15	29	23	21	14	21	20	21	8	19	16	16	14	25	20	10	27	21	21	32	26	17	25	22
	Canopy South	18	17	28	20	17	16	20	21	22	17	14	30	10	28	29	23	9	29	24	15	40	24	20	23	31
	Canopy East	19	13	31	18	3	11	18	24	22	15	10	20	28	25	28	27	16	18	20	17	30	25	24	26	32
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs						X				X															
	Sparse Foliage											X														
	Excessive Chlorsis/Necrosis						X							X												
	Mainstem Dieback													X												
	Poor tip Growth										X			X												
	Cavity			X		X	X			X	X									X	X	X				
	Weak Crotch						X																			
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark			X		X			X		X							X								
	Insect Damage					X					X							X								
	Diseased																									
	Mistletoe																									
	Leaning																				X					
	Excessive Water Shoots																									
	Surface Roots																									
	Fire Scar					X	X				X										X	X				
	Safety Hazard																									
Measures	**Safety Prune**																		X					X		
	Remove Deadwood																									
	Cable/Brace						X													X						
Rating	**Vigor**	B	C	A	B	C	C	B	C	B	D	C	A	C	B	A	B	C	B	B	B	A	A	B	A	A
	Health	B	B	B	B	C	C	B	C	B	C	C	A	D	A	B	A	B	A	B	B	A	A	A	A	A
	Aesthetics	B	B	A	B	C	D	B	B	A	D	C	A	C	B	A	B	C	A	B	C	A	A	B	A	A
	Balance	B	B	B	B	D	D	B	B	A	C	C	B	C	B	B	B	B	B	B	C	A	A	B	B	B
Impact	**Removal**			X											X	X	X	X	X	X	X	X	X	X	X	
	Encroached																									X
	200ft from Grading	X	X		X	X	X	X	X	X	X	X	X	X												
Comments																			LHB	Soil build up at base.				LHB		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4194	4195	4196	4198	4199	4200	4201	4202	4203	4205	4206	4207	4208	4209	4211	4212	4214	4215	4216	4217	4218	4219	4220	4247	4248
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									
	Trunk Diameter	26,22	22,8,3	14,13	13,13	21,6,5	12,11	15,6	10,6,4.5,4	16	8	8.5	14,11.5,11	19,7,5.5	8,8,8,7.5,7.5	7.5,6.5,6.5	18,12,10	14	12.5,10	10	13.5	13	11.5	8	16,14,13,7.5	12,11
	Tree Height	40	19	21	31	40	27	28	21	36	22	17	30	27	24	25	40	22	25	20	22	26	22	13	40	25
	Canopy North	21	15	11	18	21	13	15	5	23	14	9	21	28	15	7	12	11	10	13	17	7	7	0	20	0
	Canopy West	24	6	15	19	20	21	22	15	22	11	0	20	16	17	18	16	8	19	5	2	4	16	0	21	28
	Canopy South	22	10	16	20	20	17	19	16	16	2	0	16	19	5	16	15	5	12	6	4	26	17	0	21	18
	Canopy East	25	10	8	14	22	12	20	11	20	8	12	18	28	12	17	19	13	16	9	16	11	10	0	23	14
Physical Conditions	**Tree Declining**			X								X														
	Broken/Dead Limbs		X	X								X				X	X									
	Sparse Foliage			X	X							X														
	Excessive Chlorsis/Necrosis			X																						X
	Mainstem Dieback		X																							
	Poor tip Growth			X																						
	Cavity		X	X					X						X	X	X	X		X						X
	Weak Crotch								X				X			X										
	Hollow Trunk																	X								
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark											X														
	Insect Damage			X													X									
	Diseased																									
	Mistletoe																									
	Leaning													X			X			X	X	X	X			X
	Excessive Water Shoots																									
	Surface Roots					X				X																
	Fire Scar		X	X													X	X								
	Safety Hazard		X									X														
Measures	**Safety Prune**		X	X													X									
	Remove Deadwood		X	X																						
	Cable/Brace			X									X				X									
Rating	**Vigor**	A	B	D	C	B	A	A	B	A	A	D	C	B	A	A	A	B	A	A	A	A	A	F	B	B
	Health	A	B	C	B	B	A	A	B	A	B	C	C	A	B	A	A	B	A	A	A	A	A	F	A	C
	Aesthetics	A	D	D	C	A	A	A	B	A	B	D	C	A	B	B	B	B	A	C	C	C	C	F	B	C
	Balance	B	D	C	B	A	B	A	B	B	C	D	B	B	C	C	B	B	B	C	D	C	D	F	B	D
Impact	**Removal**																	X	X	X	X	X	X	Dead		
	Encroached						X																			
	200ft from Grading	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X								X	X
Comments																										

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4249	4250	4251	4253	4263	4264	4265	4266	4272	4273	4274	4275	4276	4285	4286	4287	4288	4289	4290	4291	4293	4294	4295	4296	4297
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak														X											
	Trunk Diameter	22	13,10,9,6	14,11,5.5,5,3	12,9,8	15,4	11	11.5,8,7	10,8.5,8.5,5	12.5,6,5,5	16,14,13	13,7	12	20	45	8,6	9.5,5	14,9	16,14,6.5,4	10.5	12,10.5,10	12,12	13	18,11.5,11.5	22,21,6.5,5	14,14
	Tree Height	35	24	20	30	27	21	18	37	22	30	20	30	32	50	15	18	35	41	20	28	1	20	42	27	22
	Canopy North	17	15	16	16	16	12	17	25	25	27	12	12	23	33	12	14	22	18	1	22	0	12	28	21	17
	Canopy West	16	24	17	8	12	13	10	24	23	25	8	8	24	30	5	8	26	26	11	18	0	14	25	23	15
	Canopy South	27	22	18	16	15	10	9	14	22	23	9	20	27	27	11	2	12	23	13	13	0	13	17	27	12
	Canopy East	18	13	12	17	13	8	13	16	20	18	18	22	22	30	13	10	17	21	12	13	0	12	27	20	15
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs									X	X															
	Sparse Foliage																			X			X			X
	Excessive Chlorsis/Necrosis											X								X			X			X
	Mainstem Dieback																						X			
	Poor tip Growth																									
	Cavity				X						X			X												
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark																			X						
	Insect Damage				X																					
	Diseased																									
	Mistletoe																									
	Leaning																									
	Excessive Water Shoots																									
	Surface Roots						X	X							X								X			X
	Fire Scar				X																					
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood																									
	Cable/Brace														X											
Rating	**Vigor**	A	B	B	B	B	B	B	A	A	B	B	B	B	A	B	B	A	A	C	A	F	C	A	B	C
	Health	A	B	B	B	A	B	B	A	A	B	C	B	B	A	B	B	A	A	D	B	F	C	A	B	C
	Aesthetics	A	B	B	B	B	B	C	B	A	B	C	C	B	A	C	C	A	A	D	A	F	D	A	A	C
	Balance	B	B	B	C	B	D	C	B	A	B	B	C	B	C	C	C	B	A	D	B	F	C	C	B	C
Impact	**Removal**																								X	X
	Encroached										X															
	200ft from Grading	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	Dead	X	X		
Comments										16 trunks total																

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4298	4299	4300	4301	4302	4303	4304	4305	4306	4307	4308	4309	4310	4311	4312	4313	4314	4315	4316	4318	4319	4320	4321	4322	4323
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																						X			
	Trunk Diameter	14	11,8	17,13	10	13,9,8	10,6,4	10,3	9,2.5	10,10	23,22,21,19	22,14	34,28,27	20	34,14,12,9,7.5	32,29,25,22	18,16,15,13,10	11,10,10,8	23,10,3.5	31,16	17,16,16,15,5	27	83	22,19,10,7,7.5	9	15
	Tree Height	8	23	32	23	28	18	25	27	22	40	55	47	33	44	50	38	21	41	37	38	21	57	39	14	35
	Canopy North	3	16	20	13	12	7	9	12	17	24	25	34	5	25	30	27	22	10	28	25	10	30	28	12	20
	Canopy West	6	14	17	10	19	15	21	15	8	36	30	40	35	27	30	30	11	12	14	28	11	27	24	13	15
	Canopy South	7	18	17	8	18	14	15	9	4	40	32	37	22	38	14	33	19	27	17	24	12	40	25	1	16
	Canopy East	4	12	32	11	16	16	16	10	22	41	40	0	0	7	33	29	23	31	18	30	30	29	27	3	15
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs	X				X												X	X			X				
	Sparse Foliage							X		X									X							
	Excessive Chlorsis/Necrosis				X			X		X									X							
	Mainstem Dieback																									
	Poor tip Growth																									
	Cavity	X								X							X									
	Weak Crotch									X	X															
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump	X																								
	Exfoliating Bark	X																				X				
	Insect Damage	X				X				X								X								
	Diseased																									
	Mistletoe																									
	Leaning										X		X	X								X			X	X
	Excessive Water Shoots					X																X				
	Surface Roots			X			X								X	X										
	Fire Scar																X									
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood										X							X				X				
	Cable/Brace					X				X	X							X			X		X			
Rating	**Vigor**	C	B	A	B	B	C	C	B	C	A	A	B	B	C	A	B	B	B	A	B	A	A	A	C	A
	Health	D	A	B	C	C	B	C	B	C	A	B	B	B	C	A	B	C	C	A	B	B	A	B	C	B
	Aesthetics	D	B	B	C	D	B	C	B	D	B	B	C	C	B	A	C	C	C	B	A	D	A	A	D	C
	Balance	D	B	B	B	D	C	D	C	D	C	C	C	D	C	C	C	D	C	B	C	D	B	B	D	C
Impact	**Removal**	X	X																							
	Encroached			X							X	X	X	X	X	X								X	X	
	200ft from Grading				X	X	X	X	X	X							X	X	X	X	X	X	X			X
Comments											9 trunks total				6 trunks total											

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4324	4325	4326	4327	4328	4329	4330	4331	4333	4334	4336	4340	4341	4342	4343	4344	4345	4346	4351	4352	4353	4361	4363	4364	4366
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X		X	X												X	X	
	Valley Oak									X			X	X	X	X	X	X	X	X	X	X	X			
	Scrub Oak																									X
	Valley Oak Hybrid																									
	Heritage Oak					X			X																	
	Trunk Diameter	32,27,18,10,10	7,5,2.5,2.5	8	15.5	42	23,17,16	18,16,12,8	42,24,11	23	10.5	9	33	15	22	15	22	20	11	14.5	15.5,9	26	17,16	12,11,10	18	7,5
	Tree Height	41	20	19	23	39	29	30	42	42	25	25	30	25	33	33	33	33	15	25	23	22	35	29	23	11
	Canopy North	35	11	8	14	18	26	24	22	22	15	11	27	12	20	11	15	17	2	15	17	15	23	16	13	10
	Canopy West	29	12	10	17	16	23	16	38	36	8	4	19	14	15	17	12	15	8	10	15	14	25	20	16	10
	Canopy South	33	8	11	14	27	31	17	24	30	1	10	21	12	5	13	23	20	15	17	16	20	20	2	15	2
	Canopy East	30	5	9	13	33	25	28	20	22	12	12	28	13	13	11	13	17	5	13	17	18	26	15	16	6
Physical Conditions	**Tree Declining**																							X		
	Broken/Dead Limbs						X		X													X		X		
	Sparse Foliage																							X		X
	Excessive Chlorsis/Necrosis																							X		
	Mainstem Dieback								X																	
	Poor tip Growth																							X		
	Cavity								X													X				
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark					X			X																	
	Insect Damage																									
	Diseased																									
	Mistletoe																									
	Leaning						X																			
	Excessive Water Shoots																									
	Surface Roots										X															
	Fire Scar								X																	
	Safety Hazard																									
Measures	**Safety Prune**						X																			
	Remove Deadwood																									
	Cable/Brace						X										X						X			
Rating	**Vigor**	A	B	A	A	B	A	A	B	A	A	B	A	B	A	B	B	A	B	B	A	B	A	E	A	C
	Health	A	B	B	B	C	B	B	C	A	B	B	B	B	B	B	B	B	C	B	A	B	A	E	A	C
	Aesthetics	A	B	B	A	B	C	A	B	A	C	B	A	B	B	B	B	A	D	A	B	C	A	E	A	C
	Balance	B	B	B	B	B	D	B	C	A	D	B	B	B	C	B	B	B	D	B	B	C	A	E	A	D
Impact	**Removal**				X	X	X	X	X	X	X	X								X	X	X	X	X		X
	Encroached		X	X																						
	200ft from Grading	X											X	X	X	X	X	X	X						X	
Comments																										

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4368	4376	4377
Tree Characteristics	**Species**			
	Coastal Live Oak		X	X
	Valley Oak			
	Scrub Oak	X		
	Valley Oak Hybrid			
	Heritage Oak			
	Trunk Diameter	6.5,6	8	12,7,9,8
	Tree Height	10	8	15
	Canopy North	5	7	10
	Canopy West	4	7	10
	Canopy South	12	7	10
	Canopy East	6	7	10
Physical Conditions	**Tree Declining**			
	Broken/Dead Limbs			
	Sparse Foliage	X		
	Excessive Chlorsis/Necrosis			
	Mainstem Dieback			
	Poor tip Growth			
	Cavity			
	Weak Crotch			
	Hollow Trunk			
	Trunk Exudation			
	Regrown Stump			
	Exfoliating Bark			
	Insect Damage			
	Diseased			
	Mistletoe			
	Leaning			
	Excessive Water Shoots			
	Surface Roots			
	Fire Scar			
	Safety Hazard			
Measures	**Safety Prune**			
	Remove Deadwood			
	Cable/Brace			
Rating	**Vigor**	C	B	B
	Health	C	B	B
	Aesthetics	C	C	B
	Balance	C	D	D
Impact	**Removal**	X	X	X
	Encroached			
	200ft from Grading			
Comments				NT. Ntg. NA. DE.

APPENDIX B

Oak Tree Maps

APPENDIX C

Richard Johnson and Associates' Letter Summarizing Fire Damage to Trees within Homestead and Potrero Valley Projects

Richard Johnson & Associates
Environmental Horticulture

801 Glenneyre Street, Suite D, Laguna Beach, CA 92651
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October 31, 2007

Mr. Cris Perez
Newhall Land
23823 Valencia Blvd.
Valencia, CA 91355

RE: **Fire Damaged Trees within Homestead and Potrero Valley Projects/ Fallen Tree in Newhall Ranch Trail Area**

Dear Mr. Perez:

Pursuant to your request, we have completed an inspection of four (4) oak trees located in the referenced location. These trees were inspected on 10-30-07. The following is the result of this inspection:

Observations- Three of the following trees were observed to have been damaged in recent fires during the month of October 2007. These trees were also partially pruned and cut by local fire fighting crews during the fire containment process. One tree was observed to have fallen over due to weakened structure from a previous fire. Specific notes, recommendations, photographic documentation and basic location maps are detailed within this report.

Homestead Project

- Tree **#963**-*Quercus agrifolia*-The main trunk of tree failed, broke away at the base and fell across the road to the northeast. Tree was subsequently cut-up by the fire department and removed from road. Tree had a pre-existing hollow base that was further weakened by fire. No further action is recommended. It is likely that the remaining trunk will continue to grow in the form of crown sprouting.

- Tree **#990**-*Quercus agrifolia*- One of the three main trunks failed and broke away at the base and fell toward the adjacent road to the east. Tree was subsequently cut-up by the fire department during the fire containment process. Tree has a pre-existing hollow trunk base that was weakened by fire. The remaining portion of the tree will survive with no further action. A portion of the lower canopy sustained only heat damage to existing foliage. If a target (pedestrian, structure, vehicular traffic etc..) is ever created under this tree, it should be considered a liability due to structural weakness and removed.

Potrero Project

- Tree **#4715**- *Quercus agrifolia* -Many of the main limbs have failed and broken away from the main trunk. These limbs were subsequently cut up by the fire department during the fire containment process. The entire trunk and main limbs are hollow due to previous fire damage. The recent fire burned the interior of pre-existing hollow sections and further weakened the trunk and limb attachments resulting in catastrophic limb failures. This tree is located adjacent to a ranch house and a highly traveled road and should be considered a liability at this time. It is highly recommended that the tree be removed due to the danger to existing targets.

No number *Quercus lobata* in Newhall Ranch Trail Area, Approximate 29" DBH:

- Neither tree, nor any other tree in the general vicinity, has any identifying tags. The DBH measurement of this tree is an estimate due to the position of tree as it lies on a hillside. The main trunk of the tree failed, broke away at the base and fell across the road to the north. Tree had a pre-existing hollow base that weakened its structure. Trunk failure is most likely due to extremely high winds that occurred in the area in the month of October 2007. No further action is recommended. It is likely that the remaining trunk will continue to grow in the form of crown sprouting.

Report Photographs:

#963

#963 Trunk base

#990 Cut trunk

#990 Canopy

#990 Trunk base

#4715 Canopy

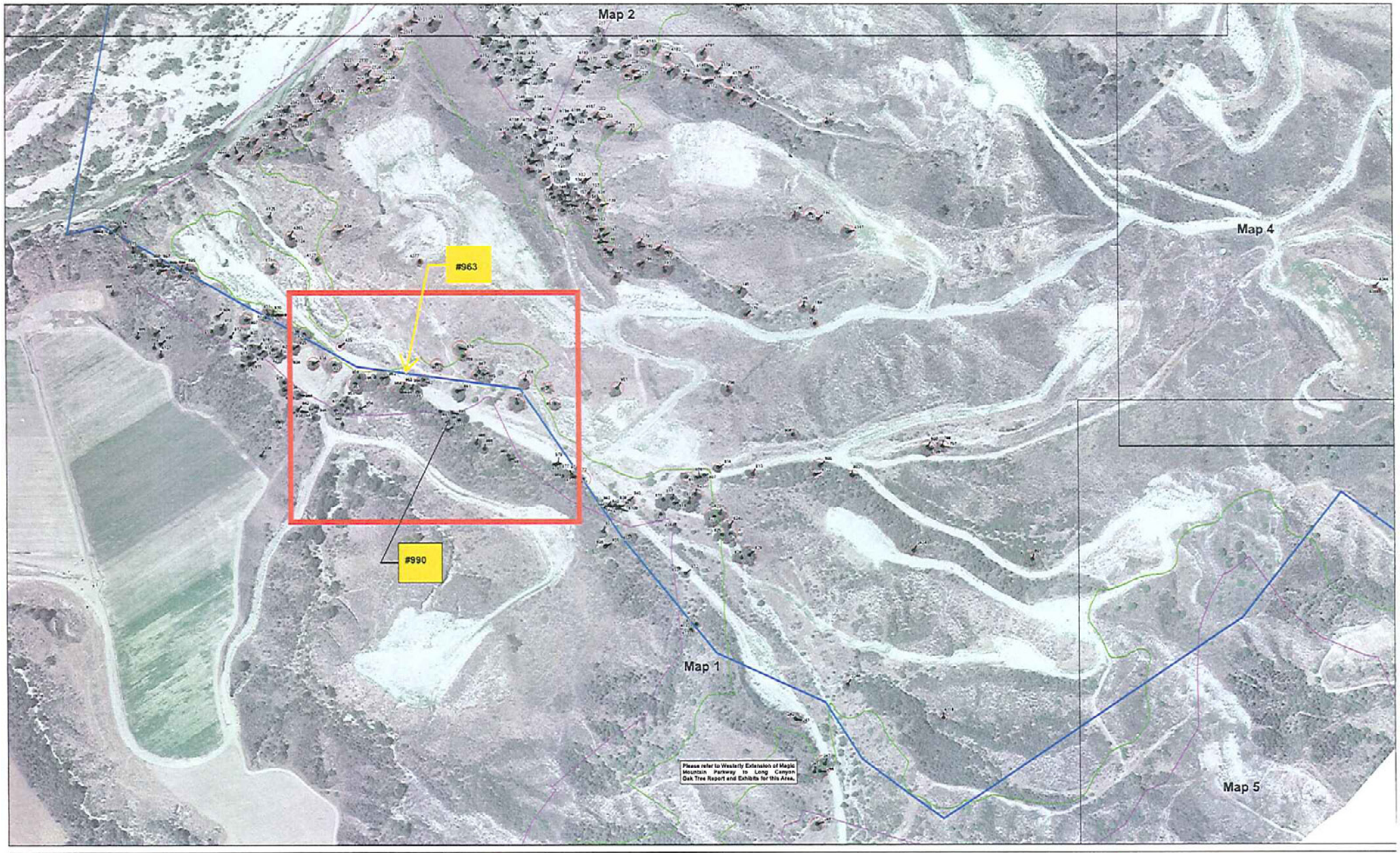
#4715 Base

#4715

No number *Quercus lobata* -

No number *Quercus lobata* – Trunk view

Location maps for tree #'s 963 and 990. Although Mission Village Project maps have been used for reference, these two trees are located within the Homestead Project boundary. One map is an overview and one is a detail view.



0 125 250 500 750 1,000 Feet

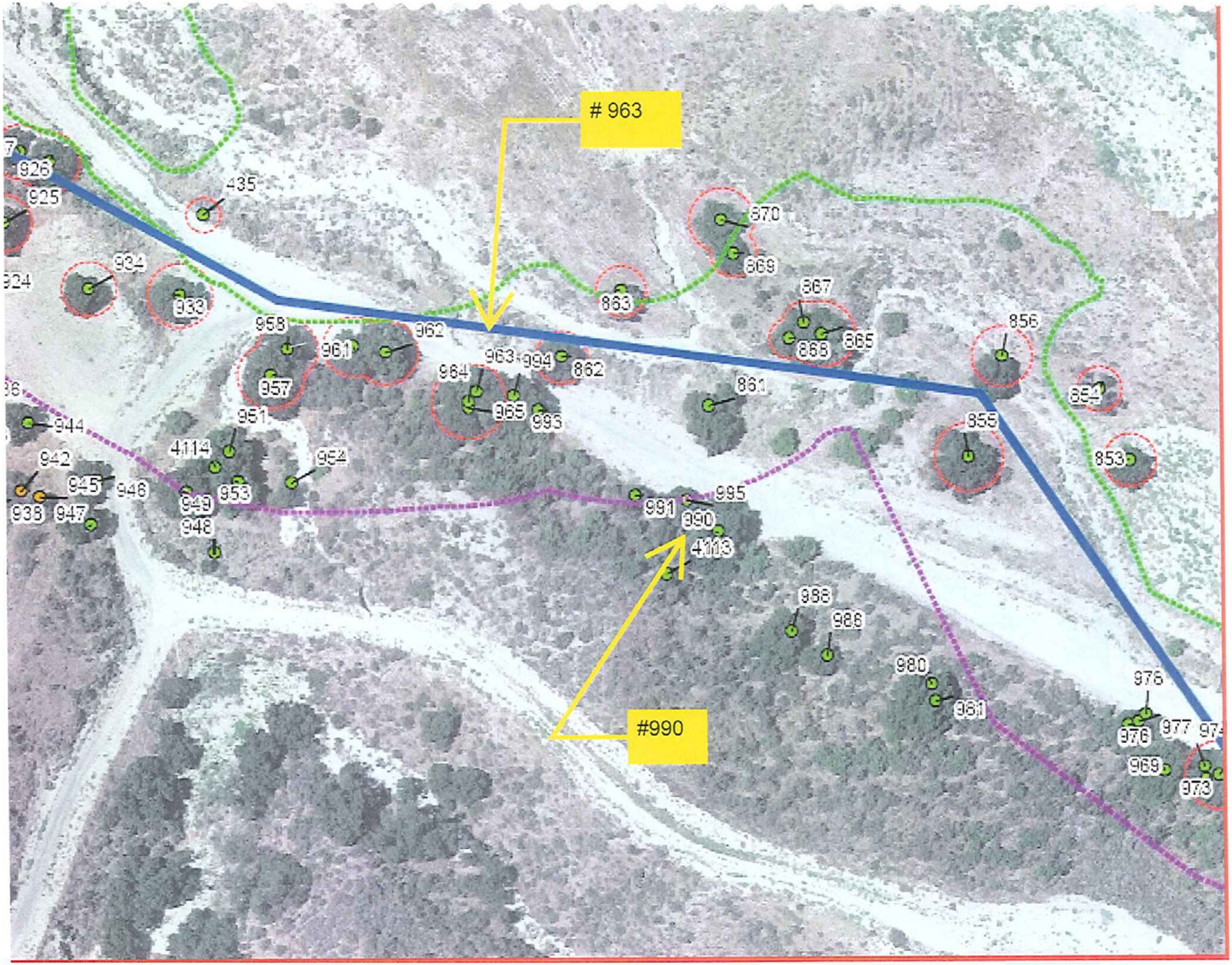
MAP INDEX

Coast Live Oak (Q. agrifolia)
Valley Oak (Q. lobata)
Scrub Oak (Q. berberidifolia)
Valley Oak Hybrid (Q. x lobata)
Tree Protective Zone
Mission Village Boundary
200 ft. Grading Limit Line
Grading Limit Line
Map Grid (Map 1-5)

Please Note: Areas in white are outside the high resolution imagery coverage.

Figure 5: Mission Village Project Oak Tree Survey Exhibits

Map 1 of 5


963
#990
926
925
435
934
933
958
961
962
957
963
994
862
964
965
993
863
870
869
867
868
865
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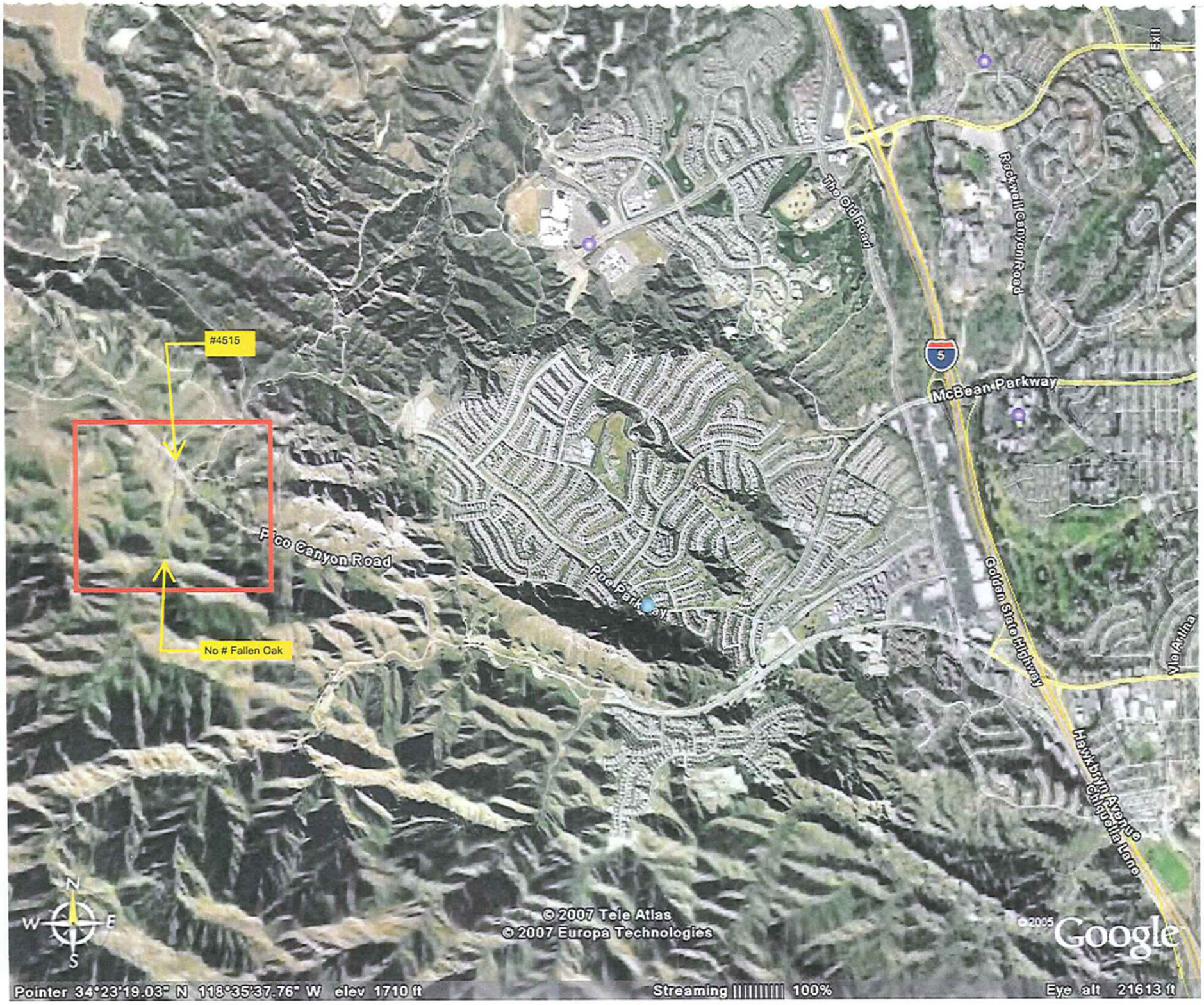
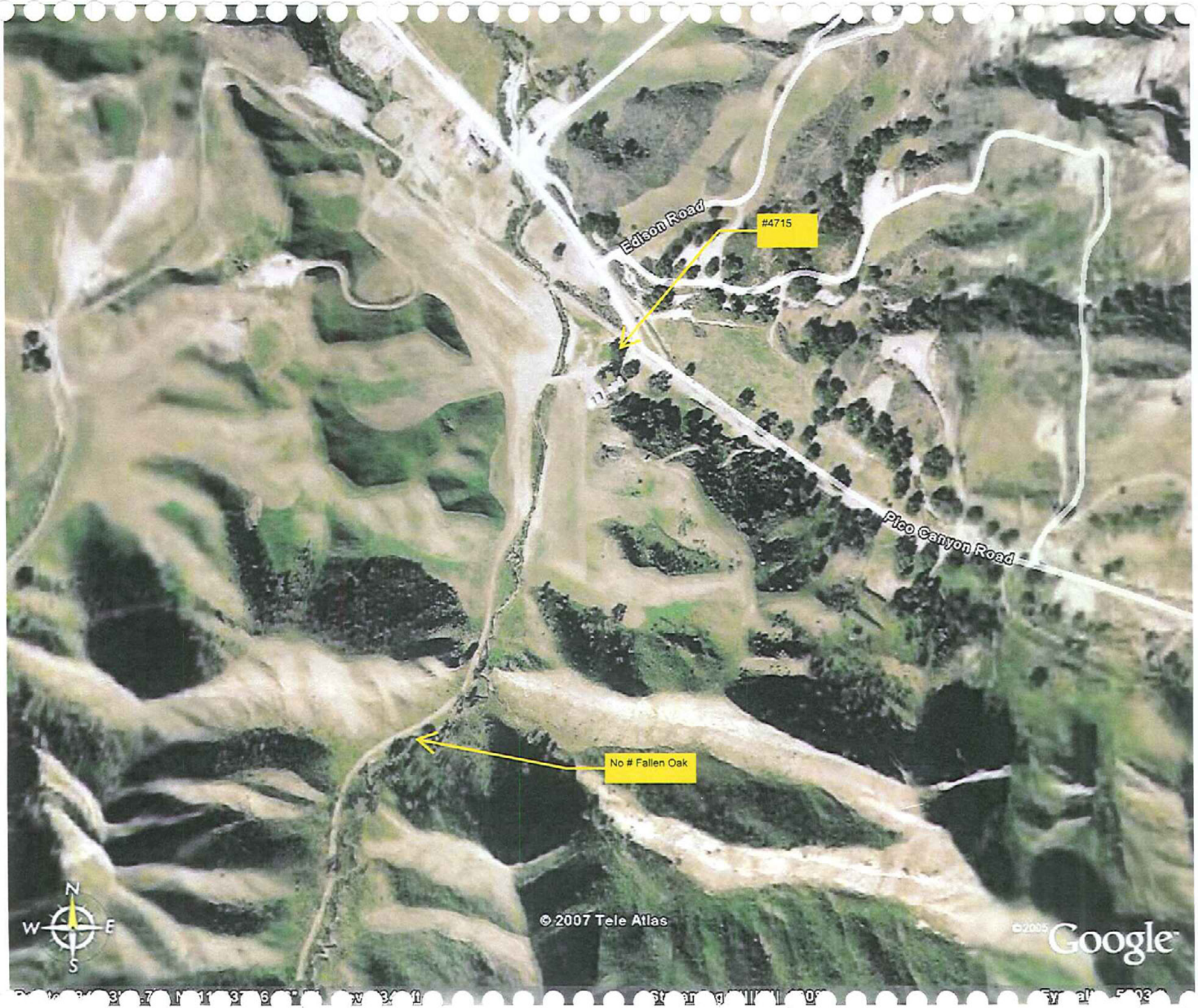
951
4114
954
949
953
948
991
995
990
4113
988
986
980
981
976
977
969
973

Location maps for tree # 4715 and no number *Quercus lobata*. The location of the *Quercus lobata* is approximate. One map is an overview and one is a detail view.


#4515
No # Fallen Oak
Pico Canyon Road
Poe Parkway
The Old Road
Rockwall Canyon Road
McBean Parkway
Golden State Highway
Hawkbryn Avenue
Chiquella Lane
Via Anina
Exit
5
© 2007 Tele Atlas
© 2007 Europa Technologies
©2005 Google
N
W
E
S
Pointer 34°23'19.03" N 118°35'37.76" W elev 1710 ft
Streaming 100%
Eye alt 21613 ft


Edison Road
#4715
Pico Canyon Road
No # Fallen Oak
N
W
E
S
© 2007 Tele Atlas
©2005 Google

Give us a call if you have any questions and/or comments.

Respectfully submitted by
RICHARD JOHNSON & ASSOCIATES, INC.

Dick Johnson
Resource Monitor

cc: Bill Romo - LACO

APPENDIX D

Richard Johnson and Associates' Boxing Specifications and Recommendations

Richard Johnson & Associates
Environmental Horticulture

801 Glenneyre Street, Suite D, Laguna Beach, CA 92651
P.O. Box 127, Laguna Beach, CA 92652
Ph. (949) 497-4248 • Fx. (949) 497-6440

January 31, 2006

Mr. Glenn Adamick
NEWHALL LAND
23823 Valencia Blvd.
Valencia, CA 91355

RE: **Landmark Village Oak Tree Boxing Specifications and Recommendations**

Dear Mr. Adamick:

Below are the boxing specifications and recommendations you requested for use in the Landmark Village Oak Tree Report.

Phase 1- Pre-Boxing Procedure Recommendations

1. First and most importantly, any and all candidate trees will be treated with the biostimulant product **IRON ROOTs** at a blended ratio of one gallon of product to 100-gallons of water. Hydro-inject this mixture in increments of 25-gallons(100 gallons per tree) into the root zone on all sides (4-points of the compass) of each tree to be boxed. Implement this action as soon as possible so product can be absorbed prior to excavation, at least one month prior to any perceived construction impact.

2. Apply the anti-desiccant product *Cloudcover* or equal 48 hours prior to side boxing per label instructions.

3. It is also highly recommended that all trees to be relocated be pre-watered prior to side boxing and relocation. Unless weather conditions are favorable

with periods of moderate rainfall in the months leading up to relocation, trees should be pre-watered two to three times prior to excavation. The last application should be made 48 hours prior to side boxing. The water should be applied at a slow rate to facilitate soil infiltration to a depth of at least four (4) feet. Application of water can be made using a water truck and hose.

4. Prune by removing all deadwood. **Do not remove any live tissue/branches greater than 2-inches., without a permit from the Forester.**

Phase 2- Oak Tree Side Boxing and Bottom Boxing Recommendations

1. Excavate the root ball of each tree in a manner that accommodates as much of the roots as possible and so root ball fits snugly in a square box with sloping and/or tapered sides.

2. Construct a soil berm around the inside edge of the box sides with cross dams to direct water into root ball. Also construct a soil berm 1 foot outside the trunk to prevent excess water from contacting trunk base. It is recommended that the root ball surface within the excavation be disturbed as little as possible. **Do not excavate soil surface within the boxed root ball to create watering basins**. Soil from side boxing excavation should be used for watering basin berms. Do not cover native soil grade with fill soil.

3. Box sides shall be made of one or two layers of ¾-inch plywood, or planks, one to 2-inches thick and reinforced with exterior bracing.

4. Two of the sides will be wider than the others and will have cleats along the vertical edges to hold the other two sides in place. Insert steel rods through and between the cleats to hold the four sides securely against the root ball. The root ball can then be undercut and the boards can be inserted to form the box bottom.

5. An option to using the steel rods, if tree weight is not too heavy, is to use steel straps (banding). Three bands will be needed around the sides and three around the bottom to secure the box.

6. No sooner than ninety (90) days after the above detailed side boxing, undercut the root ball, similar to using the rods. Secure the bottom to the box by banding the box with a minimum of two straps – install straps from top around the bottom in two places. A total of five bands should be needed.

7. Water needs will be dictated by both visual inspection and data obtained via optional soil moisture sensor readings.

8. Root ball soil moisture must be monitored on a weekly basis during winter months and daily during hot summer months.

9. An irrigation system is recommended. Otherwise, boxed trees will have to be hand-watered, via irrigation hose. An irrigation system should include a series of bubbler heads, placed in each corner of each tree box, to ensure even distribution of water.

10. Once the boxed trees are placed in the holding area, apply a 3-inch layer of oak leaves or coarse mulch atop the root ball area.

11. It is highly recommended that native soil from side box excavation be stored in a holding area to be used for backfill when replanting takes place.

Phase 3 - Planting Recommendations

Rooting patterns are determined by soil characteristics and growing practices as well as by species. Urban planting sites can prove extremely harsh for newly transplanted trees. Hardscape, such as paving and buildings, can greatly increase air temperature and radiation intensity. These conditions can make it difficulty for tree root systems to supply enough water to adequately support their tops or crowns. Thinning of the top growth, to balance with the root system, is often necessary to assist native plant recovery. Frequent watering and sturdy anchor staking will be needed.

1. When trees are transplanted, place the root ball one foot above grade to allow for any settling. Form a slope from root ball surface to grade with backfill soil. This will also reduce drainage problems. Surface to drain away from root ball.

2. Backfill tree with native surface soil from site or excavation soil saved from original tree boxing. **Do not use excavated soil from construction grading for backfill**.

3. Avoid planting tree in soil that has been compacted for construction. If there is absolutely no other alternative and tree is to be planted in soil compacted for construction, tree will need supplemental drainage installed and a wider planting pit. Do not cover native soil grade with fill soil.

4. Planting pit should be at least 4 feet wider than the root ball. All inside surfaces of the planting pit should be scarified to avoid creation of soil interface.

5. Form a basin around the root ball with cross dams and keep the root zone area wet.

6. Form the basin at the outer root ball edge so irrigation waters will be forced to percolate into the soil interface with the root ball and backfill, not just through the root ball. This is important as the root ball will consist mostly of porous soil and the possibility of an interface problem can prove critical to oak tree survival.

Follow-up Maintenance for Planting & Boxed Oak Trees

The following recommendations are given for newly planted specimen oak trees.

1. **All** trees require a basin formed at outer edge of root ball.

2. Form a cross dam for each basin to control applied irrigation.

3. Apply a consistent 3-inch layer of coarse mulch atop root ball. Keep mulch away from trunk by 10 to 12-inches. Do not allow mulch to cover root crown.

4. Apply **first irrigation** with a solution of product **Mycorrhiza ROOTs** at a ratio of one-16-ounce bag of product to 100-gallons of water. Flood/thoroughly drench each tree basin root ball and root zone area with resulting mixture, or enough to penetrate and wet sides of root ball and native soil of each tree.

5. **Second irrigation** apply **IRONROOTs** product only at a ratio of 32-ounces of product to 100-gallons of water. Inject in 25-gallon increments at the four points of the compass in each tree basin, or flood basin with the same amount.

6. After three months apply the product **Mycorrhiza ROOTS** to the root zone area.

Positive drainage is a critical component if trees are to survive. Positive, quick drainage is a must to ensure that soil remains damp, and not wet with standing water.

Fill basin with water. If water does not drain within one hour consider drilling holes through the pit bottom into native soil to a depth of 3-feet. Auger size should be no less than 2-inches in diameter. Backfill augered holes with ¾" crushed rock. Do not use pea gravel.
If you have any questions please, do not hesitate to give us a call.

RICHARD JOHNSON & ASSOCIATES, INC.

Dick Johnson
Resource Monitor

Impact Sciences, Inc., "Mission Village VTTM 61105 Project Oak Tree Report, Los Angeles County, California" (2006)

Mission Village VTTM 61105 Project

Oak Tree Report

Los Angeles County, California

Prepared for:

The Newhall Land and Farming Company
23823 Valencia Boulevard
Valencia, California 91355

Prepared by:

Impact Sciences, Inc.
803 Camarillo Springs Road, Suite A
Camarillo, California 93012
(805) 437-1900

December 2006

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1.0 EXECUTIVE SUMMARY

Total Number of Oak Trees Surveyed 511 (100%)

Total Number of Dead Trees Surveyed.....16 (3%)

Total Number of Oak Trees Planned for Removal (147 non-heritage + 13 heritage) 160 (31%)

Total Number of Oak Trees That May be Encroached
During Grading Activities (50 non-heritage + 3 heritage) 53 (10%)

Total Number of Oak Trees That Occur within 200 Feet From Grading Limit Line
and Would Not be Removed or Encroached.....282 (55%)

Total Number of Oak Trees that Would Require a County of Los Angeles Oak Tree
Permit (Removed+Encroached).....**213 (42%)**

2.0 INTRODUCTION

Pursuant to the Los Angeles County Oak Tree Ordinance, removal or damage of any tree of the oak genus (*Quercus*) that is 25 inches in circumference (8 inches in diameter), or has a combined trunk circumference of any two trunks of at least 38 inches (12 inches in diameter), as measured 4.5 feet above the mean natural grade (i.e., diameter at breast height [DBH]), is unlawful without a permit (Ordinance 88-0157 1, 82-0168 2, Section 22.56.2050, 1988). Damage is defined as any act causing or tending to cause injury to the root system or other parts of an oak tree, including, but not limited to, burning, application of toxic substances, operation of equipment or machinery, paving, changing of natural grade, and trenching or excavating (i.e., encroached) within the protective zone (the area within the dripline of an oak tree and extending to a point at least 5 feet outside the dripline, or 15 feet from the trunk[s] of a tree, whichever distance is greater) of an oak tree.

An oak tree that has a trunk DBH equal to, or greater than, 36 inches is considered a heritage tree, as defined in the Los Angeles County Oak Tree Ordinance.

2.1 Purpose

As required by the County of Los Angeles and pursuant to Section 22.56.2090 of the Los Angeles County Code, the purpose of this oak tree report is to provide information to the County on oak trees that may be removed or damaged/encroached by the development of the Mission Village VTTM 61105 project. The parameters used to evaluate each tree that was surveyed are described on the following pages under heading **3.0, METHODS**. A spreadsheet showing data collected for each oak tree surveyed is provided in **Appendix A**.

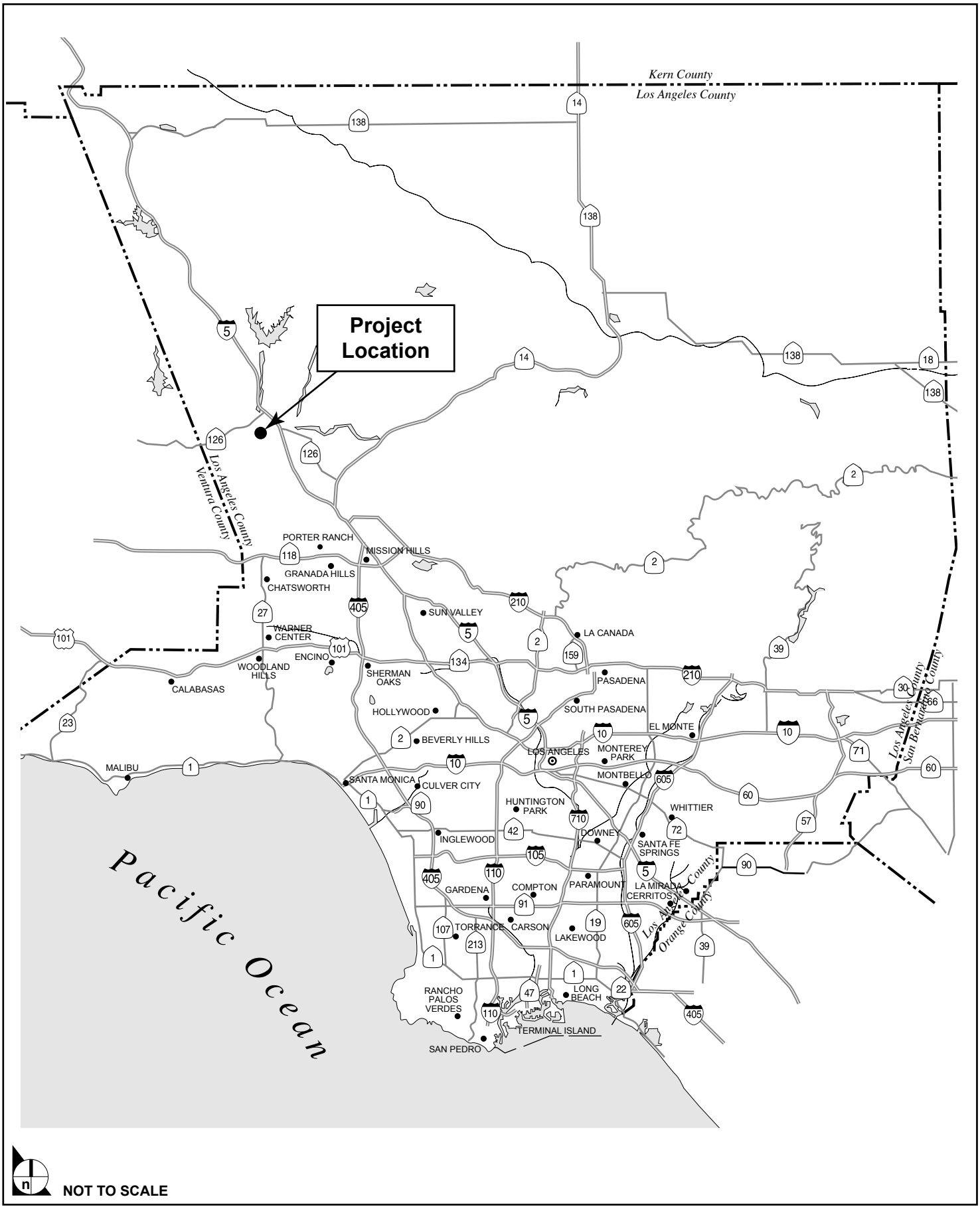
2.2 Site Location and Project Description

The project site is located in an unincorporated portion of northwestern Los Angeles County, approximately 30 miles northwest of downtown Los Angeles, in the Santa Clarita Valley. The project site is part of the approved Newhall Ranch Specific Plan, which was adopted by the Los Angeles County Board of Supervisors on May 27, 2003. The Specific Plan will guide the long-term development of the 11,963-acre Newhall Ranch community, including the goals, policies, and objectives of the County of Los Angeles General Plan and Santa Clarita Valley Area-wide Plan. The Specific Plan is regulatory in nature and serves as the zoning for Newhall Ranch.

The project grading is consistent with, and implements the Specific Plan's approved Conceptual Grading Plan, and the applicable Specific Plan Design Guidelines (Specific Plan Chapter 4, Section 4.8) for grading and hillside management. In Addition, the environmental efforts of grading the entire Specific Plan site were evaluated as part of the certified Newhall Ranch Specific Plan Program EIR.

The project boundary comprises 1,252.2 acres, of which approximately 868 acres would be disturbed by proposed development. The project site is bounded to the north by California State Highway 126 and the Travel Village RV Park; to the west by the remaining undeveloped portions of Newhall Ranch planned for future residential and commercial uses; to the south and southwest by vacant property proposed for residential and commercial uses [i.e., the proposed Legacy Village (Stevenson Ranch Phase V]); and to the east by the Six Flags Magic Mountain theme park, beyond which is Interstate 5. A regional location map (**Figure 1, Regional Location**) and a site vicinity map (**Figure 2, Vicinity Map**) illustrate the project site in a regional and local context, respectively. Currently, oak woodland, coastal sage scrub, chaparral, and grassland dominate the vegetation cover on the project site.

The project proposes to convert the approximately 868 acres of land into 5,331 residential units, approximately 1,299,000 square feet of non-residential/mixed-use space, elementary school site, library private recreation centers, and a network of landscaped trails, walkways and open space. The project boundary is shown on **Figure 3, Mission Village VTTM 61105 Project Boundary and Grading Limit Line**. The project also includes introduced oak woodlands to serve as mitigation for impacted and/or removed oak trees.

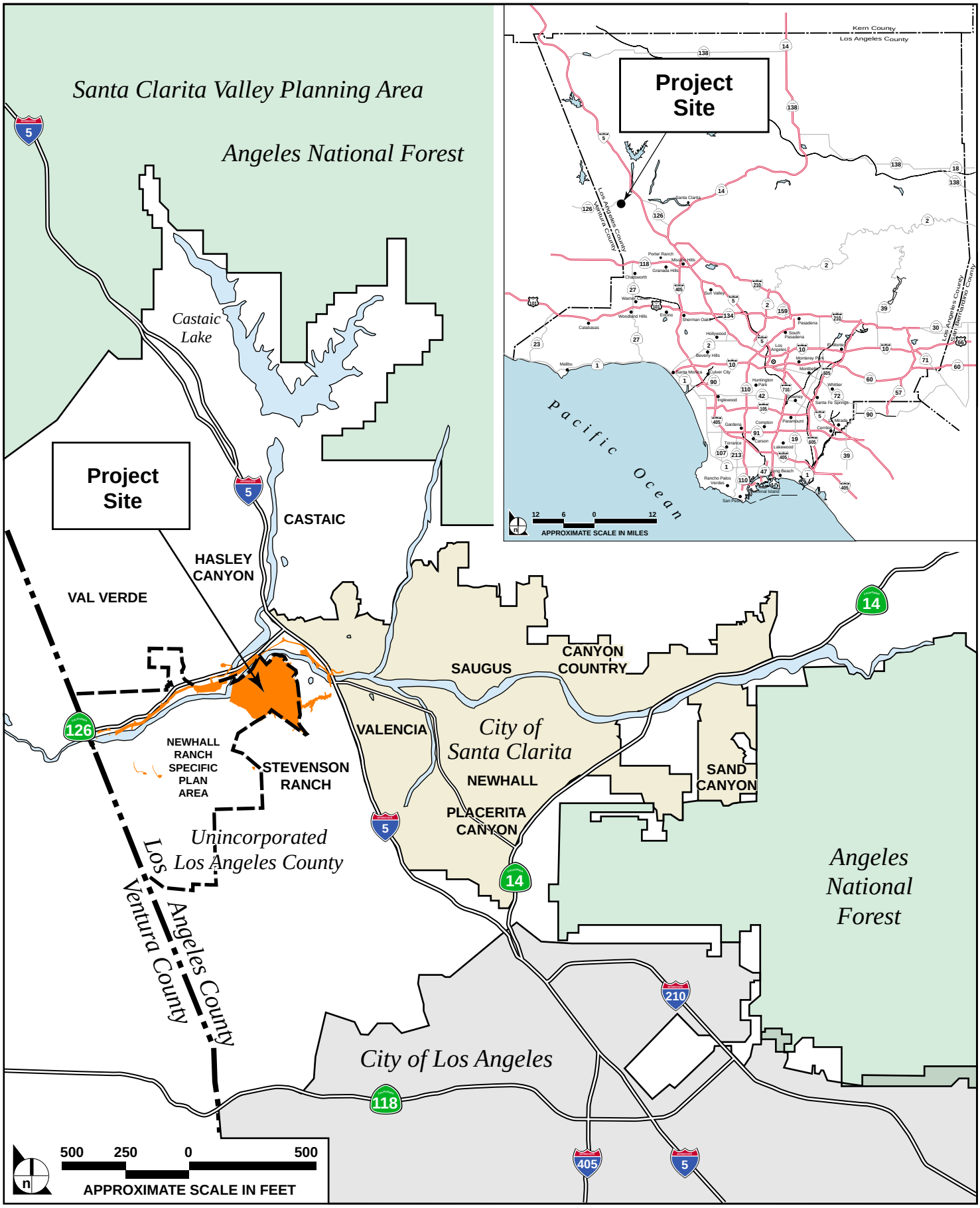


SOURCE: Impact Sciences, Inc. – February 2006

FIGURE **1**

Regional Location

32-99T•02/06

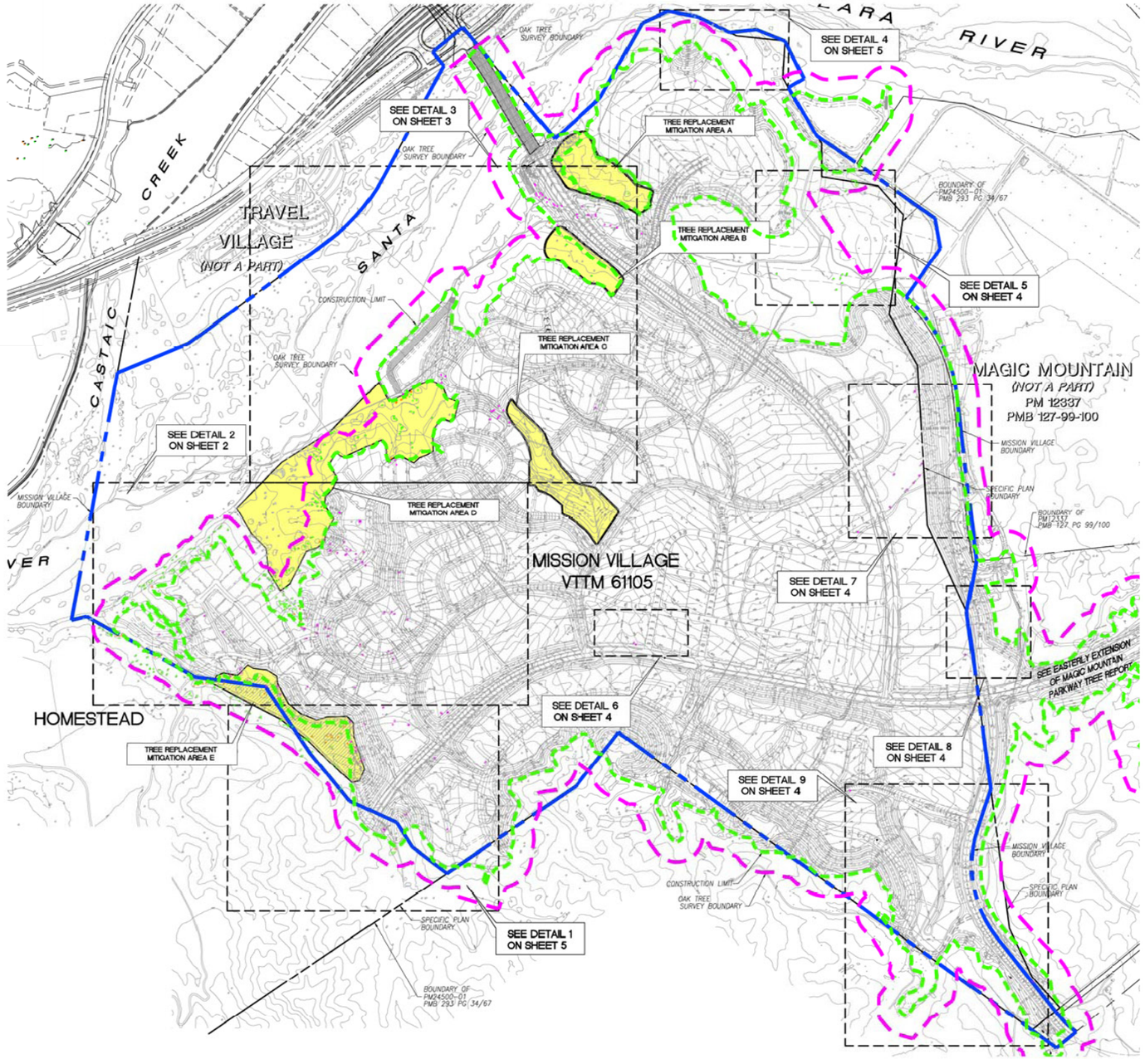


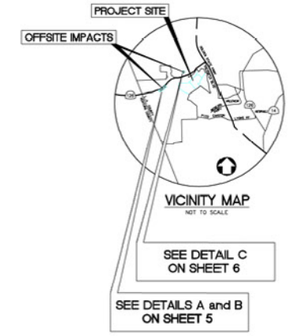
SOURCE: Impact Sciences, Inc. – April 2005

FIGURE **2**

Site Vicinity

32-99•11/06





LEGEND:

- SPECIFIC PLAN BOUNDARY PM24500-01 BOUNDARY
- EXISTING LOT LINE PER PM24500-01
- CONSTRUCTION LIMIT
- 200' FROM CONSTRUCTION LIMIT LINE
- MISSION VILLAGE BOUNDARY

OAK TREE LEGEND:

- OAK TREE – NO IMPACT
- OAK TREE – ENCROACHED
- OAK TREE – REMOVAL
- OAK TREE – GREATER THAN 200 FT FROM GRADING LIMITS
- TREE REPLACEMENT MITIGATION AREA

LEGAL DESCRIPTION:

PARCELS 11, 12, 13, 14, 15, 21, 22 OF PARCEL MAP NO. 24500–01 PMB 293 PG 34 / 67, RECORDS OF LOS ANGELES COUNTY.

SURVEY NOTE:

TREE SURVEY DATA COLLECTION PERFORMED BY IMPACT SCIENCES APRIL 2006

450 225 0 450

APPROXIMATE SCALE IN FEET

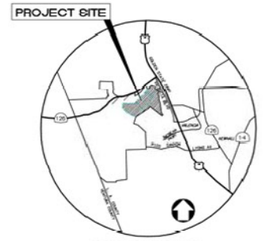
SOURCE: PSOMAS – December 2006

FIGURE **3**

Mission Village VTTM 61105 Project Boundary, Grading Limit Line, and Overview Map

32-99T•12/06

A full-size reproduction of this figure can be found at Impact Sciences.



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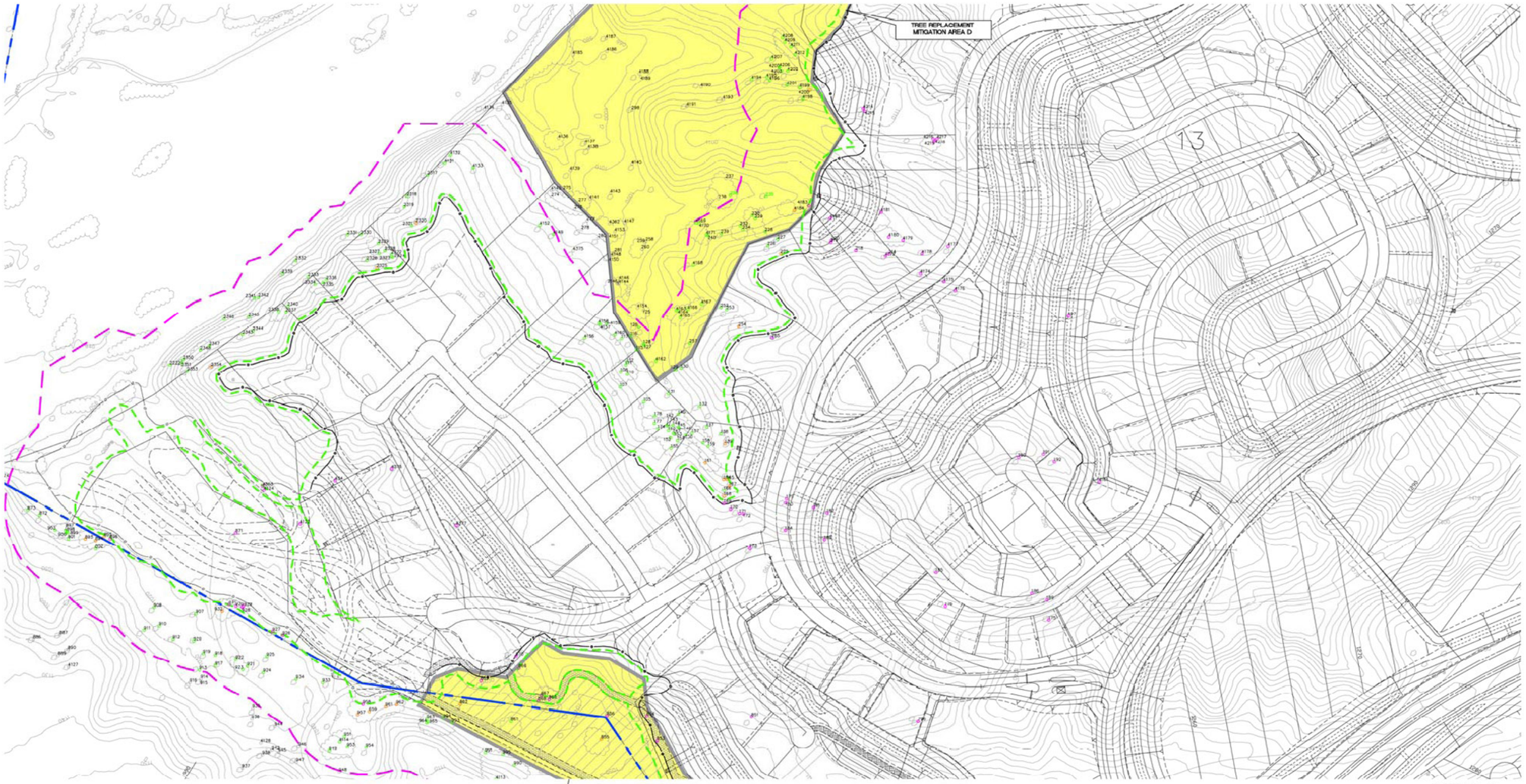

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SURVEY NOTE:

TREE SURVEY DATA COLLECTION
PERFORMED BY IMPACT SCIENCES
MARCH, 2004

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INCHES
1 1/2 0 1 2

OAK TREE LEGEND:

- OAK TREE – NO IMPACT
- OAK TREE – ENCROACHED
- OAK TREE – REMOVAL
- OAK TREE – GREATER THAN 200 FT FROM GRADING LIMITS

LEGEND:

- SPECIFIC PLAN BOUNDARY PM24500-01 BOUNDARY
- EXISTING LOT LINE PER PM24500-01
- CONSTRUCTION LIMIT
- 200' FROM CONSTRUCTION LIMIT LINE
- MISSION VILLAGE BOUNDARY
- TREE REPLACEMENT MITIGATION AREA

VTTM 61105
MISSION VILLAGE
OAK TREE REPORT

PSOMAS

DATE: 12/6/2006 REVISED ON:
JOB No: 1NRC0120.02 SHEET 2 OF 6

NEWHALL RANCH.

ME028-02.DWG

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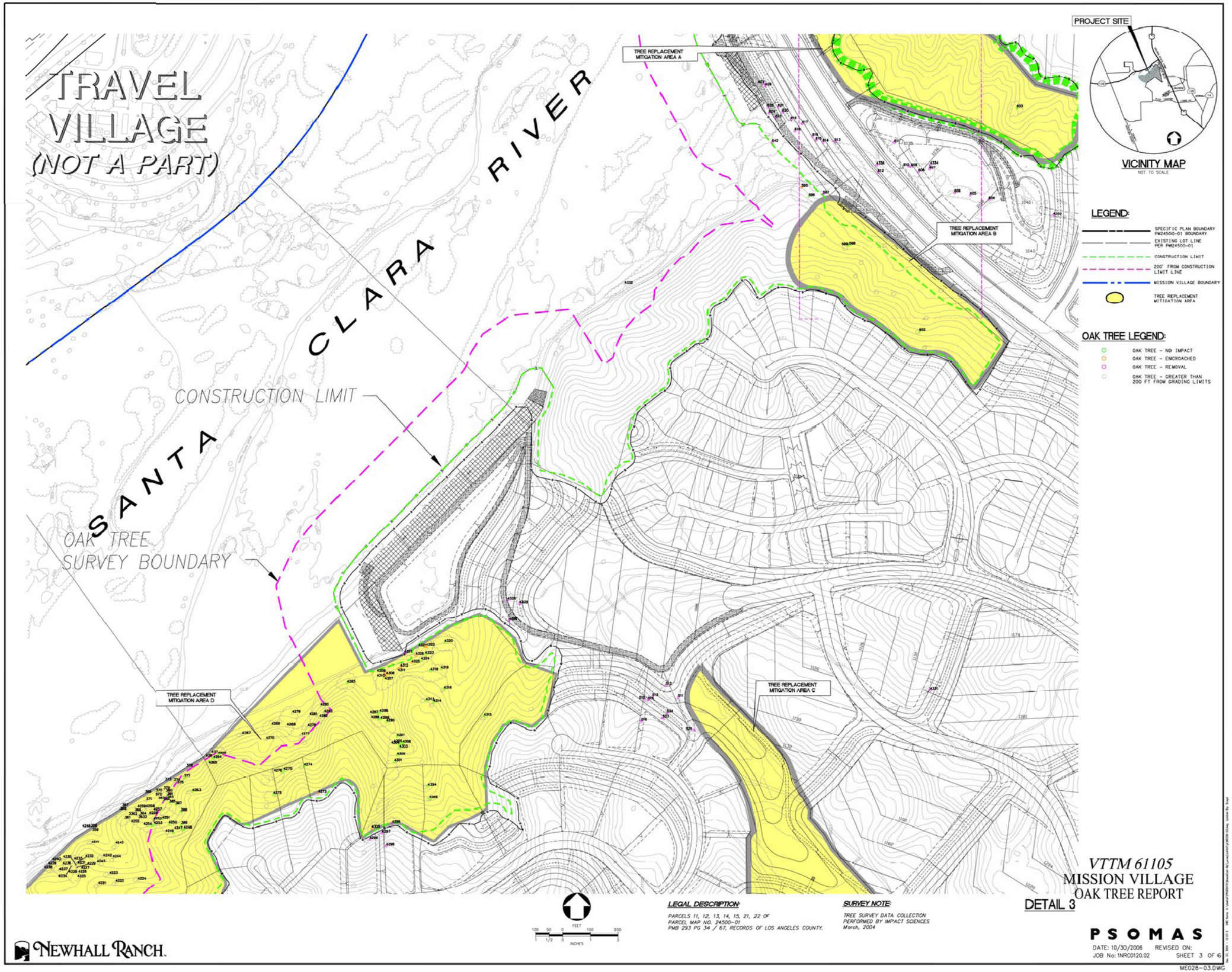

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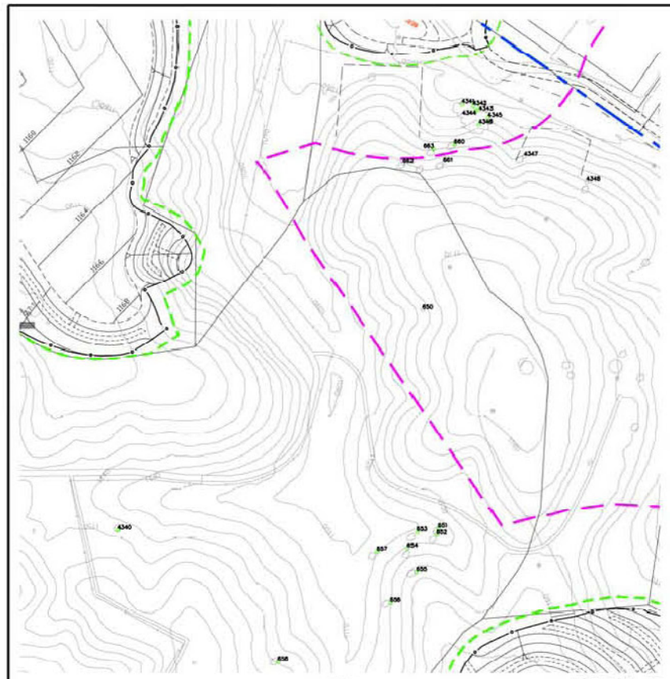

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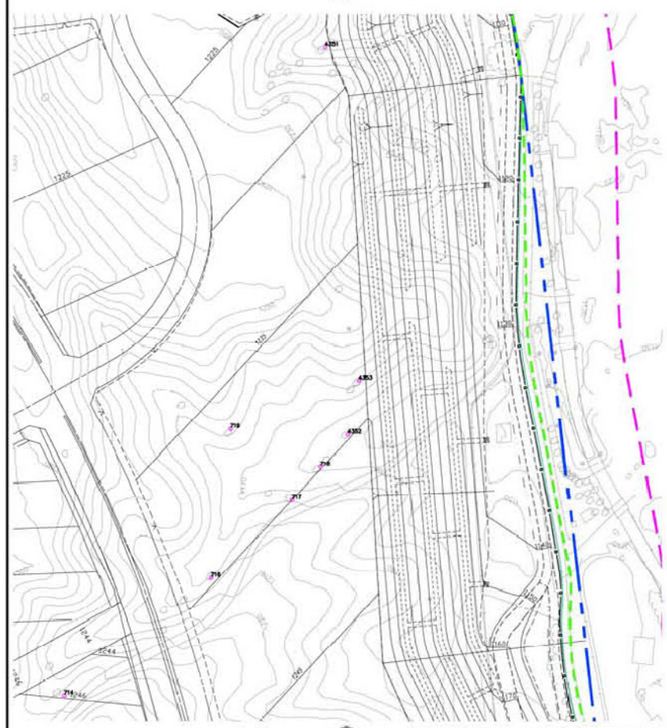
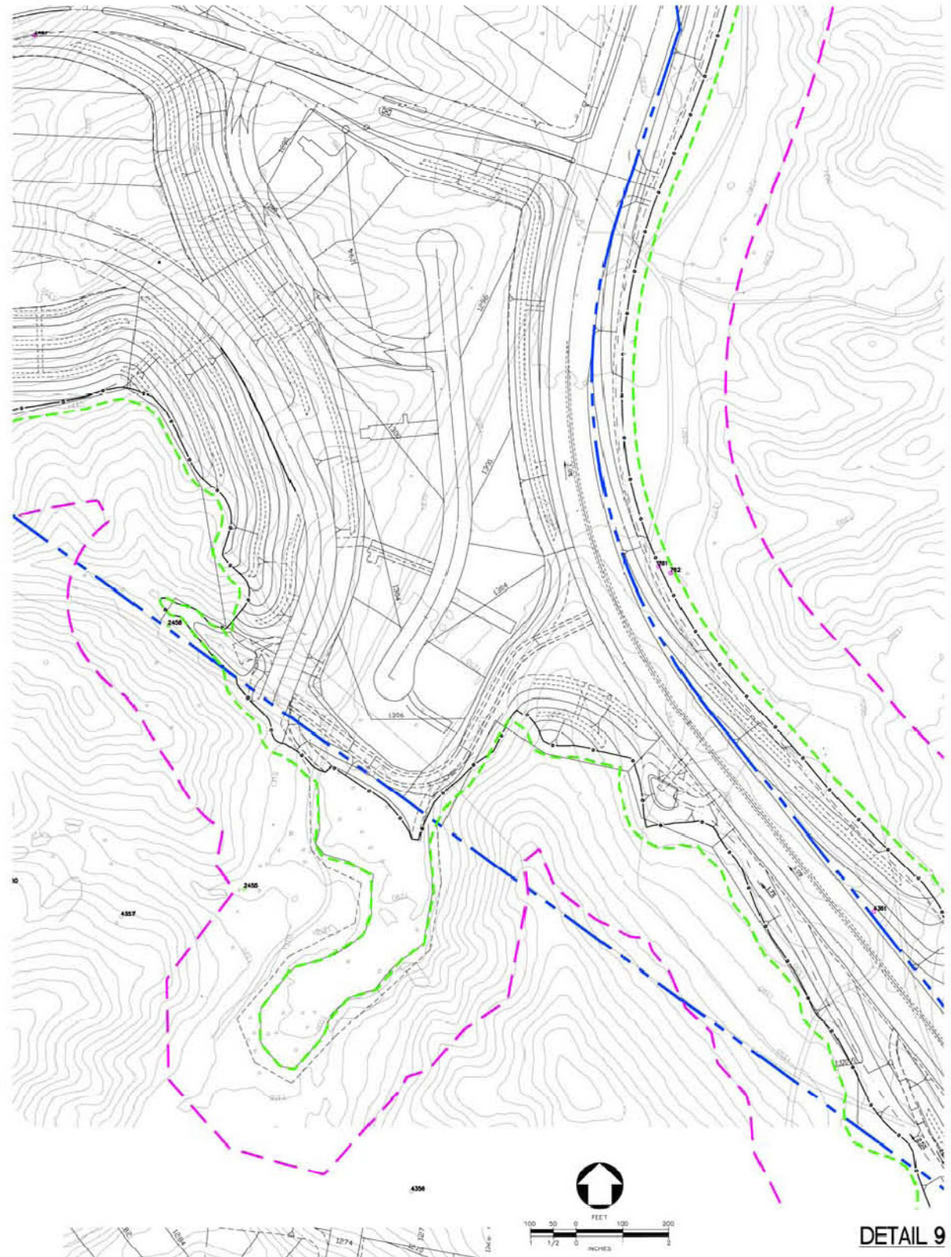


DETAIL 7

DETAIL 6



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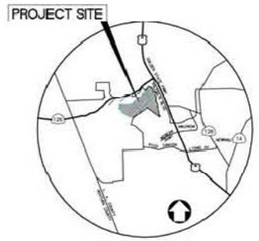

VICINITY MAP

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LEGAL DESCRIPTION:

PARCELS 11, 12, 13, 14, 15, 21, 22 OF
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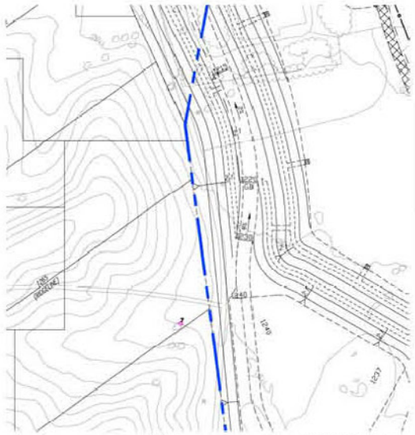

DETAIL 8

LEGEND:

- SPECIFIC PLAN BOUNDARY PM24500-01 BOUNDARY
- EXISTING LOT LINE PER PM24500-01
- CONSTRUCTION LIMIT
- 200' FROM CONSTRUCTION LIMIT LINE
- MISSION VILLAGE BOUNDARY
- TREE REPLACEMENT MITIGATION AREA

OAK TREE LEGEND:

- OAK TREE - NO IMPACT
- OAK TREE - ENCROACHED
- OAK TREE - REMOVAL
- OAK TREE - GREATER THAN 200 FT FROM GRADING LIMITS

NEWHALL RANCH

VTTM 61105
MISSION VILLAGE
OAK TREE REPORT

PSOMAS

DATE: 10/30/2006 REVISED ON:
JOB No: 1NRC0120.02 SHEET 4 OF 6

ME028-04.DWG

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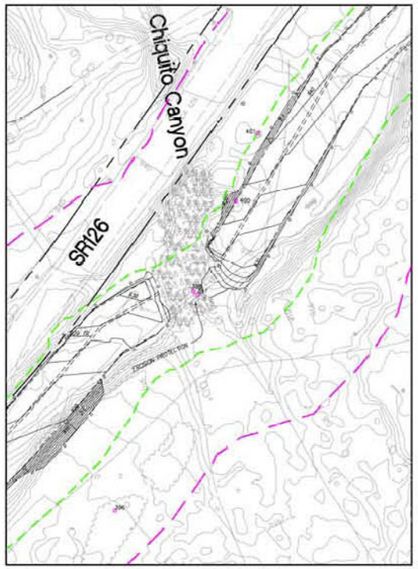

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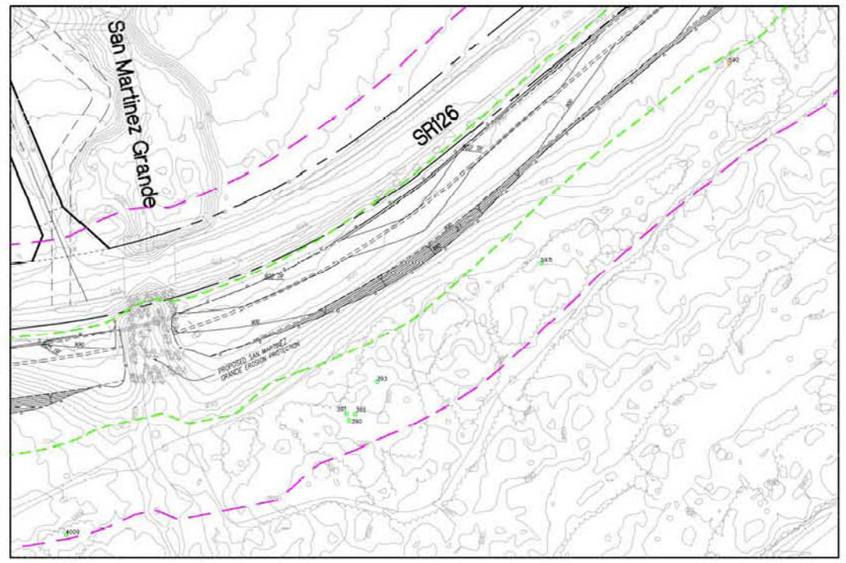

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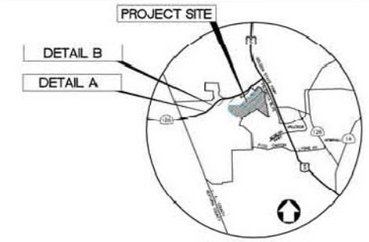

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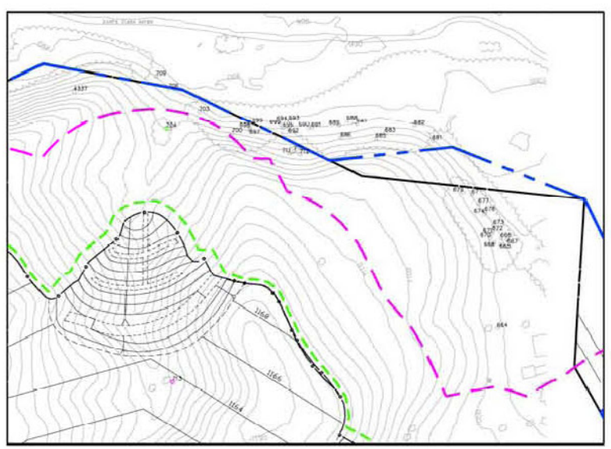

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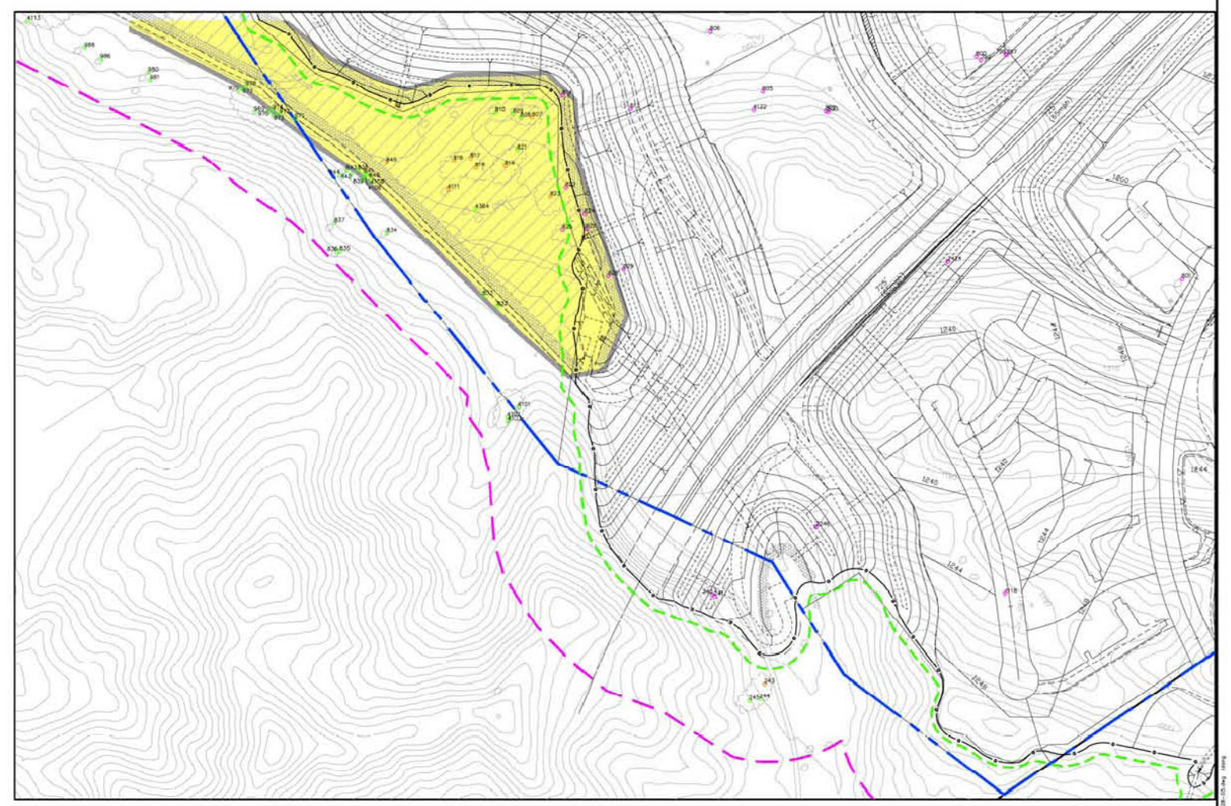

DETAIL 1

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PMB 293 PG 34 / 67, RECORDS OF LOS ANGELES COUNTY.

SURVEY NOTE:

TREE SURVEY DATA COLLECTION
PERFORMED BY IMPACT SCIENCES
MARCH, 2004

LEGEND:

- SPECIFIC PLAN BOUNDARY PM24500-01 BOUNDARY
- EXISTING LOT LINE PER PM24500-01
- CONSTRUCTION LIMIT
- 200' FROM CONSTRUCTION LIMIT LINE
- MISSION VILLAGE BOUNDARY
- TREE REPLACEMENT MITIGATION AREA

OAK TREE LEGEND:

- OAK TREE - NO IMPACT
- OAK TREE - ENCROACHED
- OAK TREE - REMOVAL
- OAK TREE - GREATER THAN 200 FT FROM GRADING LIMITS

NEWHALL RANCH.

VTTM 61105
MISSION VILLAGE
OAK TREE REPORT

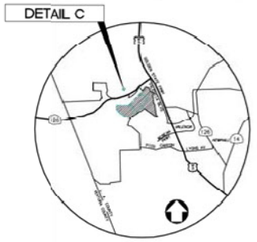
PSOMAS

DATE: 12/06/2006 REVISED ON:
JOB No: 1NRC0120.02 SHEET 5 OF 6

ME028-05.DWG

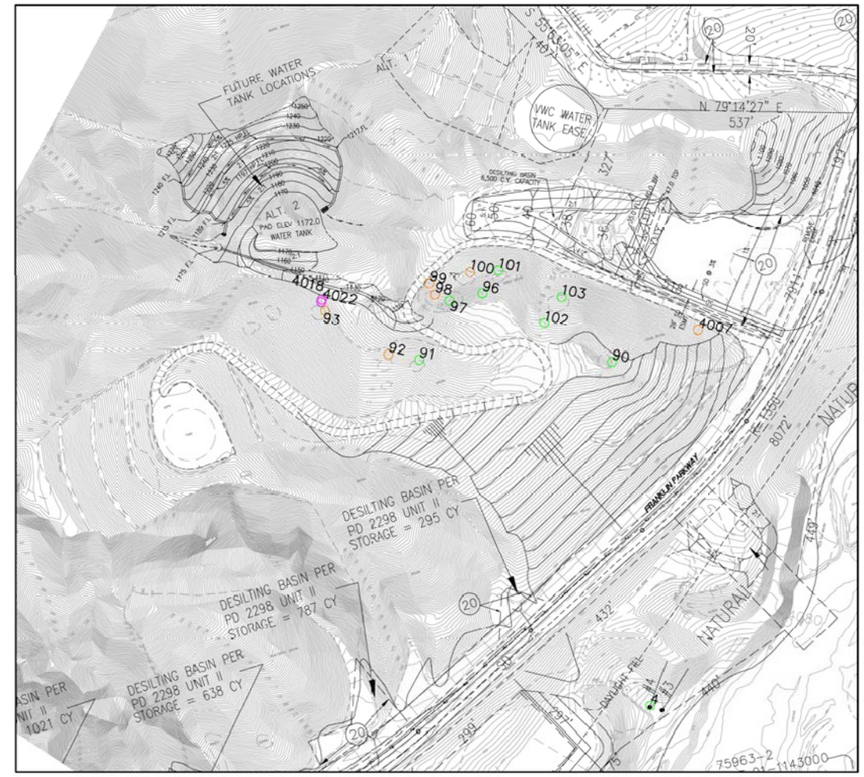
A full-size reproduction of this figure can be found at Impact Sciences.

DETAIL C



VICINITY MAP

NOT TO SCALE



FEET

INCHES

DETAIL C - OFFSITE GRADING
FRANKLIN PKWY/WATER TANK

OAK TREE LEGEND:

- OAK TREE - NO IMPACT
- OAK TREE - ENCROACHED
- OAK TREE - REMOVAL
- OAK TREE - GREATER THAN 200 FT FROM GRADING LIMITS

VTTM 61105
MISSION VILLAGE
OAK TREE REPORT

PSOMAS

DATE: 11/29/2006 REVISED ON:
JOB No: 1NRC0120.02 SHEET 6 OF 6

NEWHALL RANCH.

ME028-06.DWG

A full-size reproduction of this figure can be found at Impact Sciences.

3.0 METHODS

Impact Sciences biologists conducted on-site surveys and evaluations of the oak trees during 2005 and 2006. Only oak trees protected under the Los Angeles County Oak Tree Ordinance were surveyed. The project site was traversed on foot through areas where oak trees occur. Oak tree locations and attribute data were collected from the base of each tree with a Trimble Global Positioning System (GPS) mapping grade system. The GPS stores the spatial data with the evaluation criteria and attribute information required per the County's Oak Tree Ordinance. The locations of trees that occur on or immediately adjacent to the grading limit line were surveyed by Psomas Engineering with "professional survey grade equipment" to map trees to a sub-centimeter level of accuracy.

In addition, while conducting tree surveys, biologists identified all oak trees that have the potential to be successfully relocated to undisturbed open space areas within the Newhall Ranch Specific Plan boundary. Trees identified as candidates for relocation based on the current assessments (e.g., health, vigor, aesthetics, balance) are identified in **Table 2** under heading **4.0, RESULTS.**

Field evaluations of all oak trees surveyed included the following:

Tree Characteristics

- Measuring the diameter of the trunk of each (ordinance size) oak tree using a forester's steel diameter-equivalent tape measure. Trees with multiple trunks were measured at breast height and measurements for up to five trunks were inputted in the field. The total number of trunks of trees with more than five trunks were noted in the comment section of the data spreadsheet (**Appendix A**);
- Measuring height and crown radius for each tree in all directions (north, south, east, and west);
- Characterizing the balance or symmetry of each oak tree based on the crown radius measurements and whether or not the tree was leaning or unstable; and
- Identification of trees that are classified as heritage oak trees.

Physical Condition

- Identification of damage caused by pathogens or insect pests, by natural causes such as lightning, or from human activity;
- Evaluation of vigor based on such parameters as amount of new growth, leaf color, abnormal bark, dead wood, evidence of wilt, excessive necrosis or leaf necrosis, thinning of crown, etc.; and
- Assessment of overall health based on the evaluation of vigor, presence of damage, and comparison of typical archetype tree of same species.

Recommended Measures

- Identification of whether the tree requires safety pruning, such as the removal of dead or weak branches, and if a cable or brace should be installed if the tree is a save and would not be impacted by proposed development.

Grade

- A subjective alphabetical ranking ("A" being best and "F" being worst) was assigned for vigor, overall health, aesthetic value, and balance for each tree based on the criteria described below. Photographic examples of the alphabetical rankings for each of the four aforementioned survey parameters are shown below in **Figures 4** through **9**.

  "A" = Excellent: A healthy and vigorous tree characteristic of its species and reasonably free of any visible signs of stress, disease, or pest infestation.

  "B" = Good: A healthy and vigorous tree with minor visible signs of stress, disease, and/or pest infestation. Some maintenance measures may need to be implemented such as, pruning of dead wood or broken branches.

  "C" = Fair: Although healthy in overall appearance, there is abnormal amount of stress or disease/insect infestation, and a substantial amount of maintenance may be needed.

  "D" = Poor: A tree that may be exhibiting a substantial amount of stress, disease, or insect damage than what the amount that is expected for the species. The tree may be in a state of rapid decline, which may vary greatly in sings of dieback, necrosis, or other symptoms caused by pathogens or insect pests.

  "F" = Nearly Dead: An unhealthy tree in which mortality is inevitable. Examples of such trees include those that may show signs of disease and/or pest infestation, have a substantial amount of defoliation, and appear to be a safety hazard.

  "E" = Dead: This tree has no foliage and exhibits no sign of life or vigor.

All oak trees surveyed within the Mission Village Planning Area are displayed on attached engineering plans prepared by Psomas Engineering (Sheets 1-5). All exhibits show oak trees occurring within the proposed grading limits and within 200 feet of the grading limit line, as well as proposed on-site oak tree mitigation areas.

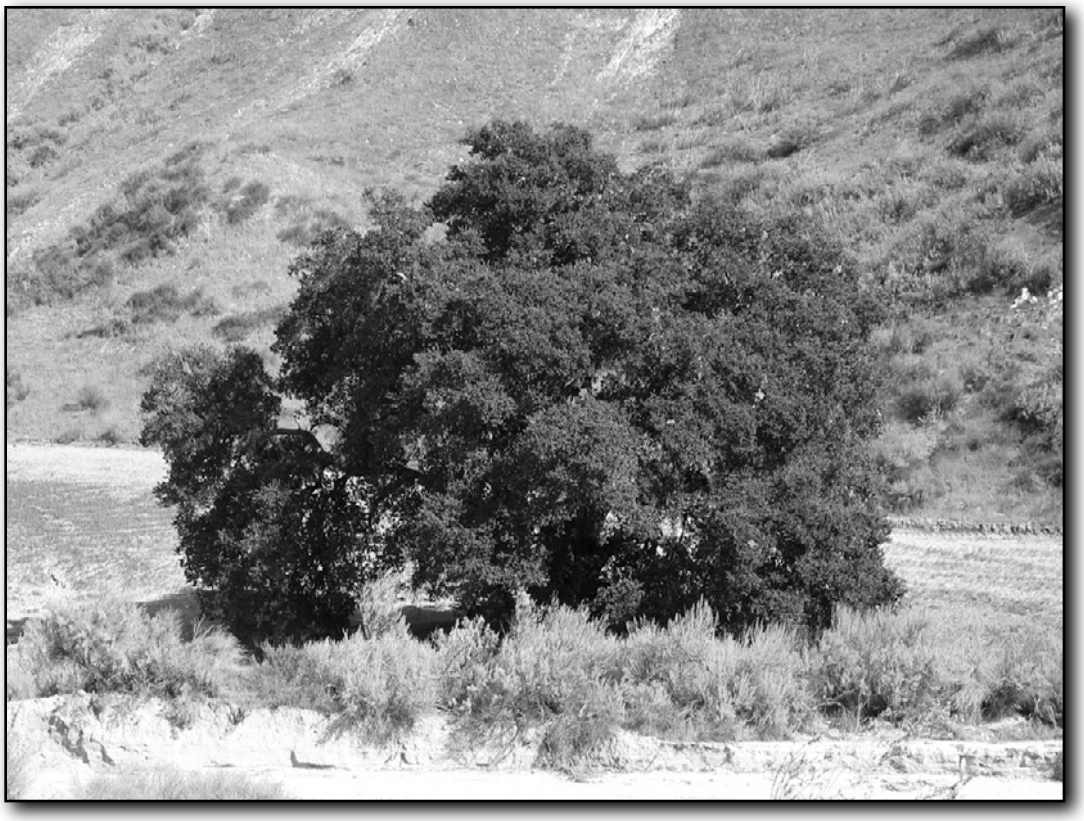


Figure 4 – Photo of Oak Tree with an “A” (Excellent) Letter Grade

Figure 5 – Photo of Oak Tree with an “B” (Good) Letter Grade

SOURCE: Impact Sciences, Inc. – December 2006

FIGURES **4 & 5**

Site Photos

Figure 6 – Photo of Oak Tree with an “C” (Fair) Letter Grade

Figure 7 – Photo of Oak Tree with an “D” (Poor) Letter Grade

SOURCE: Impact Sciences, Inc. – December 2006

FIGURES **6 & 7**

Site Photos

Figure 8 – Photo of Oak Tree with an “E” (Almost Dead) Letter Grade

Figure 9 – Photo of Oak Tree with an “F” (Dead) Letter Grade

SOURCE: Impact Sciences, Inc. – December 2006

FIGURES **8 & 9**

Site Photos

4.0 RESULTS

A total of 511 oak trees subject to the Los Angeles County Oak Tree Ordinance were surveyed within the Mission Village Project Site, which includes the VTTM 61105 boundary, the proposed grading limit line, and all areas within 200 feet of the grading limit line (see attached maps). Of the 511 oak trees surveyed, a total of 160 oak trees (31% of all trees surveyed) are planned for permanent removal, 28 of which were identified as candidates for relocation to undisturbed open space areas or other areas within the Specific Plan boundary (see **Table 3**). Of the oak trees planned for removal, 144 are coast live oaks (*Quercus agrifolia*); 11 are valley oaks (*Q. lobata*); four are scrub oaks (*Q. berberidifolia*); and one is a MacDonald's oak [*Q. macdonaldii*], a hybrid of a valley oak and a scrub oak. A total of 12 coast live oaks and one valley oak that are planned for removal/relocation are considered heritage trees under Los Angeles County Oak Tree Ordinance.

Furthermore, a total of 52 coast live oak (three of which are heritage trees) and one scrub oak may be encroached/damaged by proposed grading and construction activities. There are 282 oak trees (55% of all trees surveyed) that occur within 200 feet from the grading limit line, none of which would be removed or encroached upon by construction-related activities. A total of 16 dead trees were surveyed on the project site, none of which would require a Los Angeles Oak Tree Permit if removed or encroached.

A summary of the field data collected from the 2005/2006 oak tree survey is shown in **Table 1, Summary of Mission Village Project Area Oak Tree Survey Data**. Furthermore, **Table 2, Type of Project-Related Impact Proposed on Each Oak Tree Planned for Removal**, describes the type of project-related impact proposed on each oak tree planned for removal or that would be encroached during grading activities.

Table 1
Summary of Mission Village Project Area Oak Tree Survey Data

		Coast Live Oak (*Q. agrifolia*)	Valley Oak (*Q. lobata*)	Scrub Oak (*Q. berberidifolia*)	Valley Oak Hybrid (*Q. Macdonaldii*)	Total (% of trees surveyed)
Total Number of Trees Surveyed		472	32	7	1	511
Total Number of Dead Trees		16	--	--	--	16 (3%)
Total Number of Heritage Trees (≥ 36″ DBH)	Removals	12	1	--	--	13 (2.5%)
	Encroached	3	--	--	--	3 (.5%)
	Within 200′	6	6	--	--	12 (2%)
Total Number of Oak Trees Planned for **Removal** (includes heritage trees)		**144**	**11**	**4**	**1**	**160 (31%)**
Total Number of Oak Trees That May be **Encroached** During Grading Activities (includes heritage trees)		**52**	**--**	**1**	**--**	**53 (10%)**
Total Number of Oak Trees that **Occur within 200 Feet from Grading Limit Line** and Would Not be Removed or Encroached (includes heritage trees)		260	20	2	--	282 (55%)
Total Number of Oak Trees that Would Require a Los Angeles County Oak Tree Permit (removal + encroached)						**213 (42%)**

*Note: Dead trees are included in the total trees surveyed (511); are displayed on all exhibits, and are included in **Appendix A**, but are not considered in the total counts for trees that would require a permit for proposed impacts (removal + encroached).*

Table 2
Type of Project-Related Impact Proposed on Each Oak Tree Planned for Removal

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
7	Removal	Road	Sheet 4 of 5
139	Encroached	Road	Sheet 2 of 5
161	Encroached	Road	Sheet 2 of 5
164	Encroached	Road	Sheet 2 of 5
165	Encroached	Road	Sheet 2 of 5
167	Encroached	Road	Sheet 2 of 5
168	Encroached	Road	Sheet 2 of 5
169	Removal	Building Pad	Sheet 2 of 5
170	Removal	Building Pad	Sheet 2 of 5
171	Removal	Building Pad	Sheet 2 of 5
172	Removal	Building Pad	Sheet 2 of 5
173	Removal	Road	Sheet 2 of 5
175	Removal	Building Pad	Sheet 2 of 5
176	Removal	Building Pad	Sheet 2 of 5
179	Removal	Road	Sheet 2 of 5
180	Removal	Road	Sheet 2 of 5
181	Removal	Road	Sheet 2 of 5
182	Removal	Road	Sheet 2 of 5
183	Removal	Road	Sheet 2 of 5
184	Removal	Road	Sheet 2 of 5
***185**	Removal	Road	Sheet 2 of 5
186	Removal	Building Pad	Sheet 2 of 5
189	Removal	Road	Sheet 2 of 5
190	Removal	Road	Sheet 2 of 5
191	Removal	Building Pad	Sheet 2 of 5
192	Removal	Building Pad	Sheet 2 of 5
197	Removal	Building Pad	Sheet 2 of 5
214	Removal	Building Pad	Sheet 2 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
218	Removal	Building Pad	Sheet 2 of 5
219	Removal	Building Pad	Sheet 2 of 5
220	Removal	Building Pad	Sheet 2 of 5
225	Encroached	Building Pad	Sheet 2 of 5
241	Removal	Road	Sheet 5 of 5
242	Removal	Road	Sheet 5 of 5
243	Encroached	Road	Sheet 5 of 5
254	Encroached	Building Pad	Sheet 2 of 5
***255**	Removal	Building Pad	Sheet 2 of 5
396	Removal	Utility Corridor	Sheet 5 of 5
397	Removal	Chiquito Canyon Culvert Outlet	Sheet 5 of 5
398	Removal	Chiquito Canyon Culvert Outlet	Sheet 5 of 5
400	Removal	Road	Sheet 5 of 5
401	Removal	Road	Sheet 5 of 5
434	Removal	Building Pad	Sheet 2 of 5
511	Removal	Road	Sheet 3 of 5
512	Removal	Building Pad	Sheet 3 of 5
513	Removal	Building Pad	Sheet 3 of 5
514	Removal	Building Pad	Sheet 3 of 5
515	Removal	Building Pad	Sheet 3 of 5
516	Removal	Building Pad	Sheet 3 of 5
523	Removal	Building Pad	Sheet 3 of 5
524	Removal	Building Pad	Sheet 3 of 5
525	Removal	Road	Sheet 3 of 5
592	Encroached	Utility Corridor	Sheet 5 of 5
***595**	Encroached	Basin	Sheet 3 of 5
***597**	Removal	Road	Sheet 3 of 5
604	Removal	Basin	Sheet 3 of 5
605	Removal	Basin	Sheet 3 of 5
606	Removal	Basin	Sheet 3 of 5
607	Removal	Basin	Sheet 3 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
608	Removal	Basin	Sheet 3 of 5
609	Removal	Basin	Sheet 3 of 5
610	Removal	Basin	Sheet 3 of 5
***611**	Removal	Basin	Sheet 3 of 5
612	Removal	Road	Sheet 3 of 5
613	Removal	Road	Sheet 3 of 5
614	Removal	Road	Sheet 3 of 5
615	Removal	Road	Sheet 3 of 5
***616**	Removal	Road	Sheet 3 of 5
617	Removal	Road	Sheet 3 of 5
618	Removal	Road	Sheet 3 of 5
619	Removal	Road	Sheet 3 of 5
620	Removal	Road	Sheet 3 of 5
***621**	Removal	Road	Sheet 3 of 5
623	Removal	Road	Sheet 3 of 5
***624**	Removal	Road	Sheet 3 of 5
625	Removal	Road	Sheet 3 of 5
626	Removal	Road	Sheet 3 of 5
627	Removal	Road	Sheet 3 of 5
***642**	Removal	Road	Sheet 3 of 5
659	Encroached	Road	Sheet 2 of 5
713	Removal	Building Pad	Sheet 4 of 5
***714**	Removal	Building Pad	Sheet 4 of 5
716	Removal	Park	Sheet 4 of 5
717	Removal	Park	Sheet 4 of 5
718	Removal	Park	Sheet 4 of 5
719	Removal	Park	Sheet 4 of 5
761	Removal	Road	Sheet 4 of 5
762	Removal	Road	Sheet 4 of 5
796	Removal	Building Pad	Sheet 2 of 5
797	Removal	Building Pad	Sheet 5 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
798	Removal	Building Pad	Sheet 5 of 5
799	Removal	Building Pad	Sheet 5 of 5
800	Removal	Building Pad	Sheet 5 of 5
801	Removal	Building Pad	Sheet 5 of 5
802	Removal	Building Pad	Sheet 5 of 5
803	Removal	Building Pad	Sheet 5 of 5
805	Removal	Building Pad	Sheet 5 of 5
806	Removal	Building Pad	Sheet 5 of 5
807	Encroached	Road	Sheet 5 of 5
813	Removal	Road	Sheet 5 of 5
814	Removal	Road	Sheet 5 of 5
816	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
817	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
***818**	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
819	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
822	Removal	Road	Sheet 5 of 5
***823**	Encroached	Road	Sheet 5 of 5
824	Removal	Road	Sheet 5 of 5
825	Encroached	Road	Sheet 5 of 5
826	Removal	Road	Sheet 5 of 5
828	Removal	Road	Sheet 5 of 5
829	Removal	Road	Sheet 5 of 5
845	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
851	Removal	Building Pad	Sheet 2 of 5
853	Removal	Building Pad	Sheet 2 of 5
854	Removal	Building Pad	Sheet 2 of 5
855	Encroached	Lion Canyon Stream Restoration	Sheet 2 of 5
***856**	Removal	Lion Canyon Stream Restoration	Sheet 2 of 5
862	Encroached	Lion Canyon Stream Restoration	Sheet 2 of 5
863	Removal	Building Pad	Sheet 2 of 5
***865**	Removal	Slope Protection	Sheet 2 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
867	Removal	Slope Protection	Sheet 2 of 5
868	Removal	Slope Protection	Sheet 2 of 5
869	Removal	Building Pad	Sheet 2 of 5
870	Removal	Building Pad	Sheet 2 of 5
871	Removal	Basin	Sheet 2 of 5
893	Encroached	Basin	Sheet 2 of 5
894	Encroached	Basin	Sheet 2 of 5
895	Encroached	Basin	Sheet 2 of 5
896	Removal	Basin	Sheet 2 of 5
926	Removal	Basin	Sheet 2 of 5
927	Removal	Basin	Sheet 2 of 5
928	Removal	Basin	Sheet 2 of 5
929	Removal	Basin	Sheet 2 of 5
930	Removal	Basin	Sheet 2 of 5
931	Removal	Basin	Sheet 2 of 5
932	Encroached	Basin	Sheet 2 of 5
957	Encroached	Road	Sheet 2 of 5
958	Removal	Road	Sheet 2 of 5
961	Encroached	Road	Sheet 2 of 5
962	Encroached	Road	Sheet 2 of 5
2246	Removal	Road	Sheet 5 of 5
2320	Encroached	Building Pad	Sheet 2 of 5
2325	Encroached	Building Pad	Sheet 2 of 5
2354	Encroached	Building Pad	Sheet 2 of 5
2424	Removal	Road/ Building Pad	Sheet 5 of 5
2461	Removal	Road	Sheet 4 of 5
4111	Encroached	Lion Canyon Stream Restoration	Sheet 5 of 5
4118	Removal	Road	Sheet 5 of 5
4122	Removal	Building Pad	Sheet 5 of 5
4123	Removal	Lion Canyon Stream Restoration	Sheet 2 of 5
4124	Removal	Slope Protection	Sheet 2 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
4161	Removal	Building Pad	Sheet 2 of 5
4172	Removal	Building Pad	Sheet 2 of 5
4174	Removal	Road	Sheet 2 of 5
4175	Removal	Road	Sheet 2 of 5
4176	Removal	Building Pad	Sheet 2 of 5
4177	Removal	Road	Sheet 2 of 5
4178	Removal	Building Pad	Sheet 2 of 5
4179	Removal	Building Pad	Sheet 2 of 5
4180	Removal	Building Pad	Sheet 2 of 5
4181	Removal	Building Pad	Sheet 2 of 5
4182	Removal	Building Pad	Sheet 2 of 5
4183	Removal	Building Pad	Sheet 2 of 5
4184	Encroached	Building Pad	Sheet 2 of 5
4200	Encroached	Building Pad	Sheet 2 of 5
4214	Removal	Building Pad	Sheet 2 of 5
4215	Removal	Building Pad	Sheet 2 of 5
4216	Removal	Building Pad	Sheet 2 of 5
4217	Removal	Building Pad	Sheet 2 of 5
4218	Removal	Building Pad	Sheet 2 of 5
4219	Removal	Building Pad	Sheet 2 of 5
4273	Encroached	Building Pad	Sheet 3 of 5
4296	Removal	Building Pad	Sheet 3 of 5
4297	Removal	Building Pad	Sheet 3 of 5
4298	Removal	Building Pad	Sheet 3 of 5
4299	Removal	Building Pad	Sheet 3 of 5
4300	Encroached	Building Pad	Sheet 3 of 5
4307	Encroached	Basin	Sheet 3 of 5
4308	Encroached	Basin	Sheet 3 of 5
4309	Encroached	Basin	Sheet 3 of 5
4310	Encroached	Basin	Sheet 3 of 5
4311	Encroached	Basin	Sheet 3 of 5

Tree Number	Type of Impact	Type of Project-Related Impact	Map Location
4312	Encroached	Basin	Sheet 3 of 5
4321	Encroached	Basin	Sheet 3 of 5
4322	Encroached	Basin	Sheet 3 of 5
4325	Encroached	Basin	Sheet 3 of 5
4326	Encroached	Basin	Sheet 3 of 5
4327	Removal	Basin	Sheet 3 of 5
***4328**	Removal	Park	Sheet 3 of 5
4329	Removal	Park	Sheet 3 of 5
4330	Removal	Park	Sheet 3 of 5
***4331**	Removal	Building Pad	Sheet 3 of 5
4333	Removal	Basin	Sheet 3 of 5
4334	Removal	Basin	Sheet 3 of 5
4336	Removal	Road	Sheet 3 of 5
4351	Removal	Park	Sheet 4 of 5
4352	Removal	Park	Sheet 4 of 5
4353	Removal	Park	Sheet 4 of 5
4361	Removal	Road	Sheet 4 of 5
4363	Removal	Slope Protection	Sheet 2 of 5
4366	Removal	Building Pad	Sheet 4 of 5
4368	Removal	Road	Sheet 4 of 5
4376	Removal	Building Pad	Sheet 2 of 5
4377	Removal	Building Pad	Sheet 2 of 5

* *Heritage Tree*

To reduce the permanent loss of mature oak trees and the habitat they provide to indigenous plant and animal species, as well as migrating birds, Newhall Land and Farming has retained Richard Johnson and Associates to develop boxing, planting, and maintenance procedures for candidate trees for relocation within the Newhall Ranch Specific Plan boundary. As shown in **Table 3, Oak Trees Located on the Mission Village Project Site that are Proposed for Relocation within the Specific Plan Boundary Based on Recent Assessments**, 28 of the oak trees that are proposed for removal have been identified as candidates for relocation. Attached to this report as **Appendix B**, is the Richard Johnson and Associates'

Boxing Specifications and Recommendations for transplanting and maintaining trees selected for relocation.

Table 3
Oak Trees Located on the Mission Village Project Site that are Proposed for Relocation within the Specific Plan Boundary Based on Recent Assessments

Oak Species	Tree Tag Identification Number
Coast live oak *(Quercus agrifolia)*	170, 171, 173, 179, 183, 218, 511, 523, 524, 525, 611, 796, 801, 802, 806, 824, 851, 853, 4118, 4172, 4175, 4215, 4351, 4352, 4361
Valley oak *(Quercus lobata)*	716, 718, 761

5.0 CONCLUSION

As indicated above, 160 oak trees will be removed and 53 will be encroached, thus, 213 oak trees (42% of all trees surveyed) will require an oak tree permit from the County of Los Angeles.

6.0 SUGGESTED MITIGATION MEASURES

Pursuant to Section 22.56.2090 of the Los Angeles County Oak Tree Ordinance, the following mitigation measures are proposed to preserve and protect the oak trees addressed in this report. These mitigation and maintenance measures are suggested to mitigate the loss or impacts to 213 oak trees proposed to be removed or encroached, and to preserve and protect the remaining oak trees on the site.

MM-1 Replacement Trees

- *Consistent with the Newhall Ranch Specific Plan, oak trees removed or damaged shall be replaced by a tree of the same species at a ratio of 2:1.*

- *All replacement trees shall be at least a 15-gallon specimen in size and measure 1 inch or more in diameter, as measured from 1 foot above the base. Free-form trees with multiple stems are permissible; the combined diameter of the two largest stems of such trees shall measure a minimum of 1 inch in diameter, as measured 1 foot above the base. Replacement trees shall consist exclusively of indigenous oak trees and be certified as being grown from a seed source collected in Los Angeles or Ventura Counties.*

MM-2 Protective Fencing

A plan shall be developed for protecting oak trees on the subject property during and after development. This plan shall be approved by the Forestry Division of the County of Los Angeles.

- *Equipment damage to limbs, trunks, and roots of all remaining trees shall be avoided during project construction and development. Even slight trunk injuries can result in susceptibility to long-term pathogenic maladies.*

- *Protective fencing not less than four feet in height shall be placed at the limits of the protective zone of any individual oak tree or dense stand of oak trees within 200 feet of the grading limits, and shall be inspected by the forester and/or fire warden prior to commencement of any activity on the subject property, and shall remain in place until construction is completed.*

MM-3 Grading Restrictions Near Protective Zones

Care must be taken to limit grade changes near the protective zone of an oak tree. Grade changes can lead to plant stress from oxygen deprivation or oak root fungus at the root collar of oaks. Minor grade changes further from the trunk are not as critical but can negatively affect the health of the tree if not carefully monitored by a County-approved certified arborist.

- *The grade shall not be lowered or raised around the trunks (i.e., within the protective zone) of any oak tree without the approval of the Los Angeles County forester or a County-certified arborist. A certified arborist shall supervise all excavation or grading proposed within the protective zone of a tree.*

- *Trenching, excavation, or clearance of vegetation within the protective zone of an oak tree shall be accomplished by the use of hand tools or small hand-held power tools. Any major roots encountered shall be conserved to the greatest extent possible and treated as recommended by the certified arborist.*

- *No utility trenches shall be routed within the protective zone of an oak tree unless no feasible alternative locations are available, and shall be approved by the County forester.*

MM-4 Equipment Storage

- *No storage of equipment, supplies, vehicles, or debris shall be permitted within the protective zone of an oak tree.*

- *No dumping of construction wastewater, paint, stucco, concrete, or any other clean-up waste shall occur within the protective zone of an oak tree.*

- *No temporary structures shall be placed within the protective zone of any remaining oak tree.*

MM-5 Maintenance

Healthy trees, if not maintained, often grow beyond their ability to support themselves and fail at their most naturally occurring weak point. This is typically at a branch union at or near the main crotch of the tree. Weight-reduction pruning and/or cabling is important in any tree preservation program. Pruning of oak trees within residential neighborhoods is recommended every four to six years, based on a County-certified arborist's determination.

- *Pruning of replacement oak trees and preserved oak trees shall include the removal of dead wood, stubs, and medium pruning of branches 2 inches in diameter or less.*
- *Pruning of replacement oak trees and preserved oak trees shall be in accordance with the guidelines published by the National Arborist Association. In no case shall more than 20 percent of the tree canopy of any oak tree be removed. Cuts over 2 inches in diameter shall require a pruning permit from the County. After pruning, installation of support cables to prevent future main crotch failures may be necessary based on a County-certified arborist's determination.*
- *All replacement oak trees shall be maintained in accordance with the principles set forth in the publication, Oak Trees: Care and Maintenance prepared by the Forestry Division of the County of Los Angeles.*
- *A two-year maintenance period shall begin upon the start of planting the replacement trees. All replacement trees failing to survive within this period shall be replaced. A new two-year maintenance period shall start for each tree that failed to survive and required a replacement tree to be planted.*

MM-6 Frequency of Watering

Care should be taken to avoid placing any irrigation devices within watering distance of the protected zone of oak trees. Too much moisture near the base of an oak tree is generally believed to be the leading cause of death of oak trees in residential settings, and oak root fungus can occur as a result of over watering. Oak trees survive and thrive on annual rainfall alone and generally do not require supplemental irrigation except during periods of extreme drought or for establishment of newly planted trees (i.e., replacement trees).

- *Irrigation water shall not reach within 15 feet of any oak trunk.*
- *Neither grass nor ground covers shall be planted under the canopy of oak trees.*

MM-7 Control of Diseases and Pests

Oak trees generally have an acceptable level of common insect pests. During the visual inspection of the trees assessed, no evidence of sudden oak death (*Phytophthora ramorum*) or bleeding canker (*Phytophthora cactorum*) was observed. However, oak wilt fungus (*Ceratocystis fagacearum)* was observed on two trees on the project site. The parasite, mistletoe (*Phoradendron villosum* ssp. *villosum*), is a common threat to oak

trees; however, despite the negative effect mistletoe has on its tree hosts, both mistletoe and oaks are native to California and have co-existed and co-evolved for hundreds of years. Mistletoe was observed on several of the oak trees surveyed.

- *A County-certified arborist shall evaluate the effects of mistletoe, pathogens, and insect pests on the remaining preserved and planted oak trees periodically (about every five to seven years), in addition to the overall health and structural integrity of the trees, to ensure longevity of remaining oak trees.*

MM-8 Construction Monitoring

Damage to remaining trees must be avoided by workers and equipment during construction activities.

- *A qualified biologist or County-certified arborist shall monitor on-site construction and grading activities occurring near all identified oak tree protection zones to ensure that damage to oak trees does not occur.*

- *Prior to initiation of construction activities, the qualified biologist or County-certified arborist shall schedule a field meeting to inform personnel (involved in construction) where all protective zones are located and the importance of avoiding encroachment within the protective zones.*

APPENDIX A

Oak Tree Survey Data

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	7	81	87	90	91	92	93	96	97	98	99	100	101	102	103	105	106	107	108	110	111	112	115	116	117	126	127
Tree Characteristics	**Species**																											
	Coast Live Oak		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak	X		X																								
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak		X	X						X																		
	Trunk Diameter	8.5,6.5,5.5,5	52,14	51	27	15,13,7,7	18,10	17	8,6,6,5	39	23,22	15	19,13,8,6	14,10,5	13,4	17,14,14,4	20,16	0	10,8.5	11.5	8,9	11,11,10,10	11	15,14,6	12,11.5,9	7,5,5,4	15,13,12,5,4	19,7.5,4
	Tree Height	17	20	50	28	40	32	32	30	55	42	22	41	32	37	40	38	20	25	17	16	21	22	42	32	20	35	20
	Canopy North	15	0	30	19	22	20	15	12	41	30	15	26	25	25	25	21	0	17	17	6	18	16	11	14	10	18	12
	Canopy West	12	0	29	16	23	18	17	15	40	27	10	26	22	26	29	22	0	16	8	5	18	6	22	18	13	11	12
	Canopy South	15	0	31	16	21	20	20	14	40	18	11	29	21	27	25	22	0	5	4	10	25	1	20	12	15	20	19
	Canopy East	14	0	29	18	22	17	21	15	36	21	11	28	20	24	27	19	0	17	5	9	22	12	12	11	15	25	18
Physical Conditions	**Tree Declining**			X	X																	X						
	Broken/Dead Limbs										X					X				X	X	X		X				
	Sparse Foliage			X							X						X			X	X	X						
	Excessive Chlorsis\Necrosis			X	X												X											
	Mainstem Dieback																					X						
	Poor tip Growth			X	X						X																	
	Cavity				X					X	X					X												
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage				X															X								
	Diseased																											
	Mistletoe																											
	Leaning										X									X								
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar				X					X	X				X	X				X	X	X		X				
	Safety Hazard																			X								
Measures	**Safety Prune**			X	X						X									X		X		X				
	Remove Deadwood										X									X	X	X		X				
	Cable/Brace	X									X											X		X				
Rating	**Vigor**	A	F	D	D	B	B	A	A	C	C	B	A	B	B	B	C	F	B	D	B	C	B	B	B	B	B	A
	Health	A	F	D	D	B	B	A	B	B	C	B	A	B	B	B	B	F	B	D	C	D	B	B	B	A	B	A
	Aesthetics	A	F	C	C	B	B	B	B	B	B	B	A	B	B	B	B	F	B	D	C	C	C	B	B	B	C	B
	Balance	A	F	B	C	B	B	B	A	A	C	B	A	A	C	B	A	F	C	C	C	C	D	B	B	A	B	A
Impact	**Removal**	X	Dead																									
	Encroached						X	X			X	X	X															
	200ft from Grading			X	X	X			X	X				X	X	X	X	Dead	X	X	X	X	X	X	X	X	X	X
Comments		10 trunks total			NT. BH.																							

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	128	129	130	131	132	133	134	135	137	138	139	140	142	143	145	146	147	148	150	152	153	154	155	156	157	158	159
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak		X																									
	Trunk Diameter	21	36	16,3	28,21,12,5	19	7,6.5	14	19	9,8,6	18,5	18,9	16,15	10,8,3	9,7	20,8,8	13	14	10	13,8.5,6.5	21	22	9	22	26	19,14.5	9,7.5,5.5,5	15,11
	Tree Height	42	35	32	50	42	20	20	20	20	28	23	34	35	35	28	36	35	36	33	30	32	26	27	47	32	32	37
	Canopy North	18	25	10	26	14	0	0	0	7	15	16	21	2	2	3	11	15	16	20	21	13	2	19	28	22	20	14
	Canopy West	17	16	15	25	17	0	0	0	14	16	15	17	12	21	20	4	16	7	21	18	9	7	21	17	11	21	30
	Canopy South	17	14	16	30	10	0	0	0	12	12	11	16	7	18	17	16	15	6	12	24	21	17	20	27	21	11	15
	Canopy East	20	30	18	27	8	0	0	0	9	14	21	18	7	15	25	12	5	5	17	17	20	10	18	21	25	16	17
Physical Conditions	**Tree Declining**		X																									
	Broken/Dead Limbs									X																		
	Sparse Foliage										X												X	X				
	Excessive Chlorsis\Necrosis										X	X											X	X				
	Mainstem Dieback																											X
	Poor tip Growth																											
	Cavity		X																					X				
	Weak Crotch		X																									
	Hollow Trunk		X																									
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark		X								X	X												X				
	Insect Damage		X								X																	
	Diseased																											
	Mistletoe																											
	Leaning																											
	Excessive Water Shoots																											
	Surface Roots		X																									
	Fire Scar		X																									
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																			X								X
	Cable/Brace		X																									
Rating	**Vigor**	A	D	B	B	B	F	F	F	B	D	C	B	B	B	A	B	A	B	B	B	B	C	C	B	B	B	C
	Health	A	D	B	A	B	F	F	F	C	D	C	A	A	A	A	A	B	A	B	A	A	C	C	A	B	B	C
	Aesthetics	A	D	B	A	C	F	F	F	C	C	C	A	A	A	A	A	B	A	B	A	A	C	B	A	B	B	B
	Balance	B	D	B	B	D	F	F	F	C	C	C	A	C	D	D	C	C	C	C	B	C	D	B	B	B	B	B
Impact	**Removal**																											
	Encroached											X																
	200ft from Grading	X	X	X	X	X	Dead	Dead	Dead	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Comments																												

	Tree Number	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak																										X	
	Trunk Diameter	12	16,11	16	12,11,10.5	6.5,5.5,5,4	12	13,5	13	14,13	24,11	12	20	20	26	10.5	14.5	16,8,6,6,4,4	12.5,12	20,19,17,16	19	10.5,6.5	16,15,13,13,12	20,12,7	30	26,8	42	17,16
	Tree Height	20	35	20	20	20	16	40	22	16	40	18	42	38	37	20	20	33	38	35	43	28	38	33	43	39	35	35
	Canopy North	0	25	0	0	10	8	14	12	14	22	14	24	13	16	11	14	16	6	25	22	3	24	17	25	17	23	11
	Canopy West	0	30	0	0	14	2	11	9	6	30	8	13	31	20	15	13	18	23	27	26	22	21	26	28	22	22	23
	Canopy South	0	10	0	0	15	10	17	11	0	18	11	22	27	19	13	14	16	27	8	20	20	25	21	26	23	24	21
	Canopy East	0	18	0	0	12	16	16	15	3	16	13	20	16	22	7	16	14	9	10	22	7	27	18	23	26	26	22
Physical Conditions	**Tree Declining**									X										X								
	Broken/Dead Limbs									X							X											X
	Sparse Foliage									X						X				X								
	Excessive Chlorsis\Necrosis						X			X										X								X
	Mainstem Dieback									X										X								
	Poor tip Growth									X										X								
	Cavity						X	X		X							X						X			X	X	X
	Weak Crotch																						X					
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark									X							X			X						X	X	X
	Insect Damage									X																	X	X
	Diseased																											
	Mistletoe																											
	Leaning						X															X						
	Excessive Water Shoots																											
	Surface Roots						X	X																				X
	Fire Scar						X			X							X									X	X	X
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood									X																		X
	Cable/Brace																						X					
Rating	**Vigor**	F	C	F	F	B	C	B	A	D	A	B	B	B	A	C	B	B	B	E	B	B	B	A	A	A	C	B
	Health	F	B	F	F	B	C	B	A	E	A	B	B	A	B	B	C	B	A	E	B	B	B	B	A	B	C	C
	Aesthetics	F	B	F	F	B	D	B	A	E	A	B	B	B	A	B	D	A	B	E	A	D	A	B	A	A	C	C
	Balance	F	C	F	F	B	D	C	A	E	B	B	B	B	A	B	C	B	D	E	B	D	C	B	A	D	C	C
Impact	**Removal**										X	X	X	X	X		X	X			X	X	X	X	X	X	X	X
	Encroached		X			X	X	X	X	X																		
	200ft from Grading	Dead		Dead	Dead											X			X	X								
Comments																												

	Tree Number	189	190	191	192	197	214	218	219	220	225	226	227	228	229	230	232	234	235	239	240	241	242	243
Tree Characteristics	**Species**																							
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																							
	Scrub Oak																							
	Valley Oak Hybrid																							
	Heritage Oak																							
	Trunk Diameter	9,8,7.5,6	24	24,13.5,11,8.5	21	15,14	7,5	17	15	24,21	25,7,5	19,12	9,4,4,3	21	30	13	19,13	18,11	22	14	17	19,12	18,9,5	26,23,20
	Tree Height	30	28	38	25	40	11	35	33	45	40	38	20	16	45	26	40	40	37	16	33	33	40	50
	Canopy North	13	13	18	16	17	13	15	10	32	21	14	12	4	27	11	17	14	18	8	13	21	12	30
	Canopy West	17	20	28	19	18	10	12	18	31	11	18	10	17	26	18	14	24	21	12	17	19	16	31
	Canopy South	12	16	23	18	18	4	16	22	27	18	17	12	8	31	13	14	22	20	8	21	29	24	38
	Canopy East	13	15	26	16	19	9	15	19	30	25	16	12	1	32	1	23	27	27	6	19	30	25	36
Physical Conditions	**Tree Declining**																					X	X	
	Broken/Dead Limbs			X	X								X	X						X		X	X	
	Sparse Foliage																					X	X	
	Excessive Chlorsis\Necrosis				X									X		X						X	X	
	Mainstem Dieback													X									X	
	Poor tip Growth																						X	
	Cavity		X	X	X									X				X		X		X	X	
	Weak Crotch																					X		
	Hollow Trunk																			X				
	Trunk Exudation										X			X										
	Regrown Stump												X											
	Exfoliating Bark		X	X	X						X			X						X				
	Insect Damage													X				X		X		X	X	
	Diseased																							
	Mistletoe																							
	Leaning													X										
	Excessive Water Shoots																					X		
	Surface Roots			X															X					
	Fire Scar			X	X					X	X		X	X						X				
	Safety Hazard																							
Measures	**Safety Prune**					X																		
	Remove Deadwood				X									X										
	Cable/Brace																					X		
Rating	**Vigor**	B	B	B	B	B	B	B	B	A	B	B	B	B	A	C	B	B	A	B	B	C	D	A
	Health	A	B	B	C	B	B	B	A	A	B	A	B	C	A	C	A	A	A	C	B	D	D	A
	Aesthetics	B	C	B	C	B	C	B	B	A	B	A	C	D	A	C	B	A	A	C	B	D	D	A
	Balance	B	C	B	B	A	C	B	C	A	B	B	C	D	A	D	B	B	A	C	C	D	D	A
Impact	**Removal**	X	X	X	X	X	X	X	X	X												X	X	
	Encroached										X													X
	200ft from Grading											X	X	X	X	X	X	X	X	X	X			
Comments						LHB																		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	244	245	251	252	253	254	255	257	377	381	382	384	385	387	388	389	390	391	392	393	396	397	398	400	401	434	438
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak	X						X																				
	Trunk Diameter	36,7	13,11	20	14.5,9.5,8	24	19,18,17,11	39	24	26	10.5,8	16	34,13	3,16	12.5,3	8.5,4	17	14	14	19	19	26,13,13,11	16	16	26	33,25,11,7	13,11	8,7.5
	Tree Height	44	32	20	38	35	45	38	40	38	30	42	20	45	28	18	18	38	38	41	33	40	38	28	39	43	30	17
	Canopy North	33	20	0	23	19	32	25	21	29	11	27	28	27	10	15	13	20	27	30	15	25	5	20	28	30	30	16
	Canopy West	28	26	0	21	11	30	26	22	27	3	22	30	23	10	6	4	10	10	12	30	28	17	19	27	30	18	7
	Canopy South	35	21	0	11	5	32	28	22	15	13	22	24	18	11	5	0	10	7	13	12	26	21	15	25	33	16	5
	Canopy East	27	19	0	23	6	27	28	24	28	32	32	6	31	13	12	11	8	19	12	14	39	21	3	27	36	17	14
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs					X		X								X	X										X	
	Sparse Foliage															X	X										X	
	Excessive Chlorsis\Necrosis					X											X											
	Mainstem Dieback																X											
	Poor tip Growth																											
	Cavity	X			X	X		X						X		X											X	
	Weak Crotch						X							X														
	Hollow Trunk				X									X														
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark				X	X		X																		X		
	Insect Damage				X	X		X						X												X		
	Diseased																											
	Mistletoe																											
	Leaning										X												X	X				
	Excessive Water Shoots																											
	Surface Roots										X		X	X														
	Fire Scar				X	X		X																				
	Safety Hazard																											
Measures	**Safety Prune**																					X						
	Remove Deadwood					X		X								X												
	Cable/Brace						X																					
Rating	**Vigor**	A	B	F	B	C	A	B	A	A	B	A	B	B	B	B	C	B	B	B	B	A	A	A	A	B	C	C
	Health	A	B	F	C	C	A	B	B	A	B	A	A	B	A	C	D	B	B	B	B	A	A	A	A	B	C	C
	Aesthetics	A	C	F	B	C	A	A	A	A	C	A	B	B	B	C	D	C	B	B	B	B	B	B	A	A	D	C
	Balance	A	B	F	C	C	C	B	B	C	D	B	C	C	B	C	D	C	C	C	C	B	C	C	A	B	C	C
Impact	**Removal**							X														X	X	X	X	X	X	
	Encroached						X																					
	200ft from Grading	X	X	Dead	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X							X
Comments																												

	Tree Number	511	512	513	514	515	516	523	524	525	592	593	595	596	597	598	599	602	603	604	605	606	607	608	609	610	611	612
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
	Valley Oak																	X										
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak												X		X				X								X	
	Trunk Diameter	21	25,14	23,7	11.5,7.5,6,5	29	19,19	32,15	14,10	14,13,12,10,8	21,14,10,7	18	52	21	42,20	28,8,3.5	17	19	48	14	17,15	13,11,11	32	11.5	14.5,13.5	28	37	22
	Tree Height	28	28	35	33	35	25	30	27	34	23	30	60	40	48	37	38	37	24	37	37	38	42	38	33	39	40	39
	Canopy North	16	24	15	14	16	22	18	17	15	35	21	36	15	13	15	10	17	28	23	13	14	27	11	22	25	26	0
	Canopy West	12	22	12	8	24	18	15	18	16	22	20	32	13	34	14	14	16	20	17	15	13	28	7	4	23	28	15
	Canopy South	16	23	11	23	27	26	23	10	18	17	20	38	22	37	10	23	18	22	22	23	20	32	10	25	27	31	30
	Canopy East	17	25	15	18	27	27	20	16	17	16	26	33	10	37	23	20	14	28	26	26	12	30	14	27	22	29	14
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs						X								X													
	Sparse Foliage																		X			X						
	Excessive Chlorsis\Necrosis																		X	X								
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity																											
	Weak Crotch						X																					
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage																											
	Diseased																											
	Mistletoe																											
	Leaning										X																	X
	Excessive Water Shoots										X																	
	Surface Roots																											
	Fire Scar																											
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood						X																					
	Cable/Brace						X			X																		
Rating	**Vigor**	A	A	B	B	B	B	B	A	A	C	A	B	C	B	B	B	B	B	B	A	B	A	A	B	A	A	B
	Health	B	B	B	B	B	B	B	B	A	C	A	A	B	B	A	B	A	C	C	B	B	A	B	B	B	B	B
	Aesthetics	A	A	C	B	B	B	B	A	A	D	B	A	C	B	B	B	A	D	B	B	C	A	C	B	A	A	C
	Balance	A	A	B	C	B	C	C	B	A	D	B	A	B	C	B	B	A	C	B	B	B	A	B	C	B	A	D
Impact	**Removal**	X	X	X	X	X	X	X	X	X					X					X	X	X	X	X	X	X	X	X
	Encroached										X		X															
	200ft from Grading											X		X		X	X	X	X									
Comments					8 trunks total																							

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	613	614	615	616	617	618	619	620	621	623	624	625	626	627	642	651	652	653	654	655	656	657	658	659	660	663	704
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Valley Oak																X	X	X	X	X	X	X	X		X	X	X
	Scrub Oak																								X			
	Valley Oak Hybrid																											
	Heritage Oak				X					X		X				X												
	Trunk Diameter	17,13	31	8	49	30	30	24,20,15,6,5	18	43	22	41	30,13,11.5	29	22	48	18	18	21	12	24	17,5.5	15	14	6.5,5.5,5,4.5	16	17	24
	Tree Height	30	43	12	45	40	32	43	45	25	25	57	42	28	40	55	30	30	27	18	18	20	23	23	20	24	32	34
	Canopy North	23	27	5	40	30	0	20	14	38	8	38	26	23	25	30	15	12	17	6	10	17	14	16	8	15	16	21
	Canopy West	13	17	8	25	22	28	28	9	18	0	35	25	4	8	28	4	15	12	7	13	13	14	12	16	14	14	21
	Canopy South	17	25	21	31	7	36	27	13	0	31	27	32	32	10	34	8	15	17	13	14	12	16	15	10	15	17	21
	Canopy East	19	17	13	30	21	20	30	16	14	27	23	14	37	28	34	17	13	16	15	10	15	15	15	15	16	16	19
Physical Conditions	**Tree Declining**						X			X															X			
	Broken/Dead Limbs									X											X							
	Sparse Foliage																								X			
	Excessive Chlorsis\Necrosis					X			X	X					X										X			
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity																X				X							
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage																				X							
	Diseased																											
	Mistletoe																											
	Leaning					X	X			X	X			X														
	Excessive Water Shoots									X																		
	Surface Roots		X							X																		
	Fire Scar																											
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																											
	Cable/Brace							X											X									
Rating	**Vigor**	B	B	B	A	B	A	A	C	B	A	B	B	A	C	B	C	B	A	B	B	A	A	B	C	B	B	B
	Health	B	A	B	A	B	C	A	C	D	B	A	A	B	B	A	C	B	A	B	D	B	A	B	C	A	A	B
	Aesthetics	B	A	C	A	B	D	A	C	D	C	A	A	C	B	A	C	A	A	C	D	B	B	A	C	B	A	B
	Balance	B	B	D	A	C	E	B	B	E	D	C	B	D	C	A	B	B	A	C	D	B	B	B	C	B	B	B
Impact	**Removal**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
	Encroached																								X			
	200ft from Grading																X	X	X	X	X	X	X	X		X	X	X
Comments							Fallen tree			Fallen tree																		

	Tree Number	713	714	716	717	718	719	761	762	796	797	798	799	800	801	802	803	805	806	807	808	809	810	813	814	816	817	818
Tree Characteristics	**Species**																											
	Coast Live Oak									X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak	X	X	X	X	X	X																					
	Scrub Oak								X																			
	Valley Oak Hybrid							X																				
	Heritage Oak		X																									X
	Trunk Diameter	19	36	30	12.5	16	27	18,14	10,9.5	22	22	21	26	25	24	8,8	11,9,9,9,5	28,14	18,17	15,11,7	14	21,19	16	19	17,9,8,7,6	22,20,18,17,17	21,16,9	37
	Tree Height	35	40	42	25	23	22	26	18	35	30	28	40	40	37	22	30	44	33	37	30	38	26	33	22	41	41	37
	Canopy North	18	23	21	11	18	21	23	15	18	23	19	27	29	30	17	10	22	22	24	0	6	23	17	14	25	25	17
	Canopy West	15	18	23	14	15	15	20	12	15	25	5	27	25	22	16	23	25	23	26	14	11	17	21	16	26	16	22
	Canopy South	19	15	28	12	13	23	22	11	16	24	10	29	15	21	7	25	27	25	26	36	33	15	18	18	36	18	31
	Canopy East	14	13	29	15	16	17	23	17	18	18	22	27	27	29	12	18	24	23	30	17	31	13	18	16	32	20	27
Physical Conditions	**Tree Declining**				X																							
	Broken/Dead Limbs				X																	X	X					
	Sparse Foliage				X																							
	Excessive Chlorsis\Necrosis				X						X	X																
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity		X							X			X	X				X				X		X				X
	Weak Crotch																											
	Hollow Trunk																											
	Trunk Exudation													X														
	Regrown Stump																											
	Exfoliating Bark		X		X							X	X	X										X				
	Insect Damage				X																							
	Diseased																											
	Mistletoe																											
	Leaning																				X							X
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar									X		X	X	X				X						X				
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood																					X						
	Cable/Brace																	X	X									X
Rating	**Vigor**	B	A	A	E	B	A	A	A	A	B	B	B	B	A	A	A	B	A	A	C	C	A	A	A	A	A	A
	Health	B	B	A	E	A	B	A	A	B	C	C	B	B	A	A	A	C	A	A	C	C	B	B	A	A	A	A
	Aesthetics	B	B	A	E	A	B	A	B	A	B	C	B	B	A	A	A	B	A	A	C	C	B	A	A	A	A	A
	Balance	A	C	B	E	B	B	A	B	A	B	C	B	B	B	B	B	C	A	A	D	D	C	A	A	A	A	C
Impact	**Removal**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X			
	Encroached																			X						X	X	X
	200ft from Grading																				X	X	X					
Comments																	9 trunks total								7 trunks total			

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	819	821	822	823	824	825	826	828	829	832	833	834	835	836	837	838	839	840	841	842	843	844	845	851	853	854	855
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X																							
	Trunk Diameter	19,19,16,16	17,12,11,9,9	20,20,18,17,12	49,16,13	14,12,10,5	16,4	25,21,18,14	20,15,14,14	21,20,16,15	13,14	8,5	15,14,12,11,10	14	30,20	19	8,6	12	14	11	14,14,10,9	8.5,8	9,5,3	15,14,12,12,11	28,12,10,8	11,11,10,10	12,11,8,8	22,20,19,19
	Tree Height	40	50	48	47	27	35	40	42	40	28	18	37	38	30	27	25	50	40	40	45	33	25	41	44	30	26	38
	Canopy North	28	21	21	30	27	15	27	26	30	13	6	24	20	28	16	17	2	27	16	22	21	19	22	20	25	22	34
	Canopy West	33	25	28	42	18	20	31	19	32	15	8	23	8	40	23	18	22	3	10	32	22	18	23	27	26	5	32
	Canopy South	32	23	31	39	28	14	26	24	33	22	10	24	28	22	28	10	30	5	3	30	8	15	25	27	24	10	28
	Canopy East	36	21	33	25	21	15	27	19	26	17	9	25	21	18	25	3	3	26	7	21	17	17	24	18	25	17	30
Physical Conditions	**Tree Declining**											X															X	
	Broken/Dead Limbs																										X	X
	Sparse Foliage											X															X	
	Excessive Chlorsis\Necrosis											X																
	Mainstem Dieback																											
	Poor tip Growth																										X	
	Cavity														X						X						X	X
	Weak Crotch																											
	Hollow Trunk														X													
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark				X											X												
	Insect Damage																										X	
	Diseased										X	X								X								
	Mistletoe																											
	Leaning															X		X										
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar														X	X						X					X	
	Safety Hazard																											
Measures	**Safety Prune**				X													X										
	Remove Deadwood																										X	
	Cable/Brace								X								X	X										
Rating	**Vigor**	A	A	B	A	A	A	A	A	A	C	B	A	B	B	B	B	A	B	B	A	B	A	A	B	A	D	B
	Health	A	A	B	B	B	A	B	A	A	C	D	A	A	A	B	B	B	B	B	A	B	A	A	B	A	D	B
	Aesthetics	A	A	A	B	A	A	A	A	A	C	D	A	B	B	C	B	B	B	B	A	B	B	A	A	A	D	B
	Balance	A	A	A	B	A	A	B	A	A	C	C	A	C	C	B	D	D	D	D	B	B	B	A	A	A	D	B
Impact	**Removal**			X		X	X	X	X	X															X	X	X	
	Encroached	X			X																			X				X
	200ft from Grading		X								X	X	X	X	X	X	X	X	X	X	X	X	X					
Comments		12 trunks total			LHB			12 trunks total	8 trunks total	8 trunks total			7 trunks total							Oak wilt fungus						12 trunks total		11 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	856	861	862	863	865	867	868	869	870	871	872	873	892	893	894	895	896	897	898	899	900	901	902	903	904	907	908
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak	X				X																						
	Trunk Diameter	42,24,9,6	20,17,17,14	25	21,13,12,12,11	82	16,13,13,12	15,5,5	17,11,9	18,17,15,15	20,16,16	19	17,15,14,14,14	12,7	26,17,16,14,14	17,15,11	13,13	18,9,6	12	11	9,5	12,9,8,6	9,6	0	22	20	19,17,8	10,6,6
	Tree Height	41	41	37	31	39	35	28	30	31	27	30	40	20	41	36	27	35	38	32	22	33	26	20	40	0	37	17
	Canopy North	22	32	20	20	23	21	15	7	23	21	11	30	14	29	23	17	13	21	15	2	15	14	0	20	0	20	14
	Canopy West	21	31	22	17	32	17	20	17	25	23	23	31	12	28	26	22	15	6	1	3	17	10	0	23	0	22	15
	Canopy South	25	30	26	24	33	18	12	23	32	30	24	32	13	20	25	13	23	5	15	23	18	10	0	26	0	27	14
	Canopy East	30	33	25	25	29	19	8	20	30	18	10	29	10	30	20	21	21	16	26	22	16	15	0	24	0	23	14
Physical Conditions	**Tree Declining**	X																										
	Broken/Dead Limbs																											
	Sparse Foliage									X																		
	Excessive Chlorsis\Necrosis									X																		
	Mainstem Dieback																											
	Poor tip Growth	X								X																		
	Cavity	X										X				X									X			
	Weak Crotch		X																									
	Hollow Trunk																											
	Trunk Exudation																										X	
	Regrown Stump																											
	Exfoliating Bark											X																
	Insect Damage							X	X																			
	Diseased					X		X																				
	Mistletoe																											
	Leaning							X													X							
	Excessive Water Shoots																											
	Surface Roots														X													
	Fire Scar	X																										
	Safety Hazard																											
Measures	**Safety Prune**					X					X																	
	Remove Deadwood																											
	Cable/Brace	X	X				X																					
Rating	**Vigor**	C	A	A	B	A	B	C	B	D	B	B	B	B	A	B	B	A	B	B	B	B	B	F	B	F	B	A
	Health	C	A	A	B	B	B	B	B	C	B	B	A	A	A	A	B	A	B	B	B	A	B	F	A	F	A	A
	Aesthetics	C	A	A	B	B	B	B	B	C	B	C	A	B	A	B	C	A	B	C	C	A	C	F	A	F	A	A
	Balance	C	A	A	B	A	B	B	B	B	B	C	A	B	A	B	C	B	C	D	D	B	C	F	C	F	B	A
Impact	**Removal**	X			X	X	X	X	X	X	X							X										
	Encroached			X											X	X	X											
	200ft from Grading		X									X	X	X					X	X	X	X	X	Dead	X	Dead	X	X
Comments			13 trunks total			Canker. LHB			white fly infest-ation		LHB															NT. NTg. NA. DE.		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	910	911	912	913	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	949	951	953	954	957
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X																							
	Trunk Diameter	20	17	7,6,5	42,18, 15	27,6	8,7,4	20,10	19	16	16	31	9,5.5,2.5	25,25	18,15,13,	15,11,10,10	12,4,3	8,7	13,13,10	15,14,10,9	16,15,14,13,9	19,18,15,9,9	26	17,16,16,15,12	17,15,14,13,10	21,20,17,15,15	12	17,15,13,13,11
	Tree Height	47	37	18	42	45	23	36	38	23	31	50	16	45	35	28	27	26	30	35	43	40	40	42	44	40	32	32
	Canopy North	20	24	10	27	23	16	22	25	13	16	32	7	26	23	27	10	14	21	26	28	16	27	26	32	26	9	25
	Canopy West	24	28	9	27	20	8	27	26	10	16	25	10	24	27	26	12	18	16	14	21	22	26	25	15	25	15	26
	Canopy South	27	26	10	17	18	14	27	27	27	13	27	9	27	30	23	22	9	22	10	30	32	21	35	31	31	12	33
	Canopy East	21	25	8	25	15	16	21	16	23	17	27	10	28	18	12	16	7	20	24	24	22	24	24	30	28	12	18
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs														X	X					X							
	Sparse Foliage									X		X		X														
	Excessive Chlorsis\Necrosis												X															
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity														X		X	X	X	X		X			X	X		
	Weak Crotch														X				X		X							
	Hollow Trunk																											
	Trunk Exudation														X													
	Regrown Stump																											
	Exfoliating Bark																											
	Insect Damage															X				X								
	Diseased											X	X	X								X						
	Mistletoe																											
	Leaning																											
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar														X													
	Safety Hazard																											
Measures	**Safety Prune**																											
	Remove Deadwood														X	X												
	Cable/Brace																					X				X		X
Rating	**Vigor**	B	B	A	B	B	B	A	A	C	A	B	C	B	B	A	A	A	B	B	B	B	A	A	B	B	B	A
	Health	A	A	A	A	B	B	B	A	C	B	C	C	C	C	B	B	A	B	B	B	B	A	A	B	B	B	A
	Aesthetics	A	B	A	A	A	C	A	A	C	B	C	C	B	D	C	B	B	B	B	B	C	A	A	B	A	B	A
	Balance	A	A	A	A	A	C	A	A	C	A	B	C	B	C	B	D	B	B	B	B	B	A	A	B	B	B	B
Impact	**Removal**														X	X	X	X	X	X								
	Encroached																				X							X
	200ft from Grading	X	X	X	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	
Comments																								10 trunks total		8 trunks total		10 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	958	961	962	963	964	965	969	970	971	972	973	974	976	977	978	980	981	986	988	990	991	993	994	995	2222	2246	2317
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak				X	X															X							
	Trunk Diameter	19,18,15,14	21,20,9,4	25,23	51	36,14	22,14,11,5,4	18,16,15,14	8	19,17,12,10	13	19,4.5	18,8.5	13,12	22	8,6.5,4	17,14,14,12	17,15,14,14	15	21,16,15,14	39	15,12,11,8	28,22,12	21,11,6,5,5	21,19,17,12	15	16	25,17,12,10,2
	Tree Height	41	44	45	40	39	34	45	20	43	37	52	49	27	35	11	35	37	28	45	50	25	44	45	50	28	35	27
	Canopy North	30	21	30	27	17	24	32	12	28	34	20	27	14	25	15	34	12	15	30	37	13	24	25	26	12	14	19
	Canopy West	29	30	31	26	16	23	37	12	15	2	30	30	1	26	2	36	27	22	35	32	25	31	24	34	15	15	20
	Canopy South	27	20	32	18	37	29	32	18	26	3	33	10	30	30	0	15	32	21	27	31	20	33	24	33	7	16	14
	Canopy East	30	27	29	27	31	17	30	6	33	22	21	11	28	20	25	31	32	25	26	31	18	30	17	24	14	15	15
Physical Conditions	**Tree Declining**																											
	Broken/Dead Limbs		X					X													X							
	Sparse Foliage																					X						
	Excessive Chlorsis\Necrosis																					X						
	Mainstem Dieback																											
	Poor tip Growth																											
	Cavity		X		X		X	X												X		X	X		X			
	Weak Crotch		X																			X						
	Hollow Trunk																											
	Trunk Exudation																											
	Regrown Stump																											
	Exfoliating Bark																					X						
	Insect Damage																											
	Diseased																											
	Mistletoe																											
	Leaning								X		X	X	X	X		X												
	Excessive Water Shoots																											
	Surface Roots																											
	Fire Scar		X			X	X	X														X	X					
	Safety Hazard																					X						
Measures	**Safety Prune**																								X			
	Remove Deadwood																											
	Cable/Brace		X					X								X				X	X	X						
Rating	**Vigor**	A	A	B	A	A	A	A	B	A	A	A	A	B	A	A	A	A	B	B	A	C	A	A	A	C	A	C
	Health	A	A	B	A	A	A	A	B	A	A	A	A	B	A	B	A	A	B	A	A	C	A	A	A	C	A	C
	Aesthetics	A	A	B	A	A	A	A	C	A	B	B	B	C	B	B	A	A	A	A	A	C	A	A	A	C	A	C
	Balance	B	B	B	B	C	B	C	D	B	D	D	C	D	C	D	B	C	A	B	B	C	B	B	B	D	A	C
Impact	**Removal**	X																									X	
	Encroached		X	X																								
	200ft from Grading				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Comments		9 trunks total						Soil build up at base.									SBB	Total of 9 trunks, SBB		Total of 6 trunks.	Total of 5 trunks.				LHB			Ntg. NA. DE. 6 trunks

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344
Tree Characteristics	**Species**																											
	Coast Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																											
	Scrub Oak																											
	Valley Oak Hybrid																											
	Heritage Oak																											
	Trunk Diameter	12,3,3,2,2	13,12,12	25	14,11,10	11,4	9	15	34	27	14	8	14	20,14,11.5,10	12,9	20	15,8	11	13,10	19	15,13	19	12,8,6	8,8,4	18,12,7	10	13,13,11	14,10,12
	Tree Height	22	28	40	30	24	23	25	26	18	27	19	20	30	22	28	16	18	25	33	28	31	15	20	30	23	41	26
	Canopy North	8	35	15	25	21	6	18	20	12	14	12	0	23	11	18	15	10	17	23	16	17	15	12	17	10	24	17
	Canopy West	13	22	21	18	16	21	20	19	10	16	8	8	24	10	15	12	10	17	17	21	21	12	10	18	6	23	16
	Canopy South	12	12	22	8	3	0	20	20	14	12	6	36	23	11	15	8	11	28	15	20	18	9	10	22	14	21	17
	Canopy East	21	17	25	25	22	2	17	18	15	17	12	10	20	12	18	10	8	10	15	20	6	10	9	17	19	24	15
Physical Conditions	**Tree Declining**												X															
	Broken/Dead Limbs									X			X		X					X								
	Sparse Foliage									X																		
	Excessive Chlorsis\Necrosis																											
	Mainstem Dieback																											
	Poor tip Growth														X			X						X				
	Cavity								X				X	X	X					X	X						X	X
	Weak Crotch									X				X														
	Hollow Trunk								X																			
	Trunk Exudation																										X	
	Regrown Stump																											
	Exfoliating Bark												X		X					X								
	Insect Damage												X		X													
	Diseased																											
	Mistletoe																											
	Leaning												X															
	Excessive Water Shoots												X															
	Surface Roots																				X							
	Fire Scar								X						X				X	X								
	Safety Hazard																											
Measures	**Safety Prune**									X																		
	Remove Deadwood									X			X							X								
	Cable/Brace													X														
Rating	**Vigor**	C	B	B	C	B	B	A	C	C	B	B	B	B	B	B	B	B	B	B	B	B	D	C	B	B	B	B
	Health	C	B	B	C	B	B	B	C	C	B	A	C	B	B	B	B	B	B	B	B	B	D	C	B	B	B	B
	Aesthetics	D	C	B	C	B	C	A	B	C	B	B	D	B	C	B	C	B	B	B	B	B	D	C	C	C	B	C
	Balance	D	C	B	C	B	D	B	C	C	B	C	D	B	C	C	C	B	B	C	C	C	D	C	C	C	B	B
Impact	**Removal**																											
	Encroached			X					X																			
	200ft from Grading	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Comments		Ntg. NA. DE.	Ntg. NA. DE.	Ntg. NA. DE.	Ntg. NA. DE.											Ntg. NA. DE.	Ntg. NA. DE.						NT. Ntg. NA. DE		NT. Ntg. NA. DE	NT. Ntg. NA. DE		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	2345	2346	2347	2348	2350	2351	2353	2354	2424	2455	2458	2461
Tree Characteristics	**Species**												
	Coast Live Oak	X	X	X	X	X	X	X	X	X			
	Valley Oak												
	Scrub Oak										X	X	X
	Valley Oak Hybrid												
	Heritage Oak												
	Trunk Diameter	15,14,10	14	16,6,5	24,15,13	9,7	8.5	17	21	14,11,7,5	8.5,6,4.5,3	8,8,6,6	7,6.5,6.5,5.5
	Tree Height	29	20	23	37	20	16	19	23	25	12	14	15
	Canopy North	17	10	20	25	2	3	13	18	20	15	17	15
	Canopy West	17	10	18	22	11	12	9	19	21	14	15	15
	Canopy South	26	10	10	25	7	12	17	18	18	15	16	10
	Canopy East	25	10	21	18	3	6	12	16	19	12	15	13
Physical Conditions	**Tree Declining**					X	X						
	Broken/Dead Limbs				X	X							
	Sparse Foliage				X	X	X		X				
	Excessive Chlorsis\Necrosis					X	X						
	Mainstem Dieback					X	X						
	Poor tip Growth				X	X	X	X	X				
	Cavity					X	X	X			X		
	Weak Crotch												
	Hollow Trunk												
	Trunk Exudation				X								
	Regrown Stump												
	Exfoliating Bark				X	X		X					
	Insect Damage					X		X					
	Diseased												
	Mistletoe												
	Leaning												
	Excessive Water Shoots												
	Surface Roots												
	Fire Scar					X		X					
	Safety Hazard												
Measures	**Safety Prune**												
	Remove Deadwood				X	X							
	Cable/Brace				X								X
Rating	**Vigor**	C	B	B	D	D	D	C	C	A	A	A	A
	Health	C	B	B	C	D	D	C	C	A	B	A	A
	Aesthetics	C	B	B	C	E	D	C	B	A	A	A	A
	Balance	B	C	B	C	D	C	C	B	A	A	A	B
Impact	**Removal**									X			X
	Encroached								X				
	200ft from Grading	X	X	X	X	X	X	X			X	X	
Comments		NT. Ntg. NA. DE	NT. Ntg. NA. DE										8 trunks total

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4007	4009	4018	4022	4101	4108	4109	4110	4111	4113	4114	4118	4122	4123	4124	4125	4131	4132	4133	4149	4152	4155	4156	4157	4158
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									X
	Trunk Diameter	6,6,5,5,4	13	8	7,6,4	19,17,12,11	13	14,9	10	28,13	11	15,11,10	11	16,6,4.5	23,10	32	26,16,16	17,11	15	32	15,5,4,3,3	18,16,13,13	0	17,13	12,11,9,8,7	41
	Tree Height	23	25	23	25	37	25	40	18	40	15	25	23	24	30	32	28	22	22	41	21	37	20	35	28	41
	Canopy North	12	16	20	17	31	16	25	0	15	11	18	15	21	21	22	0	15	14	21	16	16	0	17	7	14
	Canopy West	12	16	13	11	33	16	10	0	21	12	16	17	17	23	27	0	17	13	20	17	23	0	23	20	18
	Canopy South	13	17	8	11	30	17	16	0	27	12	2	12	23	23	26	0	14	15	30	16	24	0	26	18	6
	Canopy East	11	17	13	17	30	17	14	0	27	9	14	11	12	22	25	0	13	11	30	16	20	0	19	20	21
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs																X									
	Sparse Foliage									X																
	Excessive Chlorsis/Necrosis															X	X									
	Mainstem Dieback																									
	Poor tip Growth																									
	Cavity					X				X	X	X		X				X								
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation													X												
	Regrown Stump																									
	Exfoliating Bark										X				X		X									
	Insect Damage	X				X					X	X														
	Diseased																									
	Mistletoe														X											
	Leaning																									
	Excessive Water Shoots																									
	Surface Roots															X										
	Fire Scar					X					X	X		X				X								
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood																									
	Cable/Brace							X		X																
Rating	**Vigor**	B	B	B	B	B	B	B	F	B	B	B	A	C	C	C	F	B	B	A	B	A	F	A	B	B
	Health	C	A	B	B	A	A	B	F	B	B	B	A	C	C	B	F	B	B	A	B	A	F	A	B	B
	Aesthetics	B	B	B	B	B	B	B	F	C	C	C	A	C	C	B	F	B	B	A	B	A	F	A	B	B
	Balance	B	B	B	B	B	B	C	F	B	C	C	B	C	C	C	F	B	B	A	B	B	F	B	C	C
Impact	**Removal**			X	X								X	X	X	X										
	Encroached	X								X																
	200ft from Grading		X			X	X	X	Dead		X	X					Dead	X	X	X	X	X	Dead	X	X	X
Comments		Multiple trunks.		Soil build up at base.																					Soil build up at base.	

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4159	4160	4161	4162	4163	4164	4165	4166	4167	4168	4169	4170	4171	4172	4174	4175	4176	4177	4178	4179	4180	4181	4182	4183	4184
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									
	Trunk Diameter	33	13,12	34,12,5	21	15,11	13.5,11	19,11,6	15,12,12,11	25	21,15	19,13	24,20	16,10	24	19,12,12,11,9	17,11.5,10	13.5,6.5	22,16	15,12,12,6.5	15,11.5	21,21,20,12.5	24	13,7,7,6,5.5	32	18,18,17,9.5
	Tree Height	32	18	30	40	30	35	35	31	43	40	38	45	28	43	35	31	25	35	34	30	29	42	28	36	43
	Canopy North	13	10	27	22	12	15	15	17	25	15	19	25	15	27	25	17	15	25	21	10	30	24	25	26	27
	Canopy West	14	15	29	23	21	14	21	20	21	8	19	16	16	14	25	20	10	27	21	21	32	26	17	25	22
	Canopy South	18	17	28	20	17	16	20	21	22	17	14	30	10	28	29	23	9	29	24	15	40	24	20	23	31
	Canopy East	19	13	31	18	3	11	18	24	22	15	10	20	28	25	28	27	16	18	20	17	30	25	24	26	32
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs						X				X															
	Sparse Foliage											X														
	Excessive Chlorsis/Necrosis						X							X												
	Mainstem Dieback													X												
	Poor tip Growth										X			X												
	Cavity			X		X	X			X	X									X	X	X				
	Weak Crotch						X																			
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark			X		X			X		X							X								
	Insect Damage					X					X							X								
	Diseased																									
	Mistletoe																									
	Leaning																				X					
	Excessive Water Shoots																									
	Surface Roots																									
	Fire Scar					X	X				X										X	X				
	Safety Hazard																									
Measures	**Safety Prune**																		X					X		
	Remove Deadwood																									
	Cable/Brace						X													X						
Rating	**Vigor**	B	C	A	B	C	C	B	C	B	D	C	A	C	B	A	B	C	B	B	B	A	A	B	A	A
	Health	B	B	B	B	C	C	B	C	B	C	C	A	D	A	B	A	B	A	B	B	A	A	A	A	A
	Aesthetics	B	B	A	B	C	D	B	B	A	D	C	A	C	B	A	B	C	A	B	C	A	A	B	A	A
	Balance	B	B	B	B	D	D	B	B	A	C	C	B	C	B	B	B	B	B	B	C	A	A	B	B	B
Impact	**Removal**			X											X	X	X	X	X	X	X	X	X	X	X	
	Encroached																									X
	200ft from Grading	X	X		X	X	X	X	X	X	X	X	X	X												
Comments																			LHB	Soil build up at base.				LHB		

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4194	4195	4196	4198	4199	4200	4201	4202	4203	4205	4206	4207	4208	4209	4211	4212	4214	4215	4216	4217	4218	4219	4220	4247	4248
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																									
	Trunk Diameter	26,22	22,8,3	14,13	13,13	21,6,5	12,11	15,6	10,6,4.5,4	16	8	8.5	14,11.5,11	19,7,5.5	8,8,8,7.5,7.5	7.5,6.5,6.5	18,12,10	14	12.5,10	10	13.5	13	11.5	8	16,14,13,7.5	12,11
	Tree Height	40	19	21	31	40	27	28	21	36	22	17	30	27	24	25	40	22	25	20	22	26	22	13	40	25
	Canopy North	21	15	11	18	21	13	15	5	23	14	9	21	28	15	7	12	11	10	13	17	7	7	0	20	0
	Canopy West	24	6	15	19	20	21	22	15	22	11	0	20	16	17	18	16	8	19	5	2	4	16	0	21	28
	Canopy South	22	10	16	20	20	17	19	16	16	2	0	16	19	5	16	15	5	12	6	4	26	17	0	21	18
	Canopy East	25	10	8	14	22	12	20	11	20	8	12	18	28	12	17	19	13	16	9	16	11	10	0	23	14
Physical Conditions	**Tree Declining**			X								X														
	Broken/Dead Limbs		X	X								X				X	X									
	Sparse Foliage			X	X							X														
	Excessive Chlorsis/Necrosis			X																						X
	Mainstem Dieback		X																							
	Poor tip Growth			X																						
	Cavity		X	X					X						X	X	X	X		X						X
	Weak Crotch								X				X			X										
	Hollow Trunk																	X								
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark											X														
	Insect Damage			X													X									
	Diseased																									
	Mistletoe																									
	Leaning													X			X			X	X	X	X			X
	Excessive Water Shoots																									
	Surface Roots					X				X																
	Fire Scar		X	X													X	X								
	Safety Hazard		X									X														
Measures	**Safety Prune**		X	X													X									
	Remove Deadwood		X	X																						
	Cable/Brace			X									X				X									
Rating	**Vigor**	A	B	D	C	B	A	A	B	A	A	D	C	B	A	A	A	B	A	A	A	A	A	F	B	B
	Health	A	B	C	B	B	A	A	B	A	B	C	C	A	B	A	A	B	A	A	A	A	A	F	A	C
	Aesthetics	A	D	D	C	A	A	A	B	A	B	D	C	A	B	B	B	B	A	C	C	C	C	F	B	C
	Balance	B	D	C	B	A	B	A	B	B	C	D	B	B	C	C	B	B	B	C	D	C	D	F	B	D
Impact	**Removal**																	X	X	X	X	X	X	Dead		
	Encroached						X																			
	200ft from Grading	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X								X	X
Comments																										

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4249	4250	4251	4253	4263	4264	4265	4266	4272	4273	4274	4275	4276	4285	4286	4287	4288	4289	4290	4291	4293	4294	4295	4296	4297
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak														X											
	Trunk Diameter	22	13,10,9,6	14,11,5.5,5,3	12,9,8	15,4	11	11.5,8,7	10,8.5,8.5,5	12.5,6,5,5	16,14,13	13,7	12	20	45	8,6	9.5,5	14,9	16,14,6.5,4	10.5	12,10.5,10	12,12	13	18,11.5,11.5	22,21,6.5,5	14,14
	Tree Height	35	24	20	30	27	21	18	37	22	30	20	30	32	50	15	18	35	41	20	28	1	20	42	27	22
	Canopy North	17	15	16	16	16	12	17	25	25	27	12	12	23	33	12	14	22	18	1	22	0	12	28	21	17
	Canopy West	16	24	17	8	12	13	10	24	23	25	8	8	24	30	5	8	26	26	11	18	0	14	25	23	15
	Canopy South	27	22	18	16	15	10	9	14	22	23	9	20	27	27	11	2	12	23	13	13	0	13	17	27	12
	Canopy East	18	13	12	17	13	8	13	16	20	18	18	22	22	30	13	10	17	21	12	13	0	12	27	20	15
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs									X	X															
	Sparse Foliage																			X			X			X
	Excessive Chlorsis/Necrosis											X								X			X			X
	Mainstem Dieback																						X			
	Poor tip Growth																									
	Cavity				X						X			X												
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark																			X						
	Insect Damage				X																					
	Diseased																									
	Mistletoe																									
	Leaning																									
	Excessive Water Shoots																									
	Surface Roots						X	X							X								X			X
	Fire Scar				X																					
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood																									
	Cable/Brace														X											
Rating	**Vigor**	A	B	B	B	B	B	B	A	A	B	B	B	B	A	B	B	A	A	C	A	F	C	A	B	C
	Health	A	B	B	B	A	B	B	A	A	B	C	B	B	A	B	B	A	A	D	B	F	C	A	B	C
	Aesthetics	A	B	B	B	B	B	C	B	A	B	C	C	B	A	C	C	A	A	D	A	F	D	A	A	C
	Balance	B	B	B	C	B	D	C	B	A	B	B	C	B	C	C	C	B	A	D	B	F	C	C	B	C
Impact	**Removal**																								X	X
	Encroached										X															
	200ft from Grading	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	Dead	X	X		
Comments										16 trunks total																

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4298	4299	4300	4301	4302	4303	4304	4305	4306	4307	4308	4309	4310	4311	4312	4313	4314	4315	4316	4318	4319	4320	4321	4322	4323
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Valley Oak																									
	Scrub Oak																									
	Valley Oak Hybrid																									
	Heritage Oak																						X			
	Trunk Diameter	14	11,8	17,13	10	13,9,8	10,6,4	10,3	9,2.5	10,10	23,22,21,19	22,14	34,28,27	20	34,14,12,9,7.5	32,29,25,22	18,16,15,13,10	11,10,10,8	23,10,3.5	31,16	17,16,16,15,5	27	83	22,19,10,7,7.5	9	15
	Tree Height	8	23	32	23	28	18	25	27	22	40	55	47	33	44	50	38	21	41	37	38	21	57	39	14	35
	Canopy North	3	16	20	13	12	7	9	12	17	24	25	34	5	25	30	27	22	10	28	25	10	30	28	12	20
	Canopy West	6	14	17	10	19	15	21	15	8	36	30	40	35	27	30	30	11	12	14	28	11	27	24	13	15
	Canopy South	7	18	17	8	18	14	15	9	4	40	32	37	22	38	14	33	19	27	17	24	12	40	25	1	16
	Canopy East	4	12	32	11	16	16	16	10	22	41	40	0	0	7	33	29	23	31	18	30	30	29	27	3	15
Physical Conditions	**Tree Declining**																									
	Broken/Dead Limbs	X				X												X	X			X				
	Sparse Foliage							X		X									X							
	Excessive Chlorsis/Necrosis				X			X		X									X							
	Mainstem Dieback																									
	Poor tip Growth																									
	Cavity	X								X							X									
	Weak Crotch									X	X															
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump	X																								
	Exfoliating Bark	X																				X				
	Insect Damage	X				X				X								X								
	Diseased																									
	Mistletoe																									
	Leaning										X		X	X								X			X	X
	Excessive Water Shoots					X																X				
	Surface Roots			X			X								X	X										
	Fire Scar																X									
	Safety Hazard																									
Measures	**Safety Prune**																									
	Remove Deadwood										X							X				X				
	Cable/Brace					X				X	X							X			X		X			
Rating	**Vigor**	C	B	A	B	B	C	C	B	C	A	A	B	B	C	A	B	B	B	A	B	A	A	A	C	A
	Health	D	A	B	C	C	B	C	B	C	A	B	B	B	C	A	B	C	C	A	B	B	A	B	C	B
	Aesthetics	D	B	B	C	D	B	C	B	D	B	B	C	C	B	A	C	C	C	B	A	D	A	A	D	C
	Balance	D	B	B	B	D	C	D	C	D	C	C	C	D	C	C	C	D	C	B	C	D	B	B	D	C
Impact	**Removal**	X	X																							
	Encroached			X							X	X	X	X	X	X								X	X	
	200ft from Grading				X	X	X	X	X	X							X	X	X	X	X	X	X			X
Comments											9 trunks total				6 trunks total											

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4324	4325	4326	4327	4328	4329	4330	4331	4333	4334	4336	4340	4341	4342	4343	4344	4345	4346	4351	4352	4353	4361	4363	4364	4366
Tree Characteristics	**Species**																									
	Coastal Live Oak	X	X	X	X	X	X	X	X		X	X												X	X	
	Valley Oak									X			X	X	X	X	X	X	X	X	X	X	X			
	Scrub Oak																									X
	Valley Oak Hybrid																									
	Heritage Oak					X			X																	
	Trunk Diameter	32,27,18,10,10	7,5,2.5,2.5	8	15.5	42	23,17,16	18,16,12,8	42,24,11	23	10.5	9	33	15	22	15	22	20	11	14.5	15.5,9	26	17,16	12,11,10	18	7,5
	Tree Height	41	20	19	23	39	29	30	42	42	25	25	30	25	33	33	33	33	15	25	23	22	35	29	23	11
	Canopy North	35	11	8	14	18	26	24	22	22	15	11	27	12	20	11	15	17	2	15	17	15	23	16	13	10
	Canopy West	29	12	10	17	16	23	16	38	36	8	4	19	14	15	17	12	15	8	10	15	14	25	20	16	10
	Canopy South	33	8	11	14	27	31	17	24	30	1	10	21	12	5	13	23	20	15	17	16	20	20	2	15	2
	Canopy East	30	5	9	13	33	25	28	20	22	12	12	28	13	13	11	13	17	5	13	17	18	26	15	16	6
Physical Conditions	**Tree Declining**																							X		
	Broken/Dead Limbs						X		X													X		X		
	Sparse Foliage																							X		X
	Excessive Chlorsis/Necrosis																							X		
	Mainstem Dieback								X																	
	Poor tip Growth																							X		
	Cavity								X													X				
	Weak Crotch																									
	Hollow Trunk																									
	Trunk Exudation																									
	Regrown Stump																									
	Exfoliating Bark					X			X																	
	Insect Damage																									
	Diseased																									
	Mistletoe																									
	Leaning						X																			
	Excessive Water Shoots																									
	Surface Roots										X															
	Fire Scar								X																	
	Safety Hazard																									
Measures	**Safety Prune**						X																			
	Remove Deadwood																									
	Cable/Brace						X										X						X			
Rating	**Vigor**	A	B	A	A	B	A	A	B	A	A	B	A	B	A	B	B	A	B	B	A	B	A	E	A	C
	Health	A	B	B	B	C	B	B	C	A	B	B	B	B	B	B	B	B	C	B	A	B	A	E	A	C
	Aesthetics	A	B	B	A	B	C	A	B	A	C	B	A	B	B	B	B	A	D	A	B	C	A	E	A	C
	Balance	B	B	B	B	B	D	B	C	A	D	B	B	B	C	B	B	B	D	B	B	C	A	E	A	D
Impact	**Removal**				X	X	X	X	X	X	X	X								X	X	X	X	X		X
	Encroached		X	X																						
	200ft from Grading	X											X	X	X	X	X	X	X						X	
Comments																										

Appendix A - Mission Village Project Oak Tree Survey Data

	Tree Number	4368	4376	4377
Tree Characteristics	**Species**			
	Coastal Live Oak		X	X
	Valley Oak			
	Scrub Oak	X		
	Valley Oak Hybrid			
	Heritage Oak			
	Trunk Diameter	6.5,6	8	12,7,9,8
	Tree Height	10	8	15
	Canopy North	5	7	10
	Canopy West	4	7	10
	Canopy South	12	7	10
	Canopy East	6	7	10
Physical Conditions	**Tree Declining**			
	Broken/Dead Limbs			
	Sparse Foliage	X		
	Excessive Chlorsis/Necrosis			
	Mainstem Dieback			
	Poor tip Growth			
	Cavity			
	Weak Crotch			
	Hollow Trunk			
	Trunk Exudation			
	Regrown Stump			
	Exfoliating Bark			
	Insect Damage			
	Diseased			
	Mistletoe			
	Leaning			
	Excessive Water Shoots			
	Surface Roots			
	Fire Scar			
	Safety Hazard			
Measures	**Safety Prune**			
	Remove Deadwood			
	Cable/Brace			
Rating	**Vigor**	C	B	B
	Health	C	B	B
	Aesthetics	C	C	B
	Balance	C	D	D
Impact	**Removal**	X	X	X
	Encroached			
	200ft from Grading			
Comments				NT. Ntg. NA. DE.

APPENDIX B

Richard Johnson and Associates'
Boxing Specifications and Recommendations

Richard Johnson & Associates
Environmental Horticulture

801 Glenneyre Street, Suite D, Laguna Beach, CA 92651
P.O. Box 127, Laguna Beach, CA 92652
Ph. (949) 497-4248 • Fx. (949) 497-6440

August 18, 2006

Mr. Glenn Adamick
NEWHALL LAND
23823 Valencia Blvd.
Valencia, CA 91355

RE: <u>Mission Village Selection of Oak Tree Relocation Candidates Update</u>

Dear Mr. Adamick:

This document serves as an update to the oak tree relocation candidate list for the Mission Village Project submitted April 18, 2006. A number of trees have bee removed from the list and the results are as follows. Richard Johnson & Associates, Inc. (RJA) has completed multiple site visits to the Mission Village site with Valley Crest Tree Company to formulate the oak tree relocation candidate list. It is our professional opinion that the trees listed in this report are of a high enough quality, based on overall vigor and structure, that they can be successfully relocated. RJA utilized the updated oak tree data and oak tree location maps supplied by Impact Sciences Inc. It should be noted that the trees listed below will need to be re-inspected prior to relocation to assure that conditions such as health, vigor, and structure remain favorable for the relocation process.

This report includes the following:

Number of relocation candidates.
List of relocation candidates by tag number and species.

Results:

Quercus lobata	3
Quercus agrifolia	25
Total oak tree relocation candidates	**28**

Tree#	Species
170	Quercus agrifolia
171	"
173	"
179	"
183	"
218	"
511	"
523	"
524	"
525	"
611	"
716	Quercus lobata
718	"
761	"
796	Quercus agrifolia
801	"
802	"
806	"
824	"
851	"
853	"
4118	"
4172	"
4175	"
4215	"
4351	"
4352	"
4361	"

Respectfully submitted by,

RICHARD JOHNSON & ASSOCIATES, INC.

Lemons, P., "Focused California Gnatcatcher Surveys for Mission Village, Los Angeles County, California" (January 26, 2008)

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

January 26, 2008 3738-124

U.S. Fish and Wildlife Service
Attn: Recovery Permit Coordinator
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

Subject: ***Focused California Gnatcatcher Survey, Mission Village Project, Los Angeles County, California***

Dear Recovery Permit Coordinator:

This report documents the results of nine protocol-level presence/absence surveys for the coastal California gnatcatcher (*Polioptila californica californica*; gnatcatcher) that were conducted for the approximately 1,252-acre Mission Village project area by Dudek in fall/winter 2007. The surveys were conducted in all areas of suitable habitat (i.e., coastal scrub and alliances and associations with less than 50% slopes). Approximately 535.5 acres of coastal scrub alliances and associations present on site were surveyed.

The coastal California gnatcatcher is a federally-listed threatened species and a California Department of Fish and Game (CDFG) species of special concern. It is closely associated with coastal sage scrub habitat and typically occurs below 950 feet in elevation and on slopes less than 40%, but gnatcatchers have been observed at elevations greater than 2,000 feet above mean sea level (amsl). The species is threatened primarily by loss, degradation, and fragmentation of coastal sage scrub habitat and is also impacted by brown-headed cowbird (*Molothrus ater*) nest parasitism.

LOCATION AND EXISTING CONDITIONS

The approximately 1,252-acre Mission Village site is part of the approximately 11,999-acre Newhall Ranch Specific Plan. The Mission Village site is located on the Val Verde 7.5-minute U.S. Geological Survey (USGS) quadrangle map (*Figures 1* and *2*), and is in northwestern Los Angeles County, approximately 30 miles northwest of downtown Los Angeles and immediately west of Six Flags Amusement Park. The Mission Village site is located within the Santa Clara River basin. The Santa Clara River flows through northernmost portions of the project site from

east to west. The overall geography of the site consists of large, moderately steep hills and canyons with several smaller ridgelines and canyons descending off the peak ridgelines of each hill. Portions of the site are currently used for agricultural purposes and are subject to cattle grazing. The project site is largely undeveloped except for roads and pads associated with past oil well drilling operations. Topography across the site is relatively steep, with elevations ranging from 940 feet to 1,500 feet amsl.

VEGETATION COMMUNITIES

A total of 26 plant communities (and alliances and associations) or land cover types (agriculture and developed areas) were identified and characterized as occurring on the project site during the field investigations. Acreages for each vegetation community occurring on the Mission Village site are shown in *Table 1*. Vegetation communities suitable for California gnatcatcher are described following *Table 1*. The vegetation communities correspond to the *Vegetation Classification and Mapping Program, List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003), where applicable. Where vegetation communities do not fit a defined vegetation community classification, they are defined by their dominant plant species.

TABLE 1
Vegetation Communities and Land Cover Types

Vegetation Community/Land Cover Type	Acreage
Agriculture	46.04
Big sagebrush scrub	12.78
California annual grassland	43.03
California sagebrush scrub	480.25
California sagebrush scrub–*Artemisia californica*	10.80
California sagebrush scrub–black sage	8.78
California sagebrush scrub–California buckwheat	58.51
California sagebrush scrub–purple sage	130.42
California sagebrush scrub/undifferentiated chaparral	13.87
Chamise chaparral	1.77
Coast live oak woodland	27.93
Developed	1.10
Disturbed land	175.08
Eriodictyon scrub	0.16
Giant reed grassland	5.55
Herbaceous wetlands	3.29
Hoaryleaf ceanothus chaparral	0.16
Mexican elderberry scrub	5.75
Mulefat scrub	0.41
River wash	103.10
Southern cottonwood–willow riparian forest	91.25

TABLE 1 (*Cont.*)
Vegetation Communities and Land Cover Types

Vegetation Community/Land Cover Type	Acreage
Southern willow scrub	2.15
Tamarisk scrub	1.05
Undifferentiated chaparral	23.44
Valley oak woodland	2.13
Valley oak/grassland	3.32
Total	1,252.12

Vegetation communities that provide potential habitat for the California gnatcatcher (California sagebrush scrub–*Artemisia californica* dominated, California sagebrush scrub–black sage, California sagebrush scrub–California buckwheat, California sagebrush scrub/undifferentiated, and California sagebrush scrub–purple sage) are described below. There is a total of approximately 535.5 acres of these vegetation types within the project area that are on slopes less than 50%. In accordance with the agreements between Newhall and the USFWS, only those areas with less than 50% slopes were surveyed. *Figure 3A* illustrates all suitable habitat areas for gnatcatcher on site.

There are 480.25 acres of California sagebrush scrub on the project site. Dominant native species found in this plant community include California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*) and California sagebrush (*Artemisia californica*). Other common plants include various sages (*Salvia leucophylla*, *S. mellifera*, *S. apiana*), California broom (*Lotus scoparius*), California aster (*Lessingia filaginifolia* var. *filaginifolia*), California encelia (*Encelia californica*), giant wild-rye (*Leymus condensatus*), and chaparral mallow (*Malacothamnus fasciculatus*). The understory generally is sparse and contains native grasses, including foothill needlegrass (*Nassella lepida*), and native herbs such as wishbone bush (*Mirabilis californica*) and morning-glory (*Calystegia macrostegia*).

Other coastal scrub alliances and associations were mapped on site. Each one is dominated by a particular species that characterizes the association. In some cases, the dominant plant species could be the only species present. These associations are listed below.

- California sagebrush scrub–*Artemisia californica* — 10.80 acres
- California sagebrush scrub–black sage — 8.78 acres
- California sagebrush scrub–California buckwheat — 58.51 acres
- California sagebrush scrub–purple sage — 130.42 acres
- California sagebrush scrub/undifferentiated chaparral (equal dominance of California sagebrush scrub and chaparral scrub species) — 13.87 acres

METHODS

The focused survey for the coastal California gnatcatcher was conducted on the project site between July 10, 2007, and January 10, 2008. The first four survey visits were conducted by biologist Jim Jennings (JJ; TE832515-3) and Compliance Biology Inc. biologists Ron Francis, Jr. (RF; TE085880-0) and Dave Crawford (DC; TE821229-5). Dudek biologists Jeff D. Priest (JDP; TE840619-3), Brock A. Ortega (BAO; TE813545-5), Tricia L. Wotipka (TLW; authorized under TE840619), Kam J. Muri (KJM; TE051250-2), and Paul M. Lemons (PML; TE051248-2) conducted the last five survey visits. The survey was conducted following the currently accepted protocol of the U.S. Fish and Wildlife Service, *Coastal California Gnatcatcher (Polioptila californica californica) Presence/Absence Survey Protocol* (July 28, 1997). The survey included nine visits at no less than 14-day intervals. Survey routes were arranged to ensure complete coverage of the suitable habitat on site (*Figures 3B–3H*). Each biologist used binoculars suitable for birding to aid in detecting and identifying bird species. The weather conditions were within protocol limits, as shown in *Table 2* below. A tape of recorded vocalizations was used frequently in order to elicit a response from the species. The tape was played approximately every 50 to 100 feet; if a gnatcatcher had been detected, the playing of the tape would have ceased to avoid harassment.

TABLE 2
Survey Details and Conditions

Survey Area	Date	Biologist's Initials	Time	Survey Conditions (skies, wind, temperature)
1	7/10/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/24/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/7/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/21/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/4/2007	JDP	0645–1005	78°–92° Fahrenheit (F); 0% cloud cover (cc), 0–3 mile per hour (mph) winds
	9/18/2007	TLW	0815–1120	67°F–74°F, 0% cc, 0–1 mph winds
	10/2/2007	TLW	0645–0855	54°F–67°F, 0% cc, 0–1 mph winds
	10/16/2007	JDP	0645–1025	54°F–66°F, 50%–25% cc, 0–2 mph winds
	10/31/2007	JDP	0830–1130	53°F–74°F, 0% cc, 0–1 mph winds
2	7/11/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/25/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.

TABLE 2 (*Cont.*)
Survey Details and Conditions

Survey Area	Date	Biologist's Initials	Time	Survey Conditions (skies, wind, temperature)
	8/8/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/22/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/5/2007	PML	0540–1030	67°F–87°F, 0% cc, 0–4 mph winds
	10/3/2007	KJM	0715–1130	68°F–84°F, 0% cc, 3–7 mph winds
	10/17/2007	TLW	0700–1050	57°F–69°F, 100%–35% cc, 0–1 mph winds
	11/2/2007	BAO	0700–1005	48°F–65°F, 10%–0% cc, 0–1 mph winds
	11/16/2007	KJM	0700–1015	55°F–73°F, 80%–20% cc, 0–3 mph winds
3	7/12/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/26/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/9/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/23/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/6/2007	PML	0540–1100	65°F–86°F, 40%–0% cc, 0–6 mph winds
	9/20/2007	TLW	0715–1135	54°F–71°F, 50% cc, 0–1 mph winds
	10/4/2007	TLW	0650–1050	57°F–75°F, 0% cc, 0–1 mph winds
	10/18/2007	TLW	0715–1115	61°F–76°F, 0% cc, 1–2 mph winds
	11/7/2007	TLW	0730–1105	54°F–75°F, 100%–25% cc, 0–1 mph winds
4	7/13/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/27/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/10/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/24/2007	JJ	Between 0600 and 1200	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	10/5/2007	PML	0700–1100	53°F–72°F, 0% cc, 0–5 mph winds, 10+ mph gusts
	10/19/2007	PML	0645–1130	58°F–73°F, 0% cc, 0–3 mph winds
	11/2/2007	JDP	0645–1130	48°F–68°F, 5%–0% cc, 0–3 mph winds
	12/27/2007	JDP	0800–1030	47°F–48°F, 20%–10% cc, 0–3 mph winds
	1/10/2008	PML	0800–1100	53°F–64°F, 50%–20% cc, 0–5 mph winds, 8+ mph gusts
5	7/10/2007	DC	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/24/2007	DC	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.

TABLE 2 (*Cont.*)
Survey Details and Conditions

Survey Area	Date	Biologist's Initials	Time	Survey Conditions (skies, wind, temperature)
	8/7/2007	DC	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/21/2007	DC	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/4/2007	PML	0630–1115	77°F–96°F, 0% cc, 0–4 mph winds
	9/18/2007	PML	0630–1130	54°F–75°F, 0%–5% cc, 0–5 mph winds
	10/2/2007	JDP	0640–1015	54°F–72°F, 0% cc, 0–1 mph winds
	10/17/2007	PML	0725–1100	58°F–68°F, 100%–5% cc, 0–2 mph winds
	11/8/2007	TLW	0735–1035	50°F–64°F, 100% cc, 0–1 mph winds
6	7/10/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/24/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/7/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/21/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/4/2007	KJM	0715–1125	76°F–95°F, 0% cc, 0–4 mph winds
	9/18/2007	KJM	0715–1100	62°F–71°F, 0% cc, 0–6 mph winds
	10/2/2007	KJM	0745–1115	54°F–78°F, 0% cc, 1–4 mph winds
	10/17/2007	JDP	0700–1155	57°F–69°F, 100%–10% cc, 0–2 mph winds
	11/16/2007	PML	0700–1100	55°F–76°F, 70%–40% cc, 0–2 mph winds
7	7/11/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	7/25/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/8/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	8/22/2007	RF	Between 0600 and 1100	Specific conditions not recorded; however, weather conditions were suitable per survey protocol.
	9/5/2007	KJM	0615–1130	64°F–94°F, 0% cc, 1–6 mph winds
	9/20/2007	JDP	0715–1200	54°F–71°F, 50% cc, 0–1 mph winds
	10/4/2007	JDP	0650–1148	57°F–75°F, 0% cc, 0–3 mph winds
	10/18/2007	PML	0650–1145	63°F–72°F, 0% cc, 1–4 mph winds, 5–10 mph gusts
	12/24/2007	PML	0740–1110	53°F–64°F, 0% cc, 0–6 mph winds, 6–10 mph gusts

RESULTS

No coastal California gnatcatchers were detected on site.

Eighty-six wildlife species were observed during the surveys, comprising two species of reptile, 70 bird species, 10 mammal species, and four species of butterfly. A full list of wildlife species observed during the survey is provided in *Appendix A*. Please feel free to contact me at 760.479.4238 with questions or if you require additional information.

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

Sincerely,

Paul M. Lemons
Wildlife Biologist

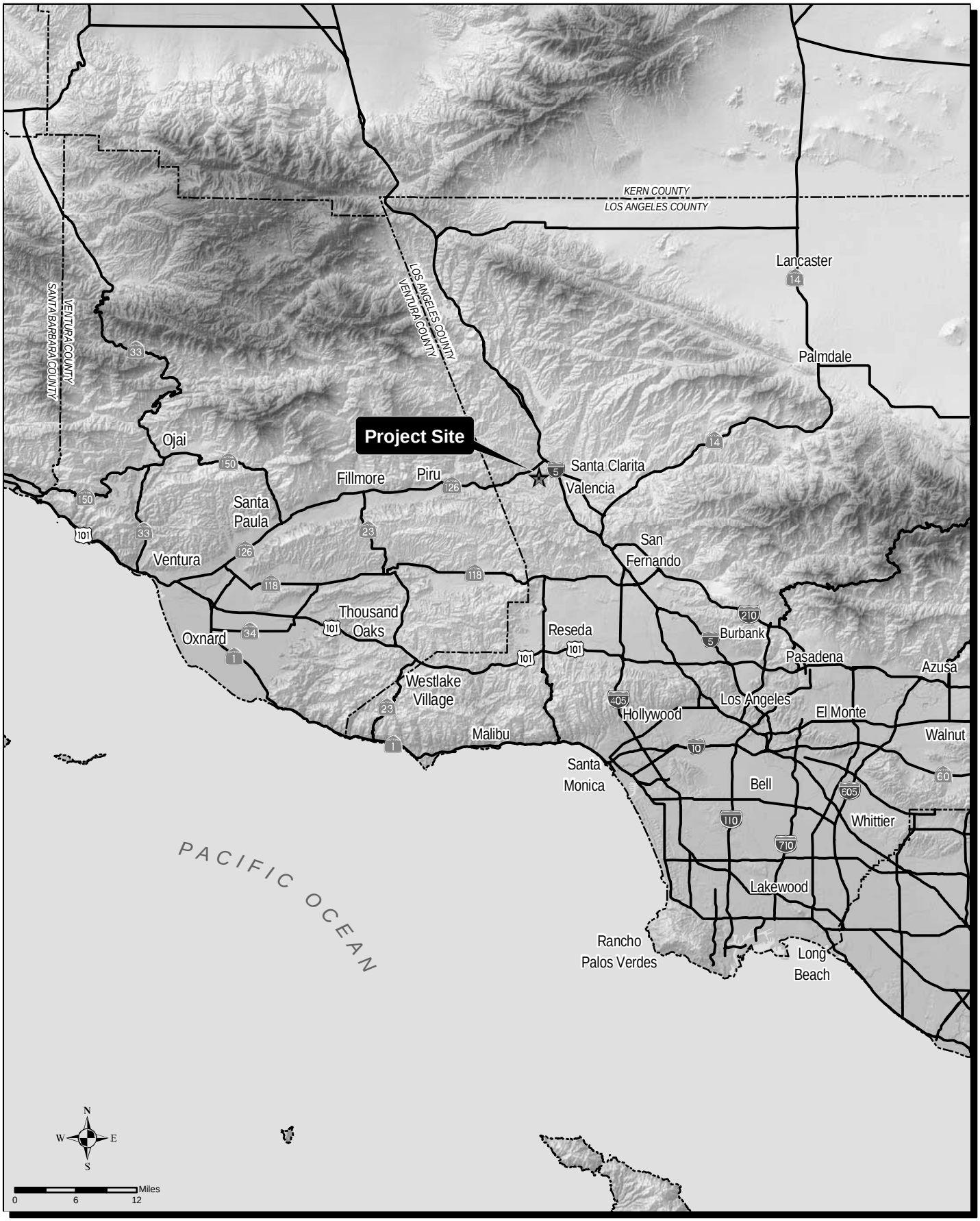
Att: *Figures 1–3H*
Appendix A

Cc: *Mark Subbotin, Newhall Land*
Matt Carpenter, Newhall Land
Glenn Adamick, Newhall Land
Brock Ortega, Dudek
Kam Muri, Dudek
Tricia Wotipka, Dudek
Jeff Priest, Dudek
Sherri Miller, Dudek

REFERENCES

California Department of Fish and Game. 2003. *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database*. September 2003.

U.S. Fish and Wildlife Service. 1997. *Coastal California Gnatcatcher (Polioptila californica californica) Presence/Absence Survey Protocol*. July 28, 1997.



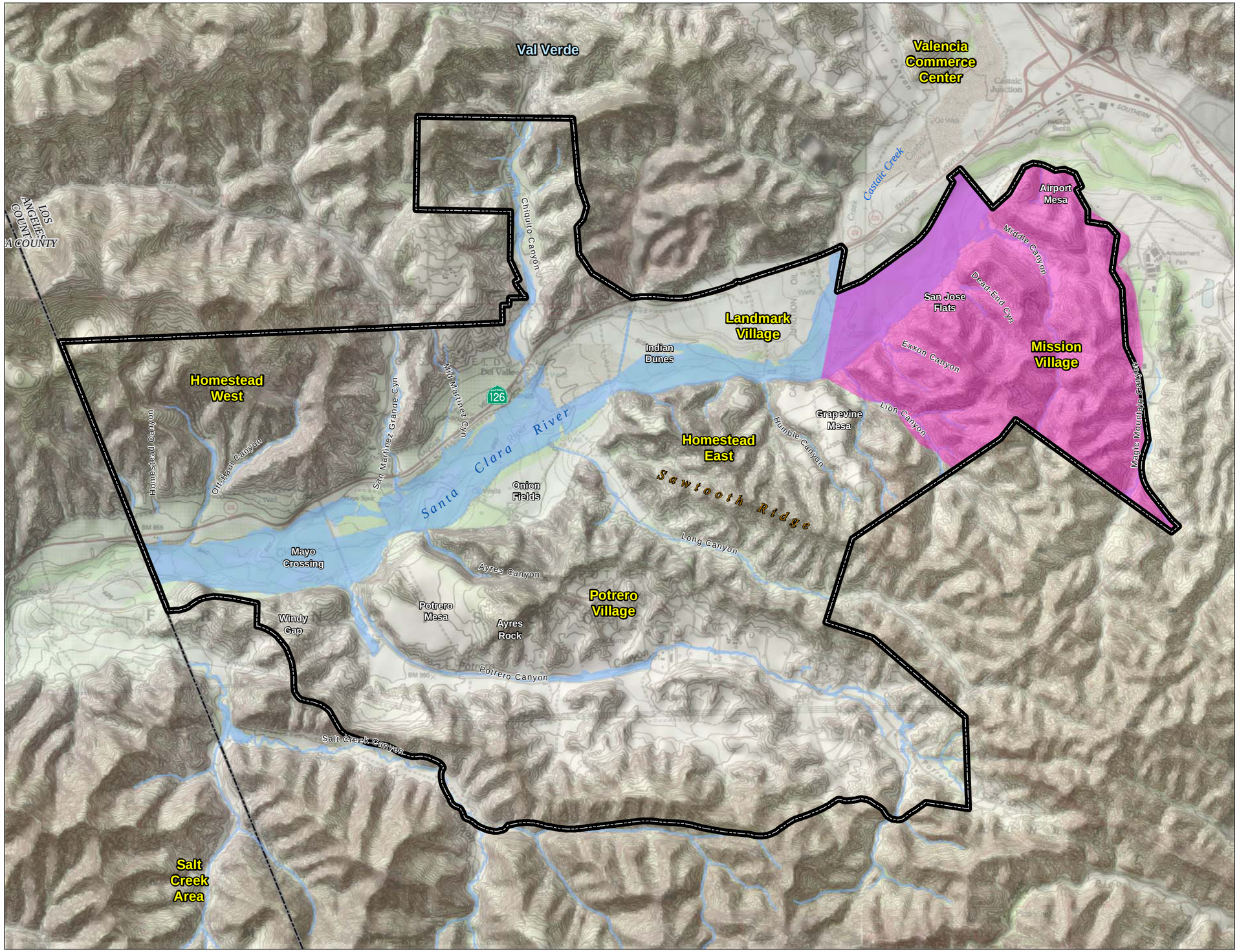
Z:\Projects\j373801\Newhall Ranch\arcmap\Mission Village\CAGN\ -SL 1/10/2008

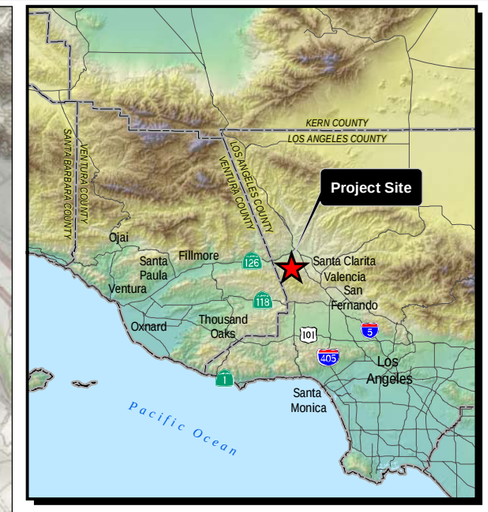
DUDEK
Santa Barbara GIS Division
621 Chapala Street
Santa Barbara, Ca 93101
(805)963-0651

Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Regional Map

FIGURE
1





Newhall Ranch SPA
Mission Village Project Site
County Boundary
2004 CDFG ACOE Jurisdiction

N

0 0.25 0.5 0.75 Miles

IMAGE SOURCE: USGS 24K Quad

Z:\Projects\373801\Newhall Ranch\arcmap\Mission Village\CAGN\ - SL 1/10/2008

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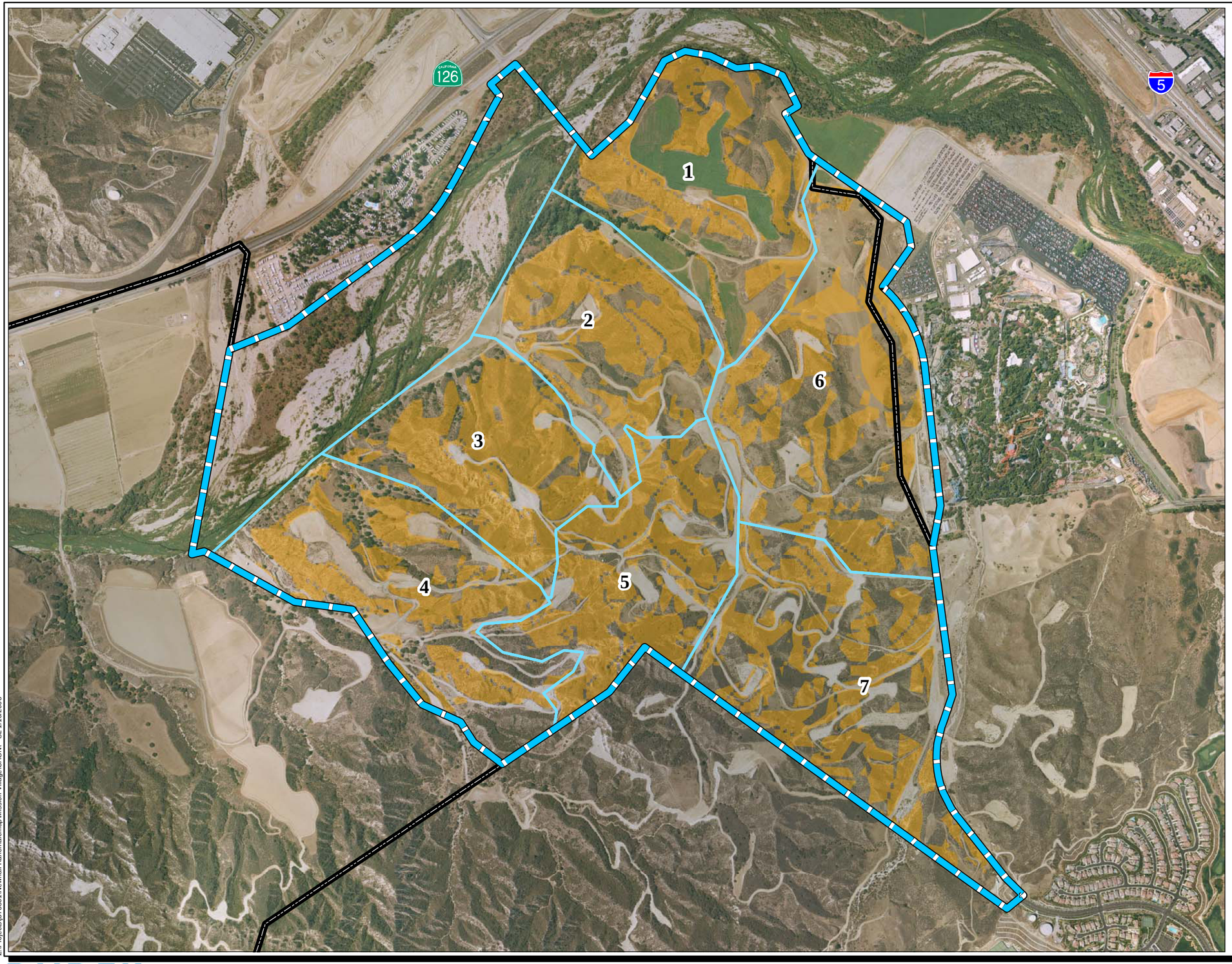
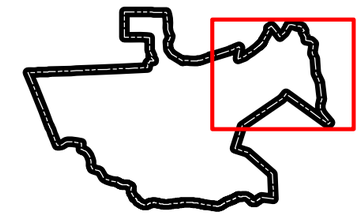
Santa Barbara, Ca 93101
(805) 963-0651

Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Vicinity Map

FIGURE 2





Newhall Ranch SPA

Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

N

0 600 1,200 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

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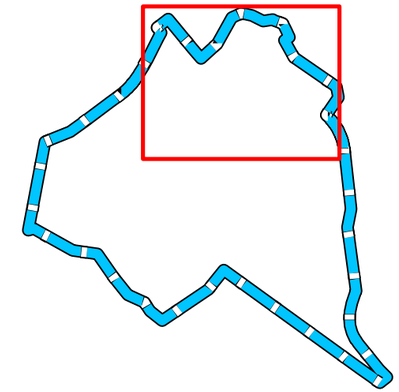
Focused Survey Areas

FIGURE 3A



Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Rufous-Crowned Sparrow

Cooper's Hawk

N

0 250 500 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

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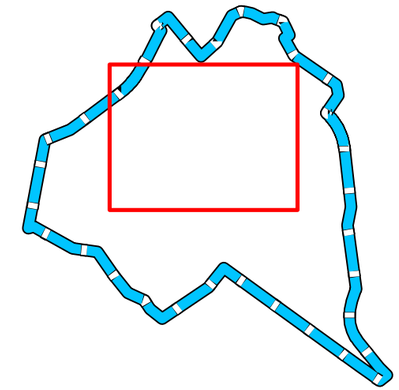
Focused Survey Area 1

FIGURE 3B



Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Northern Harrier

Rufous-Crowned Sparrow

Cooper's Hawk

N

0 250 500 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

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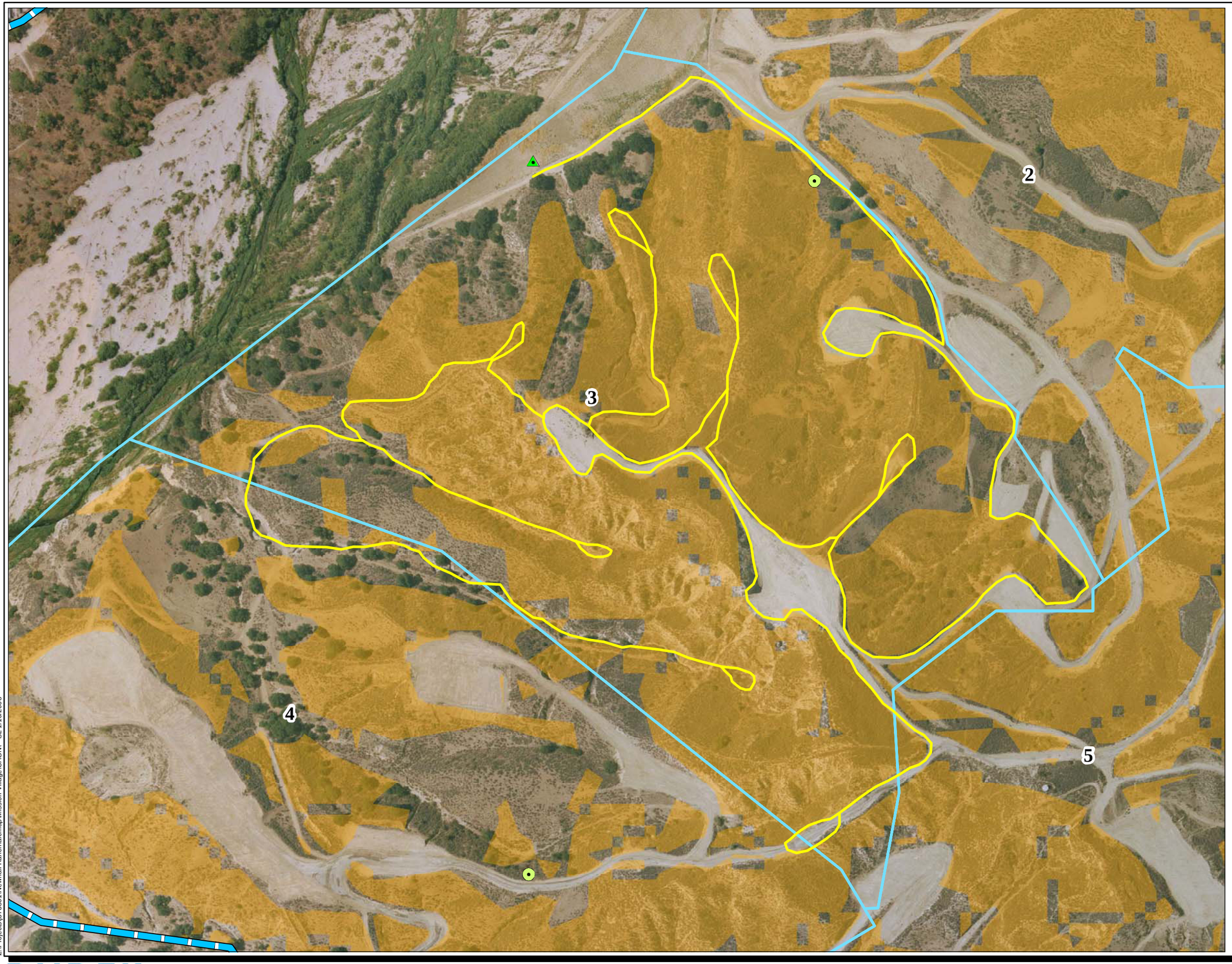
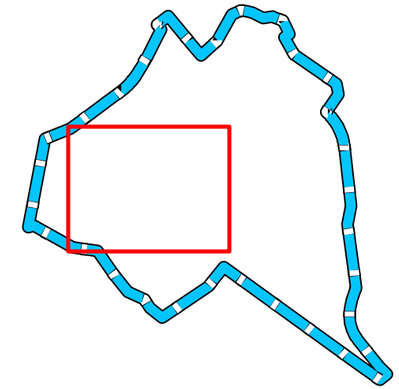
Focused Survey Area 2

FIGURE
3C





Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Northern Harrier

Rufous-Crowned Sparrow

Cooper's Hawk

N

0 250 500 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

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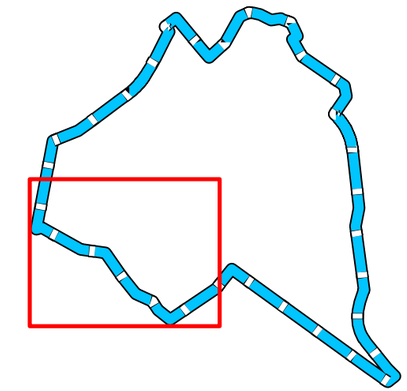
Focused Survey Area 3

FIGURE 3D



Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Rufous-Crowned Sparrow

N

0 250 500 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

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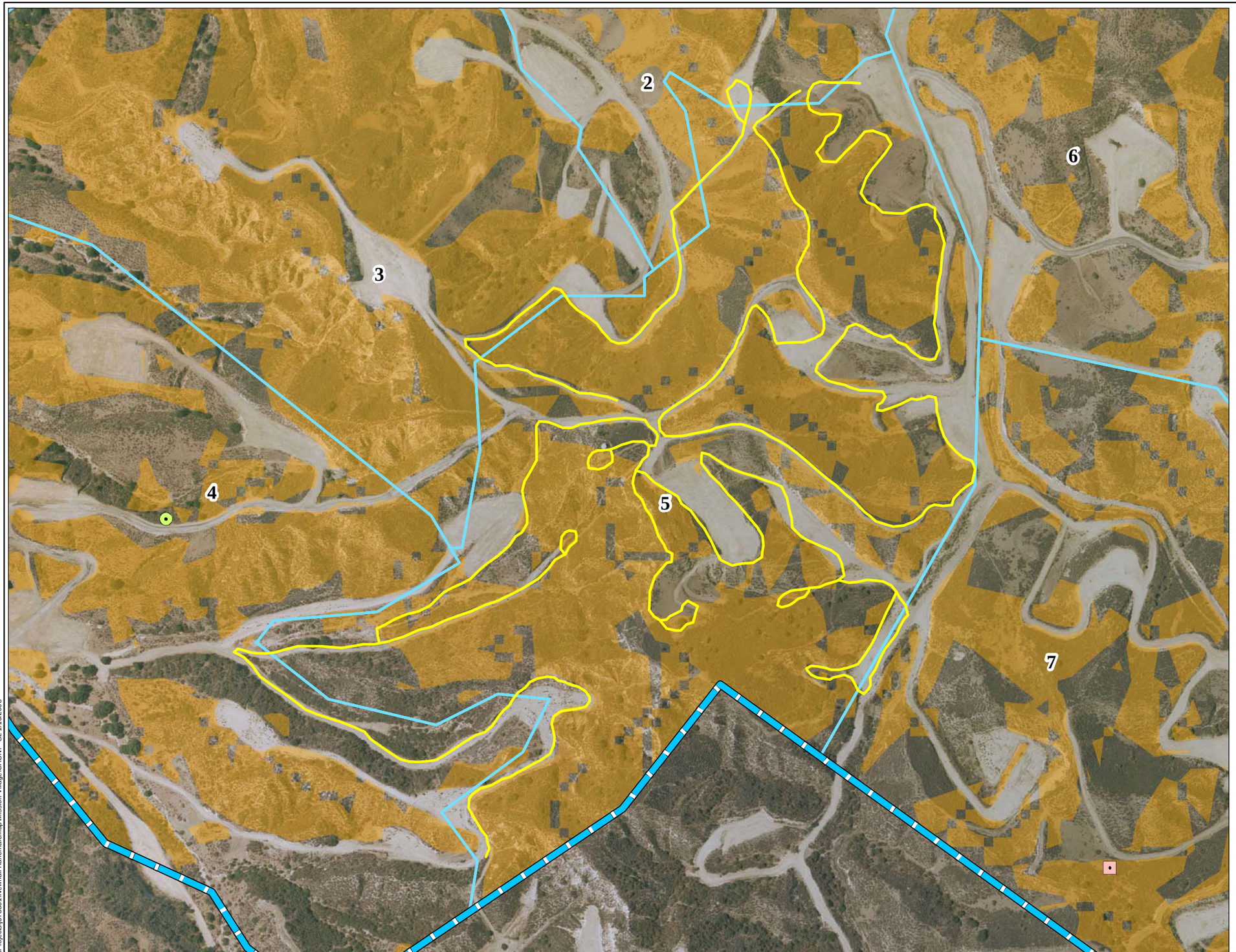
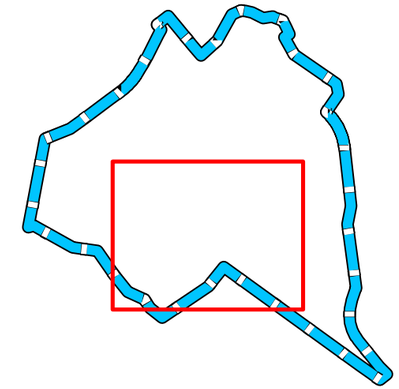
Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Focused Survey Area 4

FIGURE 3E





Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Rufous-Crowned Sparrow

Raptor Nest

N

Feet
0 250 500

IMAGE SOURCE: AirPhotoUSA, 2007

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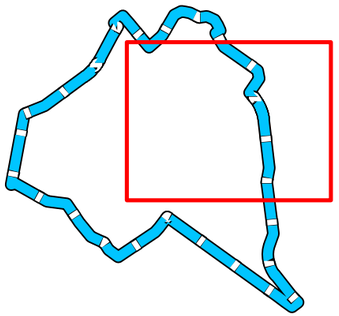
Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Focused Survey Area 5

FIGURE
3F



Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

Cooper's Hawk

Northern Harrier

Rufous-Crowned Sparrow

White-Tailed Kite

N

Feet
0 250 500

IMAGE SOURCE: AirPhotoUSA, 2007

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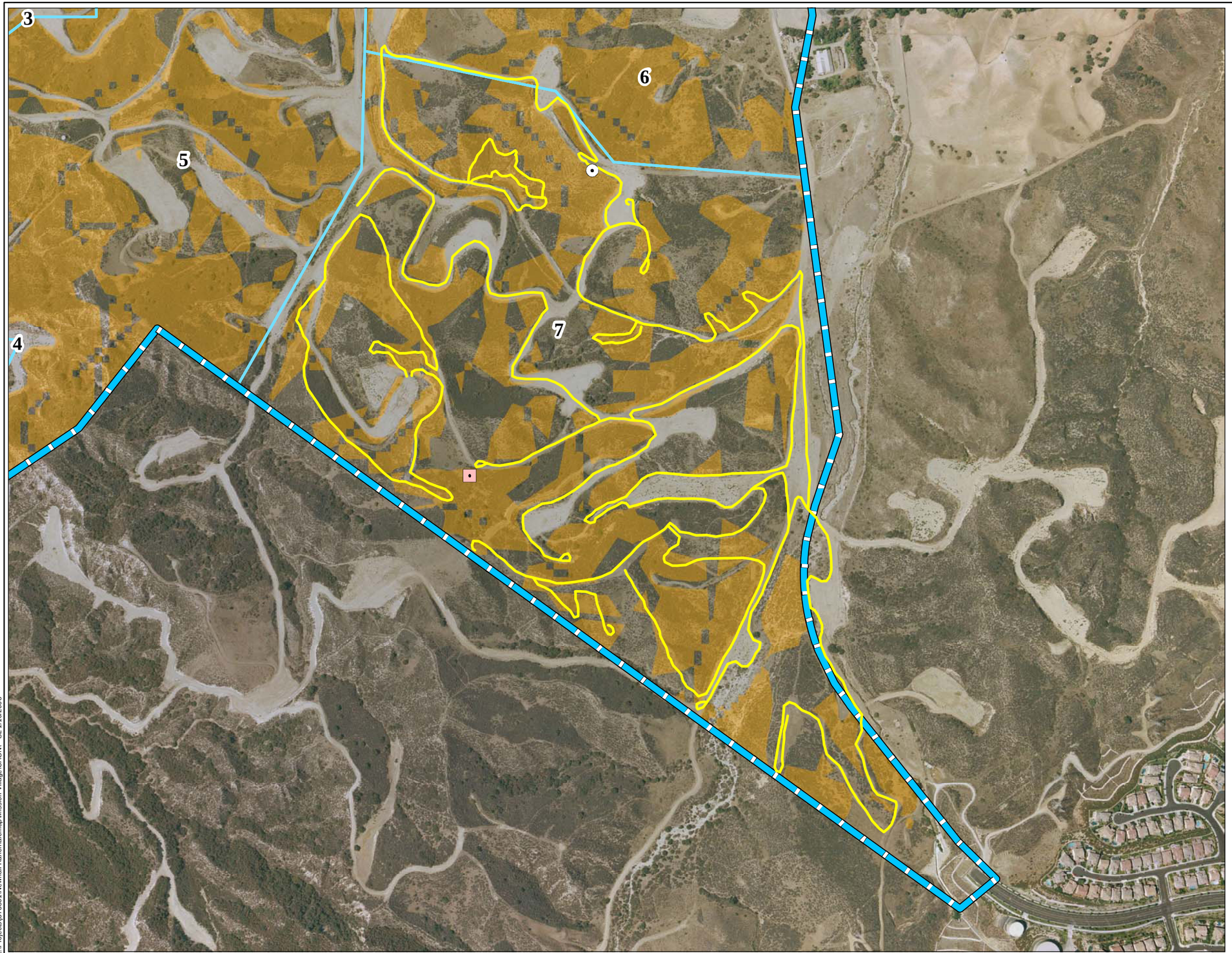
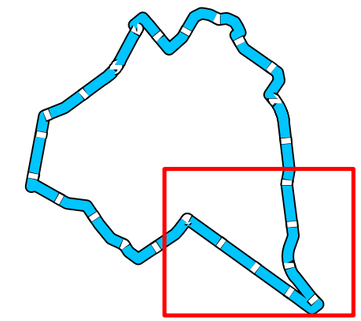
Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Focused Survey Area 6

FIGURE
3G





Mission Village Project Site

CAGN Survey Areas

CAGN Suitable Habitat

CAGN Survey Routes

Incidental Wildlife Sightings

White-Tailed Kite

Raptor Nest

N

Feet

0 250 500

IMAGE SOURCE: AirPhotoUSA, 2007

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Mission Village Coastal California Gnatcatcher 2007 Focused Survey Report

Focused Survey Area 7

FIGURE
3H

APPENDIX A

Wildlife Species Observed during California Gnatcatcher Surveys – Mission Village Project

APPENDIX A
Wildlife Species Observed during California Gnatcatcher Surveys
Mission Village Project

WILDLIFE SPECIES – VERTEBRATES

REPTILES

IGUANIDAE – IGUANID LIZARDS
Sceloporus occidentalis – western fence lizard
Uta stansburiana – side-blotched lizard

BIRDS

ARDEIDAE – HERONS
Ardea herodias – great blue heron
Ardea alba – great egret

ANATIDAE – WATERFOWL
Anas platyrhynchos – mallard

CATHARTIDAE – NEW WORLD VULTURES
Cathartes aura – turkey vulture

ACCIPITRIDAE – HAWKS
Accipiter cooperii – Cooper's hawk
Buteo jamaicensis – red-tailed hawk
Buteo lineatus – red-shouldered hawk
Circus cyaneus – northern harrier
Elanus leucurus – white-tailed kite

FALCONIDAE – FALCONS
Falco sparverius – American kestrel

PHASIANIDAE – PHEASANTS AND QUAILS
Callipepla californica – California quail

CHARADRIIDAE – PLOVERS
Charadrius vociferus – killdeer

SCOLOPACIDAE – SANDPIPERS
Numenius americanus – long-billed curlew

LARIDAE – GULLS AND TERNS
Larus occidentalis – western gull

COLUMBIDAE – PIGEONS AND DOVES
* *Columba livia* – rock dove
Patagioenas fasciata – band-tailed pigeon
Zenaida macroura – mourning dove

CUCULIDAE – CUCKOOS AND ROADRUNNERS
Geococcyx californianus – greater roadrunner

TYTONIDAE – BARN OWLS
Tyto alba – barn owl

STRIGIDAE – TRUE OWLS
Bubo virginianus – great horned owl

CAPRIMULGIDAE – GOATSUCKERS
Chordeiles acutipennis – lesser nighthawk

TROCHILIDAE – HUMMINGBIRDS
Calypte anna – Anna's hummingbird
Calypte costae – Costa's hummingbird
Selasphorus rufus – rufous hummingbird
Selasphorus sasi – Allen's hummingbird

PICIDAE – WOODPECKERS
Colaptes auratus – northern flicker
Melanerpes formicivorus – acorn woodpecker
Picoides nuttallii – Nuttall's woodpecker

TYRANNIDAE – TYRANT FLYCATCHERS
Myiarchus cinerascens – ash-throated flycatcher
Sayornis nigricans – black phoebe
Sayornis saya – Say's phoebe
Tyrannus vociferans – Cassin's kingbird
Tyrannus verticalis – western kingbird

ALAUDIDAE – LARKS
Eremophila alpestris – horned lark

HIRUNDINIDAE – SWALLOWS
Hirundo rustica – barn swallow

Petrochelidon pyrrhonota – cliff swallow
Stelgidopteryx serripennis – northern rough-winged swallow
Tachycineta thalassina – violet-green swallow

CORVIDAE – JAYS AND CROWS
Aphelocoma californica – western scrub-jay
Corvus brachyrhynchos – American crow
Corvus corax – common raven

PARIDAE – TITMICE
Baeolophus inornatus – oak titmouse

AEGITHALIDAE – BUSHTITS
Psaltriparus minimus – bushtit

TROGLODYTIDAE – WRENS
Thryomanes bewickii – Bewick's wren
Troglodytes aedon – house wren

REGULIDAE – KINGLETS
Regulus calendula – ruby-crowned kinglet

SYLVIIDAE – GNATCATCHERS
Polioptila caerulea – blue-gray gnatcatcher

TURDIDAE – THRUSHES AND BABBLERS
Sialia mexicana – western bluebird

TIMALIIDAE – LAUGHINGTHRUSH AND WRENTIT
Chamaea fasciata – wrentit

MIMIDAE – THRASHERS
Mimus polyglottos – northern mockingbird
Toxostoma redivivum – California thrasher

PTILOGONATIDAE – SILKY-FLYCATCHERS
Phainopepla nitens – phainopepla

LANIIDAE – SHRIKES
Lanius ludovicianus – loggerhead shrike

STURNIDAE – STARLINGS
* *Sturnus vulgaris* – European starling

VIREONIDAE – VIREOS
Vireo huttoni – Hutton's vireo

PARULIDAE – WOOD WARBLERS
Dendroica coronata – yellow-rumped warbler
Dendroica petechia – yellow warbler

EMBERIZIDAE – BUNTINGS AND SPARROWS
Aimophila ruficeps – rufous-crowned sparrow
Chondestes grammacus – lark sparrow
Melospiza melodia – song sparrow
Passerculus sandwichensis – Savannah sparrow
Pipilo crissalis – California towhee
Pipilo maculatus – spotted towhee
Zonotrichia leucophrys – white-crowned sparrow

CARDINALIDAE – CARDINALS AND GROSBEAKS
Pheucticus melanocephalus – black-headed grosbeak

ICTERIDAE – BLACKBIRDS AND ORIOLES
Euphagus cyanocephalus – Brewer's blackbird
Sturnella neglecta – western meadowlark

FRINGILLIDAE – FINCHES
Carpodacus mexicanus – house finch
Carduelis psaltria – lesser goldfinch
Carduelis tristis – American goldfinch

MAMMALS

LEPORIDAE – HARES AND RABBITS
Sylvilagus bachmani – brush rabbit

SCIURIDAE – SQUIRRELS
Spermophilus beecheyi – California ground squirrel

GEOMYIDAE – POCKET GOPHERS
Thomomys bottae – Botta's pocket gopher

MURIDAE – RATS AND MICE
Neotoma sp. – woodrat (midden)

CANIDAE – WOLVES AND FOXES
Canis latrans – coyote

PROCYONIDAE – RACCOONS AND RELATIVES
Procyon lotor – common raccoon

MUSTELIDAE – WEASELS, SKUNKS, AND OTTERS
Mephitis mephitis – striped skunk

FELIDAE – CATS
Lynx rufus – bobcat

CERVIDAE – DEERS
Odocoileus hemionus – mule deer

BOVIDAE – BISON, GOATS, AND SHEEP
* *Bos bovis* – domestic cattle

WILDLIFE SPECIES – INVERTEBRATES

BUTTERFLIES AND MOTHS

PAPILIONIDAE – SWALLOWTAILS
Papilio rutulus – tiger swallowtail

PIERIDAE – WHITES AND SULFURS
Pieris rapae rapae – cabbage butterfly
Pontia protodice – checkered white

RIODINIDAE – METALMARKS
Apodemia mormo virgulti – Behr's metalmark

* signifies introduced (non-native) species

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Dudek, "2007 Sensitive Plant Survey Results for the Newhall Ranch Specific Plan Area, Los Angeles County, California" (December 2007)

2007 Sensitive Plant Survey Report

Newhall Ranch

DECEMBER 2007

PREPARED FOR:

The Newhall Land and Farming Company
23823 Valencia Blvd.
Valencia, CA 91355

PREPARED BY:

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25152 Springfield Court, Suite 180
Valencia, CA 91355

2007 SENSITIVE PLANT SURVEY RESULTS
for
NEWHALL RANCH SPECIFIC PLAN AREA
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

Newhall Land
23823 Valencia Boulevard
Valencia, California 91355
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Prepared by:

DUDEK

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December 2007

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1.0 INTRODUCTION

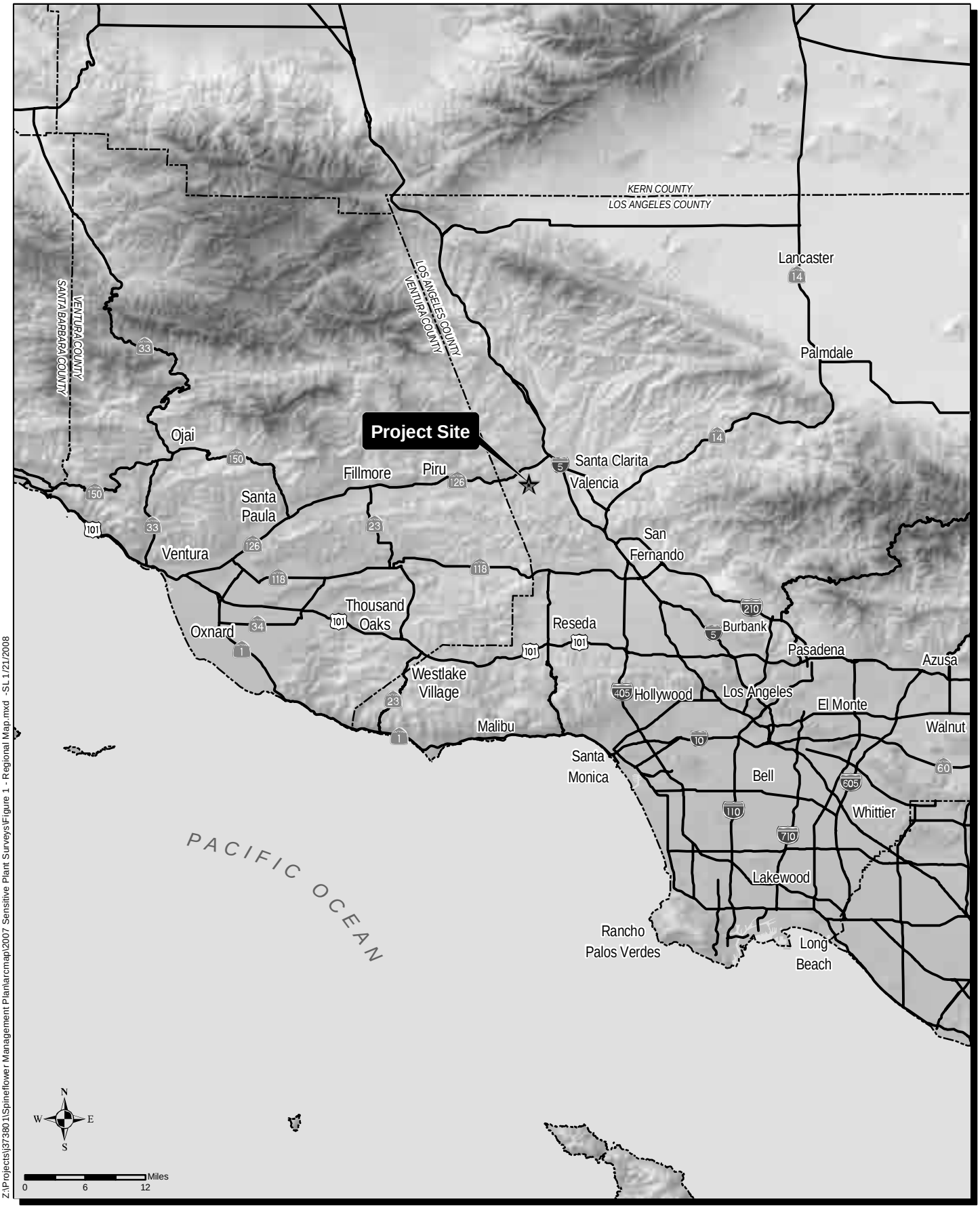
The purpose of this report is to document the results of surveys for sensitive plant species within the approximately 7,778-acre Newhall Ranch Specific Plan study area, a subset of the 11,963-acre Newhall Ranch Specific Plan area, for the 2007 field season. Surveys focused on known locations of the state-listed endangered San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) (SFVS). Other sensitive plant species were recorded if observed on site.

2.0 SITE DESCRIPTION

The Newhall Ranch Specific Plan study area is located in an unincorporated portion of the Santa Clara River Valley in northwestern Los Angeles County (*Figure 1*). It lies roughly one-half mile west of Interstate 5 (I-5) and largely southwest of the junction of I-5 and State Route 126 (SR-126), with portions of the Specific Plan study area located in San Martinez Grande and Chiquito canyons north of SR-126. The City of Santa Clarita is located to the east of the study area, and the Ventura County/Los Angeles County line lies along the western boundary. Site elevations range from 825 feet above mean sea level (AMSL) in the Santa Clara River bottom at the Ventura County/Los Angeles County line to approximately 3,200 feet AMSL on the ridgeline of the Santa Susana Mountains along the southern boundary (*Figure 2*).

Dudek surveyed known locations of SFVS within areas that are designated for development according to the approved Specific Plan. The Newhall Ranch Specific Plan study area consists of approximately 7,778 acres, with the actual area surveyed containing approximately 6,644 acres. The study area includes areas north of SR-126 between Chiquito Canyon west to the Ventura County line; south of SR-126, it includes areas between the Airport Mesa and Potrero Canyon, including Middle, Dead-End, Lion, Humble, and Long canyons. However, the active channel in the Santa Clara River, agriculture fields (e.g., Potrero Mesa), and areas currently proposed for conservation (most notably the “High Country” area) were excluded from the study area. This study area is dominated by east-, west-, and northwest-trending primary ridges, with north- and south-trending secondary ridges. Site elevations range from approximately 850 feet AMSL in the Santa Clara River floodplain to approximately 2,000 feet AMSL along the ridgeline, which separates Potrero Canyon from Salt Creek Canyon and Grave Canyon.

Slope gradients range from moderate to very steep in the hillside areas to very gentle within the Santa Clara River floodplain, tributary canyons, and associated mesas. Distinctive elevated geographic features include Sawtooth Ridge; Razorback Ridge; Windy Gap; Ayers Rock; and Potrero, Grapevine, and Airport Mesas.



Z:\Projects\j373801\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 1 - Regional Map.mxd -SL 1/21/2008

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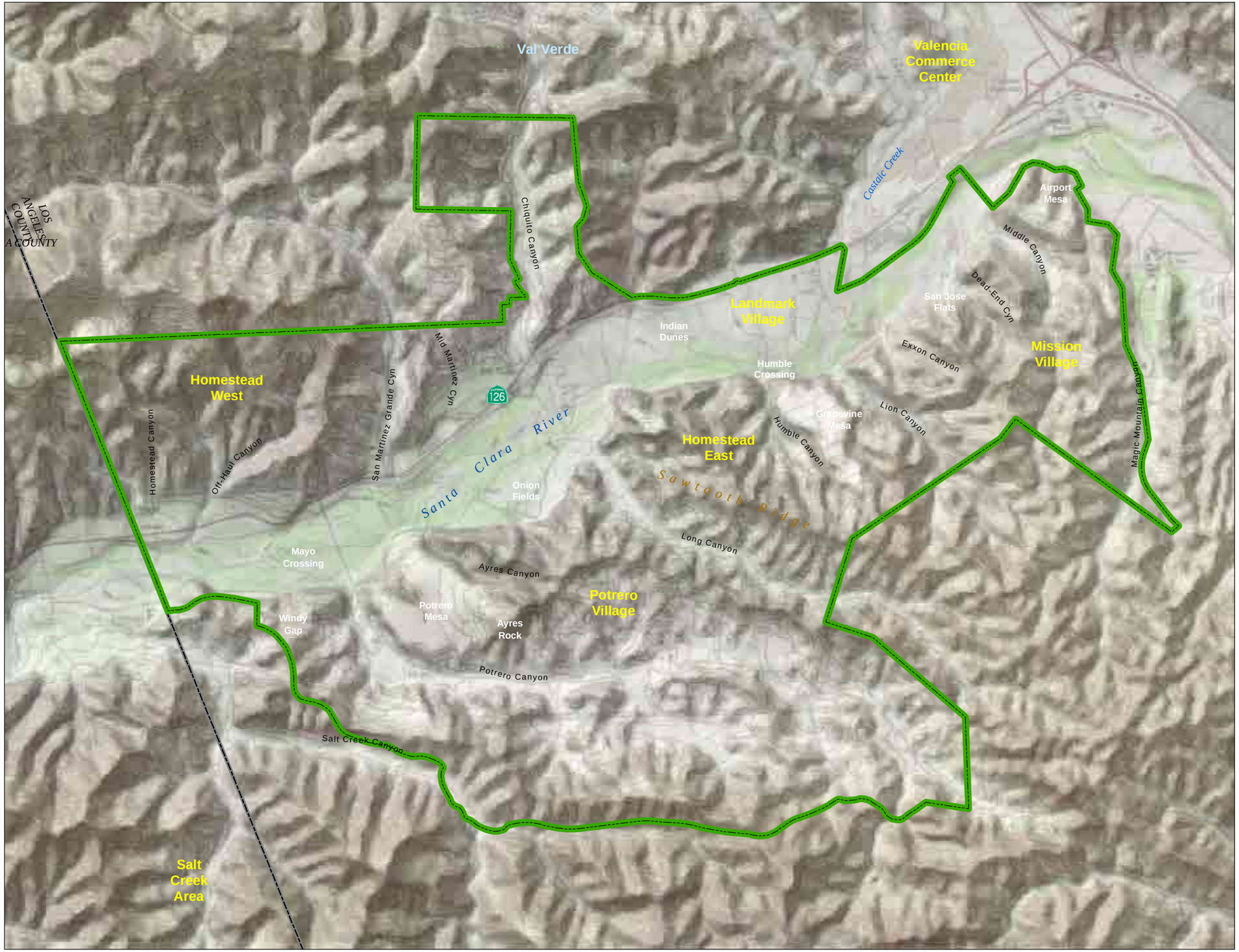
Newhall Ranch - 2007 Sensitive Plant Surveys

Regional Map

FIGURE
1



Newhall Ranch Specific Plan study area

County Boundary

N

0 0.25 0.5 0.75 1 Miles

IMAGE SOURCE: USGS 24K Quad

Z:\Projects\37380\1\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 2 - Vicinity Map.mxd SL 1/21/2008

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Newhall Ranch - 2007 Sensitive Plant Surveys

Vicinity Map

FIGURE 2

2.1 Plant Communities and Land Covers

Native and naturalized vegetation communities within the study area are representative of those found in this region and provide examples of those plant communities found in the Santa Susana Mountains and the Santa Clara River ecosystems. Upland vegetation types dominate the landscape within the study area both north and south of the Santa Clara River. The majority of the site consists of the following upland plant communities: Coastal scrub (including alliances and associations), chaparral (including alliances and associations), coast live oak woodlands, mixed oak woodlands, valley oak woodlands and savannahs, California walnut woodland, and California annual grasslands. The Santa Clara River and its tributaries support a variety of riparian and scrub vegetation communities. These include southern cottonwood willow riparian forest, southern willow scrub, oak riparian forest, mulefat scrub, arrow weed scrub, big sagebrush scrub, alluvial scrub, herbaceous wetlands, coastal and valley freshwater marsh and cismontane alkali marsh. Intermittent and ephemeral drainages onsite also provide habitat for scalebroom and Great Basin series and alluvial scrubs.

Newhall Land leases out portions of the study area for oil and natural gas production, cattle grazing and agricultural operations (e.g., food crop production, dryland farming, honey farming). All such operations are currently ongoing. Grazing activities and oil and natural gas production have had a noticeable effect on much of the natural vegetation communities on site. Scrub communities have been displaced by non-native grasslands as a result of grazing. Southern California Edison and Southern California Gas Company have distribution lines within easements on site as well.

2.2 Geology and Soils

Geologically, the study area is located within the Transverse Ranges geomorphic province of Southern California in the eastern portion of the Ventura depositional basin. This basin was produced by tectonic downwarping in the geologic past to produce a large-scale synclinal structure in which a thick sequence of Cenozoic sediments has accumulated. These sediments have been lithified into a sequence of sedimentary rock that has subsequently been uplifted, tilted, and tectonically deformed (Allan E. Seward 2002, 2004). They are cut by segments of the Del Valle and Salt Creek faults. Bedrock formations found on site include the Modelo, Towsley, Pico, Saugus, and Pacoima formations, as well as Quaternary Terrace deposits. Surficial deposits include Quaternary alluvium, slopewash, soil, and artificial fill (Allan E. Seward 2002, 2004).

3.0 SURVEY METHODS

Data regarding botanical resources present in the Specific Plan study area were obtained through a review of the pertinent literature, field reconnaissance, and focused surveys for sensitive species, with varying levels of specificity, all of which are described below.

3.1 Literature Review

General floristic and sensitive botanical resources present or potentially present within the Newhall Ranch Specific Plan study area were identified through a literature search using the following sources: the California Natural Diversity Database for the Newhall, Santa Susana, Oat Mountain, Mint Canyon, San Fernando, Green Valley, Warm Springs Mountain, Whitaker Peak, Cobblestone Mountain, Piru, Simi, Thousand Oaks, and Val Verde quadrangle maps (CDFG 2007); 2002 and 2003 Sensitive Plant Survey Results for Newhall Ranch Specific Plan Area (Dudek 2002, 2004a); 2003 Sensitive Plant Survey Results for Valencia Commerce Center, Castaic Mesa, Isola and Ventura Homestead Sites, Magic Mountain Entertainment Center (Entrada) Site, Castaic Junction Site, and Salt Creek (Dudek 2004b, 2004c, 2004d, 2004e, 2004f, 2004g); 2004 Sensitive Plant Survey Results for Valencia Commerce Center, Entrada Site, Legacy, and Newhall Ranch Specific Plan Area (Dudek 2004h, 2004i, 2004j, 2004k); 2005 Sensitive Plant Survey Results for Valencia Commerce Center, Entrada Site, and Newhall Ranch Specific Plan Area (Dudek 2006a, 2006b, 2006c); 2006 Sensitive Plant Survey Results for Valencia Commerce Center, Entrada Site, and Newhall Ranch Specific Plan Area (Dudek 2006d, 2006e, 2006f); *Biological Resource Assessment of the Proposed Santa Susana Mountains/Simi Hills Significant Ecological Area* (PCR et al. 2002); CalFlora (2002); U.S. Fish and Wildlife Service (USFWS 1999); *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2001); *Vascular Flora of the Liebre Mountains, Western Transverse Ranges, California* (Boyd 1999); *Checklist of Rare Ventura County Rare Plant Species* (Magney 2002); *A Flora of the Santa Barbara Region, California* (Smith 1976); *A Flora of the Santa Monica Mountains, California* (Raven et al. 1986); *Revised Report: Biology of the San Fernando Valley Spineflower, Ahmanson Ranch, Ventura County, California* (Glenn Lukos and Sapphos Environmental 2000); *Report to the Fish and Game Commission on the Status of San Fernando Valley Spineflower* (CDFG 2001); Biota Report, Newhall Ranch Specific Plan (RECON and Impact Sciences 1996); and herbarium specimens from Rancho Santa Ana Botanic Garden (RSA) and the University of California, Riverside (UCR) Herbarium. General vegetation communities' information was obtained from Holland (1986), Sawyer and Keeler-Wolf (1995), and CDFG (2003). Plant species nomenclature follows Hickman (1993).

3.2 Field Reconnaissance Methods

Botanical surveys were conducted by Dudek staff biologists, with assistance provided by Anuja Parikh and Nathan Gale of FL*x*. All surveys were conducted on foot. Surveys were conducted in teams of two or more biologists, with at least one senior-level biologist included with each team. Resumes for survey personnel are provided in *Appendix A.*

Botanical surveys of the site were conducted between late May and mid-July of 2007 in accordance with the schedule provided in *Table 1*. Approximately 750 person-hours (75 person-days) were spent conducting SFVS surveys within the study area. Biologists were able to observe reference populations of SFVS and other sensitive plant species in order to develop a search-image prior to conducting surveys of the study area. Surveys focused on the identification and location of SFVS within known populations. Additional sensitive plant species observed during SFVS surveys, including California Native Plant Society (CNPS) List 1B and List 4 species, were also recorded.

Table 1
Survey Schedule & Personnel: Newhall Ranch Specific Plan Area

Date	Biologists	Purpose	General geographic Area
5-21-07	Adam Causey, Callie Ford, Galen Hagen, Rebekah Krebs,Thomas Liddicoat	Focused surveys for SFVS; other sensitive plant species noted as observed.	San Martinez Canyon, Potrero Canyon
5-22-07	Britney Strittmater, Callie Ford, Galen Hagen, Rebekah Krebs, Thomas Liddicoat	Focused surveys for SFVS; other sensitive plant species noted as observed.	Grapevine Mesa
5-23-07 to 5-24-07	Adam Causey, Britney Strittmater, Callie Ford, Galen Hagen, Thomas Liddicoat	Focused surveys for SFVS; other sensitive plant species noted as observed.	Grapevine Mesa
5-29-07 to 5-31-07	Adam Causey, Britney Strittmater,	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa
6-01-07	Britney Strittmater, Galen Hagen, Jon Jones	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa
6-13-07 to 6-14-07	Brianna Wood, Britney Strittmater, Galen Hagen, Marcus Obregon	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa
6-15-07	Brianna Wood, Britney Strittmater, Galen Hagen, Marcus Obregon	Focused surveys for SFVS; other sensitive plant species noted as observed.	San Martinez Canyon
6-18-07 to 6-21-07	Britney Strittmater, Marcella Waggoner, Marcus Obregon	Focused surveys for SFVS; other sensitive plant species noted as observed.	San Martinez Canyon
7-02-07	Britney Strittmater, Galen Hagen	Focused surveys for SFVS; other sensitive plant species noted as observed.	Grapevine Mesa
7-03-07	Adam Causey, Britney Strittmater,	Focused surveys for SFVS; other sensitive	Grapevine Mesa

Table 1
Survey Schedule & Personnel: Newhall Ranch Specific Plan Area

Date	Biologists	Purpose	General geographic Area
	Galen Hagen	plant species noted as observed.	
7-12-07 to 7-13-07	Britney Strittmater, Callie Ford, Rebekah Krebs	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa, Potrero Canyon
7-16-07 to 6-18-07	Britney Strittmater, Jon Jones, Marcus Obregon	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa, Grapevine Mesa
7-18-07	FLx (Anujah Parikh , Nathan Gale)	Focused surveys for SFVS; other sensitive plant species noted as observed.	Airport Mesa, Potrero Canyon

All plant species encountered during the field surveys were identified and recorded for inclusion in *Appendix B*. Latin and common names of plants follow *The Jepson Manual* (Hickman 1993) or other recently published taxonomic treatments. Where not listed in Hickman (1993), common names were taken from Abrams (1923). Where not found in this reference, a variety of sources were used (e.g., Dale 1985 or Roberts 1998).

Surveys in the Newhall Ranch Specific Plan study area during the 2007 field season focused on the observation of current year SFVS plants, with observations of other sensitive plant species noted when observed. Surveys for SFVS were focused in areas of known SFVS populations, generally open areas of California sagebrush, California sagebrush-purple sage series, California buckwheat and California annual grassland series (Sawyer and Keeler-Wolf 1995) on ridgelines, slopes, and escarpments with a southern, southwestern, or southeastern exposure. This strategy was based on information gathered during the documentation of SFVS populations flagged by the CDFG; information gathered during surveys by Dudek for SFVS populations in the Newhall Ranch Specific Plan study area during 2002, 2003, 2004, 2005 and 2006; information contained in the report prepared by Glenn Lukos Associates, Inc. and Sapphos Environmental, Inc. (2000); the status report prepared for the Fish and Game Commission (CDFG 2001); and conversations with Rick Reifner, the botanist who rediscovered SFVS at Ahmanson Ranch in 1999.

While surveying in the field and mapping SFVS, a 4-meter (13.1-foot) rule was used to separate polygons for mapping purposes. This distance is a heuristic mapping tool based on the topography, vegetation, detectability of the plants, the general accuracy of the GPS, and time constraints. This heuristic criterion is not specifically tied to SFVS biology (i.e., reproductive biology, seed dispersal) and thus is not intended to reflect reproductively isolated sub-populations, the total extent of the SVFS seed bank, or any other feature of the species life history.

The outer perimeter of each SFVS polygon was searched in one continuous direction until returning to the starting point, with plants being located within at least every 1 to 4 meters (3.3 to 13.1 feet) along the boundary, and points were stored with a Trimble GPS (that has sub-meter accuracy) manually to form the boundaries of the polygon. GPS points were taken every one to four meters. Each SFVS polygon was given a unique identifier (i.e., numbers and/or letters) in the field. Data was either directly entered into the GPS or on field data sheets for each of the SFVS polygons that include data on site conditions (i.e., plant number estimates, associated species). A field checklist also was compiled of polygon numbers and method of data entry (i.e., GPS unit or field form) for each polygon surveyed each day. Polygons were analyzed in the lab and delineated based on a 4-meter minimum convex polygon rule (i.e., all polygons within 4 meters of each other will be joined using GIS software (e.g., ArcGIS, AutoCAD), then delineated as one polygon with the outer boundary represented by a minimum convex polygon).

Due to the small numbers of SFVS individuals that were observed during the 2007 field season, each population was determined through direct counting. No other sensitive plant species were observed. Information regarding the mapping for SFVS is included in *Section 4.2.1* below.

3.2.1 Sensitive Plant Species

Sensitive plant species are those species that have been given special recognition by federal, state, or local conservation agencies and organizations due to limited, declining, or threatened population sizes. This includes those species listed by the state and federal government as threatened or endangered, those species proposed for state and/or federal listing or candidates, those plant species found on Lists 1A, 1B or 2 of the *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2001) or CNPS online inventory (CNPS 2007), and those plant species which are found on the list of "Threatened and Endangered Species and Species of Concern, Los Angeles County" (Los Angeles Almanac 2007). CNPS List 3 or List 4 species were included in discussions only when encountered during the field surveys. Focused surveys were conducted only in areas that were previously known to support SFVS.

3.2.2 Survey Limitations

Surveys were conducted in the late spring and summer of 2007. The timing of the surveys was coincident with the blooming period for SFVS and other early blooming annual species. Surveys continued past the peak bloom period for the SFVS into the summer when SFVS became a highly visible brick red while all of the other plants dried and faded to pale straw colors. Surveying during these two time periods maximized the potential for detection of SFVS during the survey effort.

Surveys for SFVS were concentrated in areas of suitable habitat, which was generally in openings in vegetation and/or on south-facing slopes. Other sensitive species were recorded when observed.

The focused surveys for SFVS were conducted during daylight hours under weather conditions that did not preclude observation of sensitive plant species (e.g., surveys were not conducted during heavy fog or rain).

The rainfall in the winter and spring of 2007 was less than average; consequently, the new vegetation growth was also very low. The SFVS were smaller and less abundant this year compared to previous years. In addition, other sensitive plant species were not incidentally observed as they had been in previous years.

4.0 RESULTS OF SURVEYS

4.1 Botany – Floral Diversity

The study area is situated at the nexus of the Transverse Ranges, Coast Ranges, Sierra Nevada, Mojave Desert, and coastal plains (Hickman 1993). Ecotone areas such as this are often characterized by higher biological diversity than similar-sized areas within the core of a physiographic region (Boyd 1999). As such, a high diversity of plant species is expected during a year of average rainfall for the area.

At least 562 plant species were identified within the Newhall Ranch Specific Plan study area. Of these, 406 species (72%) are native to the region and 156 species (28%) are nonnative. The cumulative list of plant species identified on the site in 2002, 2003, 2004, 2005, 2006 and 2007 is provided as *Appendix B.*

4.2 Sensitive Plant Species

Focused surveys were conducted within those areas that were previously known to support SFVS occurrences, and SFVS was the only sensitive plant species observed during the course of 2007 SFVS surveys. Other sensitive species that have the potential to occur within the VCC study area, based on the presence of suitable habitat and soils, are listed in *Table 2.* The sensitive species listed in *Table 2* are confined primarily to those species listed by the state and federal government as threatened or endangered, those species proposed for state and/or federal listing or candidates, and those plant species found on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001) or CNPS online inventory (CNPS 2007).

Table 2
Sensitive Plant Species Observed or Potentially Occurring in the Newhall Ranch Specific Plan Study Area

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Arenaria paludicola	marsh sandwort	FE/SE	1B	Dense freshwater marsh/perennial herb/May-August	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; nearest occurrence is in the Santa Ana River. Limited suitable habitat on site; very low likelihood of occurrence within the study area.
Astragalus brauntonii	Braunton's milk-vetch	FE/None	1B	Chaparral, coastal sage scrub, grasslands; often on carbonate substrates/perennial herb/March-July	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; nearest occurrence is in the Simi Hills. Suitable habitat exists on site. Moderate likelihood of occurrence within the study area.
Atriplex coulteri	Coulter's saltbush	None/None	1B	Coastal sage scrub and grasslands on alkaline or clay substrate/perennial herb/March-October	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, suitable habitat is present on site. Moderate likelihood of occurrence within the study area.
Atriplex serenana var. *davidsonii*	Davidson's saltscale	None/None	1B	Coastal bluff scrub and coastal sage scrub on alkaline substrate/annual herb/May- October	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. *Atriplex serenana var. serenana* observed on site. Low likelihood of occurrence within the study area.
Baccharis malibuensis	Malibu baccharis	None/None	1B	Chaparral, coastal sage scrub, cismontane woodland/deciduous shrub/August	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; closest known populations in the western Santa Monica Mountains near Malibu. Not expected to occur within the study area.
Berberis nevinii	Nevin's barberry	FE/SE	1B	Chaparral, coastal sage scrub, riparian scrub, cismontane woodland on sandy or gravelly substrate/evergreen shrub/March-April	Not observed during 2007 field season. CNDDB records exist for San Francisquito Canyon at confluence with Santa Clara River; suitable habitat is present on site. Moderate likelihood of occurrence within the study area.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Brodiaea filifolia	thread-leaved Brodiaea	FT/SE	1B	Clay substrate openings in chaparral, sage scrub, and grasslands/perennial herb (geophyte)/March-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; nearest occurrence is in San Dimas. Suitable habitat is present on site. Low likelihood of occurrence within the study area.
Calochortus clavatus var. *clavatus*	club-haired mariposa lily	None/None	4	Chaparral and coastal sage scrub/ perennial herb (geophyte)/March-May	Not observed during 2007 field season. No CNDDB records exist for Newhall and Val Verde quads. Very low likelihood of occurrence in the study area.
Calochortus clavatus var. *gracilis*	slender mariposa lily	None/None	1B	Chaparral and coastal sage scrub/perennial herb (geophyte)/March-May	Not observed during 2007 field season. Observed during the Not observed during 2007 field season. In 2006, this species was observed on north tending slopes throughout the study area. This species was not mapped throughout the entire study area in 2006. This species is locally abundant and 2 polygons were mapped in 2006 containing an estimated 322 individuals total. CNDDB records also exist for mouth of Pico Canyon.
Calochortus plummerae	Plummer's mariposa lily	None/None	1B	Chaparral, coastal sage scrub, cismontane woodland, grasslands on rocky granitic substrate/perennial herb (geophyte)/May-July	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, records exist for the Santa Susana Mountains and Simi Hills. Suitable habitat exists on site. Moderate likelihood of occurrence within the study area.
Calochortus weedii var. *vestus*	late-flowered mariposa lily	None/None	1B	Chaparral, cismontane & riparian woodland/perennial herb (geophyte)/ June-August	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, habitat similar to where species occurs in eastern Ventura County is present onsite. This species was observed at the head of the Salt Creek drainage in the Santa Susana Mountains to the southwest during the 2003 field season. Moderate likelihood of occurrence within the study area.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Calystegia peirsonii	Peirson's morning-glory	None/None	4	Chaparral, coastal sage scrub, cismontane woodland, grassland/ perennial herb/May-June	Not observed during 2007 field season. Observed in 2006 in chaparral and California sagebrush throughout the survey area.
Calystegia sepium ssp. *binghamiae*	Santa Barbara morning-glory	None/None	1A	Marshes and swamps/perennial herb/ April-May	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, limited suitable habitat is present on site. Low likelihood of occurrence within the study area.
Centromadia [=*Hemizonia*] *parryi* ssp. *australis*	southern tarplant	None/None	1B	Mesic edges of marshes in grasslands/ annual herb/May-November	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, suitable habitat is present on site. Low likelihood of occurrence within the study area.
Cercocarpus betuloides var. *blancheae*	island mountain-mahogany	None/None	4	Chaparral, closed-cone coniferous forest/evergreen shrub/February-May	Not observed during 2007 field season. The species was observed in mixed chaparral in the study area during the 2006 field season.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	FC/SE	1B	Coastal sage scrub, sandy soils/annual herb/April-June	Observed on site in four general areas within the survey area: Airport Mesa, Grapevine Mesa, Potrero Canyon and San Martinez Grande Canyon. A total of 68 polygons were mapped with an estimated 452 individuals during the 2007 growing season.
Deinandra [=*Hemizonia*] *minthornii*	Santa Susana tarplant	None/SR	1B	Chaparral and coastal sage scrub on rocky substrate/deciduous shrub/July-November	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, records exist for the Simi Hills and Oat Mountain. Suitable habitat exists on site. Moderate likelihood of occurrence within the study area.
Delphinium parryi ssp. *blochmaniae*	dune larkspur	None/None	1B	Maritime chaparral, coastal dunes/ perennial herb/ April-May	Not observed during 2007 field season. No likelihood of occurrence.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Dodecahema leptoceras	slender-horned spineflower	FE/SE	1B	Alluvial scrub on sandy substrate/annual herb/April-June	Not observed during 2007 field season; however, Santa Clara River bottom excluded from survey area. Historical CNDDB records exist for the Newhall or Val Verde quads in alluvial habitat similar to those present on site. Moderate likelihood of occurrence within the study area.
Dudleya blochmaniae var. *blochmaniae*	Blochman's dudleya	None/None	1B	Clay openings in chaparral and coastal sage scrub, grasslands/perennial herb/April-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. Suitable habitat is present on site. Low likelihood of occurrence within the study area.
Dudleya cymosa ssp. *marcescens*	marcescent dudleya	FT/CR	1B	Chaparral, often on volcanic substrate/perennial herb (geophyte)/ April-June	Not observed during 2007 field season. No CNDDB records exist for Newhall and Val Verde quads. Unidentified *Dudleya cymosa* observed on vertical sandstone cliffs and slopewash in 2002 are actually *D. lanceolata*, a common species. Low likelihood of occurrence within the study area.
Dudleya cymosa ssp. *Ovatifolia*	Santa Monica Mountains dudleya	FT/None	1B	Chaparral and coastal sage scrub, often on volcanic substrate/perennial herb (geophyte)/April-June	Not observed during 2007 field season. No CNDDB records exist for Newhall and Val Verde quads. Unidentified *Dudleya cymosa* observed on vertical sandstone cliffs and slopewash in 2002 are actually *D. lanceolata*, a common species. Low likelihood of occurrence within the study area.
Dudleya multicaulis	many-stemmed dudleya	None/None	1B	Coastal bluff scrub, coastal sage scrub, valley and foothill grassland, rocky, often clay substrate/perennial herb/ April-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; closest known occurrences are in Calabasas and San Dimas. Suitable habitat exists on site. Moderate likelihood of occurrence within the study area.
Dudleya parva	Conejo dudleya	FT/None	1B	Coastal sage scrub and grassland on rocky, gravelly clays/perennial herb/May-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. Suitable habitat exists on site. Low likelihood of occurrence within the study area.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Erodium macrophyllum	round-leaved filaree	None/None	2	Cismontane woodland and grasslands on clay substrate/annual herb/March-May	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; however, records exist for Simi Valley, and this plant was observed in the hills east of Castaic Lake in 2003. Suitable habitat is present on site; moderate likelihood of occurrence in the study area.
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower	None/None	1A	Marshes and swamps/perennial herb/ August-October	Not observed within study area during 2007 field season. A *Helianthus* population, discovered in 2002 at Castaic Spring, on the south side of the Santa Clara River between Middle Canyon and San Jose Flats, was determined by some experts to be this species, but determined by other experts not to be this species. Based on pollen electron microscopy and chromosome counts, it is likely that the *Helianthus* species on Newhall Land property is a hybrid between *H. nuttallii* and *H. californicus* or an intermediate evolutionary step between the two species (Porter and Fraga 2004). No suitable habitat observed in the study area.
Horkelia cuneata var. *puberula*	mesa horkelia	None/None	1B	Chaparral, cismontane woodland, coastal sage scrub on sandy or gravelly substrate/ perennial herb/February-December	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. Suitable habitat present on site. Low likelihood of occurrence within the study area.
Juglans californica	Southern California black walnut	None/None	4	Chaparral, cismontane woodland, coastal sage scrub, alluvial scrub/ deciduous tree/March-May	Not observed on site during 2007 field season. Observed in past years's surveys in California sagebrush and chaparral on site. High likelihood of occurrence in the study area.
Juncus acutus ssp. *leopoldii*	southwestern spiny rush	None/None	4	Coastal dunes, meadows, seeps, marshes, and swamps/ perennial herb/May-June	Not observed during 2007 field season. Observed in mesic riparian areas on site during 2006 field season.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Malacothamnus davidsonii	Davidson's bush mallow	None/None	1B	Chaparral, coastal sage scrub, riparian woodland/ deciduous scrub/June-January	Not observed during 2007 field season. Nearest occurrences are in San Fernando and Sunland. Suitable habitat present on site. Moderate likelihood of occurrence within the study area.
Nama stenocarpum	mud nama	None/None	2	Edges of lakes, rivers, ponds, vernal pools/annual/January-July	Not observed during 2007 field season. Moderate likelihood of occurrence on banks of Santa Clara River and other mesic areas on site. No CNDDB records exist for the Newhall or Val Verde quads. Limited suitable habitat present on site. Low likelihood of occurrence within the study area.
Nemophila parviflora var. *quercifolia*	oak-leaved nemophila	None/None	4	Cismontane woodland, lower montane coniferous forest/annual herb/May-June	Not observed on site during 2007 field season. Observed in past years's surveys in oak woodland east of Grapevine Mesa. High likelihood of occurrence in the study area.
Nolina cismontana	chaparral nolina	None/None	1B	Chaparral, coastal sage scrub on sandstone or gabbro substrate/ perennial shrub May-July	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. Suitable habitat present on site. Low likelihood of occurrence within the study area.
Opuntia basilaris var. *brachyclada*	short-joint beavertail	None/None	1B	Chaparral, Joshua tree woodland, Mojavean desert scrub/succulent shrub/ April-June	Not observed during 2007 field season. This plant was identified as on site by Dudek in 2002; however, recent investigations indicate that the *Opuntia basilaris* plants on Newhall Ranch are not *O. basilaris* var. *brachyclada*, but are *O. basilaris* var. *ramosa*.
Pentachaeta lyonii	Lyon's pentachaeta	FE/SE	1B	Openings in chaparral and coastal sage scrub, grasslands/annual herb/March-August	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; nearest occurrences are in the Simi Valley. Suitable habitat present on site. Moderate likelihood of occurrence within the study area.

Table 2 (Cont.)

Scientific Name	Common Name	Status Federal/State	CNPS List	Primary Habitat Associations/ Life Form/Blooming Period	Presence or Likelihood of Occurrence On Site
Rorippa gambelii	Gambel's watercress	FE/ST	1B	Marsh and swamps (freshwater and brackish)/ perennial herb/April-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads. Limited suitable habitat is present on site. Low likelihood of occurrence within the study area.
Senecio aphanactis	rayless ragwort	None/None	2	Chaparral, coastal sage scrub, cismontane woodland on alkaline substrate/annual herb/January-April	Not observed during 2007 field season. Historical CNDDB record for Saugus, south of Santa Clara River. Suitable habitat is present on site. Moderate likelihood of occurrence within the study area.
Sidalcea neomexicana	salt spring checkerbloom	None/None	2	Chaparral, coastal sage scrub, and playas on alkaline substrate/perennial herb/March-June	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; suitable habitat present on site. Moderate likelihood of occurrence within the study area.
Thelypteris puberula var. *sonorensis*	Sonoran maiden fern	None/None	2	Meadows and seeps/perennial herb/ fertile January-September	Not observed during 2007 field season. No CNDDB records exist for the Newhall or Val Verde quads; nearest occurrence at Point Dume. Limited suitable habitat present on site. Low likelihood of occurrence within the study area.

Legend

FE:	Federally-listed as endangered	CNPS List 1A:	Plants presumed extinct in California
FT:	Federally-listed as threatened	CNPS List 1B:	Plants rare, threatened, or endangered in California and elsewhere
FC:	Federal candidate for listing	CNPS List 2:	Plants rare, threatened, or endangered in California but more common elsewhere
SC:	State candidate for listing	CNPS List 3:	Plants about which we need more information – a review list
SE:	State-listed as endangered	CNPS List 4:	Plants of limited distribution – a watch list
ST:	State-listed as threatened		
SR:	State-listed as rare		

Figures 3 through *6* depict the locations of sensitive species, including SFVS, in the Newhall Ranch Specific Plan study area. Labels for each of the polygons in the figures correlate with those in *Tables 3* through *6*, which contain estimates for the numbers of individuals within each polygon. *Table* 7 provides a summary of occurence data for the study area. Information regarding the mapping and recorded characteristics of SFVS is included in *Section 4.2.1* below.

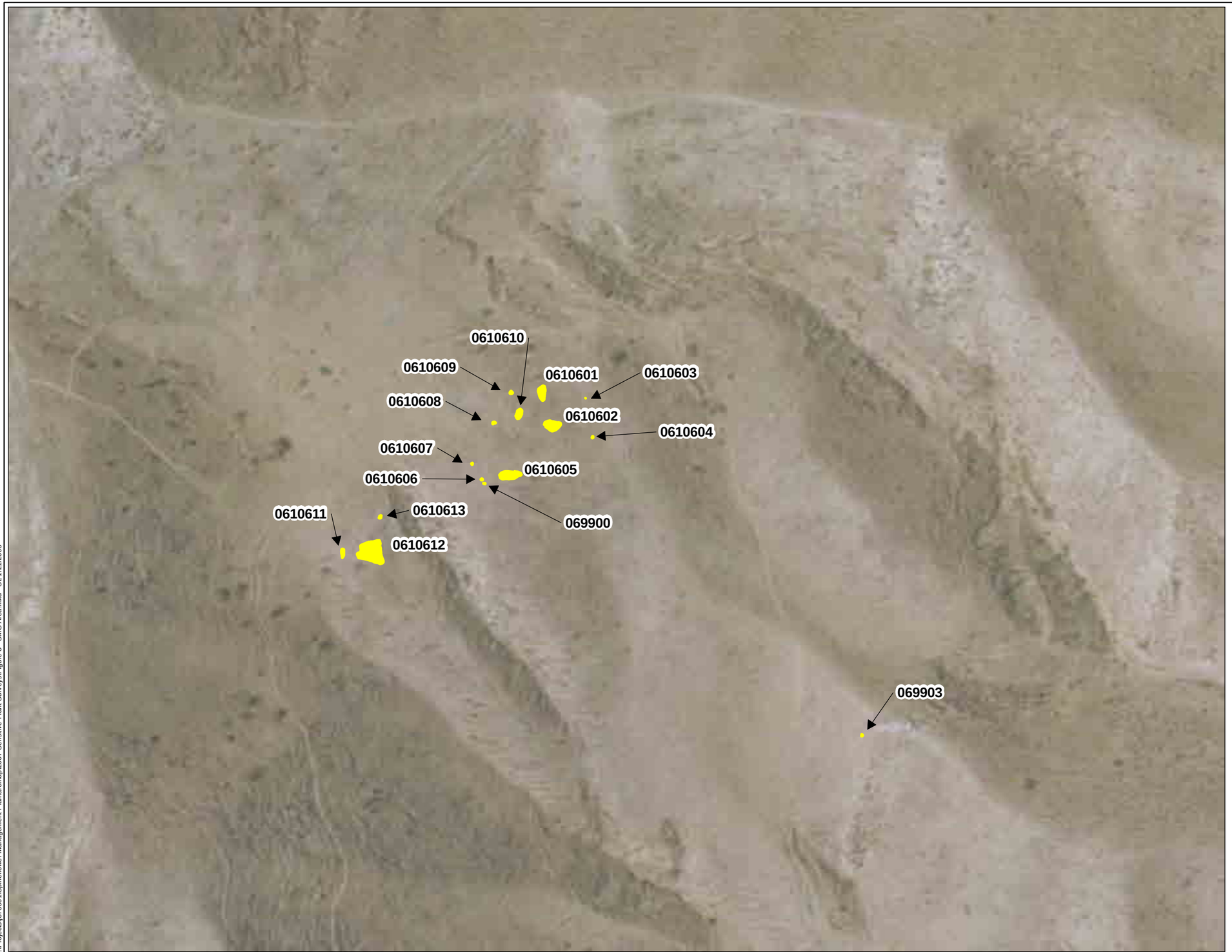
4.2.1 San Fernando Valley Spineflower (*Chorizanthe parryi* var. *fernandina*)

SFVS is state-listed as endangered, a candidate for federal listing, and found on List 1B.1 of the *CNPS Inventory of Rare and Endangered Vascular Plants of California*. Until its rediscovery in 1999 at Laskey Mesa on Ahmanson Ranch in Ventura County, it was thought to be extinct. A review of information of historical occurrences of SFVS in the CNDDB indicates that it was previously thought to occur in sandy to gravelly soils of washes, riverbeds, and upland areas primarily on the margins of the San Fernando Valley at the base of the Santa Susana Mountains, San Gabriel Mountains, and the Simi Hills. Munz (1974) provides distribution information to include Orange and San Diego counties. SFVS was not observed on site during limited focused surveys for sensitive plant species conducted in 1992 (Dames and Moore 1993) or general botany surveys conducted in 1995 (RECON and Impact Sciences 1996).

SFVS polygons were identified in several general locations of the study area for the Newhall Ranch Specific Plan including areas around Airport Mesa (including Dead-End Canyon), Grapevine Mesa (including Lion Canyon and Long Canyon), Potrero Canyon, and San Martinez Canyon. The polygons for these occurrences are depicted in *Figures 3* through *6*. Labels for each of the polygons in these figures correlate with those in *Tables 3* through *6*, which contain estimates for the numbers of individuals within each polygon.

Most of the SFVS individuals were found on slopes with a south-facing component in vegetation communities consisting of open California sagebrush, California buckwheat, ecotonal California sagebrush/California buckwheat and California annual grassland series, or at the edge of agricultural fields on mesas. Most of the observed SFVS individuals were found on soils mapped by the USDA (1969) as slightly eroded to eroded Castaic-Balcom silty clay loam (30% to 50% slopes) or Terrace Escarpments. Plants in the vicinities of Grapevine and Airport mesas were observed downslope of terrace surfaces capped by Zamora clay loam (2% to 9% slopes). Elevations at SFVS locations on site range from approximately 1,000 to 1,300 feet AMSL.

Vegetative cover in the area of SFVS occurrences ranged from 6% to 75% but was more commonly between 15% and 35%. The soil type for all mapped SFVS occurrences in the study area consisted of sandy and clay loams.



Newhall Ranch Specific Plan study area

San Fernando Valley Spineflower

N

0 100 200 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

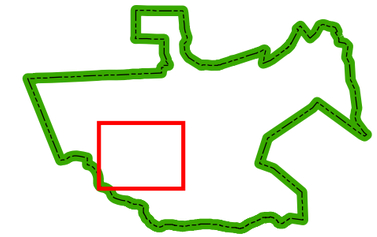
Z:\Projects\1373801\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 3 - SMG Area.mxd - SL 1/21/2008

DUDEK
Santa Barbara GIS Division
621 Chapala Street
Santa Barbara, Ca 93101
(805) 963-0651

Newhall Ranch - 2007 Sensitive Plant Surveys

San Martinez Grande Area

FIGURE 3



Newhall Ranch Specific Plan study area

San Fernando Valley Spineflower

N

0 500 1,000 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

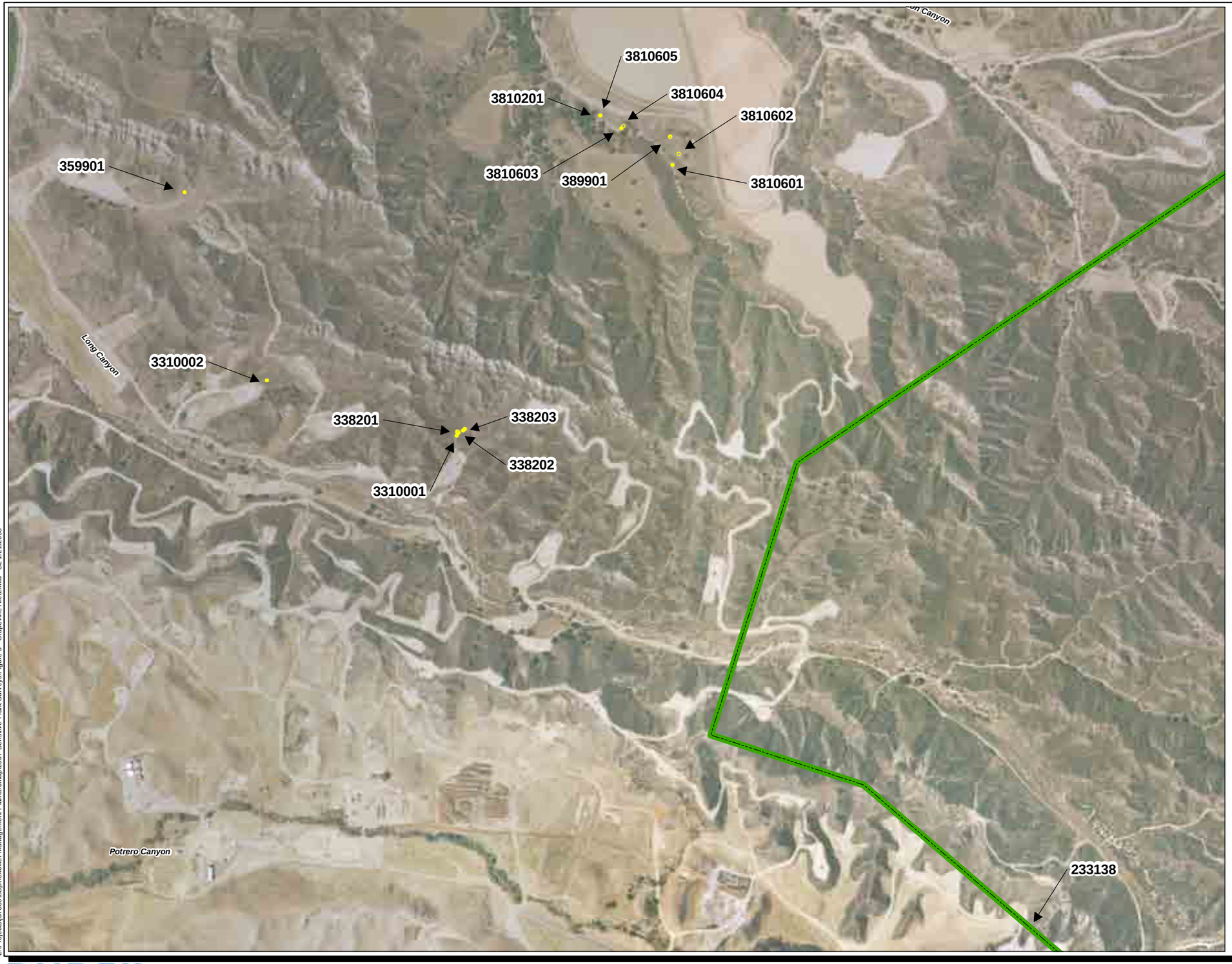
Z:\Projects\373801\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 4 - Potrero Area.mxd - SL 1/21/2008

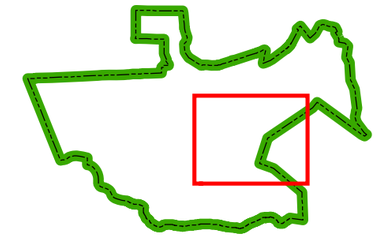
DUDEK
Santa Barbara GIS Division
621 Chapala Street
Santa Barbara, Ca 93101
(805) 963-0651

Newhall Ranch - 2007 Sensitive Plant Surveys

Potrero Canyon Area

FIGURE 4





Newhall Ranch Specific Plan study area

San Fernando Valley Spineflower

N

0 500 1,000 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

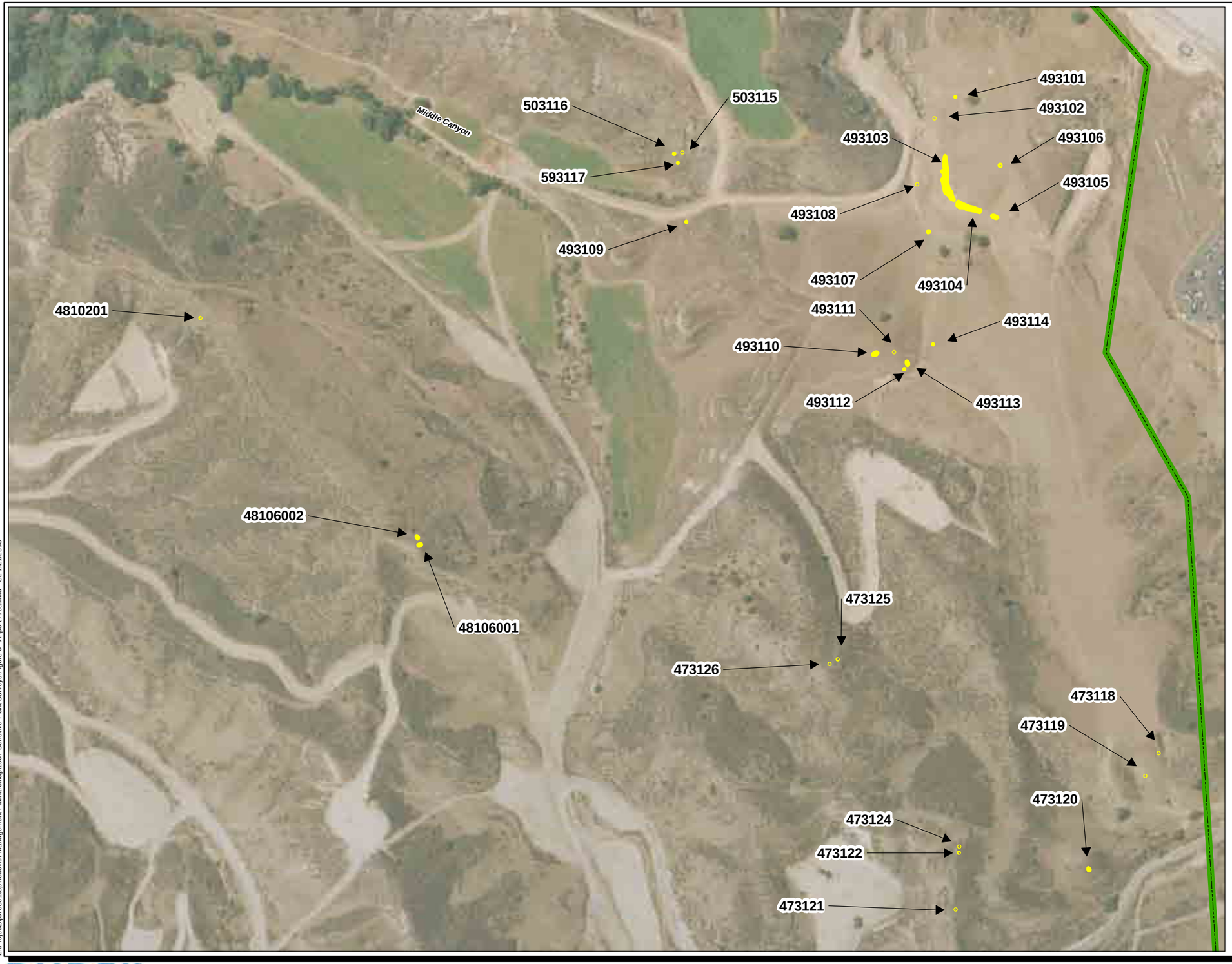
Z:\Projects\373801\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 5 - Grapevine Area.mxd - SL 1/21/2008

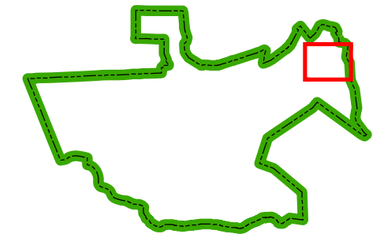
DUDEK
Santa Barbara GIS Division
621 Chapala Street
Santa Barbara, Ca 93101
(805) 963-0651

Newhall Ranch - 2007 Sensitive Plant Surveys

Grapevine Mesa Area

FIGURE 5





Newhall Ranch Specific Plan study area

San Fernando Valley Spineflower

N

0 250 500 Feet

IMAGE SOURCE: AirPhotoUSA, 2007

Z:\Projects\373801\Spineflower Management Plan\arcmap\2007 Sensitive Plant Surveys\Figure 6 - Airport Area.mxd - SL 1/21/2008

DUDEK
Santa Barbara GIS Division
621 Chapala Street
Santa Barbara, Ca 93101
(805) 963-0651

Newhall Ranch - 2007 Sensitive Plant Surveys

Airport Mesa Area

FIGURE 6

Table 3
San Fernando Valley Spineflower Summary of Occurrence Data for the San Martinez Grande Canyon Vicinity

Polygon Name	Polygon Area (sq. ft.)	Estimated Number of Individuals
069900	2	3
069903	2	7
0610601	79	4
0610602	121	9
0610603	1	1
0610604	2	1
0610605	138	12
0610606	2	2
0610607	1	1
0610608	4	1
0610609	6	1
0610610	44	3
0610611	19	2
0610612	428	22
0610613	5	4
Total	**854**	**73**

Table 4
San Fernando Valley Spineflower Summary of Occurrence Data for the Potrero Canyon Vicinity

Polygon Name	Polygon Area (sq. ft.)	Estimated Number of Individuals
143127	54	24
143128	72	7
143129	1	1
143130	103	21
143131	20	2
143132	1	1
133133	1	1
273137	1	1
283134	1	1
283135	115	7
283136	1	1
Total	**370**	**67**

Table 5
San Fernando Valley Spineflower Summary of Occurrence Data for the Grapevine Mesa Vicinity

Polygon Name	Polygon Area (sq. ft.)	Estimated Number of Individuals
233138	1	1
3310001	1	16
3310002	1	9
338201	58	33
338202	1	4
338203	1	2
359901	1	2
389901	6	2
3810201	1	1
3810601	1	1
3810602	1	1
3810603	1	1
3810604	1	1
3810605	1	2
Total	**76**	**76**

Table 6
San Fernando Valley Spineflower Summary of Occurrence Data for the Airport Mesa Vicinity

Polygon Name	Polygon Size (square feet)	Estimated Number of Individuals
473118	1	1
473119	1	1
473120	32	3
473121	1	1
473122	1	1
473124	1	6
473125	1	2
473126	1	1
4810201	1	4
48106001	33	2
48106002	22	2
493101	1	1
493102	1	1
493103	1782	125
493104	886	35
493105	89	4
493106	15	16
493107	15	2
493108	1	1
493109	1	1
493110	86	6

Table 6 (Cont.)

Polygon Name	Polygon Size (square feet)	Estimated Number of Individuals
493111	1	1
493112	1	1
493113	54	2
493114	1	1
503115	1	1
503116	1	3
593117	1	1
Total	**3032**	**226**

Table 7
San Fernando Valley Spineflower Summary of
Occurrence Data for the Newhall Ranch Specific Plan Study Area

Geographic Occurrence	Estimated Number of Individuals
Airport Mesa	226
Grapevine Mesa	76
Potrero Canyon	67
San Martinez Grande Canyon	73
Totals for the Newhall Ranch Specific Plan Study Area	**442**

A total of 68 SFVS polygons were mapped ranging in size from less than 1 to 1,782 square feet. The number of individuals within each polygon ranges from 1 to approximately 125. At Airport Mesa, there were an estimated 226 individuals in 28 polygons (*Table 6*). At Grapevine Mesa, there were an estimated 76 individuals in 14 polygons (*Table 5*). At Potrero Canyon, there were 67 individuals in 11 polygons (*Table 4*), and at San Martinez Grande Canyon, there were 73 individuals in 15 different polygons (*Table 3*). The entire Newhall Ranch Specific Plan study area contained an estimated 442 SFVS individuals for the 2007 field season (*Table 7*). CNDDB forms are included in *Appendix C* for each of the four occurrences on site.

5.0 ACKNOWLEDGMENTS

Britney Strittmater prepared this report, with review by Callie Ford and Sherri Miller and staff at Newhall Land. Spenser Lucarelli provided graphics and GIS mapping analyses.

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APPENDIX A

Resumes of Survey Personnel

Adam M. Causey – Biologist

EXPERIENCE

Adam Causey has 2 years' experience as a biologist/habitat restoration specialist. He specializes in vegetation surveys and construction monitoring. His responsibilities also include conducting field work and communicating with field and construction personnel.

Newhall Ranch, Newhall Land and Farming, Inc., Los Angeles and Ventura Counties, California.

- **Landmark Village Project**. Completed baseline vegetation data collection. This data was used to assist in preparation of a conceptual wetland mitigation plan that met mitigation requirements and provided maximum benefit to the client.
- **Rivervillage Slender Mariposa Lily and Plummer's Mariposa Lily Transplantation Project.** Provided qualitative and quantitative site monitoring at intervals throughout the year. Documented and analyzed data. Preparing annual reports per clients documenting conditions, providing management recommendations, and progress toward success. Perform monitoring visits to ensure required maintenance is being performed as necessary.
- **Westridge Native Grasslands Restoration Area.** Provided qualitative and quantitative site monitoring at regular intervals throughout the year. Documented and analyzed data. Preparing annual reports per clients documenting conditions, providing management recommendations, and progress toward success.
- **Automall Mitigation Bank Project.** Provided qualitative and quantitative site monitoring at regular intervals throughout the year. Documented and analyzed data. Prepare annual reports per clients documenting conditions, providing management recommendations, and progress toward success.
- **Interim Agricultural Operations Plan for Spineflower Conservation Plan Protection.** Research past, current, and future agricultural land uses on land adjacent to future preserves. Developing guidelines (BMPs, grazing, pesticide usage, monitoring and reporting etc.) to allow agricultural land use to continue while maintaining spineflower populations until preserved in the future.
- **Newhall Ranch Land and Farming.** Assisted in conducting rare plant surveys to document and monitor spineflower on the ranch. Performed biological surveys for spineflower, a state endangered and sensitive plant species, including population counts and using GPS to locate the boundaries of the populations.

EDUCATION

University of California, Davis
BS Environmental Horticulture and Urban Forestry
2005

- **Middle Canyon Spring Habitat Management Plan.** Assisted in developing habitat management plan for two sensitive species.
- **Lily Mitigation and Monitoring Plans.** Completed five various lily mitigation and monitoring plans to be implemented at a later date. Plans provide methods for collection, planting, maintenance, a timeline, success standards, and options for future adaptive management.
- **Valencia Commerce Center (TPM 26363).** Conducted construction monitoring to ensure compliance with construction permits. Conducted nesting bird and rare plant surveys (slender mariposa lily). Monitored observed lilies to ensure growth and successful maintenance and preservation of site.
- **TPM 20685 Slender Mariposa Lily Mitigation and Monitoring.** Provided qualitative and quantitative site monitoring at intervals throughout the year. Documented and analyzed data. Prepare annual reports per clients documenting conditions, providing management recommendations, and progress toward success. Perform monitoring visits to ensure required maintenance is being preformed as necessary.
- **Habitat Restoration Plan for the Soledad Business Park Bank Protection Project.** Provided qualitative and quantitative site monitoring at intervals throughout the year. Documented and analyzed data. Prepare annual reports per clients documenting conditions, providing management recommendations, and progress toward success. Perform monitoring visits to ensure required maintenance is being preformed as necessary.

Tejon Ranch, Kern County, CA

- **Grapevine Creek Water Usage Project, Tejon Mountain Village, Tejon Ranch. Kern County, CA.** Assist preparing and organizing project to quantify vegetation communities surrounding Grapevine Creek. Completed data collection with transect and quadrates. Currently analyzing data and writing report summarizing findings.
- **Tejon Section 7 Preserve Survey and Monitoring Project, Tejon Ranch, Kern County, CA.** Use motion sensitive cameras to help conduct surveys for listed endangered species. Conduct construction monitoring to ensure no loss of animals during work. Completed majority of monitoring the early morning hours.

Santa Ynez Well Field Clean-up Project, Santa Ynez River Water Conservation District, Santa Barbara County, CA. Provided monitoring of construction work being completed in river ensuring compliance with obtained permits.

SCE Bark Beetle Project, Forest Falls, San Bernardino County, CA. Provided monitoring to ensure the loss or no biological resources in the course the tree falling project.

The Nature Conservancy – The Cosumnes River Preserve, Galt, California. Monitored vegetation at multiple sites in vernal pools, riparian forests, grasslands, and restoration projects. Collected, entered, and analyzed vegetation data for management decisions as well as fire and grazing studies. Implemented field mapping projects using a GPS unit. Assisted in prescribed fire efforts and exotic species removal on the preserve. Responsible for designing and conducting a germination study on burned and unburned samples of goatgrass, an invasive species on the preserve.

Davis Fire Crew – Davis, California. Squad boss responsible for supervising and instructing squad of six to seven crew members. Communicated clearly with team while working with the complete crew of 20 people or independently as a squad. Responsible for ensuring professional presentation of crew as well as completion of assigned tasks correctly, safely, and quickly in stressful and dangerous wildland situations. Helped communication flow between crew members and higher authorities.

Mr. Causey was also a member of a Type II hand crew dispatched from the Mendocino National Forest. Common assignments include cutting containment lines, holding line, assisting in mopping up after fire containment, and rehabilitation projects. Successfully completed long hours of physically demanding work.

Tomato Genetic Resource Center, Department of Vegetable Crops, University of California, Davis. As a student assistant, assisted greenhouse manager and curator of collection with pollination, harvesting, seed processing, general plant care, and other tasks while working in the field, greenhouse, and lab. Performed tasks requiring high attention to detail such as preparing seed samples for use, storage, worldwide distribution for research purposes, and data entry into database. Helped with seed scarification, tissue culture work, and the preparation of isozyme gels.

Callie Ford – Biologist

EXPERIENCE

Callie Ford is committed to professional management of environmental resources, including land conservation. As a biologist with Dudek, Ms. Ford has prepared biological sections for environmental impact reports (EIRs) and biological technical reports as well as focused survey reports on multiple projects.

Project Experience

Environmental Services for Newhall Land and Farming Company, Santa Clarita, California. Assisted in writing numerous biological technical reports and biological sections of EIRs with detailed information of special-status wildlife species. Coordinated and performed biological surveys for spineflower, a state endangered and sensitive plant species, including population counts and using GPS to locate the boundaries of the populations. Also performed biological monitoring of known spineflower populations, including population counts and point-intercept transects, and performed vegetation mapping for multiple vegetation classes.

Focused Wildlife Surveys, Yaqui Pass and Viking Farms, Borrego Springs, California. Conducted general nocturnal and diurnal surveys with a focus on special-status wildlife species on two proposed development properties in Borrego Springs.

Hazard Tree Removal Project, San Bernardino and San Jacinto Mountains, Southern California Edison, San Bernardino and Riverside Counties, California. Performed biological monitoring for trees affected by bark beetle infestations, including sensitive plant surveys and nesting wildlife species, and provided recommendations for removing trees in environmentally sensitive areas (e.g., riparian zones). Also assisted in biological monitoring for trees affected by the 2007 fires in the Lake Arrowhead area.

Miramar Trunk Sewer Replacement and Permanent Access Project, City of San Diego Metropolitan Wastewater Department (MWWD), San Diego, California. Performed construction monitoring for the sewer replacement in Rose Canyon. Monitored for special-status wildlife species.

Santa Clara River Watershed Basin Analysis, Counties of Ventura and Los Angeles, California. Researched permits issued by the US Army Corps of Engineers (ACOE) and other documents related to the Santa Clara River Watershed Basin Analysis project regarding impacts to jurisdictional waters and any sensitive plant or wildlife species.

EDUCATION

California Polytechnic State University, San Luis Obispo
BS Environmental Management & Protection/Minor in GIS
2006
Cum Laude

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals (AEP)

San Diego Metropolitan Wastewater District As-Needed Contract, San Diego, California. Reviewed and analyzed plant survey forms and incorporated pertinent information into a biological report.

Mid-County Parkway Project, County of Riverside, California. Performed wildlife surveys for the sensitive burrowing owl species.

Aliso Creek Water Quality SUPER Project, South Orange County Wastewater Authority, Laguna Niguel, California. Reviewed southwestern willow flycatcher and least Bell's vireo survey records and assisted with writing the focused survey report for the Aliso Creek area.

High Tech Project, High Tech High Learning, City of Chula Vista, California. Reviewed southwestern willow flycatcher and least Bell's vireo survey records and assisted with writing the focused survey report for the High Tech High School Development project.

Gobernadora Multipurpose Basin Project, Santa Margarita Water District, Rancho Santa Margarita, California. Assisted writing the biological technical report for the Canada Gobernadora Multipurpose Basin, which is located next to the Canada Gobernadora Creek and north of the Gobernadora Ecological Reserve Area.

Additional Experience

Morro Bay National Estuary Program, Morro Bay, California—Water Quality Testing Volunteer. Performed water quality testing, including testing for nitrogen, phosphates, dissolved oxygen, turbidity, pH, and flow (using FloMaster).

City of San Diego, Multiple Species Conservation Program Section—Intern.

- Performed biological surveys for native vegetation using hand-held GIS system and uploaded new GIS information into database.
- Reviewed plans with property within the Multiple Habitat Plan Area and made sure the plan was following the correct guidelines for that plan (i.e., riparian buffer zones, landscape plans, etc).
- Revised management plans per comments from local organizations and agencies.
- Organized property information for land put into a trust as part of mitigation measures.

Relevant Studies

- Association of Environmental Professionals CEQA Workshop November 2006.
- Friends of the Jepson Herbarium. *Introduction to the Morphology and Identification of Flowering Plants.* University of Berkeley Sciences Building. March 18–19, 2007.

NATHAN GALE
Principal Scientist, FL*x*

EDUCATION AND CERTIFICATIONS

Ph.D., Geography, University of California, Santa Barbara, 1985.
M.A., Geography, University of California, Santa Barbara, 1980.
PWS, Certified Professional Wetland Scientist #1216, Society of Wetland Scientists, 1999.

SUMMARY OF QUALIFICATIONS

Dr. Gale has 26 years of experience managing and conducting multidisciplinary projects ranging from methodology development to applied environmental impact assessments, planning studies, and restoration programs. His management experience includes proposal preparation; contract negotiation and client relations; cost control and schedule monitoring; document production supervision; and quality assurance review. His specific technical work has involved experimental and sampling design; photographic documentation; and mapping of natural vegetation, sensitive species, environmental constraints, and land use. He also has field experience in quantitative vegetation sampling, environmental data collection, and wetland delineation. Dr. Gale is skilled in qualitative and quantitative data analysis for numerous applications including ecological and environmental impact assessment as well as mitigation and monitoring planning. He has been responsible for the preparation of NEPA/CEQA environmental documents, planning studies, and technical reports for the Department of Defense (DOD), the Department of Energy (DOE), the Department of Interior (DOI), and for state and local agencies. In addition, he has published extensively in the fields of geography, ecology, planning, and environmental studies.

EXPERIENCE

Rare Plant and Vegetation Surveys and Mapping, Newhall Ranch/Valencia Company Project Sites, Los Angeles and Ventura Counties, CA. Newhall Land and Farming Company, URS Corporation, Impact Sciences, Inc., and Dudek and Associates, Inc. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), and *Helianthus* sp. (sunflower), vegetation surveys and mapping of plant communities, and report preparation for various sites, including the Santa Clara River and Castaic Creek. Surveys were carried out annually during six field seasons in the years 2000 through 2005. Participation in the development of a spineflower management plan, preserve design, and associated research activities.

Rare Plant and Vegetation Surveys and Mapping, Los Angeles and Riverside Counties, CA. Natural Resource Consultants. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), *Orcuttia californica* (California Orcutt grass), and *Navarretia fossalis* (spreading navarretia), vegetation surveys, and report preparation for three sites in the year 2003 and two sites in 2004.

Restoration Planning and Implementation, Former Guadalupe Oil Field, San Luis Obispo County, CA. Unocal Corporation and Jordan Environmental Services. Preparation and implementation of site-specific restoration plans, including the development of revegetation specifications, monitoring methods, performance criteria, and performance evaluation. Development of general mitigation and restoration success criteria, including sampling design, data collection, statistical data analysis, and reporting for selected reference

wetlands for future comparison with wetland mitigation and restoration sites. Participation in activities related to uplands and wetlands habitat restoration with the Restoration Working Group, comprising regulatory agency representatives and Unocal consultants, for the long-term Guadalupe Restoration Project.

Vegetation and Rare Plant Surveys and Wetlands Delineations, Ventura and Los Angeles Counties, CA. Impact Sciences, Inc. Vegetation surveys and mapping of plant communities, rare plant surveys, field wetland surveys, delineation of jurisdictional wetlands, and report preparation for more than 35 sites in various locations in Ventura and Los Angeles counties.

Ventura River Estuary Enhancement Project, Ventura County, CA. California Department of Parks and Recreation. Design and implementation of a five-year vegetation monitoring program for restoration efforts at Emma Wood State Beach. The project involved monitoring four vegetation types: willow-cottonwood forest, saltbush scrub, dune scrub, and foredune vegetation. Activities included botanical surveys, survival and growth surveys, photodocumentation, data collection and comparative analysis of natural and revegetated areas, evaluation of exotics eradication, and recommendations for ongoing restoration.

Peacekeeper Rail Garrison Mitigation Program, San Antonio Terrace, Vandenberg AFB. U.S. Air Force and The Earth Technology Corporation. Technical advisor and senior data analyst for wetland creation, upland dune scrub habitat restoration, coast live oak revegetation, and vegetation monitoring for a five-year biological mitigation and monitoring program. Activities included initial planning, budgeting, methodology development, sampling design, vegetation sampling, data analysis, preparation and review of annual monitoring reports.

Guadalupe Oil Field Restoration. California Department of Fish and Game and Hagler Bailly Consulting, Inc. Initial restoration planning, including background research, historical air photo assessment, and analysis of restoration alternatives at the Guadalupe Oil Field. Results from these tasks were used in the evaluation of potential restoration options, and to anticipate biological, hydrological, ecological, logistical, economic, and other issues associated with each restoration option.

Restoration of Coastal Dunes and Associated Wetlands in California. California Department of Fish and Game and Hagler Bailly Consulting, Inc. Principal scientist responsible for compiling and annotating a comprehensive bibliography of restoration and revegetation projects in coastal California, with an emphasis on coastal dune habitats and coastal wetlands.

Recovery Plan for Two Federally Endangered Plant Species. U.S. Fish and Wildlife Service. Technical advisor responsible for developing strategy and task recommendations for the recovery plan for marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Key aspects of the plan included an outline of steps for habitat protection, species and habitat monitoring, biological and ecological research, and the establishment of new populations.

Implementation of Recovery Activities for Two Federally Endangered Plant Species. California Department of Fish and Game and University of California. Research on species biology and ecology, plant propagation, experimental establishment of new populations, and monitoring of existing and new populations of marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Reporting of species and habitat status and progress of recovery activities.

Rare Plant Census. All American Pipeline, L.P. Rare plant monitoring census for Gaviota tarplant (*Hemizonia increscens* ssp. *villosa*) in permanent plots established at Gaviota, CA.

UCSB Campus Lagoon Wetland Restoration. The Herbarium, Museum of Systematics and Ecology, University of California, Santa Barbara. Design and implementation of a five-year vegetation monitoring program for wetland plant communities restored at the UCSB Campus Lagoon, Santa Barbara County, CA, as required by the Streambed Alteration Agreement of the California Department of Fish and Game. The project included plant species identification, vegetation sampling, data analysis, photodocumentation, and report preparation.

Vernal Pool Restoration Monitoring, Isla Vista, CA. Isla Vista Recreation and Park District. Vegetation monitoring, data analysis, and publication preparation for a 10-year assessment of restored and created vernal pools at the Del Sol Open Space and Vernal Pool Reserve.

Plant Surveys and Wetland Delineations for Five Land Parcels, Isla Vista, CA. County of Santa Barbara Planning and Development. Field surveys and report preparation for botanical and wetland resources, including jurisdictional wetland delineations and mapping, in coastal mesa vernal pool habitat along Del Playa Drive, Isla Vista.

Santa Barbara County Oak Restoration Program. University of California, Santa Barbara. Vegetation monitoring in savanna and woodland habitats of blue oak, valley oak, and coast live oak, for the long-term assessment of cattle grazing impacts on oak seedling recruitment at Sedgwick Ranch, Santa Barbara County, CA.

Restoration Plan, Naval Base Ventura County, Port Hueneme Site, CA. Naval Base Ventura County and The Environmental Company. Field visits and preparation of a habitat protection and restoration plan for four special interest natural areas.

Biological Surveys and Wetlands Delineation for the National Reconnaissance Office (NRO) Campus, Vandenberg AFB. U.S. Air Force and Titan Corporation. Field biological surveys, jurisdictional wetlands delineation, and preparation of an addendum to the environmental assessment for The General Plan for the Cantonment Area of the base.

Controlled Burn Monitoring, Vandenberg AFB. U.S. Air Force and Museum of Systematics and Ecology, University of California, Santa Barbara. Pre-burn monitoring of vegetation and plant species in coastal sage scrub and chaparral at two prescribed burn sites, South Vandenberg AFB.

Restoration Plans for Installation of VTS Fiber-Optic Cable System, Honda Ridge Road Repair, and El Rancho Road Bridge Project, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Preparation of restoration plans including sections on ecological background, revegetation measures, monitoring and maintenance methods, performance criteria for assessing success, and restoration schedule for sites at North and South Vandenberg AFB.

Implementation of Restoration Plans, South Base and VTS Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force and Foster Wheeler Environmental Corp. Native plant species restoration, long-term monitoring, and restoration evaluation at four sites at Vandenberg AFB, CA.

Natural Resources Surveys and Environmental Assessments, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal environmental scientist responsible for conducting field surveys and preparing report sections for vegetation, wildlife, and wetland resources for 17 environmental assessments of facility and infrastructure development projects, and for an EIS on San Antonio Creek.

Integrated Natural Resources Management Plan, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal scientist responsible for preparing sections on existing conditions, issues of concern, and management objectives for vegetation, wildlife, and wetland resources for a basewide five-year plan.

EIS and Environmental Assessments. U.S. Air Force. Program manager and contract administrator, under a contract with the Strategic Air Command (SAC), for eight environmental assessments and one EIS for proposed USAF real estate, facility construction, and training actions. Impact analyses were conducted for the full range of environmental and socioeconomic issues; major areas of focus involved endangered species' habitats, cultural and historical resources, and hazardous waste sites.

Goleta Revitalization EIR/EIS. County of Santa Barbara Planning and Development. Wetland delineations at sixteen creek crossings and plant surveys for street extensions, bikepaths and a multipurpose trail.

Oil and Gas Exploration and Facilities Development EIRs/EISs. Santa Barbara County and California State Lands Commission. Environmental analyst for EIRs/EISs of oil and gas development projects located offshore California.

Supplemental Environmental Impact Report for the 1990 Long Range Development Plan. University of California, Santa Barbara. Program manager for a supplemental EIR focussed on growth-related impacts to local school districts, and potential secondary environmental impacts to sensitive wetland habitats that could be caused by needed school facility expansion.

Biological Monitoring for Installation of CITS, VTS, South Base, and Tranquillon Mountain Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force, Tetra Tech, Inc., and Foster Wheeler Environmental Corporation. Onsite biological monitoring for cable installation activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Surveys and Monitoring for Installation of Building 3000 Fiber-Optic Cable System, Vandenberg AFB. U.S. Air Force and System Technology Associates. Field surveys and onsite biological monitoring for cable installation activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Monitoring for Honda Ridge Road Repair and Point Sal Road Repair, Vandenberg AFB. U.S. Air Force, Tetra Tech, Inc., and Ace Engineering, Inc. Onsite biological monitoring for road repair activities to ensure avoidance of adverse impacts to sensitive biological and wetland resources.

Biological Monitoring, Environmental Quality Assurance Program (EQAP), Santa Barbara County, CA. Storrer Environmental Services. Biological monitoring for the Level (3) fiber-optic cable installation project, the stabilization of oil wells for the Venoco State Lease 421 piers, and the AERA/Molino flowlines abandonment project.

MEMBERSHIPS

California Botanical Society; California Exotic Pest Plant Council; Society of Wetland Scientists; Society of Ecological Restoration; The International Mountain Society.

SELECTED PUBLICATIONS

Dr. Gale has been an author and collaborator on numerous academic publications, government research grant reports, and presentations at national and international professional conferences. In addition, he has contributed to environmental and planning documents. A summarized count of his work includes: Refereed Journal Articles - 28; Book Chapters - 5; Papers in Conference Proceedings - 3; Government Research Reports - 13; Contributions to Planning Studies - 44; Contributions to Environmental Documents - 55.

Journal Articles

"Coast Live Oak Revegetation on the Central Coast of California," (with A. Parikh), *Madroño*, 45(4), 1998, 301-309.

"Vegetation Monitoring of Created Dune Swale Wetlands, Vandenberg Air Force Base, California," (with A. Parikh), *Restoration Ecology*, 6(1), 1998, 83-93.

"The Analysis of Class Dispersion Patterns Using Matrix Comparisons," (with L.E. Harvey and F.W. Davis), *Ecology*, 69(2), 1988, 537-542.

"Tests of Randomness: Unidimensional and Multidimensional," (with L.J. Hubert, R.G. Golledge, and C.M. Costanzo), *Environment and Planning A*, 17, 1985, 373-385.

"Measuring Association Between Spatially Defined Variables: An Alternative Procedure," (with L.J. Hubert, R.G. Golledge, and C.M. Costanzo), *Geographical Analysis*, 17, 1985, 36-46.

"Unclassed Matrix Shading and Optimal Ordering in Hierarchical Cluster Analysis," (with W.C. Halperin and C.M. Costanzo), *Journal of Classification*, 1, 1984, 775-92.

Conference Proceedings

"Review of Ten Years of Vernal Pool Restoration and Creation in Santa Barbara, California," (with W.R. Ferren Jr., D.M. Hubbard, S. Wiseman, and A. Parikh), in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference, California Native Plant Society, Sacramento, CA, 1998, 206-216.

"Vegetation Monitoring of Created Wetland Sites on the San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh), in M.C. Landin (Ed.) Proceedings of the National Interagency Workshop on Wetlands: Technology Advances for Wetlands Science, Technical Report, Wetlands Research and Technology Center, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS, 1995, 153-55.

"Wetland Creation and Vegetation Monitoring in a Stabilized Sand Dune Ecosystem, San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh and T. Waddell), in M.C. Landin (Ed.) Proceedings of the 13th Annual Meeting of the Society of Wetland Scientists (SWS), New Orleans, LA, 1993, 368-76.

"First-Year Vegetation Monitoring of Created Wetlands on the San Antonio Terrace, Vandenberg Air Force Base, California," (with A. Parikh and T. Waddell), in A.E. Leviton and M.L. Aldrich (Eds.) Proceedings of the Pacific Division, American Association for the Advancement of Science, University of California, Santa Barbara, June 1992, p. 46.

EXPERIENCE

Galen Hagen has 4 years' experience as a researcher and instructor of physics, statistics, and research methods. Mr. Hagen is a published researcher and is familiar with experimental design, data analysis, and scientific report writing.

Hazard Tree Removal Project, Southern California Edison, San Bernardino and San Jacinto Mountains, Riverside and San Bernardino County, California. Conducted wildlife surveys, botanical surveys, habitat assessments and surveys for sensitive and US Forest Service threatened, endangered, and sensitive species throughout the San Bernardino and San Jacinto Mountains along Southern California Edison power line routes. The surveys are supporting implementation of a bark beetle tree removal project along existing power lines within San Bernardino County. The project area encompasses 106 square miles, with an estimated 62,000 acres of tree removal, 22,000+ power poles, and 538 linear miles of utility lines.

Barstow Industrial Park, San Bernardino County, California. Conducted biological surveys, including vegetation mapping and focused plant surveys.

Focused Wildlife Surveys, Yaqui Pass and Viking Farms, Borrego Springs, California. Conducted general nocturnal and diurnal surveys with a focus on special-status wildlife species on two proposed development properties in Borrego Springs.

Newhall Ranch Project, Newhall Land and Farming Company, Counties of Los Angeles and Ventura, California. Responsible for several tasks under this contract, including the following:

- Newhall Ranch Special-Status Plant Surveys. Conducted and coordinated focused surveys as a member of a team of botanists for the state-listed endangered San Fernando Valley spineflower plant species and other sensitive plants, recording population counts and using GPS to delineate the boundaries of the populations. Also performed biological monitoring of known spineflower populations, including population counts and point-intercept transects.
- Valencia Commerce Center (TPM 26363). Construction monitoring to assure client compliance with CDFG permit requirements protecting riparian habitat and listed species.

Assisted with the preparation and writing of numerous biological technical reports, biological sections of environmental impact reports/

EDUCATION

University of Otago,
New Zealand
Fulbright Fellow
2004–2005

University of California,
San Diego
BS Cognitive Psychology
—Minor in Economics
2003

AWARDS

Fulbright Fellowship
2004

UCSD Chancellor's
Research Scholarship
2002

Provost's Honors
1999–2003

PUBLICATIONS

Hagen, G., J. Gatherwright, B.A. Lopez, and J. Polich. 2006. "P3a from Visual Stimuli: Task Difficulty Effects." *International Journal of Psychophysiology* 59(1):8–14.

FURTHER STUDIES

Association of Environmental Professionals "CEQA" Seminar
November 2003

environmental impact statements (EIR/EIS), biota reports, and conservation easements, with detailed information on special-status plant and wildlife species. Some examples include:

- Spineflower Conservation Plan. Assisted in the preparation and writing of the San Fernando Valley Spineflower Conservation Plan for the management of spineflower preserves and assisted with the preparation of an associated 2081 permit for take.
- Landmark Village EIS/EIR. Assisted in the preparation and writing of the Landmark Village EIS/EIR, providing detailed information on special-status plant and wildlife species.
- Mission Village Biota. Assisted in the preparation and writing of the Mission Village Biota report, providing detailed information on special-status plant and wildlife species.
- Castaic Creek Conservation Easement. Assisted with the coordination and assembly of the Castaic Creek conservation easement.

EXPERIENCE

Jon Jones is a restoration specialist with ample experience using topographic maps. He has led a field crew researching the recovery of montane vegetation communities following disturbance. During this project, he was responsible for collecting a large volume of plant data (including species inventory and biometrics), utilizing a wide variety of sampling protocols, while operating in strenuous conditions. Mr. Jones has taught undergraduate field and computer labs in forest ecology. During these, he supervised the collection of field data on the vegetation community, analysis of this data, and reporting on ecological relationships. While residing in the Santa Ynez Valley in California, Mr. Jones served as a volunteer with Los Padres National Forest. Here, he primarily assisted with preparation of records and documents relating to the monitoring of endemic species of special concern and management of their habitats, particularly within riparian corridors of coastal California near Santa Barbara. Additionally, he has authored multiple biological publications and conference presentations. Mr. Jones is familiar with issues relating to non-native plants in the south-central California region. He has also had some acquaintance with steelhead restoration in coastal California.

Relevant Projects

Volunteer, USDA National Forest Service. Mr. Jones worked intermittently as a Forest Service volunteer for the Fisheries program at Los Padres National Forest, California part-time during 1998–99; for the Threatened, Endangered, Sensitive and Proposed Species program at the Southwest Regional Office, New Mexico part-time during 1999–2001; and for the Fisheries program at Alabama National Forests, Alabama part-time during 2001–2003. He assisted the Forest Fish Biologist or TESP Coordinator, often with large-scale (and sometimes controversial) issues relating to monitoring impacts on endemic species of special concern and riparian habitat management. Mr. Jones assisted in preparing Forest Service documents, such as forest plans and biological assessments, through organizing, analyzing, and graphic presentation of data, through collecting and organizing supporting literature and materials, and through document review, editing, and basic administrative functions. He occasionally assisted in fisheries fieldwork, including preparation of equipment used in stream habitat surveys or fish species inventories. He directly participated in an invasive bullfrog eradication project and helped install an interpretive display on fisheries. Mr. Jones obtained the permit necessary to drive National Forest Service 4WD vehicles.

EDUCATION

Texas Christian University
MS Environmental Science
1995

Texas Christian University
BS Criminal Justice
1989

Research Assistant, Department of Natural Resources, University of New Hampshire. Mr. Jones conducted a labor-intensive field research project investigating patterns and processes of post-disturbance forest ecosystem recovery on a chronosequence of landslides in the White Mountains, New Hampshire. Supervised two full-time and three part-time field technicians, and delegated responsibilities within the crew. Designed, planned, and operated independently with minimal consultation with his supervisor. Adapted ecological research protocols to perform a wide variety of forest and vegetation sampling procedures in examination of factors influencing rates and trajectories of forest succession following cataclysmic disturbance. Established transects and plots. Collected extensive data on plant species inventory, plant species distribution, plant biometries and age, foliage samples to be dried and prepared for chemical analysis, and basic soil descriptive data. Prepared basic mapping of many study sites. Organized field data for later analysis. Organized and maintained equipment and supplies for project. Operated in remote mountainous areas, often in hazardous terrain and adverse weather. Performed extensive scientific literature review to integrate methods and objectives with related studies. Coordinated project activities and shared facilities use with White Mountain National Forest personnel.

Teaching Assistant, Department of Natural Resources, University of New Hampshire. Mr. Jones taught two labs per week for undergraduate Forest Ecology course. Total of 55 students. Field labs consisted of teaching and supervising students in use of standard forestry research protocols and equipment, including establishing permanent forest study plots, identifying plant species, collecting a wide variety of biometric data, including tree height and DBH, performing increment boring of trees for age determination, and collecting basic site climatic data. Computer labs consisted of teaching and supervising students in analysis and presentation of biological data; calculating many indicators of ecological community composition, such as dominance, density, evenness, heterogeneity, diversity, basal area, and parabolic stem volume; analyzing complex relationships among many ecological variables through correlation, regression, and statistics; and preparing reports and graphic presentations to address questions of ecological community composition over time. Organized and maintained equipment, supplies, and records for these labs. Led one class discussion per week. Graded student lab reports and projects. Graded student exams (including essays) for the lecture component of this course. Basic administrative support of course. Safely operated University vehicles.

Science Assistant 11, Department of Physiology, TCOM University of North Texas Health Science Center. Mr. Jones worked as a medical research laboratory technician during summers throughout the 1980s. Performed and assisted in animal surgeries and experiments. Collected blood and tissue samples. Analyzed blood samples. Prepared chemical compounds. Operated, calibrated, and maintained highly complex medical and scientific equipment in a cardiovascular physiology lab. Constructed specialized scientific devices. Measured and recorded data. Produced graphic presentations of data. Coordinated activities with other technicians and doctors. Provided veterinary treatment for animals.

Thesis Research

Awarded an Adkins Fellowship Grant in 1993–94 through a competitive application process at the Biology Department, Texas Christian University. This grant provided financial support to procure supplies and contract services for MS thesis research investigating interactions of micronutrients and ultraviolet radiation on the reproduction, health, and behavior of old-world chameleons. These

experiments pioneered the new research model of photonutritional ecology, and produced multiple peer-reviewed publications and conference presentations.

Publications

J.R. Jones et al. "Vitamin D Nutritional Status Influences Voluntary Behavioral Photoregulation in a Lizard." Chapter in *Biologic Effects of Light*, M.F. Holick, E.G. Jung, eds., Walter de Gruyter & Co., Berlin, New York. 1996.

J.R. Jones et al. "Hematology and Serum Chemistries for Captive, Female Panther Chameleons, *Chamaeleo pardalis*, with Hepatocellular Lipidosis." *Bulletin of the Association of Reptilian and Amphibian Veterinarians*, Vol 6, Number 2. 1996.

G.W. Ferguson, J.R. Jones, et al. "Indoor Husbandry of the Panther Chameleon, Chamaeleo pardalis: Effects of Dietary Vitamins A and D and Ultraviolet Irradiation on Pathology and Life-History Traits." *Zoo Biology*. 15:279–299. 1996.

Presentations

"Vitamin D Ingestion Influences Behavioral Photoregulation in the Panther Chameleon *Chamaeleo pardalis*." J.R. Jones, G.W. Ferguson et al. *39th Annual Meeting of the Society for the Study of Amphibians and Reptiles*, University of Kansas. July 1996.

"Vitamin D Nutritional Status Influences Voluntary Behavioral Photoregulation." J.R. Jones, G.W. Ferguson et al. *Biologic Effects of Light International Symposium*, Atlanta, Georgia. October 1995.

"Reproductive and Pathological Effects of Dietary Vitamin D3 and Ultraviolet Radiation Manipulation in Old World Chameleons." J.R. Jones. *19th Annual Meeting of the International Herpetological Symposium*, Denver, Colorado. June 1995.

"Differential Behavioral Responses to Ultraviolet Light Based on Nutritional State Regarding Vitamin D." J.R. Jones et al. *Texas Academy of Science, Annual Meeting*, Waco, Texas. March 1995.

EXPERIENCE

Rebekah Krebs' interest in environmental education, sustainable land activities and methods, environmental auditing, sustainable design, and wildlife rehabilitation make her a valuable asset to Dudek. Ms. Krebs' general duties as an Environmental Specialist with Dudek include specializing in Lee, Collier, Charlotte, and Hendry County protected species surveys; bald eagle monitoring; red cockaded woodpecker surveys and cavity tree searches; FWCC deer and hog spotlight and track surveys; gopher tortoise surveys and relocation; wetland flagging and delineation; environmental resource permits and other permitting documents; wetland monitoring; and reviewing exotic vegetation control.

RELEVANT EXPERIENCE

Environmental Scientist I, Boylan Environmental, Inc., Ft. Myers, Florida, 2004. Completed permitting-associated activities and reports for the following agencies: DEP, ASOE, FWCC, USFWS, and SFWMD. Created maps used for environmental permitting with the use of AutoCAD and associated programs. Performed wetland delineation and monitoring as well as wildlife monitoring and surveying duties.

Ecologist I, Passarella and Associates, Inc., Ft. Myers, Florida, 2002–2004. Completed permitting-associated activities and reports for the following agencies: DEP, ACOE, FWCC, USFWS, and the SFWMD. Carried out wetland delineation, monitoring, and sustainability reporting duties, as well as wildlife monitoring, relocation, and surveys.

Internship, CREW Land and Water Trust, Ft. Myers, Florida, 2001–2002. Designed and implemented environmental curriculum for guided hikes and school field trip, assisted in land stewardship of public lands, participated in community outreach programs, and assisted in the operation of a non-profit environmental organization.

EDUCATION

Florida Gulf Coast University
BA Environmental Studies
2002

Valencia Community College
AA Associate in Arts
1999

Florida Gulf Coast University
Plant ID Coursework

38 Hours of Army Corps of Engineers Wetland Delineation and Management Training

DEP Wetland Delineation and Management Training

CERTIFICATIONS & AFFILICATIONS

Florida Association of Environmental Professionals

Society of Wetland Scientists

EXPERIENCE

Thomas Liddicoat has extensive experience in environmental document preparation and permitting and has been evaluating impacts to special-status plant communities and wildlife species throughout Southern California for over 2 years. Mr. Liddicoat conducts biological resource assessments, biotic inventories, vegetation mapping, wetland delineations, mitigation plan implementation and monitoring, and brown-headed cowbird (*Molothrus ater*) trapping, and has conducted general and focused surveys for special-status species throughout San Diego, Riverside, Orange, Los Angeles, Kern, and San Bernardino Counties.

Mr. Liddicoat has performed biological monitoring of construction and infrastructure projects occurring in environmentally sensitive and/or protected areas (e.g., vegetation removal, grading, BMPs, and SWPPP requirements), produced assessments of wetlands and uplands to support management plans, identified regulatory issues for development and infrastructure projects to guide project designs, completed project permit applications with federal, state, and local environmental regulations, and managed permit compliance. Mr. Liddicoat also has experience working safely around the large earth-moving equipment found at various construction projects.

Mr. Liddicoat currently holds a federal recovery permit for several special-status vernal pool branchiopod species and is also currently working towards achieving federal permits for the federally-listed threatened coastal California gnatcatcher (*Polioptila californica californica*) and federally-listed endangered southwestern willow flycatcher (*Empidonax traillii*).

Electric Utility/Fiber Optics/Energy

Hazard Tree Removal Project, Southern California Edison, San Bernardino and San Jacinto Mountains, Riverside and San Bernardino County, California. Responsible for Edison's Hazard Tree Removal Project occurring in the San Bernardino National Forest and surroundings. Responsible for conducting biological surveys along all Edison circuits within the San Bernardino and San Jacinto Mountains prior to removal of bark-beetle-infested trees, drought-stressed trees, and other damaged trees from the vicinity of its poles, lines, and other facilities. The project area encompasses 106 square miles, an estimated 62,000 acres of tree removal, 22,000+ power poles, and 538 linear miles of utility lines. Biologist's responsibilities include coordinating with Edison personnel and US Forest Service (USFS) biologists regarding

EDUCATION

San Diego State University
BS Biological Sciences, Ecology Emphasis
2005

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals (AEP)

REGISTRATIONS & CERTIFICATIONS

Fairy Shrimp 10a Survey Permit, USFWS Federal Permit TE 139634-0 (Expires 05/16/2011)

site-specific sensitivities, conducting biological surveys of all lines within San Bernardino National Forest, monitoring tree-cutting crews felling infected trees, and writing biological documents.

Southern California Edison Pole and Utilities Replacement Project, Riverside and San Bernardino Counties, California. Biologist's responsibilities included conducting habitat assessments, monitoring tree removal activities, and conducting wildlife surveys, botanical surveys, and surveys for sensitive and US Fish and Wildlife Service (USFWS) threatened, endangered, and sensitive species throughout the project area. Activities were performed in multiple locations within Riverside and San Bernardino Counties, specifically the Santa Ana Mountains and western valleys of Riverside County to San Jacinto Mountain, Palm Springs, Coachella Valley, southern slopes of San Bernardino County, San Bernardino Mountains, and the Apple Valley region of San Bernardino County.

Master-Planned Communities

Tejon Mountain Village, Kern County, California. The 280,000-acre ranch is held in private ownership by the Tejon Ranch Company (TRC). Duties included biotic resource assessments and inventories, habitat assessments and focused surveys for several special-status species, vegetation mapping, California condor (*Gymnogyps californianus*) tracking and monitoring, wildlife corridor studies, and preparation of specific survey reports and a biological technical report.

Newhall Ranch, Newhall Land and Farming Company, County of Los Angeles, California. Assisted with habitat vegetation mapping and focused surveys for the state-listed endangered San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) on the approximately 6,000-acre Newhall Ranch in Los Angeles County, California.

Ferber Ranch, The Planning Center, County of Orange, California. Proposed development of approximately 1,100 acres of unincorporated terrain required vegetation mapping, habitat assessments, jurisdictional delineation of waters of the US (including wetlands), USFWS focused surveys for the federally-listed endangered Arroyo toad (*Bufo californicus*) and federally-listed endangered burrowing owl (*Athene cunicularia*), and the collection of mammalian data for a wildlife corridor study.

Parks and Recreation Facilities

Carlsbad Municipal Golf Course Project, City of Carlsbad Recreation Department, City of Carlsbad, California. Biological construction monitor for the municipal golf course project in Carlsbad, California, completed in 2007. The approximately 400-acre project area contains sensitive coastal sage scrub, southern maritime chaparral, and wetland habitat for the federally-listed threatened coastal California gnatcatcher (*Polioptila californica*), the federally endangered least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*). Performed construction monitoring to support permit compliance (e.g., vegetation removal, grading requirements, construction surveys, BMPs, and SWPP regulations), prepared project monitoring reports, and assisted in monitoring the installation and maintenance of approximately 40 acres of coastal sage scrub and 1.83 acres of wetland mitigation.

Development (including private and commercial)

Denton Testamentary Trust Project, City of San Diego, California. Biologist's responsibilities included habitat/resources assessment, vegetation mapping, jurisdictional delineation of waters of the US (including wetlands), general wildlife and botanical surveys, potential impacts analysis, and preparation of biological resources report.

Escondido Police Firing Range Project, City of Escondido, San Diego, California. Performed vegetation mapping, habitat assessment, jurisdictional delineation of waters of the US (including wetlands), general flora and fauna surveys, and impacts analysis as well as preparing the biological technical letter report.

White Horse Estates Project, Barratt American, City of San Diego, California. Monitoring construction activities adjacent to sensitive native habitats within the Multiple Habitat Planning Area of the City of San Diego's Multiple Species Conservation Program. Responsibilities included the preparation of daily observation reports, making recommendations for remedial measures as necessary, and coordination with City staff.

Transportation

Mid-County Parkway, Riverside County Integrated Project, Riverside County, California. Conducted a variety of field surveys within the Mid-County Parkway study area, which ranges from approximately 1.7 km (1.1 miles) to 6.5 km (4 miles) in width and is approximately 32 miles in length. Field surveys included vegetation mapping, habitat assessments, rare plant surveys, general and focused sensitive wildlife surveys, and focused surveys for the state- and federally-listed fairy shrimp. Responsibilities also included preparation of annual reports submitted to USFWS.

Brown-Headed Cowbird Trapping Program, Sprinter Project, North County Transit District, City of Oceanside, California. Managed the daily operation and maintenance of a cowbird trapping program along Loma Alta Creek in the City of Oceanside and at the Carlsbad Municipal Golf Course. The trapping program is a USFWS requirement as mitigation for impacts to habitat for federally-listed species including least Bell's vireo, southwestern willow flycatcher, and California gnatcatcher. Responsibilities also included preparation of annual reports for submission to USFWS.

Habitat Conservation Plans

Habitat and Fire Management Plan, Riverside County Habitat Conservation Agency, City of Riverside, California. Project activities were conducted within the Steele Peak and Lake Mathews Riverside Habitat Conservation Agency Reserves. Duties included habitat assessments, vegetation sampling via modified relevé methodology within all grid locations, and trap grid installation (539 traps).

Trump National Golf Course Annual Gnatcatcher Surveys, City of Rancho Palos Verdes, California. Conducted California gnatcatcher surveys over approximately 100 acres of restored coastal sage scrub and coastal bluff scrub habitat within and surrounding the golf course on the Palos Verdes Peninsula. The goal of the surveys was to determine the breeding status of paired birds, territory number, size, and location, breeding success, and cowbird predation in accordance with the Ocean Trails Habitat Conservation Plan.

Water/Wastewater/Reclaimed Water/Flood Protection

As-Needed Biological Resources, City of San Diego Metropolitan Wastewater Department (MWWD), City of San Diego, California. Completed biological surveys, monitoring and reporting for multiple urban canyons within the City of San Diego. Provided construction monitoring and emergency sewer maintenance monitoring services, conducted biological resources and habitat impact assessments, and developed construction design recommendations and minimization and avoidance measures for work in sensitive habitat areas for a variety of project impact areas within urban canyons and open space in San Diego.

Reservoir Improvement Program Mitigated Negative Declaration (MND), Rainbow Municipal Water District, San Diego County, California. The project involved the construction of geomembrane covers on five reservoirs within the District's boundaries and associated inlet/outlet piping. Primary biologist's duties included performing habitat assessments, vegetation mapping, and impacts analysis as well as preparing the biological resources report and biological section of the CEQA-submitted MND.

San Marcos Creek Roadway Improvements and Flood Protection Project, City of San Marcos, California. Performed vegetation mapping, habitat assessment, and focused botanical survey for sensitive plant species, specifically the southern tarplant (*Hemizonia parryi* ssp. *Australis*).

Wetlands Permitting Project, El Camino Memorial Park, City of San Diego, California. Prepared and processed applications for Army Corps of Engineers Nationwide Permit 13, Regional Water Quality Control Board, California Department of Fish and Game RGP 63 for emergency bank stabilization certification application pursuant to Section 401 of the federal Clean Water Act and a Streambed Alteration Agreement pursuant to Section 1602 of the California Fish and Game Code. Also completed vegetation mapping, general flora and fauna survey, impacts analysis, and jurisdictional delineation of waters of the US, including wetlands.

Frank Marcus Obregon – Biologist

EXPERIENCE

F. Marcus Obregon is a talented biologist with a comprehensive background in natural resources, ecological management practices, geospatial analysis (global positioning systems and geographic information systems (GPS/GIS)), field sampling, and data organization. As a seasoned biological field technician, he has experience in many different areas around the country, which provides him with knowledge of a variety of environments, plant communities, and monitoring techniques. Mr. Obregon has participated in, organized, and directed a wide variety of field activities, including the development and implementation of impacted ecosystem restoration projects; forest, range, and riparian management; research greenhouse operations; wetland analysis; and fire effects monitoring.

Master-Planned Communities (includes mixed-use projects)

Tejon Ranch, Tejon Mountain Village LLC, Kern County, California. Conducted biological investigations, including vegetation mapping, wetlands delineation, ringtail and golden eagle surveys, and focused surveys for sensitive plant species over a 28,000-acre site. Contributed to the biological technical resources report in support of California Environmental Quality Act (CEQA) documentation.

Newhall Ranch, Newhall Land and Farming Company, Los Angeles County, California. Conducted biological investigations, including focused surveys for sensitive plant species and a baseline pilot study to evaluate mitigation requirements for the San Fernando spineflower. Contributed to the biological technical resources report in support of CEQA documentation.

Residential (subdivisions)

Vineyard-Ventura (Casden), City of Oxnard, Ventura County, California. Conducted biological investigations, including vegetation mapping and focused surveys for sensitive plant species, and prepared a biological technical resources report in support of CEQA documentation for a 344-unit residential development.

Parcel 129, Hollister Ranch, Santa Barbara County, California. Conducted biological investigations and prepared a biological technical resources report in support of CEQA documentation for a proposed staff house and road improvements.

EDUCATION

University of Texas, San Antonio
BS Biology with Minor in Anthropology
2004

PROFESSIONAL AFFILIATIONS

Southern California Botanists

PUBLICATIONS

Produced "The Invasive Plant Handbook" in the *Santa Monica Mountains NRA*, February 2005

Commercial Development

Cabrillo Business Park, City of Goleta, Santa Barbara County, California. Conducted biological investigations and prepared wetland delineation and existing conditions technical report in support of CEQA documentation for a business park expansion.

Utility Development

Las Virgenes Pipeline, City of Calabasas, Los Angeles County, California. Conducted biological investigations in support of CEQA documentation for a utility pipeline through Malibu Creek State Park.

South Orange County Wastewater Authority, City of Dana Point, Orange County, California. Conducted biological investigations and prepared an impacts analysis and existing conditions report in support of CEQA documentation for the upgrade of an outfall structure upgrade.

Construction Monitoring

Tejon Ranch, Tejon Industrial Complex, Kern County, California. Conducted surveys for sensitive plants and animals and monitored construction activities for various projects.

Commerce Center, Newhall Land and Farming Company, Kern County, California. Monitored construction activities to ensure compliance with California Department of Fish and Game (CDFG) guidelines.

Previous Experience

Western Ecological Research Center, Las Vegas Field Station, US Geological Survey, Henderson, Nevada. As a biological science technician, Mr. Obregon was a member of a six-person team that collected data using well-established measurement and sampling methods to evaluate plant, seed, and soil conditions in fire-affected areas within the Colorado Plateau, Great Basin, and Mojave Desert. Assembled and tabulated collected data, e.g., computed and checked records from field data and computed figures to determine biological measurements. Used the inventory of plants and their distribution, habitat characteristics, and response to various experimental treatments to research the role plant invasions have on the function of fire-impacted ecosystems.

Specific duties included establishing permanent sampling sites, collecting soil samples, gathering vegetation inventory and monitoring data using handheld computers, identifying plant species using taxonomic keys, collecting and preparing herbarium specimens, managing geospatial data using ArcGIS, analyzing fire data, and maintaining field, laboratory, and computer equipment. Regularly worked in a research greenhouse to provide assistance in departmental soil seed bank assays. Used geospatial data, in coordination with aerial and topographic maps, to prepare operations and coordinate field-sampling trips that were carried out in remote locations for 2 to 14 days at a time.

Gulf Coast Exotic Plant Management Team, Big Thicket National Preserve, National Park Service, Beaumont, Texas. As a range technician, Mr. Obregon led a four-person summer seasonal team in the fulfillment of partner parks' exotic plant control programs. Performed interrelated tasks in

support of rangeland, forest, and wetland management projects to improve resource quality on federal lands.

Trained team members in forest, range, and wetland restoration techniques. Coordinated efforts that focused on herbicide treatment of noxious weeds, plant identification, vegetation monitoring, and map reading. Calibrated, adjusted, and used standard technicians' research, testing, and treatment devices in difficult working conditions.

Led the collection and analysis of scientific data for a variety of investigative projects. Selected and modified standard techniques and methods to meet project goals. Coordinated and trained technicians on the collection of treatment data using standardized methods and GPS. Directed the collection, organization, and analysis of spatial data using GPS units and the ArcGIS suite of software. Used spatial data collected from inventoried, monitored, and treated vegetation plots to create project maps and develop work plans. Used the National Park EPMT data management tool, APCAM, to input field data for national distribution.

Native Plant Conservation Corps Internship, Ecological Restoration Department, Santa Monica Mountains NRA, National Park Service, Thousand Oaks, California. As crew leader, led a four-person team to meet riparian restoration program outcomes. Managed finances, handled administrative matters, and coordinated training for crewmembers in restoration ecology management practices. Regularly participated in and supervised restoration site preparation in both riparian and upland Mediterranean environments. Exotic plant abatement, operation and maintenance of a native plant nursery, threatened and endangered species management, and site-specific revegetation and restoration projects were conducted to remediate the invasion of exotic plant species and disruption of hydrology and soil communities.

Assisted in the preparation and execution of volunteer restoration and planting days. Educated volunteers on the ecological significance of restored lands, proper planting techniques, and the characteristics of the target native plants. Supervised exotic species removal projects and prepared, monitored, and maintained landscape-scale restoration projects. Surveyed native areas and reviewed publications to determine appropriate plant palettes for restoration areas. Assisted in the preparation of native plant requests for granted departmental projects. Prepared native plants by collecting and processing local seeds to ensure true gene characteristics, estimated seed and seedling mortality to meet orders, and propagated and cared for plant stock.

Learn, Lead, and Serve Internship, Department of Biology, University of Dayton, Ohio. Developed *ATHENA*, a web-based learning tool, to provide University of Dayton students with advanced solutions for biological questions using open source software. Statistically analyzed the consequences of applying this method over a test segment of freshman biology majors. Received funding from a cooperative NSF and University of Dayton grant. Published the results of *ATHENA* in a formal thesis.

ANUJA K. PARIKH
Principal Ecologist, FL*x*

EDUCATION AND CERTIFICATIONS

Ph.D., Plant Geography, University of California, Santa Barbara, 1989.
M.S., Geography, University of Bombay, India, 1981.
B.S., Zoology and Geology, University of Bombay, India, 1979.
PWS, Certified Professional Wetland Scientist #841, Society of Wetland Scientists, 1995.

SUMMARY OF QUALIFICATIONS

Dr. Parikh has 22 years of field and research experience in the areas of botany, plant ecology, wetlands, biogeography, and earth resources. Her work has included environmental baseline inventories and impact assessments, rare and endangered plant species surveys, revegetation and mitigation plans, restoration and monitoring of native upland and wetland habitats, and coast live oak revegetation studies. She has expertise in field vegetation sampling, plant species identification, wetland delineation, and the collection of physical environmental data. Using aerial photography and field surveys, she has prepared vegetation maps based on classification and quantification of plant communities in a variety of habitats; she also has mapped environmental constraints, incorporating data on sensitive species, natural habitats, and physiographic and man-made features. Dr. Parikh is experienced with experimental design as well as processing and analyzing ecological data using statistical and graphics software.

EXPERIENCE

Rare Plant and Vegetation Surveys and Mapping, Newhall Ranch/Valencia Company Project Sites, Los Angeles and Ventura Counties, CA. Newhall Land and Farming Company, URS Corporation, Impact Sciences, Inc., and Dudek and Associates, Inc. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), and *Helianthus* sp. (sunflower), plant species identification and comprehensive species lists, vegetation surveys and mapping of plant communities, and report preparation for various sites, including the Santa Clara River and Castaic Creek. Surveys were carried out annually during six field seasons in the years 2000 through 2005. Participation in the development of a spineflower management plan, preserve design, and associated research activities.

Rare Plant and Vegetation Surveys and Mapping, Los Angeles and Riverside Counties, CA. Natural Resource Consultants. General rare plant surveys and concentrated surveys for *Chorizanthe parryi* var. *fernandina* (San Fernando Valley spineflower), *Dodecahema leptoceras* (slender-horned spineflower), *Orcuttia californica* (California Orcutt grass), and *Navarretia fossalis* (spreading navarretia), vegetation surveys, and report preparation for three sites in the year 2003 and two sites in 2004.

Restoration Planning and Implementation, Former Guadalupe Oil Field, San Luis Obispo County, CA. Unocal Corporation and Jordan Environmental Services. Preparation and implementation of site-specific restoration plans, including the development of revegetation specifications, monitoring methods, performance criteria, and performance evaluation. Development of general mitigation and restoration success criteria, including sampling design, data collection, statistical data analysis, and reporting for selected reference wetlands for future comparison with wetland mitigation and restoration sites. Participation in activities

related to uplands and wetlands habitat restoration with the Restoration Working Group, comprising regulatory agency representatives and Unocal consultants, for the long-term Guadalupe Restoration Project.

Vegetation and Rare Plant Surveys and Wetlands Delineations, Ventura and Los Angeles Counties, CA. Impact Sciences, Inc. Vegetation surveys and mapping of plant communities, rare plant surveys, field wetland surveys, delineation of jurisdictional wetlands, and report preparation for more than 35 sites in various locations in Ventura and Los Angeles counties.

Peacekeeper Rail Garrison Mitigation Program, San Antonio Terrace, Vandenberg AFB, CA. U.S. Air Force and The Earth Technology Corporation. Project biologist responsible for directing, planning, and implementing biological field activities related to wetlands creation, upland habitat restoration, coast live oak revegetation, and vegetation monitoring for all mitigation and restoration sites.

Recovery Plan for Two Federally Endangered Plant Species. U.S. Fish and Wildlife Service. Ecologist and principal author responsible for background research and all botanical elements of the recovery plan for marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*).

Implementation of Recovery Activities for Two Federally Endangered Plant Species. California Department of Fish and Game and University of California. Research on species biology and ecology, plant propagation, experimental establishment of new populations, and monitoring of existing and new populations of marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorippa gambelii*). Reporting of species and habitat status and progress of recovery activities.

Rare Plant Census. All American Pipeline, L.P. Rare plant monitoring census for Gaviota tarplant (*Hemizonia increscens* ssp. *villosa*) in permanent plots established at Gaviota, CA.

Ventura River Estuary Enhancement Project, Ventura County, CA. California Department of Parks and Recreation. Design and implementation of a five-year vegetation monitoring program for restoration efforts at Emma Wood State Beach. The project involved monitoring four vegetation types: willow-cottonwood forest, saltbush scrub, dune scrub, and foredune vegetation. Activities included botanical surveys, survival and growth surveys, photodocumentation, data collection and comparative analysis of natural and revegetated areas, evaluation of exotics eradication, and recommendations for ongoing restoration.

Santa Barbara County Oak Restoration Program. University of California, Santa Barbara. Plant identification and vegetation monitoring in savanna and woodland habitats of blue oak, valley oak, and coast live oak, for the long-term assessment of cattle grazing impacts on oak seedling recruitment at Sedgwick Ranch, Santa Barbara County, CA.

Vernal Pool Restoration Monitoring, Isla Vista, CA. Isla Vista Recreation and Park District. Vegetation monitoring, data analysis, and publication preparation for a 10-year assessment of restored and created vernal pools at the Del Sol Open Space and Vernal Pool Reserve.

Plant Surveys and Wetland Delineations for Five Land Parcels, Isla Vista, CA. County of Santa Barbara Planning and Development. Field surveys and report preparation for botanical and wetland resources, including jurisdictional wetland delineations and mapping, in coastal mesa vernal pool habitat along Del Playa Drive, Isla Vista.

Rare and Endangered Plant Species Surveys. Metropolitan Water District and ERC Environmental and Energy Services Co. Plant species identification and sensitive plant species surveys at proposed reservoir and mitigation sites (Potrero Creek, Harford Springs, Crown/Rawson Valleys, Motte Rimrock Reserve, Domenigoni Valley, Santa Rosa Plateau Preserve, Lake Skinner, and Vail Lake) for the Metropolitan Water District's Eastside Reservoir Project, Riverside County, CA.

Vegetation Mapping and Plant Species Surveys. Santa Barbara County, CA. Vegetation mapping using aerial photographs of riparian communities along the Santa Ynez River, Santa Barbara County; field vegetation and topographical data collection from transects, species identification, rare and endangered plant species surveys, and report preparation for the County Flood Control District.

Rare and Endangered Plant Species Surveys. California Department of Water Resources. Rare and endangered plant species identification and mapping along a proposed aqueduct route in the Lompoc and Lake Cachuma areas in Santa Barbara County, and near Santa Margarita, San Luis Obispo County; field verification, ground truthing and mapping of vegetation communities along the Santa Ynez River, CA.

Floristic and Vegetation Surveys. U.S. Department of Agriculture, Forest Service. Preparation of floras and vegetation surveys in the Los Padres National Forest at Mt. Pinos, a subalpine community in Ventura and Kern counties, and at Alder Creek Botanical Area, Monterey County, CA. Identification of plant species and collection of vegetation and site data in permanent plots established in blue oak woodland in San Luis Obispo County, CA, as part of a Forest Service project on vegetation and habitat inventory and classification.

Wetland Vegetation Surveys, Mapping, and Monitoring. Dames & Moore. Vegetation mapping using aerial photographs, calculations of riparian habitat acreages, and field botanical surveys for a land development project along the Santa Clara River, Los Angeles County, CA. Biological construction monitoring for an archaeological site investigation in the Los Carneros wetlands, Goleta, CA. Field surveys and mapping of wetlands and vernal pools at Beale AFB, CA.

Rare and Endangered Plant Species Surveys and Vegetation Mapping. Jones and Stokes Associates, Inc. Field surveys for rare and endangered plant species at the proposed Los Vaqueros Reservoir site near Livermore, Contra Costa and Alameda counties, CA, and along ephemeral drainages near Taft in the Central Valley, Kern County, CA, for a project involving clean-up of oil and brea deposits. Habitat mapping and field surveys of riparian vegetation and plant species on transects along the Lower Ventura River, for an aquatic biology survey.

Ecological Survey Reports for Candidate Research Natural Areas. U.S. Department of Agriculture, Forest Service. Field work, literature reviews, and document preparation for the San Emigdio Mesa and Sawmill Mountain Candidate Research Natural Areas, Los Padres National Forest, Ventura County, CA.

Restoration Plan, Naval Base Ventura County, Port Hueneme Site, CA. Naval Base Ventura County and The Environmental Company. Field visits and preparation of a habitat protection and restoration plan for four special interest natural areas.

Biological Surveys and Wetlands Delineation for the National Reconnaissance Office (NRO) Campus, Vandenberg AFB. U.S. Air Force and Titan Corporation. Field biological surveys, jurisdictional wetlands delineation, and preparation of an addendum to the environmental assessment for The General Plan for the Cantonment Area of the base.

Controlled Burn Monitoring, Vandenberg AFB. U.S. Air Force and Museum of Systematics and Ecology, University of California, Santa Barbara. Pre-burn monitoring of vegetation and plant species in coastal sage scrub and chaparral at two prescribed burn sites, South Vandenberg AFB.

Restoration Plans for Installation of VTS Fiber-Optic Cable System, Honda Ridge Road Repair, and El Rancho Road Bridge Project, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Preparation of restoration plans including sections on ecological background, revegetation measures, monitoring and maintenance methods, performance criteria for assessing success, and restoration schedule for sites at North and South Vandenberg AFB.

Implementation of Restoration Plans, South Base and VTS Fiber-Optic Cable Systems, Vandenberg AFB. U.S. Air Force and Foster Wheeler Environmental Corp. Native plant species restoration, long-term monitoring, and restoration evaluation at four sites at Vandenberg AFB, CA.

Integrated Natural Resources Management Plan, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal ecologist responsible for preparing sections on existing conditions, issues of concern, and management objectives for vegetation, wildlife, and wetland resources for a basewide five-year plan.

Natural Resources Surveys and Environmental Assessments, Vandenberg AFB. U.S. Air Force and Tetra Tech, Inc. Principal environmental scientist responsible for conducting field surveys and preparing report sections for vegetation, wildlife, and wetland resources for 17 environmental assessments of facility and infrastructure development projects, and for an EIS on San Antonio Creek.

Natural Resources Management Plans. U.S. Air Force and Higginbotham/Briggs & Associates. Participation in data collection, field visits, agency coordination, document preparation and review for Natural Resources Management Plans prepared for Kaena Point Satellite Tracking Station, HI, and Onizuka AFB, CA.

Biological Monitoring, Environmental Quality Assurance Program (EQAP), Santa Barbara County, CA. Storrer Environmental Services. Biological monitoring for the Level (3) fiber-optic cable installation project, the All-American Pipeline relocation at Gaviota Creek, and the stabilization of oil wells for the Venoco State Lease 421 piers.

Goleta Revitalization EIR/EIS. County of Santa Barbara Planning and Development. Wetland delineations at sixteen creek crossings and plant surveys for street extensions, bikepaths and a multipurpose trail.

UCSB Campus Lagoon Wetland Restoration. The Herbarium, Museum of Systematics and Ecology, University of California, Santa Barbara. Design of a five-year vegetation monitoring program for wetland plant communities restored at the UCSB Campus Lagoon, Santa Barbara County, CA, as required by the Streambed Alteration Agreement of the California Department of Fish and Game. The monitoring project included plant species identification, vegetation sampling, data analysis, photodocumentation, and report preparation.

Vegetation Surveys and Analysis. The Herbarium, Department of Biological Sciences, University of California, Santa Barbara. Plant species identification and vegetation sampling in upland and wetland areas for baseline data inventory of botanical resources and rare plants at Fish Slough, Inyo and Mono

counties, CA. Project design and field surveys of topography, riparian vegetation, and plant species in the Ventura River estuary, Ventura County, CA; computer graphics, analysis, and document preparation of environmental relationships and distribution of species and vegetation communities. Computer analysis for a project on the botanical wetland resources of the Carpinteria salt marsh, Santa Barbara County, CA.

Wetlands Management Plan. Department of Geography and Campus Wetlands Committee, University of California, Santa Barbara. Field and literature surveys of hydrology and sedimentation of the campus-owned wetland resources in Devereux Slough and the Storke Campus wetlands.

Watershed Surveys. U.S. Department of Agriculture, Forest Service. Geomorphological, botanical, and hydrological field work in preliminary watershed surveys in Santa Barbara and Ventura counties, CA.

Research Activities. Department of Geography, University of California, Santa Barbara. Sampling and monitoring regeneration of tree and herbaceous species in the riparian zone of a chaparral watershed recovering from wildfire (N. Fork Matilija Creek, Ventura County); topographic channel surveys, computer plotting, ecological and botanical field, laboratory and greenhouse experiments, literature review, and data analysis. Vegetation sampling, inventory and analysis, and topographical surveys in chaparral ecosystems and oak woodlands in Burton Mesa chaparral, Santa Barbara County. Field sampling in coniferous forests of the Mendocino National Forest Reserve, CA.

MEMBERSHIPS

California Native Plant Society; Society of Wetland Scientists; Society of Ecological Restoration; California Botanical Society.

SELECTED PUBLICATIONS AND REPORTS

"Coast Live Oak Revegetation on the Central Coast of California," (with N. Gale), *Madroño*, 45(4), 1998, 301-309.

"Vegetation Monitoring of Created Dune Swale Wetlands, Vandenberg Air Force Base, California," (with N. Gale), *Restoration Ecology*, 6(1), 1998, 83-93.

"Review of Ten Years of Vernal Pool Restoration and Creation in Santa Barbara, California," (with W.R. Ferren Jr., D.M. Hubbard, S. Wiseman, and N. Gale), in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference, California Native Plant Society, Sacramento, CA, 1998, 206-216.

"Peacekeeper Rail Garrison and Small ICBM Mitigation Program, San Antonio Terrace, Vandenberg AFB, California—Annual Wetlands Monitoring Report, Annual Upland Monitoring Report, Year 5," Prepared for the U.S. Department of the Air Force, Detachment 10, Space and Missile Systems Center, San Bernardino, CA, February 1996.

"Vegetation Monitoring of Created Wetland Sites on the San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale), in M.C. Landin (Ed.) Proceedings of the National Interagency Workshop on Wetlands: Technology Advances for Wetlands Science, Technical Report, Wetlands Research and Technology Center, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS, 1995, 153-55.

"Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*)," (with N. Gale), U.S. Fish and Wildlife Service, Ventura, CA, August 1994.

"Wetland Creation and Vegetation Monitoring in a Stabilized Sand Dune Ecosystem, San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale and T. Waddell), in M.C. Landin (Ed.) Proceedings of the 13th Annual Meeting of the Society of Wetland Scientists (SWS), New Orleans, LA, 1993, 368-76.

"First-Year Vegetation Monitoring of Created Wetlands on the San Antonio Terrace, Vandenberg Air Force Base, California," (with N. Gale and T. Waddell), in A.E. Leviton and M.L. Aldrich (Eds.) Proceedings of the Pacific Division, American Association for the Advancement of Science, University of California, Santa Barbara, June 1992, p. 46.

"Biotic Inventory and Ecosystem Characterization for Fish Slough, Inyo and Mono Counties, California," (with the Fish Slough Research Team), Report to State of California, The Resources Agency, Department of Fish and Game, by the Departments of Biological Sciences, Geography, and Geological Sciences, University of California, Santa Barbara, June 1991.

"Ecology of a Mediterranean-Climate Estuarine Wetland at Carpinteria, California: Plant Distributions and Soil Salinity in the Upper Marsh," (with R. Callaway, S. Jones, W. Ferren), *Canadian Journal of Botany*, 68, 1990, 1139-1146.

"Botanical Resources at Emma Wood State Beach and the Ventura River Estuary, California: Inventory and Management," (with W. Ferren, M. Capelli, D. Magney, K. Clark, and J. Haller), Report to the State of California Department of Parks and Recreation, Environmental Report No. 15, The Herbarium, Department of Biological Sciences, University of California, Santa Barbara, August 1990.

"UCSB Campus Wetlands Management Plan, Part II—Technical Report—Hydrology, Water Quality, and Sedimentation of West and Storke Campus Wetlands," (with F. Davis, D. Theobald, and R. Harrington), Report to the California Coastal Conservancy and Campus Wetlands Committee, University of California, Santa Barbara, CA, 1990.

"Recovery of the Chaparral Riparian Zone After Wildfire," (with F. Davis, E. Keller, and J. Florsheim), Proceedings of the California Riparian Systems Conference, September 22-24, 1988, Davis, CA, Protection, Management, and Restoration for the 1990s, Gen. Tech. Rep. PSW-110, U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station, 1989, 194-203.

"Plant Communities and Flora of the Proposed Botanical Reserve on Mt. Pinos, Ventura and Kern counties, CA," (with D. Capralis), Survey Report, U.S. Department of Agriculture, Forest Service, Los Padres National Forest Headquarters, Goleta, CA, August 1988.

"Terrestrial Vegetation of Rattlesnake Canyon," (with F. Davis), Proceedings of the Chaparral Ecosystems Research Conference, Santa Barbara, CA, Report No. 62, California Water Resources Center, University of California, Davis, CA, 1986, 13-17.

Britney Strittmater – Environmental Analyst

EXPERIENCE

Britney Strittmater has project experience that includes National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) report preparation, vegetation mapping, biological resource surveys, data collection and analysis, and biological monitoring. Ms. Strittmater has also successfully completed a background course in CEQA.

Newhall Specific Plan, Newhall Land and Farming, Inc., Counties of Los Angeles and Ventura, California. Conducted focused surveys for the state-listed endangered San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*). Performed population counts and point-intercept transects. Assisted with writing related biological technical reports and environmental impact statements/ environmental impact reports (EISs/EIRs).

Bark Beetle Infestation Project, Southern California Edison, San Bernardino and Riverside Counties, California. Monitored tree removal and pole maintenance activities in biologically sensitive areas to ensure avoidance of impacts to potentially occurring US Forest Service (USFS) Threatened, Endangered, and Sensitive species.

Southern Subregion Natural Community Conservation Plan (NCCP) Habitat Reserve Vegetation Communities Mapping, Orange County, California. Conducted vegetation mapping for both native and developed land uses based on the Gray and Bramlet habitat classification system.

San Juan Preserve Oak Inventory, Riverside and Orange Counties, California. Assisted in oak inventory on USFS land. Performed diameter-at-breast-height (DBH) recordings and tagged all oak, sycamore, pine, and eucalyptus trees.

EDUCATION

Humboldt State University
BS Botany
2007

LICENSES & CERTIFICATIONS

Association of Environmental Professionals—CEQA Basics Workshop
Fall 2007

PROFESSIONAL AFFILIATIONS

California Invasive Plant Council (Cal-IPC)

California Native Plant Society (CNPS)

EXPERIENCE

Marcella Waggoner has 20 years' experience working as a biologist with the University of California Riverside. Ms. Waggoner has conducted insect surveys and insect identification, including ant surveys in least tern nesting sites, and has conducted nesting bird surveys for the US Fish and Wildlife Service, Alaska (North Slope Bird Habitat Study). She worked as a technician for the US Forest Service Pacific Southwest Forest Experiment Station, conducting plant transect surveys for fuel-load research. Ms. Waggoner recorded data using global positioning system (GPS) units and created maps with a geographic information system (GIS) for presentations and publications.

Ms. Waggoner's design project experience has focused on sustainable design and master planning for residential properties, private land trust properties, and camps. Design features include trails, permeable parking areas, and native plantings.

Ms. Waggoner has conducted environmental damage assessments and surveys for sensitive plant and animal species in California. She regularly conducts biological monitoring for construction projects and long-term monitoring of mitigation projects in environmentally sensitive areas. She is currently working on a variety of habitat restoration projects with various responsibilities at Dudek.

North Green Valley Interceptor Sewer Upgrade Wetlands Mitigation and Monitoring, Leucadia Wastewater District, Carlsbad, California. Conducted biological monitoring for this restoration project. Also prepared annual reports to document the condition of the restoration project. Habitat types restored include coastal sage scrub and southern willow scrub.

Conceptual Wetland Mitigation and Monitoring Plan Vista South Project, California. Helped to develop a mitigation plan including goals, assessment criteria, and biological monitoring directives. Habitat types restored include coastal sage scrub and southern willow scrub.

Saddleback Estates Munz's Onion (*Allium munzii*) Salvage and Monitoring Project, California. Conducted biological monitoring during the salvage and translocation of the rare and endangered Munz's onion. Prepared monitoring reports of the salvage operation. Collected GPS data at pre- and post-salvage locations of Munz's onion bulbs. Collected and delivered Munz's onion bulbs to Rancho Santa Ana Botanic Garden for storage and propagation.

EDUCATION

Conway School of Landscape Design, Conway, Massachusetts
MA Sustainable Design and Land Use Planning
2006

Certificate in Geographic Information Systems, University of California, Riverside
2002

University of California, Riverside
BS Biology
1976

PROFESSIONAL AFFILIATIONS

American Planning Association (APA)

Newhall Ranch Project, Newhall Land and Farming Company, Counties of Los Angeles and Ventura, California. Conducted focused surveys as a member of a team of botanists for the state-listed endangered San Fernando Valley spineflower plant species and other sensitive plants.

Brianna Wood – Environmental Analyst

EXPERIENCE

Brianna Wood's expertise includes rare and endangered wildlife field surveying, technical report writing, CEQA/NEPA compliance, and environmental regulatory compliance for agencies such as US Army Corps of Engineers, US Fish and Wildlife Service, California Department of Fish and Game, and California Water Quality Control Board, among others. Ms. Wood has extensive experience with scientific field techniques, including biodiversity, habitat assessment, and wildlife behavioral surveys. She performs quality control for wetland delineations and permit applications and is skilled at presenting report findings to clients and agencies in conferences. Ms. Wood is also an experienced and proficient technical writer, producing reports such as biological assessments, wildlife survey reports, wetland delineations, initial studies, environmental impact reports, etc.

Ms. Wood has nearly 3 years' experience as a professional permit coordinator for small and large-scale housing/commercial developments, mitigation/restoration, gravel extraction, and mining projects requiring numerous federal, state, and local permits. Further experience includes extensive inputting, organizing, and deciphering of large volumes of numerical, physical, and qualitative data for biological studies and inventories. She is also experienced in using GPS equipment for habitat analysis and wildlife behavioral studies.

Environmental Field Surveys and Monitoring. Conducted and directed field surveys for special-status species, including raptor surveys and wildlife habitat assessments, and conducted supporting field work for botanical inventories, cultural resource surveys, phase I site assessments, and wetland delineations. Recent wildlife survey experience includes local field surveys for presence of protected species such as Foothill yellow-legged frog, Valley elderberry longhorn beetle mitigation monitoring, giant garter snake habitat monitoring, and specialized surveys for birds (especially raptors) of special concern. Ms. Wood has performed wildlife research and habitat analyses in a variety of ecosystems, including California Central Valley oak woodlands/ annual grasslands, chaparral, Sierra/Cascade montane forests, Southern California coastal sage scrub, and numerous marine ecosystems in Southern California, Baja Mexico, northeastern Australia, and Belize.

Technical Report Writing and Formatting. Ms. Wood has prepared numerous CEQA and NEPA documents, such as Initial Studies/Environmental Assessments, Mitigated Negative Declarations/ FONSIs, Environmental Impact Reports, Municipal Services Reviews, Biological Assessment Reports, and various Natural Environment

EDUCATION

San Diego State University, California
BS General Biology, emphasis in Marine Biology
2003

LICENSES & CERTIFICATIONS

Certificate for CEQA course, UC Davis Extension

Certificate for Mitigation Monitoring Course, City of Chico Center for Economic Development

Scuba Dive Master and Scientific Research Scuba Diving Certification through San Diego State University

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals

Audubon Society – Altacal Local Chapter

Studies. In her capacity as an Environmental Analyst, she has made determinations of significant effects on the distribution and relative health of species of concern and their habitat as well as determining avoidance and mitigation measures. She also regularly produces Requests for Proposals, Scope of Work Contracts, and budget tracking sheets.

Preparation of Permitting Applications and Agency Correspondence. Ms Wood's duties as permit coordinator have included the preparation of application packages for US Army Corps of Engineers Section 404 permits, California Department of Fish and Game Streambed Alteration Agreements, Water Quality Certification applications, and permits for many other public agencies. Additionally, she has been responsible for the quality control of wetland delineations submitted to the US Army Corps of Engineers. She has experience dealing with wetland delineation procedures and regulations pertaining to wetlands, regularly communicating with local, state, and federal agency staff on behalf of clients and coordinating the permitting needs to streamline the regulatory compliance process.

APPENDIX B

Vascular Plant Species Observed
at Newhall Ranch
(2002, 2003, 2004, 2005, 2006, and 2007)

APPENDIX B
Vascular Plant Species Observed at Newhall Ranch

LYCOPODIAE

SELAGINELLACEAE – SPIKE-MOSS FAMILY

Selaginella bigelovii – Bigelow's spike-moss

EQUISETAE

EQUISETACEAE – HORSETAIL FAMILY

Equisetum hyemale – common scouring-rush
Equisetum laevigatum – smooth scouring-rush
Equisetum telmateia – giant horsetail

FILACEAE

AZOLLACEAE – MOSQUITO FERN FAMILY

Azolla c.f. filiculoides – duckweed fern

DENNSTAEDTIACEAE – BRAKEN FAMILY

Adiantum jordani – California maiden-hair
Pellaea andromedifolia – coffee fern
Pellaea mucronata var. *mucronata* – bird's-foot fern
Pentagramma triangularis – goldenback fern

POLYPODIACEAE – POLYPODY FAMILY

Polypodium californicum – California polypody

CONIFERAE

CUPRESSACEAE – CYPRESS FAMILY

* *Cedrus deodara* – Deodar cedar
Juniperus californica – California juniper

PINACEAE – PINE FAMILY

* *Pinus halepensis* – Aleppo pine
* *Pinus pinea* – stone pine

APPENDIX B
Vascular Plant Species Observed at Newhall Ranch

ANGIOSPERMAE (DICOTYLEDONES)

AIZOACEAE – FIG-MARIGOLD FAMILY

* *Aptenia cordifolia* – baby sun-rose
* *Carpobrotus* sp. – sea-fig

AMARANTHACEAE – AMARANTH FAMILY

* *Amaranthus albus* – tumbleweed
Amaranthus blitoides – prostrate amaranth
* *Amaranthus hybridus* – amaranth
Amaranthus palmeri – Palmer's amaranth
Amaranthus powellii – Powell's amaranth
* *Amaranthus retroflexus* – rough pigweed

ANACARDIACEAE – SUMAC FAMILY

Malosma laurina – laurel sumac
Rhus ovata – sugar-bush
Rhus trilobata – squaw bush
* *Schinus molle* – Peruvian pepper-tree
Toxicodendron diversilobum – poison-oak

APIACEAE – CARROT FAMILY

* *Anethum graveolens* – dill
Apiastrum angustifolium – wild celery
* *Apium graveolens* – celery
Berula erecta – cutleaf water-parsnip
Bowlesia incana – American Bowlesia
* *Conium maculatum* – poison hemlock
* *Coriandrum sativum* – cilantro
* *Daucus carota* – Queen Anne's lace
Daucus pusillus – rattlesnake weed
Lomatium utriculatum – common lomatium
Sanicula bipinnata – poison sanicle

APOCYNACEAE – DOGBANE FAMILY

Apocynum cannabinum – Indian hemp
* *Vinca major* – periwinkle

APPENDIX B
Vascular Plant Species Observed at Newhall Ranch

ASCLEPIADACEAE – MILKWEED FAMILY

Asclepias californica – California milkweed
Asclepias fascicularis – narrow-leaf milkweed

ASTERACEAE – SUNFLOWER FAMILY

Achillea millefolium – yarrow
Achyrachaena mollis – blow-wives
Acourtia microcephala – sacapellote
Agoseris grandiflora – large-flowered agoseris
Ambrosia acanthicarpa – annual burweed
Ambrosia confertifolia – weak-leaved burweed
Ambrosia psilostachya – western ragweed
Artemisia californica – coastal sagebrush
Artemisia douglasiana – California mugwort
Artemisia dracunculus – tarragon
Artemisia tridentata – Great Basin sagebrush
Baccharis douglasii – marsh baccharis
Baccharis emoryi – Emory's baccharis
Baccharis pilularis – coyote brush
Baccharis salicifolia – mulefat
Baccharis sarothroides – chaparral broom
Brickellia californica – California brickellbush
Brickellia nevinii – Nevin's brickellbush
* *Carduus pycnocephalus* – Italian thistle
* *Centaurea melitensis* – star thistle
Chaenactis glabriuscula – yellow pincushion
* *Chrysothamnus nauseosus* – rubber rabbitbrush
Cirsium occidentale var. *californicum* – California thistle
Cirsium occidentale var. *occidentale* – cobwebby thistle
* *Cirsium vulgare* – bull thistle
* *Cnicus benedictus* – blessed thistle
Conyza canadensis – horseweed
Conyza coulteri – Coulter's conyza
Coreopsis bigelovii – Bigelow's coreopsis
* *Coreopsis tinctoria* – calliopsis
Corethrogyne filaginifolia – virgate cudweed aster
* *Cotula coronopifolia* – African brass-buttons

Encelia actoni – Acton's encelia
Encelia californica – California bush sunflower
Encelia farinosa – brittlebush, incensio
Ericameria palmeri var. *pachylepis* – goldenbush
Ericameria pinifolia – pine-bush
Erigeron foliosus – leafy daisy
Eriophyllum confertiflorum – long-stem golden yarrow
Euthamia occidentalis – western goldenrod
Filago californica – California fluffweed
* *Filago gallica* – narrow-leaf filago
* *Gazania linearis* – gazania
Gnaphalium bicolor – bicolor cudweed
Gnaphalium californicum – California everlasting
Gnaphalium canescens ssp. *microcephalum* – white everlasting
Gnaphalium leucocephalum – Sonora everlasting
Gnaphalium luteo-album – white cudweed
Gnaphalium sp. *nova* – everlasting
Gnaphalium palustre – lowland cudweed
Hazardia squarrosa ssp. *grindelioides* – saw-toothed goldenbush
Helianthus annuus – common sunflower
Helianthus nuttallii c.f. ssp. *parishii* – Los Angeles sunflower
Hemizonia fasciculata – fascicled tarweed
Hemizonia kelloggii – Kellogg's tarweed
Heterotheca grandiflora – telegraph weed
Heterotheca sessiliflora – golden aster
Isocoma menziesii – goldenbush
Iva axillaris – poverty weed
* *Lactuca saligna* – willowleaf lettuce
* *Lactuca serriola* – prickly lettuce
Lagophylla ramosissima – common hareleaf
Lasthenia californica – coast goldfields
Lepidospartum squamatum – scale-broom
Lessingia filaginifolia – California aster
Lessingia glandulifera – lessingia
Malacothrix saxatilis – cliff malacothrix
* *Matricaria matricarioides* – pineapple weed
Micropus californicus – slender cottonweed

Pluchea odorata – marsh-fleabane
Pluchea sericea – arrow weed
* *Pulicaria paludosa* – Spanish sunflower
Rafinesquia californica – California chicory
Senecio californicus – California butterweed
Senecio flaccidus var. *douglasii* – butterweed
* *Senecio vulgaris* – common groundsel
Silybum marianum – milk thistle
* *Sonchus asper* – prickly sow-thistle
* *Sonchus oleraceus* – common sow-thistle
Stebbinoseris heterocarpa [*Microseris heterocarpa*] – brown puffs
Stephanomeria exigua – small wreathplant
Stephanomeria pauciflora – wire-lettuce
Stephanomeria virgata – twiggy wreathplant
Stylocline gnaphaloides – everlasting nest-straw
Uropappus lindleyi [*Microseris lindleyi*] – silver puffs
Wyethia ovata – mule ears
Xanthium spinosum – spiny cocklebur
Xanthium strumarium – cocklebur

BETULACEAE – BIRCH FAMILY

Alnus rhombifolia – white alder

BORAGINACEAE – BORAGE FAMILY

Amsinckia menziesii var. *intermedia* – yellow fiddleneck
Amsinckia menziesii var. *menziesii* – yellow fiddleneck
Amsinckia tessellata – devil's lettuce
Cryptantha sp. – forget-me-not
Cryptantha intermedia – common forget-me-not
Cryptantha micrantha – redroot cryptantha
Cryptantha microstachys – tejon cryptantha
Cryptantha muricata – prickly cryptantha
Heliotropium curassavicum – wild heliotrope
Pectocarya linearis – slender pectocarya
Pectocarya penincillata – pectocarya
Pectocarya setosav – pectocarya
Plagiobothrys arizonicus – popcorn flower

Plagiobothrys canescens – rusty popcorn flower
Plagiobothrys collinus – California popcorn flower
Plagiobothrys fulvus – common popcorn flower

BRASSICACEAE – MUSTARD FAMILY

Athysanus pusillus – dwarf athysanus
* *Brassica nigra* – black mustard
* *Capsella bursa-pastoris* – shepard's purse
Caulanthus lasiophyllus – California mustard
Descurainia pinnata ssp. *halictorum* – tansy mustard
* *Hirschfeldia incana* – short-podded mustard
Lepidium lasiocarpum – peppergrass
* *Lepidium latifolium* – peppergrass
Lepidium virginicum – wild peppergrass
* *Lobularia maritime* – sweet-alyssum
* *Raphanus sativus* – wild radish
* *Rorippa nasturtium-aquaticum* – water cress
* *Sisymbrium altissimum* – tumble mustard
* *Sisymbrium irio* – London rocket
* *Sisymbrium officinale* – hedge mustard
* *Sisymbrium orientale* – Oriental mustard
Stanleya pinnata var. *pinnata* – Prince's plume
Thysanocarpus curvipes – fringepod
Tropidocarpum gracile – slender dobie-pod

CACTACEAE – CACTUS FAMILY

* *Cereus peruvianus* – Peruvian apple cactus
Opuntia basilaris var. *ramosa* – beaver-tail cactus
Opuntia californica var. *parkeri* – cane cholla
Opuntia littoralis – coastal prickly-pear
Opuntia X vaseyi – prickly-pear cactus
* *Trichocereus spachianus* – golden torch cactus

CAPPARACEAE – CAPER FAMILY

Isomeris arborea – bladderpod

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CAPRIFOLIACEAE – HONEYSUCKLE FAMILY

Lonicera subspicata – southern honeysuckle
Sambucus mexicana – Mexican elderberry
Symphoricarpos sp. – snowberry
Symphoricarpos c.f. mollis – spreading snowberry

CARYOPHYLLACEAE – PINK FAMILY

* *Cerastium glomeratum* – sticky mouse-ear
* *Herniaria cinerea* – gray herniaria
Loeflingia squarrosa – no common name
* *Silene gallica* – common catchfly
Spergularia sp. – stickwort, starwort
* *Spergularia rubra* – sand-spurrey
* *Spergularia c.f. villosa* – villous sand-spurrey
* *Stellaria media* – common chickweed

CASURINACEAE – SHEET OAK FAMILY

* *Casuarina cunninghamiana* –Australian Pine

CHENOPODIACEAE – GOOSEFOOT FAMILY

Atriplex canescens – four-winged saltbush
* *Atriplex heterosperma* – weedy orache
Atriplex lentiformis – big saltbush, quail brush
* *Atriplex rosea* – tumbling oracle
* *Atriplex semibaccata* – Australian saltbush
Atriplex serenana var. *serenana* – bractscale
Atriplex suberecta – Australian saltbush
Atriplex triangularis – spearscale
* *Bassia hyssopifolia* – five-hooked bassia
* *Beta vulgaris* – garden beet
* *Chenopodium album* – lamb's-quarters
* *Chenopodium ambrosioides* – Mexican tea
Chenopodium berlandieri – pitseed goosefoot
* *Chenopodium botrys* – goosefoot
Chenopodium californicum – California goosefoot
* *Chenopodium murale* – nettle-leaved goosefoot
Chenopodium rubrum – red goosefoot

* *Salsola tragus* – Russian-thistle
* *Spinacia oleracea* – spinach

CONVOLVULACEAE – MORNING-GLORY FAMILY
Calystegia macrostegia ssp. *cyclostegia* – morning-glory
Calystegia peirsonii – Peirson's morning-glory
* *Convolvulus arvensis* – bindweed

CRASSULACEAE – STONECROP FAMILY
Crassula connata – dwarf stonecrop
Dudleya cymosa – unidentified dudleya
Dudleya lanceolata – lanceleaf dudleya

CUCURBITACEAE – GOURD FAMILY
Cucurbita foetidissima – coyote-melon, calabazilla
Marah macrocarpus – wild cucumber

CUSCUTACEAE – DODDER FAMILY
Cuscuta californica – California dodder
Cuscuta pentagona – five-angled dodder
Cuscuta subinclusa – canyon dodder

DATISCACEAE – DASTICA FAMILY
Dastica glomerata – Durango root

ERICACEAE – HEATH FAMILY
Arctostaphylos glauca – bigberry manzanita

EUPHORBIACEAE – SPURGE FAMILY
Chamaesyce albomarginata – rattlesnake spurge
* *Chamaesyce maculata* – spotted spurge
Chamaesyce polycarpa – small-seed sand mat
Chamaesyce serpyllifolia – thyme-leafed spurge
Croton californicus – California croton
Eremocarpus setigerus – doveweed
Euphorbia spathulata – reticulate-seed spurge
* *Ricinus communis* – castor-bean
Stillingia linearifolia – linear-leaved stillingia

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FABACEAE – PEA FAMILY

* *Acacia baileyana* – golden wattle
Astragalus didymocarpus – white dwarf locoweed
Astragalus gambelianus – Gambel's locoweed
Astragalus trichopodus – Santa Barbara locoweed
Glycyrrhiza lepidota – wild licorice
Lathyrus laetiflorus – wild sweet pea
Lathyrus vestitus – wild pea
Lotus corniculatus – bird's-foot lotus
Lotus hamatus – grab lotus
Lotus humistratus – lotus
Lotus purshianus – Spanish-clover
Lotus salsuginosus – coastal lotus
Lotus scoparius var. *scoparius* – deerweed
Lotus strigosus – strigose deerweed
Lupinus bicolor – Lindley's annual lupine
Lupinus excubitus – Mountain Springs bush lupine
Lupinus excubitus var. *hallii* – grape soda lupine
Lupinus hirsutissimus – stinging lupine
Lupinus microcarpus var. *densiflorus* – chick lupine
Lupinus microcarpus var. *microcarpus* – chick lupine
Lupinus sparsiflorus – Coulter's lupine
Lupinus succulentis – arroyo lupine
Lupinus truncatus – collar lupine
* *Medicago polymorpha* – California burclover
* *Medicago polymorpha* var. *brevispina* – short-spined California burclover
* *Medicago sativa* – alfalfa
* *Melilotus alba* – white sweet-clover
* *Melilotus indica* – yellow sweet-clover
* *Robinia pseudoacacia* – black locust
Trifolium sp. – clover
Trifolium albopurpureum – rancheria clover
Trifolium ciliolatum – tree clover
* *Trifolium fragiferum* – strawberry clover

Trifolium gracilentum – pin-point clover
* *Trifolium hirtum* – rose clover
Trifolium microcephalum – maiden clover
* *Trifolium repens* – white clover
Trifolium willdenovii – valley clover
Vicia hassei – Hesse's vetch
* *Vicia villosa* ssp. *villosa* – winter vetch

FAGACEAE – BEECH FAMILY

Quercus agrifolia – coast live oak
Quercus berberidifolia – scrub oak
Quercus douglasii – blue oak
Quercus lobata – valley oak

GERANIACEAE – GERANIUM FAMILY

* *Erodium brachycarpum* – shortfruit stork's bill
* *Erodium botrys* – long-beaked filaree
* *Erodium cicutarium* – red-stemmed filaree
* *Erodium moschatum* – white-stemmed filaree

GROSSULARIACEAE – CURRANT FAMILY

Ribes aureum – golden currant
Ribes malvaceum – chaparral currant

HYDROPHYLLACEAE – WATERLEAF FAMILY

Emmenanthe penduliflora – whispering bells
Eriodictyon crassifolium var. *nigrescens* – yerba santa
Eucrypta chrysanthemifolia – common eucrypta
Nemophila menziesii – baby blue-eyes
Nemophila parviflora var. *quercifolia* – oak-leaved nemophila
Phacelia cicutaria – caterpillar phacelia
Phacelia cicutaria var. *hispida* – caterpillar phacelia
Phacelia distans – blue fiddleneck
Phacelia imbricata ssp. *imbricata* – imbricate phacelia
Phacelia minor – wild canterbury-bell
Phacelia ramosissima – shrubby phacelia

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JUGLANDACEAE – WALNUT FAMILY

Juglans californica – Southern California black walnut

LAMIACEAE – MINT FAMILY

* *Marrubium vulgare* – horehound
Mentha citrata – orange mint
Salvia apiana – white sage
Salvia columbariae – chia
Salvia leucophylla – purple sage
Salvia mellifera – black sage
Stachys ajugoides – bugle hedge-nettle
Stachys ajugoides var. *rigida* – rigid hedge-nettle
Stachys albens – white hedge-nettle
Trichostema lanceolatum – vinegar weed

LAURACEAE – LAUREL FAMILY

Umbellularia californica – California laurel

LOASACEAE – STICK-LEAF FAMILY

Mentzelia sp. – blazing star
Mentzelia laevicaulis – blazing star
Mentzelia micrantha – small-flowered stick-leaf

LYTHRACEAE – LOOSESTRIFE FAMILY

Lythrum californicum – California loosestrife

MALVACEAE – MALLOW FAMILY

Malacothamnus fasciculatus ssp. *laxiflorus* – chaparral bush mallow
Malacothamnus fremontii – bush mallow
Malacothamnus marrubioides – bush mallow
* *Malva neglecta* – common mallow
* *Malva parviflora* – cheeseweed

MELIACEAE – MAHOGANY FAMILY

* *Melia azedarach* – China berry

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MORACEAE – FIG FAMILY

* *Ficus carica* – edible fig

MYRTACEAE – MYRTLE FAMILY

* *Eucalyptus* sp. – eucalyptus
* *Eucalyptus camaldulensis* – red gum
* *Eucalyptus globulus* – blue gum
* *Eucalyptus leucoxylon* – white ironbark
* *Eucalyptus polyanthemos* – silver dollar gum
* *Eucalyptus sideroxylon* – red ironbark

NYCTAGINACEAE – FOUR O'CLOCK FAMILY

Mirabilis laevis var. *crassifolia* [*M. californica*] – California wishbone-bush

OLEACEAE – OLIVE FAMILY

Fraxinus dipetala – California ash
* *Fraxinus uhdei* – tropical ash
Fraxinus velutina – velvet ash
* *Ligustrum lucidum* – glossy privet
* *Olea europaea* – mission olive

ONAGRACEAE – EVENING-PRIMROSE FAMILY

Camissonia bistorta – southern sun cup
Camissonia boothii – sun cup
Camissonia boothii ssp. *decorticans* – shredding evening primrose
Camissonia californica – mustard primrose
Camissonia hirtella – sun cup
Camissonia micrantha – miniature sun cup
Camissonia strigulosa – sun cup
Clarkia purpurea – winecup clarkia
Clarkia speciosa – clarkia
Clarkia unguiculata – elegant clarkia
Epilobium brachycarpum – willow herb
Epilobium canum ssp. *canum* – California fuchsia
Epilobium ciliatum – California cottonweed
Ludwigia peploides – yellow waterweed
Ludwigia repens – water primrose

Oenothera elata – evening primrose
* *Oenothera laciniata* – evening primrose

OROBANCHACEAE – BROOM-RAPE FAMILY
Orobanche parishii ssp. *parishii* – broom-rape
Orobanche sp. – broom-rape

PAEONIACEAE – PEONY FAMILY
Paeonia californica – California peony

PAPAVERACEAE – POPPY FAMILY
Argemone corymbosa – prickly poppy
Eschscholzia californica – California poppy
Platystemon californicus – California creamcups

PLANTAGINACEAE – PLANTAIN FAMILY
Plantago erecta – dot-seed plantain
* *Plantago indica* – plantain
* *Plantago lanceolata* – English plantain
* *Plantago major* – common plantain

PLATANACEAE – SYCAMORE FAMILY
Platanus racemosa – western sycamore

POLEMONIACEAE – PHLOX FAMILY
Allophyllum divaricatum – purple false gillyflower
Allophyllum glutinosum – sticky false gillyflower
Eriastrum densifolium – woollystar
Eriastrum densifolium ssp. *elongatum* – elongate eriastrum
Eriastrum densifolium ssp. *mohavense* – Mohave eriastrum
Eriastrum sapphirinum – sapphire eriastrum
Gilia angelensis – angel gilia
Gilia capitata – globe gilia
Leptodactylon californicum – prickly phlox
Linanthus androsaceus – common linanthus
Linanthus pygmaeus - linanthus

Navarretia atractyloides – holly-leaf skunkweed
Phlox gracilis – slender phlox

POLYGONACEAE – BUCKWHEAT FAMILY

Chorizanthe fimbriata – fringed spineflower
Chorizanthe parryi var. *fernandina* – San Fernando Valley spineflower
Chorizanthe staticoides – turkish rugging
Eriogonum angulosum – angle-stem buckwheat
Eriogonum baileyi – Bailey's buckwheat
Eriogonum brachyanthum – short-flowered buckwheat
Eriogonum elongatum – long-stemmed buckwheat
Eriogonum fasciculatum ssp. *foliolosum* – California buckwheat
Eriogonum fasciculatum ssp. *polifolium* – California buckwheat
Eriogonum gracile var. gracile – slender woolly buckwheat
Eriogonum gracillimum – rose and white buckwheat
Eriogonum maculatum – spotted buckwheat
Eriogonum c.f. viridescens – buckwheat
Lastarriaea coriacea – lastarriaea
* *Polygonum arenastrum* – common knotweed
* *Polygonum argyrocoleon* – smartweed
Polygonum lapathifolium – willow weed
Polygonum punctatum – perennial smartweed
Pterostegia drymarioides – pterostegia
* *Rumex conglomeratus* – whorled dock
* *Rumex crispus* – curly dock
Rumex hymenosepalus – wild rhubarb
Rumex maritimus – golden dock
Rumex obtusifolius – dock
Rumex salicifolius – willow dock

PORTULACACEAE – PURSLANE FAMILY

Calandrinia ciliata – redmaids
Calyptridium sp. – pussypaws
Claytonia parviflora – small-leaved montia
Claytonia perfoliata – miner's lettuce
* *Portulaca oleracea* – common purslane

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RANUNUCULACEAE – BUTTERCUP FAMILY

Clematis ligusticifolia – yerba de chiva
Delphinium parryi ssp. *parryi* – Parry's larkspur

RHAMNACEAE – BUCKTHORN FAMILY

Ceanothus crassifolius – hoary-leaved ceanothus
Ceanothus tomentosus – woolyleaf ceanothus
Rhamnus crocea – redberry
Rhamnus ilicifolia – holly-leaf redberry

ROSACEAE – ROSE FAMILY

Adenostoma fasciculatum – chamise
Cercocarpus betuloides – mountain-mahogany
Cercocarpus betuloides var. *betuloides* – birch-leaf mountain-mahogany
Cercocarpus betuloides var. *blancheae* – island mountain-mahogany
Heteromeles arbutifolia – toyon
Prunus ilicifolia – holly-leaf cherry
Rosa californica – California rose
Rubus ursinus – California blackberry
* *Sangwisorba minor* – garden burnet

RUBIACEAE – MADDER FAMILY

Galium angustifolium – narrow-leaved bedstraw
* *Galium aparine* – goose grass
Galium nuttallii ssp. *nuttallii* – San Diego bedstraw
Galium porrigens – climbing bedstraw

SALICACEAE – WILLOW FAMILY

Populus fremontii – Fremont cottonwood
Populus tremuloides – Quaking aspen
Salix exigua – narrow-leaved willow
Salix gooddingii – black willow
Salix laevigata – red willow
Salix lasiolepis – arroyo willow
Salix lucida ssp. *lasiandra* – golden willow

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SAURURACEAE – LIZARD'S-TAIL FAMILY

Anemopsis californica – yerba mansa

SCROPHULARIACEAE – FIGWORT FAMILY

Antirrhinum coulterianum – white snapdragon
Antirrhinum multiflorum – withered snapdragon
Castilleja affinis – coast paintbrush
Castilleja densiflora – dense-flowered owl's-clover
Castilleja exserta – common owl's-clover
Castilleja foliolosa – woolly Indian paintbrush
Collinsia heterophylla – purple Chinese houses
Cordylanthus rigidus – bird's beak
Keckiella cordifolia – heart-leaf penstemon
Linaria canadensis – toadflax
Mimulus aurantiacus – bush monkeyflower
Mimulus aurantiacus var. *pubescens* – bush monkeyflower
Mimulus guttatus – seep monkeyflower
Mimulus pilosus – downy monkeyflower
Penstemon centranthifolius – scarlet bugler
* *Verbascum thapsus* – woolly mullein
* *Verbascum virgatum* – wand mullein
* *Veronica anagallis-aquatica* – water speedwell

SIMAROUBACEAE – QUASSIA FAMILY

* *Ailanthus altissima* – tree of heaven

SOLANACEAE – NIGHTSHADE FAMILY

Datura wrightii – western jimsonweed
* *Nicotiana glauca* – tree tobacco
Nicotiana quadrivalvis – Indian tobacco
* *Solanum americanum* – small-flowered nightshade
Solanum douglasii – white nightshade
* *Solanum eleagnifolium* – silver leaf horse-nettle
* *Solanum sarrachoides* – hairy nightshade
Solanum xanti – chaparral nightshade

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TAMARICACEAE – TAMARISK FAMILY

* *Tamarix* sp. – tamarisk

* *Tamarix ramoissima* – tamarisk

ULMACEAE – ELM FAMILY

* *Ulmus pumila* – Siberian elm

URTICACEAE – NETTLE FAMILY

Hesperocnide tenella – western nettle

Parietaria hespera – western pellitory

Urtica dioica – giant creek nettle

* *Urtica urens* – dwarf nettle

VERBENACEAE – VERVAIN FAMILY

Verbena lasiostachys – western verbena

VIOLACEAE – VIOLET FAMILY

Viola pedunculata – Johnny jump-ups

VISCACEAE – MISTLETOE FAMILY

Phoradendron macrophyllum – big leaf mistletoe

Phoradendron villosum – oak mistletoe

VITACEAE – GRAPE FAMILY

Parthenocissus vitacea – woodbine, Virginia creeper

Vitis girdiana – desert wild grape

ZYGOPHYLLACEAE – CALTROP FAMILY

* *Tribulus terrestris* – puncture vine

ANGIOSPERMAE (MONOCOTYLEDONES)

ARECACEAE – PALM FAMILY

* *Washingtonia robusta* – Mexican fan palm

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CYPERACEAE – SEDGE FAMILY

Carex alma – sturdy sedge
Carex praegracilis – clustered field sedge
Carex sp. – sedge
Cyperus eragrostis – tall cyperus
Cyperus esculentus – yellow nut-grass
* *Cyperus involucratus* – nutsedge
Cyperus odoratus – coarse cyperus
Eleocharis montevidensis – slender creeping spike-rush
Eleocharis parishii – Parish's spikerush
Eleocharis rostellata – beaked spikerush
Scirpus acutus – hard-stemmed bulrush
Scirpus americanus – winged three-square
Scirpus maritimus – alkali bulrush
Scirpus microcarpus – bulrush
Scirpus robustus – Pacific coast bulrush

JUNCACEAE – RUSH FAMILY

Juncus sp. – rush
Juncus acutus ssp. *leopoldii* – southwestern spiny rush
Juncus balticus – wire rush
Juncus bufonius – toad rush
Juncus longistylis – rush
Juncus mexicanus – Mexican rush
Juncus rugulosus – wrinkled rush
Juncus textilis – Indian rush
Juncus torreyi – rush
Juncus triformis – Yosemite dwarf rush
Juncus xiphioides – iris-leaved rush

LEMNACEAE – DUCKWEED FAMILY

Lemna miniscula – duckweed
Lemna valdiviana – duckweed

LILIACEAE – LILY FAMILY

* *Allium cepa* – onion
Allium porrum – onion

* *Amaryllis bella-donna* – naked lady
* *Asparagus officinalis* – asparagus
Bloomeria crocea – common goldenstar
Brodiaea terrestris ssp. *kernensis* – dwarf brodiaea
Calochortus clavatus var. *gracilis* – slender mariposa lily
Calochortus venustus – mariposa lily
Dichelostemma capitatum – blue dicks
Muilla maritima – common muilla
Yucca whipplei – Our Lord's candle
Yucca schidigera – Mojave Yucca

POACEAE – GRASS FAMILY

Achnatherum coronatum – giant needlegrass
* *Agrostis* sp. – bentgrass
* *Agrostis viridis* – water bent
* *Arundo donax* – giant reed
* *Avena barbata* – slender oat
* *Avena fatua* – wild oat
Avena sativa – cultivated oat
Bromus catharticus – California brome
Bromus catharticus var. *catharticus* – California brome
* *Bromus diandrus* – ripgut grass
* *Bromus hordeaceus* – soft chess
* *Bromus madritensis* ssp. *rubens* – foxtail chess
* *Bromus sterilis* – sterile brome
* *Bromus tectorum* – cheat grass
* *Cortaderia jubata* – pampas grass
* *Crypsis schoenoides* – prickle grass
* *Cynodon dactylon* – Bermuda grass
* *Digitaria sanguinalis* – hairy crabgrass
Distichlis spicata – salt grass
* *Echinochloa colonum* – jungle-rice
Echinochloa crus-galli – barnyard grass
* *Eleusine indica* – goose grass
Elymus glaucus – western wild-rye
Elymus multisetus – big squirreltail
Eragrostis mexicana – lovegrass

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Vascular Plant Species Observed at Newhall Ranch

* *Festuca arundinacea* – tall fescue
* *Hordeum marinum* – Mediterranean barley
* *Hordeum murinum* – glaucous foxtail barley
* *Lamarckia aurea* – goldentop
* *Leptochloa uninerva* – Mexican sprangletop
Leymus condensatus – giant ryegrass
Leymus triticoides – beardless wild rye
* *Lolium multiflorum* – Italian ryegrass
* *Lolium perenne* – perennial ryegrass
Melica imperfecta – California melic
Muhlenbergia asperifolia – scratch-grass
Muhlenbergia microsperma – littleseed muhly
Nassella cernua – nodding needlegrass
Nassella lepida – foothill needlegrass
Nassella pulchra – purple needlegrass
Panicum capillare – western witchgrass
* *Panicum miliaceum* – broom corn millet
* *Parapholis incurve* – sickle grass
Paspalum distichum – knotgrass
* *Phalaris aquatica* – Harding grass
* *Phalaris minor* – Mediterranean canary grass
* *Piptatherum miliaceum* – smilo grass
* *Poa annua* – annual bluegrass
Poa secunda – Malpais bluegrass
* *Polypogon interruptus* – ditch beard grass
* *Polypogon monspeliensis* – rabbit's-foot grass
Schismus barbatus – abumashi
Sorghum bicolor – sorghum
Sorghum halepense – Johnsongrass
Sporobolus airoides – alkali scation
* *Triticum aestivum* – cultivated wheat
Vulpia microstachys – fescue
* *Vulpia myuros* – rattail fescue
Vulpia octoflora – six-weeks fescue

POTAMOGETONACEAE – PONDWEED FAMILY

Potamogeton foliosus – leafy pondweed

APPENDIX B
Vascular Plant Species Observed at Newhall Ranch

TYPHACEAE – CATTAIL FAMILY

Typha domingensis – slender cattail
Typha latifolia – broad-leaved cattail

* signifies introduced (non-native) species

APPENDIX C

California Natural Diversity Database Forms

CALIFORNIA NATIVE SPECIES FIELD SURVEY FORM

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Document Code _____ Quad Code _____
IndexCode _____ Occurrence # _____
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PLEASE ENTER ALL INFORMATION AVAILABLE TO YOU.
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ATTACH OR DRAW A MAP ON BACK.

Scientific name (no codes): *Chorizanthe parryi* var. *fernandina*

Reporter: Anuja Parikh, Nathan Gale, and others **Phone:** (760) 942.5147

Address: Dudek, 605 Third Street, Encinitas, CA 92024

Date of Field Work: May 29-June 1, June 13-14, July 12-13, 16-18, 2007 **County:** Los Angeles **Collection:** No **If yes,** # **Mus./Herb:**

Location: Northern Santa Susana Mountains/Santa Clarita Valley, Newhall Ranch, southeast of confluence of the Santa Clara River and Castaic Creek, east, south, and west edges of Airport Mesa and adjacent mesas.

Quad Name: **Newhall** X 7½' ___ 15' **Elevation**: 1120-1240' T 4N R 16W Sec 13

Landowner/Manager: Newhall Land, 23823 Valencia Boulevard, Valencia, CA 91355

Species Found? X Yes ____ No **If not, reason:**

Is this a new location record? _____ Yes X No ____ **Unknown**

Total# of Individuals = 226 Is this a subsequent visit? X Yes ___ No Compared to your last visit: ___more ___ same X fewer

Phenology (plants): ____ % vegetative ____ % flowering ____ % fruiting

Population Age Structure (animals): ____ # adults ____ #juveniles ____ # others

Site Function for Species (animals): ____ breeding ____ foraging ____ wintering ____ roosting ____ denning ____ other

Habitat Description (plant communities, dominants, associates, other rare spp., substrate/soils, aspect/slope):

Most occurred in coastal scrub habitat with *Artemisia californica, Salvia leucophylla,* and *Eriogonum fasciculatum.* Most plants were on 30- 50% slopes with southwest, southeast, northwest, west, and east aspects, and flat areas; plants found on silty clay loam soil.

Current Land Use Visible Disturbances/Possible Threats: Current Land Use: Cattle grazing, farming; Visible Disturbances: cattle grazing, farming, grading/clearing; Possible Threats: proposed residential/commercial development.

Overall Site Quality: ____ Excellent ____ Good X Fair ____ Poor

Comments: This report summarizes 28 discrete locations, each with from 1 to an estimated 125 individuals observed.

Should/Could this site be protected? How?

Other comments: Rainfall was less than recent years.

DETERMINATION (Check one or more, fill in blanks)

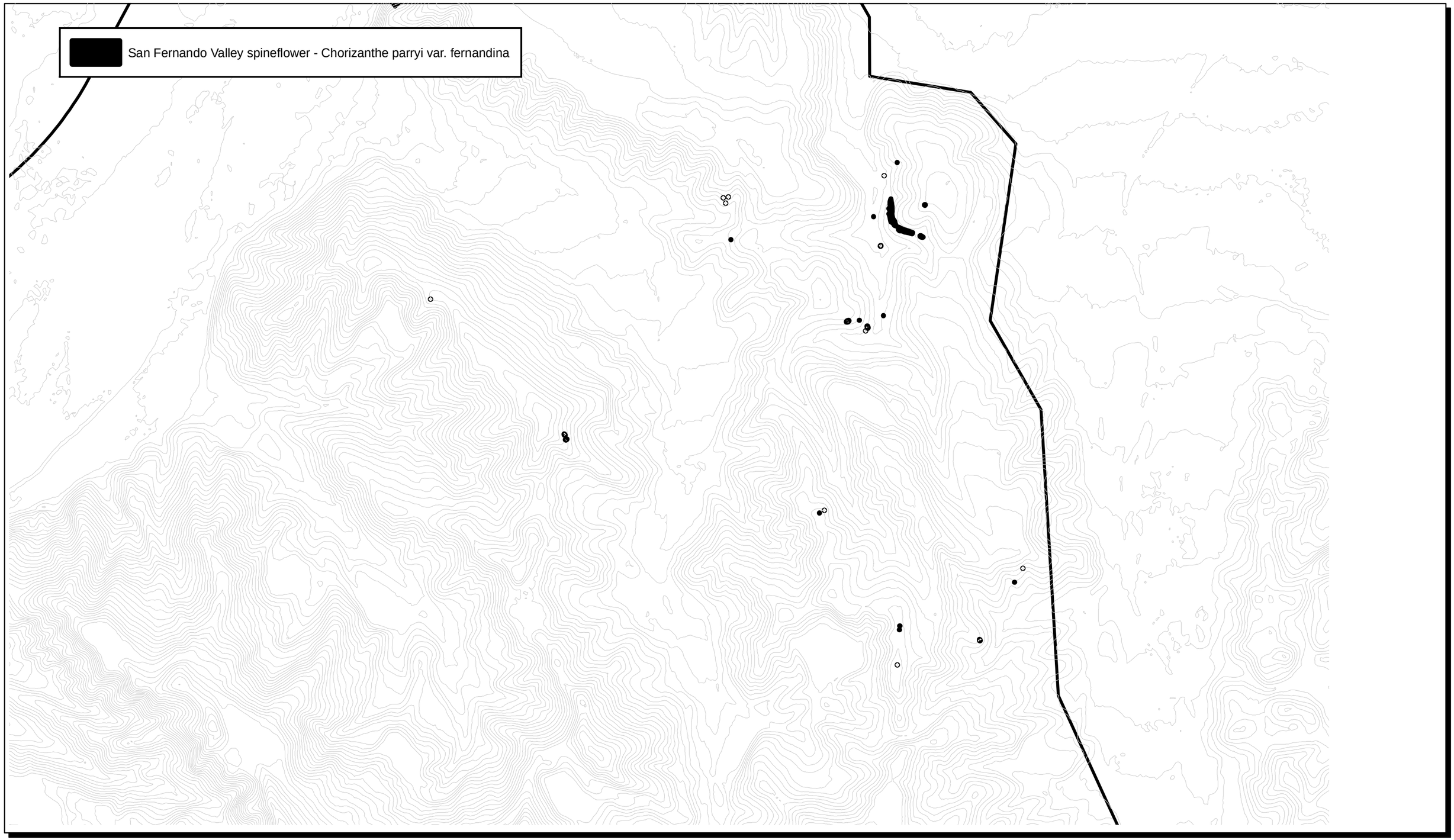
____ Keyed in a site reference:
___ Compared with specimen housed at:
____ Compared with photo/drawing in:
____ By another person (name):
X Other: Personal knowledge

OTHER KNOWLEDGEABLE INDIVIDUALS (Name/Address/Phone)

PHOTOGRAPHS (Check one or more)

Subject	Type
___ Plant/Animal	___ Slide
__ Habitat	____ Print
____ Diagnostic Feature	
____ Other	

May we obtain duplicates at our cost?
____ Yes X No



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Santa Barbara, Ca 93101
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Newhall Ranch - Airport Mesa

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PLEASE ENTER ALL INFORMATION AVAILABLE TO YOU.
PLEASE USE THE BACK FOR COMMENTS IF NECESSARY.
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Scientific name (no codes): *Chorizanthe parryi* var. *fernandina*

Reporter: C. Ford, B. Strittmater, G. Hagen, R. Krebs, T. Liddicoat, A. Causey, J. Jones, and F. M. Obregon Phone: (760) 942.5147

Address: Dudek, 605 Third Street, Encinitas, CA 92024

Date of Field Work: May 22-24, July 2-3, 16-18, 2007 **County:** Los Angeles **Collection:** No **If yes,** # **Mus./Herb:**

Location: Northern Santa Susana Mountains/Santa Clarita Valley, Newhall Ranch, south of confluence of the Santa Clara River and Castaic Creek, eastern, southern, and western edges of Grapevine Mesa and scattered ridges in the area.

Quad Name: **Newhall** _X_ 7½' ___ 15' **Elevation**: 1040-1400' T 4N R 17W Sec 23

Landowner/Manager: Newhall Land, 23823 Valencia Boulevard, Valencia, CA 91355

Species Found? _X_ Yes ___No If not, reason:

Is this a new location record? _____ Yes __X__ No ____ Unknown

Total# of Individuals = 76 Is this a subsequent visit? _X_Yes __ No Compared to your last visit: ___more ___ same _X_ fewer

Phenology (plants): ____ % vegetative _____ % flowering _____ % fruiting

Population Age Structure (animals): ____ # adults ____ #juveniles ____ # others

Site Function for Species (animals): ____ breeding ____ foraging ____ wintering ____ roosting ____ denning ____ other

Habitat Description (plant communities, dominants, associates, other rare spp., substrate/soils, aspect/slope):

Open California sagebrush, California buckwheat, ecotonal California sagebrush/California buckwheat and coast live oak woodland, and at the edge of agricultural fields on mesas. Associated native species include *Artemisia californica* and *Eriogonum fasciculatum*. Slopes were generally southwest facing between 30 and 65% slopes on severely eroded terrace escarpments. Soil texture is predominantly clay loam.

Current Land Use Visible Disturbances/Possible Threats: Current Land Use: Cattle grazing, farming; Visible Disturbances: cattle grazing, farming; Possible Threats: proposed residential/commercial development.

Overall Site Quality: ____ Excellent __X__ Good _____ Fair ____ Poor

Comments: This report summarizes 14 discrete locations, each with from one to an estimated 33 individuals observed.

Should/Could this site be protected? How?

Other comments: Rainfall less than recent years.

DETERMINATION (Check one or more, fill in blanks)

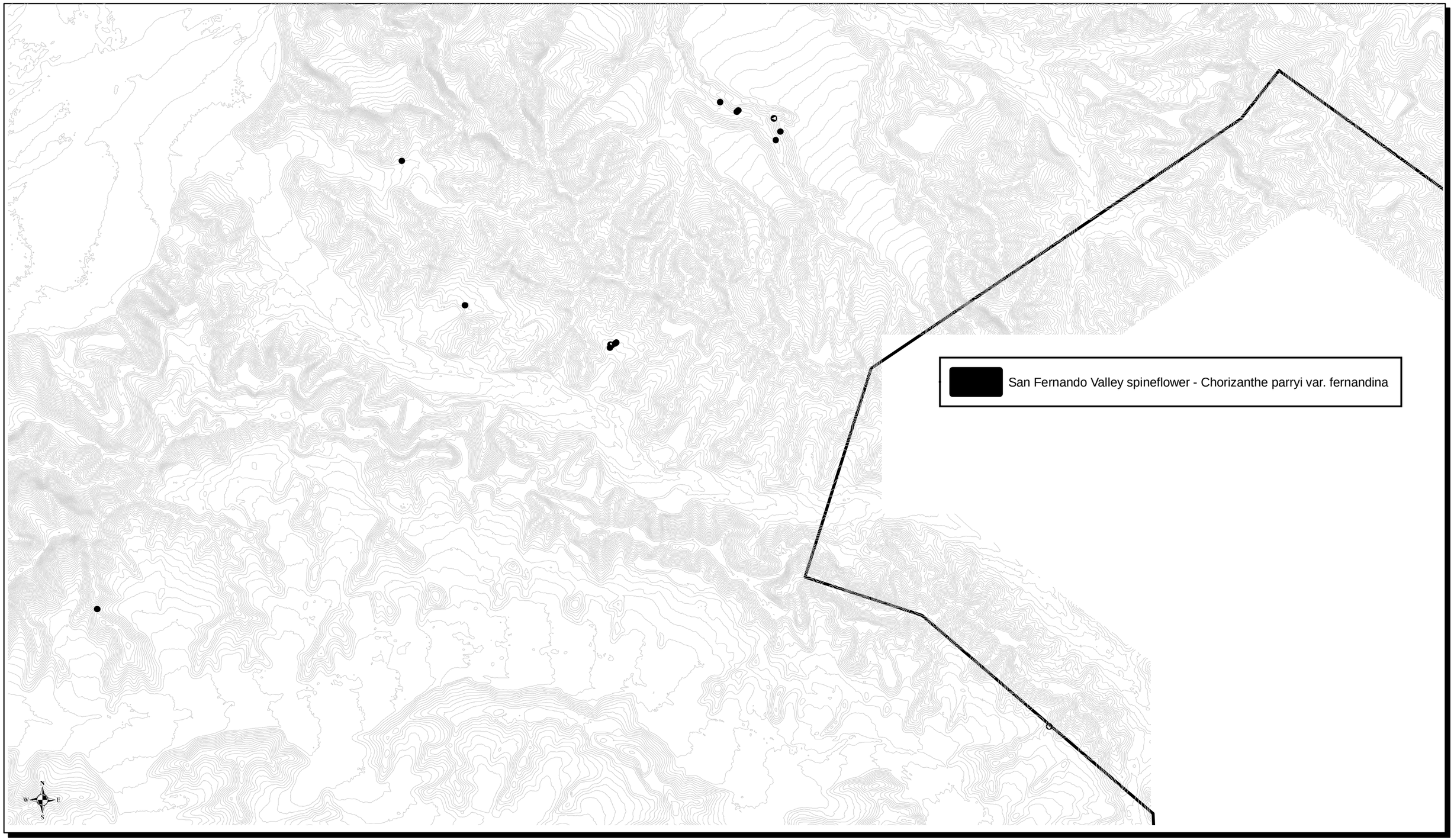
____Keyed in a site reference:
____ Compared with specimen housed at:
____Compared with photo/drawing in:
____ By another person (name):
_X_Other: Personal knowledge

OTHER KNOWLEDGEABLE INDIVIDUALS (Name/Address/Phone)

PHOTOGRAPHS (Check one or more)

Subject	Type
___ Plant/Animal	____Slide
__ Habitat	____Print
____Diagnostic Feature	
____Other	

May we obtain duplicates at our cost?
____Yes __X__No



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Newhall Ranch - Grapevine Mesa

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CALIFORNIA NATIVE SPECIES FIELD SURVEY FORM

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IndexCode _____ Occurrence # _____
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Scientific name (no codes): *Chorizanthe parryi* var. *fernandina*

Reporter: Anuja Parikh, Nathan Galen, and others Phone: (760) 942.5147

Address: Dudek & Associates, 605 Third Street, Encinitas, CA 92024

Date of Field Work: May 21, July 12-13, 18, 2007 **County:** Los Angeles **Collection:** No **If yes,** # **Mus./Herb:**

Location: Northern Santa Susana Mountains/Santa Clarita Valley, Newhall Ranch: south of State Route 126 just east of the Ventura County line, on ridges and north facing slopes throughout Potrero Canyon

Quad Name: **Newhall** _X_ 7½' ___ 15' **Elevation**: 960-1160' T 4N R 17W Sec 29

Landowner/Manager: Newhall Land, 23823 Valencia Boulevard, Valencia, CA 91355

Species Found? X Yes ___No **If** not, reason:

Is this a new location record? _____ Yes __X__ No ____ Unknown

Total# of Individuals = _67_ Is this a subsequent visit? _X_ Yes __ No Compared to your last visit: ___more ___ same _X_ fewer

Phenology (plants): ____ % vegetative _____ % flowering _____ % fruiting

Population Age Structure (animals): ____ # adults ____ #juveniles ____ # others

Site Function for Species (animals): ____ breeding ____ foraging ____ wintering ____ roosting ____ denning ____ other

Habitat Description (plant communities, dominants, associates, other rare spp., substrate/soils, aspect/slope):

Coastal scrub, including California sagebrush - black sage series, and California sagebrush - purple sage series, and California annual grasslands Dominant plants associated with the populations include *Artemisia californica, Salvia leucophyla, Centaurea melitensis, Erodium cicutarium, Bromus spp.* and *Eriogonum fasciculatum.* Most plants are on south-east to south facing slopes, with some in flat areas. Slopes were generally between 30 and 50%. Soil texture is generally silty clay loam.

Current Land Use Visible Disturbances/Possible Threats: Current Land Use: Cattle grazing, farming; Visible Disturbances: cattle grazing, fire in recent past (5-1 0 years); Possible Threats: Proposed for estate residential development.

Overall Site Quality: ____ Excellent _____ Good _____ Fair _X_ Poor

Comments: This report summarizes 11 discrete locations, each with from one to an estimated 24 individuals observed.

Should/Could this site be protected? How?

Other comments: Rainfall less than recent years.

DETERMINATION (Check one or more, fill in blanks)

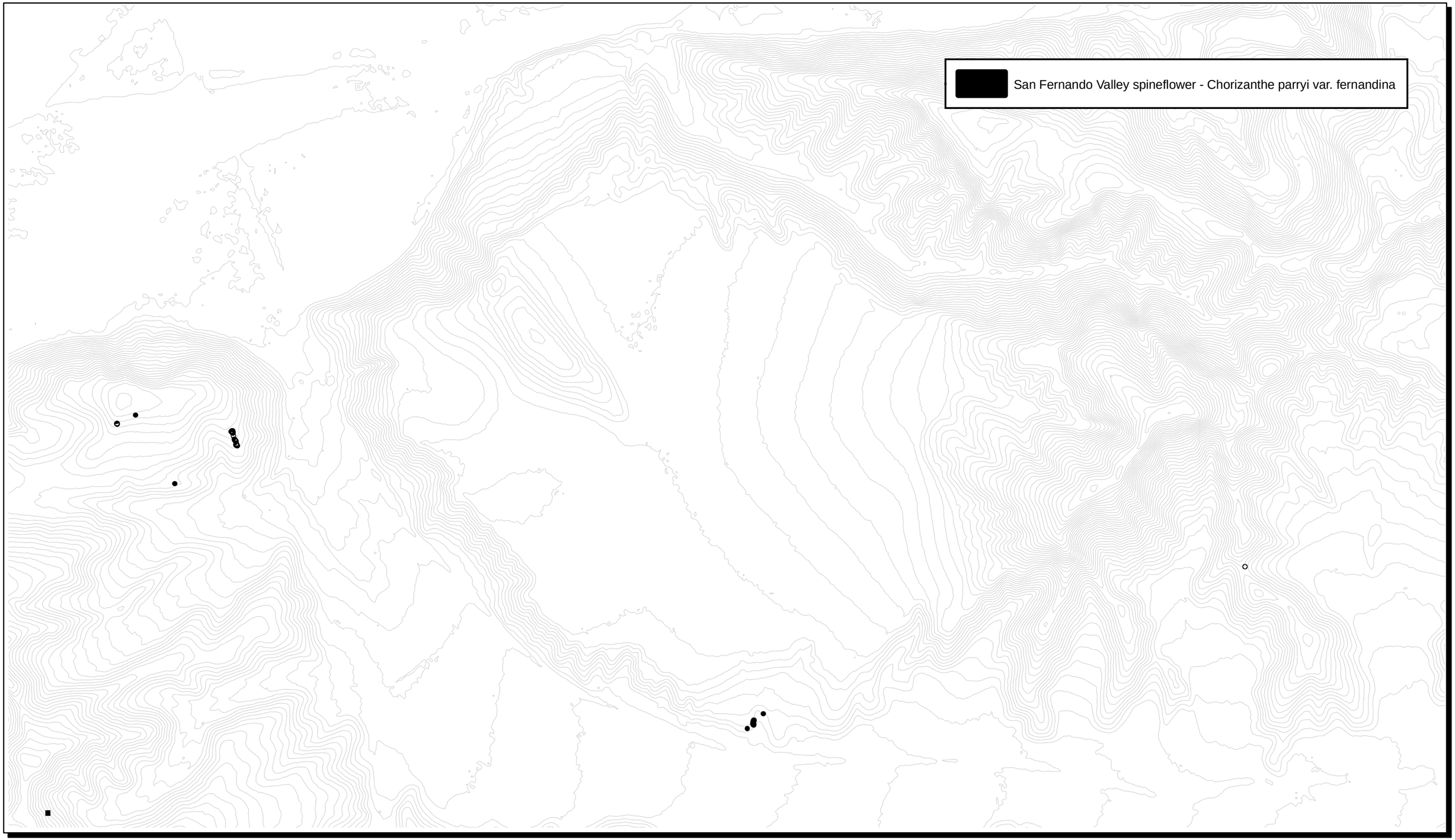
____ Keyed in a site reference:
____ Compared with specimen housed at:
____ Compared with photo/drawing in:
____ By another person (name):
_X_ Other: Personal knowledge

OTHER KNOWLEDGEABLE INDIVIDUALS (Name/Address/Phone)

PHOTOGRAPHS (Check one or more)

Subject	Type
____ Plant/Animal	____ Slide
__ Habitat	____ Print
____ Diagnostic Feature	
____ Other	

May we obtain duplicates at our cost?
____ Yes __X__ No



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Newhall Ranch - Potrero Canyon

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Scientific name (no codes): *Chorizanthe parryi* var. *fernandina*

Reporter: C. Ford, B. Strittmater, G. Hagen, R. Krebs, T. Liddicoat, A. Causey, J. Jones, B. Wood, M. Waggoner and F. M. Obregon Phone: (760) 942.5147

Address: Dudek, 605 Third Street, Encinitas, CA 92024

Date of Field Work: May 21, June 15, 18-21, 2007 **County:** Los Angeles **Collection:** No **If yes,** # **Mus./Herb:**

Location: Northern Santa Susana Mountains/Santa Clarita Valley, Newhall Ranch: north of State Route 126, west of San Martinez Grande Canyon Road

Quad Name: **Val Verde** _X_ 7½' ___ 15' **Elevation**: 1040-1200' T 4N R 17W Sec 21

Landowner/Manager: Newhall Land, 23823 Valencia Boulevard, Valencia, CA 91355

Species Found? X Yes ____ **No** If not, reason:

Is this a new location record? _____ Yes __X__ No ____ Unknown

Total# of Individuals = 73 Is this a subsequent visit? _X_ Yes __ No Compared to your last visit: ___more ___ same _X_ fewer

Phenology (plants): ____ % vegetative _____ % flowering _____ % fruiting

Population Age Structure (animals): ____ # adults ____ #juveniles ____ # others

Site Function for Species (animals): ____ breeding ____ foraging ____ wintering ____ roosting ____ denning ____ other

Habitat Description (plant communities, dominants, associates, other rare spp., substrate/soils, aspect/slope):
Locations are predominantly within California annual grassland and coastal scrub, dominated by *Bromus hordeaceus, Avena fatua, Centaurea melitensis, Vulpia myuros, and Hirschfeldia incana,* and *Artemisia californica.* Most plants are on east- or southeast-facing slopes from 30 to 50% slopes. Silty clay loams dominate.

Current Land Use Visible Disturbances/Possible Threats: Current Land Use: Cattle grazing, farming; Visible Disturbances: cattle grazing, fire in recent past (5-1 0 years); Possible Threats: Currently proposed for estate residential development.

Overall Site Quality: ____ Excellent _____ Good ___X___ Fair ____ Poor

Comments: This report summarizes 15 discrete locations, each with from one to an estimated 22 individuals observed.

Should/Could this site be protected? How?

Other comments: Rainfall less than recent years.

DETERMINATION (Check one or more, fill in blanks)

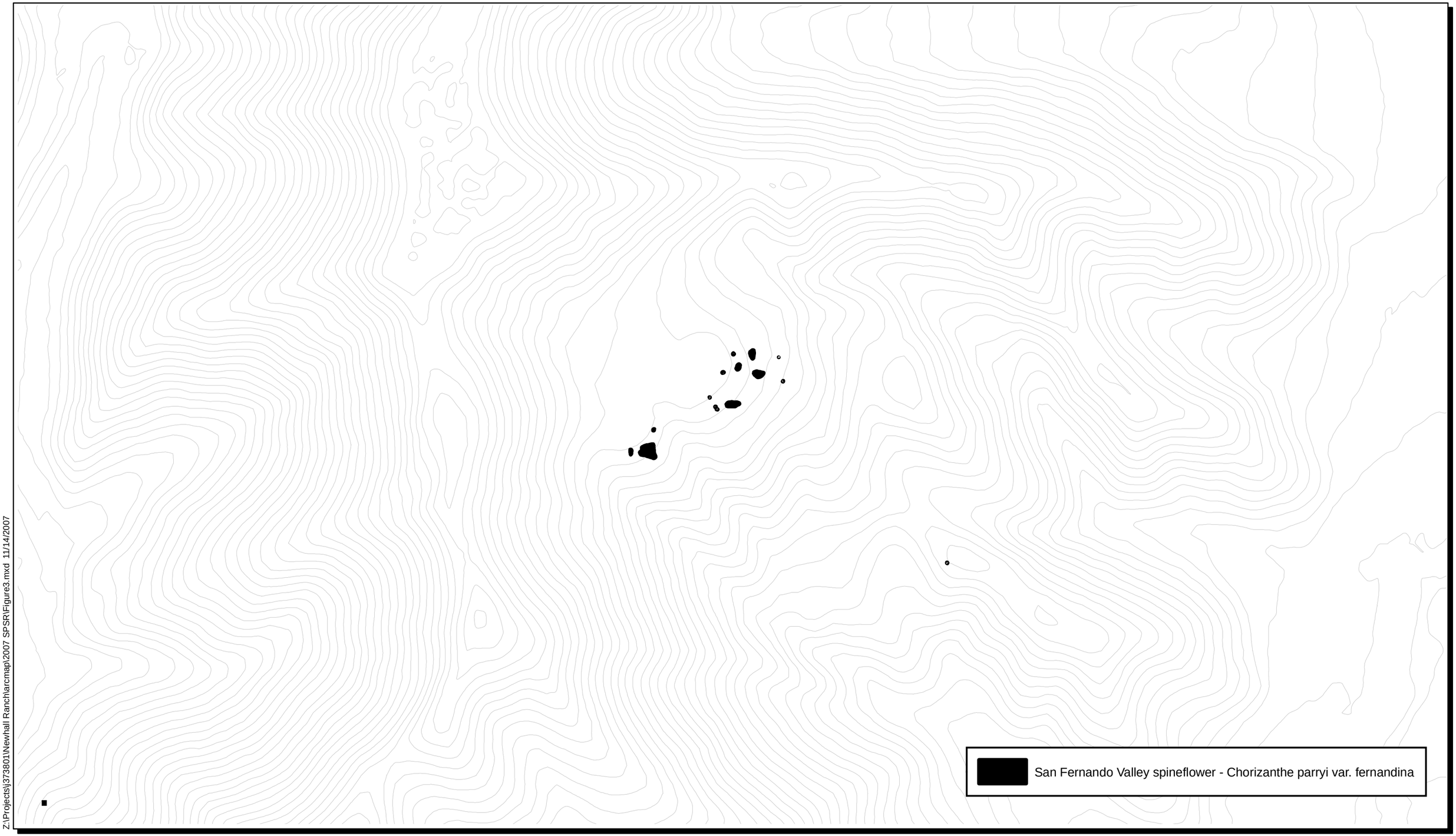
____ Keyed in a site reference:
____ Compared with specimen housed at:
____ Compared with photo/drawing in:
____ By another person (name):
_X_ Other: Personal knowledge

OTHER KNOWLEDGEABLE INDIVIDUALS (Name/Address/Phone)

PHOTOGRAPHS (Check one or more)

Subject	Type
____ Plant/Animal	____ Slide
__ Habitat	____ Print
____ Diagnostic Feature	
____ Other	

May we obtain duplicates at our cost?
_____ Yes __X__ No



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Newhall Ranch - San Martinez Grande

2007 Sensitive Plant Survey Results

APPENDIX 4.5

Traffic Analysis

Mission Village

TRAFFIC IMPACT ANALYSIS

October 2010

AUSTIN-FOUST ASSOCIATES, INC.
TRAFFIC ENGINEERING AND TRANSPORTATION PLANNING

MISSION VILLAGE
Traffic Impact Analysis

Prepared by:

Austin-Foust Associates, Inc.
2223 Wellington Avenue, Suite 300
Santa Ana, California 92701-3161
(714) 667-0496

REGISTERED PROFESSIONAL ENGINEER
DARYL J. ZERFASS
No.1824
exp. 6/30/2011
TRAFFIC
STATE OF CALIFORNIA

October 1, 2010

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1.0 INTRODUCTION

Mission Village (Vesting Tentative Tract Map (VTTM) 61105) consists of a portion of the Newhall Ranch Specific Plan area and is located within the Santa Clarita Valley in unincorporated County of Los Angeles. The Mission Village project is generally bounded by the Santa Clara River to the north, the Six Flags Magic Mountain theme park to the east, and undeveloped land to the south and west.

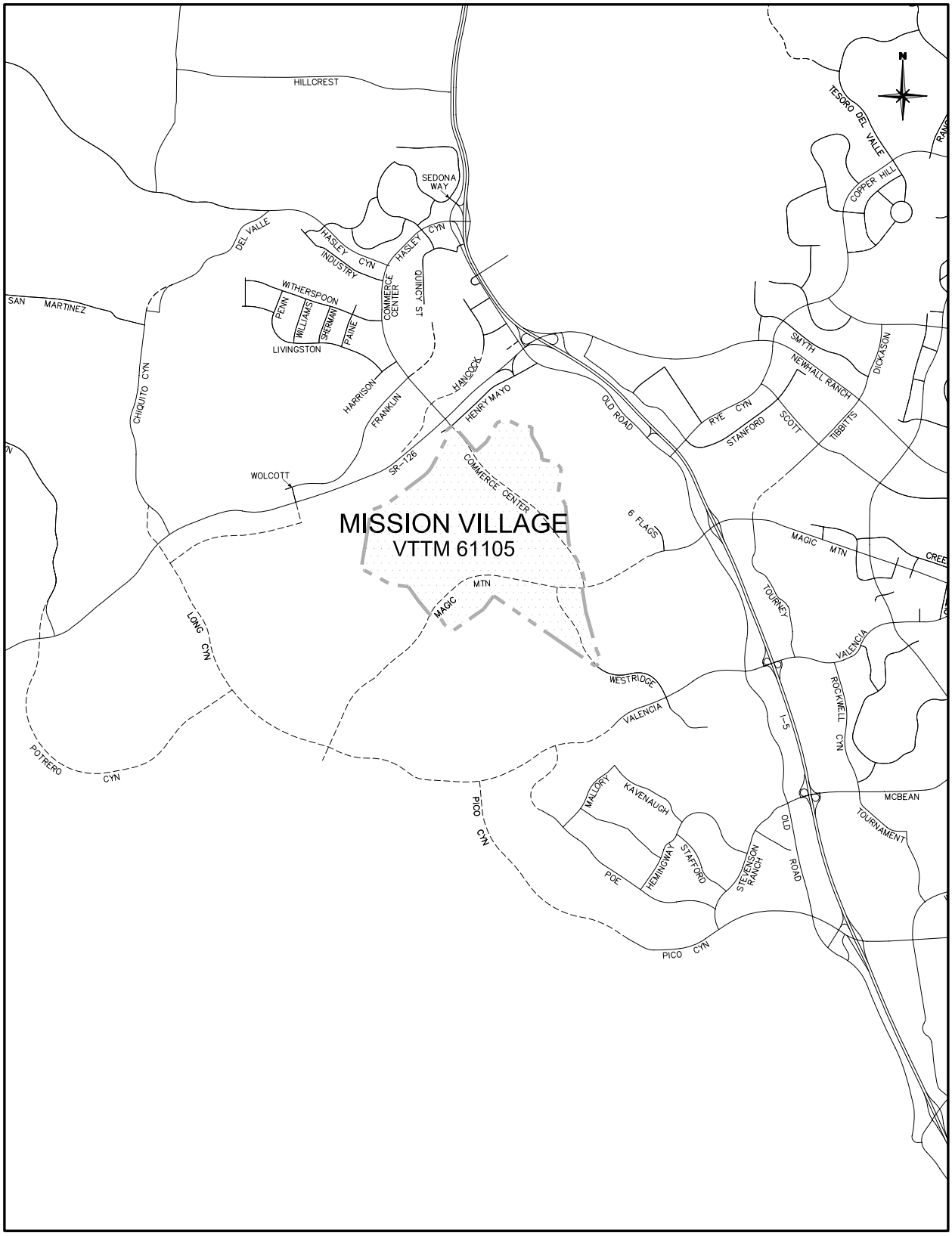
1.1 PROPOSED PROJECT

Figure 1-1 illustrates the general location of the project site. It consists of residential dwelling units (a mix of single family detached units and attached condominium units), commercial retail and office uses, a library, an elementary school, a fire station, a bus transfer station, and public parks. The proposed uses are consistent with the approved Newhall Ranch Specific Plan.

Initially, site access will come from a westerly extension of Magic Mountain Parkway and a northerly extension of Westridge Parkway. A connection to the north will then be made via a southward extension of Commerce Center Drive. A future extension of Magic Mountain Parkway to the west will provide access to additional villages of the Newhall Ranch.

VTTM 61105 consists of a variety of land uses that include 382 single-family dwelling units, 1,824 condominiums, 905 apartment/condominiums, 459 age qualified condominiums, 491 mixed use residential units over commercial, and 351 continued care retirement community (CCRC) residential units, for a total of 4,412 residential dwelling units. VTTM 61105 also includes 1,488,700 square feet of mixed use commercial (retail and office) and 66,400 square feet of mixed use commercial (retail and office under residential), for a total of 1,555,100 square feet of commercial uses. In addition to the residential and commercial uses, VTTM 61105 includes 40.9 acres of parks and recreation centers, an elementary school, a fire station, a bus transfer station, and a library.

For the purpose of the project's traffic study, the project land uses described in the preceding paragraph have been categorized based on the land use categories used by the Santa Clarita Valley Consolidated Traffic Model (SCVCTM) and the Institute of Transportation Engineers (ITE) Trip Generation Manual, a description of which is provided in Chapter 3.0.



Legend

Existing Roadway
Future Roadway
Project Boundary

Figure 1-1

PROJECT SITE LOCATION

The proposed site plan for Mission Village as depicted in VTTM 61105 (March 2010) is provided in Figure 1-2, and the proposed land use plan is illustrated in Figure 1-3.

1.2 STUDY AREA

The study area includes the roadways and intersections within the project site as well as locations off-site where project generated traffic could potentially cause a significant impact. Figure 1-4 illustrates the area evaluated in this traffic study. The area includes a number of future new roadways, and roadways for which improvements are currently programmed or planned. However, planned future roadway improvements are not included in the background conditions for the purpose of determining the direct project impacts, unless those roadway and improvements are part of the project itself. For the evaluation of future year cumulative conditions, future roadways are included as appropriate for the horizon year based on the level of cumulative development that is being evaluated (i.e., if cumulative projects are constructing new roadways, those roadways are included as part of the cumulative analysis).

1.3 METHODOLOGY

The traffic analysis evaluates the proposed project utilizing the established guidelines of the Los Angeles County Department of Public Works (See Reference 3 in Section 1.6). For locations within the City of Santa Clarita, the analysis follows the City's established guidelines for analysis (See Reference 4 in Section 1.6). The project scenarios analyzed are as follows:

1. Existing Conditions plus Ambient Growth
2. Existing Conditions plus Ambient Growth plus Project
3. Year 2021 Cumulative Conditions without Project
4. Year 2021 Cumulative Conditions with Project
5. Year 2035 Cumulative Buildout Conditions without Project
6. Year 2035 Cumulative Buildout Conditions with Project
7. Cumulative Conditions Phasing Study (various years)

The County's traffic study guidelines specify the analysis of Scenarios 1 and 2 shown above. The County also has a requirement for an evaluation of Existing Conditions plus Ambient Growth plus Project plus Related Projects, which is addressed by Scenarios 4 and 6. Since the Santa Clarita Valley is a rapidly

Figure 1-2

PROJECT SITE PLAN

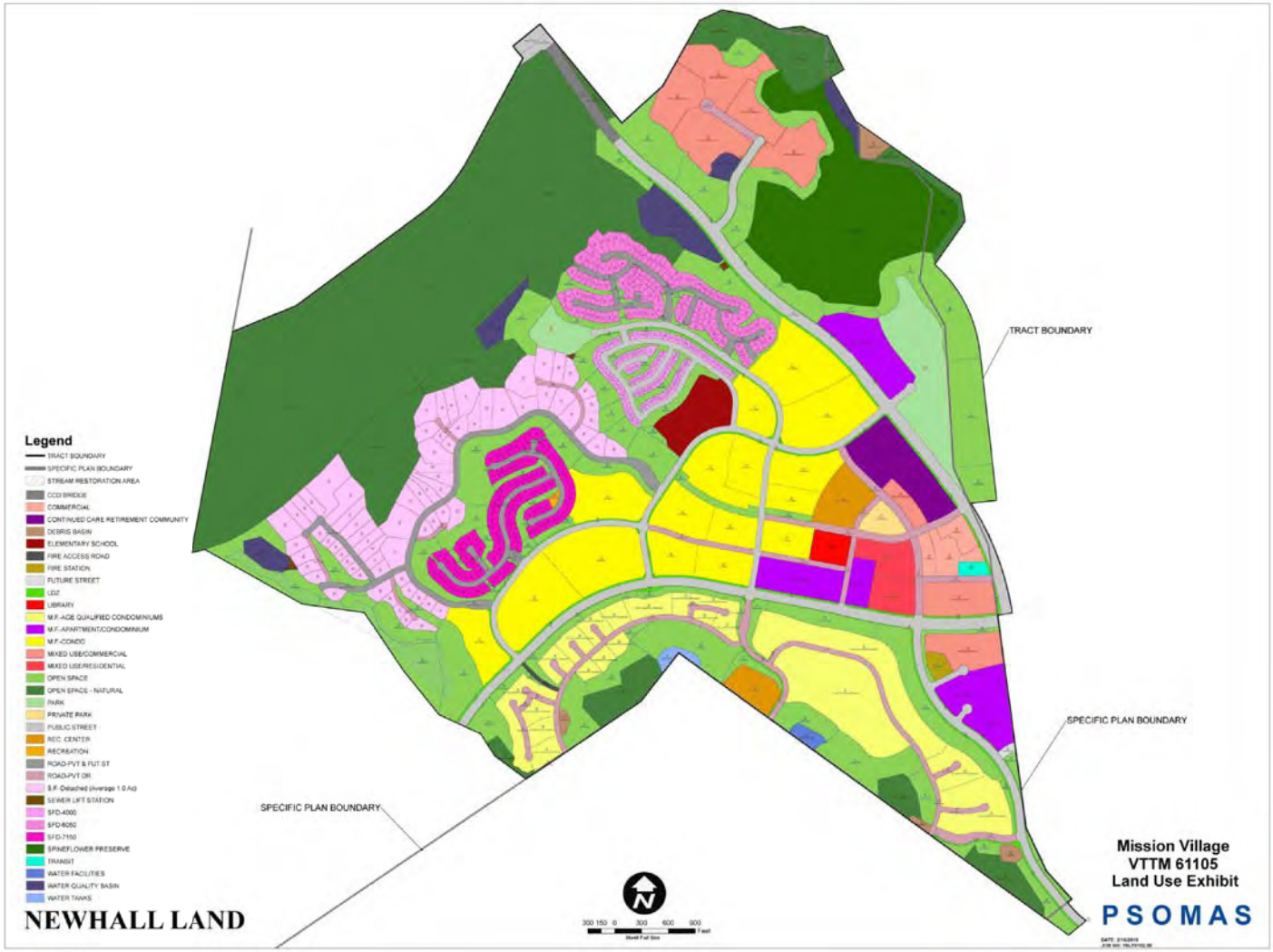
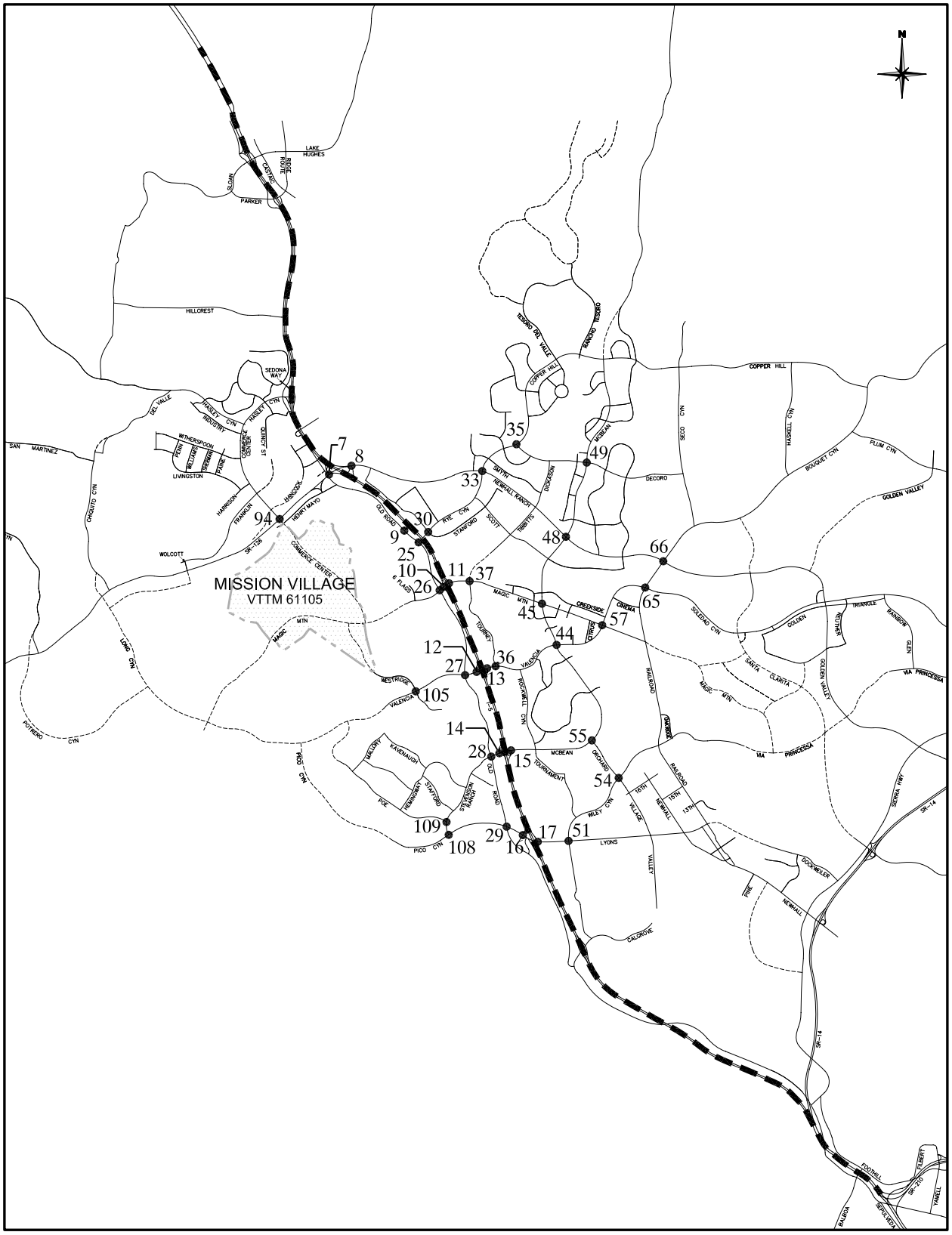


Figure 1-3

PROJECT LAND USE PLAN



Legend

- Off-Site Intersection Study Locations
- XX Off-Site Intersection Location Number
- Freeway Study Locations
- Project Boundary
- - - - Future Roadway

See Figure 3-5 for On-Site Intersection Study Locations

Figure 1-4

PROJECT STUDY AREA

growing area with numerous proposed, approved and pending projects (i.e., "Related Projects"), the Cumulative Conditions Scenarios are based on forecasts derived using the SCVCTM as that model has the capability of forecasting the complex interaction of vehicle trips between existing and future land uses. The City of Santa Clarita's traffic study guidelines specify the analysis of Scenarios 3 and 4 for the determination of project impacts. As such, Scenarios 1 and 2 are not considered for intersections under the jurisdiction of the City of Santa Clarita, as they represent a hypothetical scenario that is considered exclusively by the County.

The SCVCTM was developed jointly by the County of Los Angeles Department of Public Works and the City of Santa Clarita and is the primary tool used for forecasting traffic volumes for the Santa Clarita Valley. The SCVCTM has the ability to provide traffic volume forecasts for a long-range setting, which represents buildout conditions (generally considered as year 2035 or later).

In conjunction with the development of this traffic impact analysis, a special comprehensive phasing study, the Westside Roadway Phasing Analysis, was prepared to address the cumulative development of all planned projects west of the I-5 freeway (see References 8 and 9 in Section 1.6), and was approved by the County for use as a supporting document for traffic studies such as this in May 2007. This subject area, referred to here as the Westside of the Santa Clarita Valley, evaluates the phased development of Mission Village, the entirety of the Newhall Ranch Specific Plan area, the Entrada project, the Legacy Village project, as well as the Valencia Commerce Center business/industrial park area as these areas build out over the next 25 years. All together, these projects represent the development of over 27,000 residential dwelling units and over 11 million square feet of commercial uses. Along with the phased development of the Westside projects, the phasing analysis incorporates the other anticipated developments outside of the Westside area (see discussion in Section 2.2.2) as well as the buildout of the remaining portions of the Santa Clarita Valley as allowed by the City and County's General Plans.

The Westside Roadway Phasing Analysis is the most comprehensive roadway planning effort prepared to date for the Santa Clarita Valley and, as such, is referenced by this analysis as the source of cumulative traffic data forecasts. Periodic updates of the phasing study will be prepared, the purpose of which is to ensure that the roadway improvements occur when needed and based on the actual development activity as it changes over time. In other words, the development timeline of the Westside area will evolve based on several factors, such as economic conditions and consumer driven requirements, and periodic updates of the phasing study will allow the timing of the roadway improvements to be

prioritized based on the actual land development activity as it occurs. Additional discussion of the Westside Roadway Phasing Analysis is provided in Section 4.3.

1.4 PERFORMANCE CRITERIA

For CEQA purposes, defined performance criteria are utilized to determine if a proposed project causes a significant impact. In most traffic studies, performance criteria are based on two primary measures. The first is "capacity", which establishes the vehicle carrying ability of a roadway and the second is "volume." The volume measure is either a traffic count (in the case of existing volumes) or a forecast for a future point in time. The ratio between the volume and the capacity gives a volume/capacity (V/C) ratio and based on that V/C ratio, a corresponding level of service (LOS) is defined. Traffic LOS is designated A through F with LOS A representing free flow conditions and LOS F representing severe traffic congestion. Traffic flow quality for each LOS is described in Table 1-1.

Table 1-2 summarizes the V/C ranges that correspond to LOS "A" through "F" for arterial roads, intersections and freeway segments. The V/C ranges listed for arterial roads and intersections within the study area are those used by the County of Los Angeles and the City of Santa Clarita. The V/C ranges listed for freeway segments are based on the V/C and LOS relationships specified in the *2000 Highway Capacity Manual* (see Reference 2 in Section 1.6 and referred to as "*HCM 2000*" in this report) for basic freeway sections with free-flow speeds of 105 kilometers per hour (65 miles per hour), and the V/C methodology is specified by the County's Congestion Management Program (CMP) for the evaluation of CMP freeway monitoring stations.

Both the V/C ratio and the LOS are used in determining impact significance. Certain LOS values are deemed unacceptable, and increases in the V/C ratio which cause or contribute to the LOS being unacceptable are defined as a significant impact (see following sections for details). Note that while the Caltrans guidelines for the preparation of traffic studies (see Reference 5 in Section 1.6) recommend the HCM method for the evaluation of State highway facilities, those guidelines do not include a threshold of significance criteria for the determination of a significant project impact that is based on the HCM methodologies. As such, the thresholds of significance criteria specified by the local agencies (i.e., County of Los Angeles, City of Santa Clarita, and the LA County CMP) are utilized for this analysis.

Table 1-1: Level of Service Descriptions

LOS	Arterial Roads	Freeway Segments
A	Describes primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.	Describes free-flow operations. Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.
B	Describes reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the street class. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.	Represents reasonably free flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.
C	Describes stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the free-flow speed for the street class.	Provides for flow with speeds at or near the free-flow speed of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.
D	Borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40 percent of free-flow speed.	The level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.
E	Characterized by significant delays and average travel speeds of 33 percent or less of the free-flow speed. Such operations are caused by a combination of adverse signal progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.	At its highest density value, LOS E describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speeds that still exceed 49 miles per hour. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.
F	Characterized by urban street flow at extremely low speeds, typically one-third to one-fourth of the free-flow speed. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.	Describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. LOS F operations within a queue are the result of a breakdown or bottleneck at a downstream point. LOS F is also used to describe conditions at the point of the breakdown or bottleneck and the queue discharge flow that occurs at speeds lower than the lowest speed for LOS E, as well as the operations within the queue that forms upstream. Whenever LOS F conditions exist, they have the potential to extend upstream for significant distances.
Source: *Highway Capacity Manual 2000 (HCM 2000)*, Transportation Research Board, National Research Council.		

Table 1-2: Volume/Capacity Ratio Level of Service Ranges

LOS	Roadway V/C & Intersection ICU Ranges	Freeway Segment V/C Ranges
A	0.00 – 0.60	0.00 – 0.30
B	0.61 – 0.70	0.31 – 0.50
C	0.71 – 0.80	0.51 – 0.71
D	0.81 – 0.90	0.72 – 0.89
E	0.91 – 1.00	0.90 – 1.00
F	Above 1.00	Above 1.00
Sources: Congestion Management Program of Los Angeles County HCM 2000		

In establishing V/C based performance criteria, there are certain items that need to be addressed to obtain suitable V/C estimates and relate them to LOS. For instance, while average daily traffic (ADT) is a useful measure to show general levels of traffic on a facility and to provide data for other related aspects such as noise and air quality, highway congestion is largely a peak hour or peak period occurrence and ADT does not reflect peak period conditions very effectively. Because of this, ADT is not used here as the basis for capacity evaluation but instead this evaluation focuses on those parts of the day when such congestion can occur, specifically the AM and PM peak hours.

For the arterial and freeway system, the peak hour is the accepted time period used for impact evaluation and a number of techniques are available to establish suitable V/C ratios and define the corresponding LOS. These definitions and procedures are established by individual local jurisdictions, such as the County, the City of Santa Clarita, or by regional programs such as the Congestion Management Program (CMP).

The analysis of the arterial road system is based on intersection capacity since this is the defining capacity limitation on an arterial highway system. There may be exceptions where certain facilities have long distances between signalized intersections, but within the traffic analysis study area, peak hour intersection performance is the most representative measure for evaluating the arterial road system.

The analysis of the freeway system is based on peak hour volumes by direction. The measure used to provide an estimate of LOS can be V/C, speed (miles/hour) or density (passenger cars/mile/lane). The three basic measurements for traffic (speed, density, and volume) are interrelated in such a way that if values for two of these measures are known, the third can be computed. Table 1-3 shows the relationship between these three measures and how they translate to LOS.

Table 1-3: LOS Criteria for Basic Freeway Segments

Criteria	LOS				
	A	**B**	**C**	**D**	**E**
Maximum density (pc/mi/ln)	11	18	26	35	45
Minimum speed (mi/h)	65.0	65.0	64.6	59.7	52.2
Maximum V/C	0.30	0.50	0.71	0.89	1.00
Maximum service flow rate (pc/h/ln)	710	1,170	1,680	2,090	2,350

Notes:

The exact mathematical relationship between density and V/C has not always been maintained at LOS boundaries because of the use of rounded values. Density is the primary determinant of LOS. The speed criterion is the speed at maximum density for a given LOS.

Values based on a free flow speed of 65 mph.

Source: Highway Capacity Manual 2000 (HCM 2000) (see Reference 2 in Section 1.6).

Levels of service for arterial roadway intersections and for freeway mainline segments are determined based on operating conditions during the AM and PM peak hours. For intersections, the intersection capacity utilization (ICU) methodology is applied, providing a planning level basis for determining V/C and LOS. This methodology sums the V/C ratios for the critical movements of an intersection and is the preferred procedure for intersection analysis by the City of Santa Clarita and the County of Los Angeles. The ICU methodology is generally compatible with the intersection capacity analysis methodology outlined in the *HCM 2000*. For freeway segments, the V/C methodology is applied, which also provides a planning level basis for determining capacity utilization and LOS, and which is the methodology specified by the County CMP. The HCM 2000 equates V/C ratios to other performance measures such as speed and density as shown in the previously referenced Table 1-3.

The ICU calculation methodology and associated impact criteria for the study area arterial system are summarized in Table 1-4. The County strives to maintain LOS C at existing intersections and utilizes LOS D (ICU not to exceed 0.90) as the accepted standard and target level of service for the design of future intersections, as well as for existing intersections for long-range planning purposes. The City of Santa Clarita strives to maintain LOS D for existing and future conditions. However, several intersections in both the City and the County have been identified as operating at LOS E for General Plan Buildout Conditions as part of the pending General Plan/Area Plan update (see Reference 6 in Section 1.6).

Table 1-4: Arterial Intersection Performance Criteria

V/C Calculation Methodology

Level of service to be based on peak hour intersection capacity utilization (ICU) values calculated using the following assumptions:

Saturation Flow Rates:

County Methodology: 1,600 vehicles/hour/lane for through lanes, right-turn lanes, and single left-turn lanes
2,880 vehicles/hour/lane for dual left-turn lanes (total of both lanes)
City Methodology: 1,750 vehicles/hour/lane for all lanes

Clearance Interval: .10

Performance Targets

County: LOS D (peak hour ICU less than or equal to 0.90) for long-range cumulative buildout conditions mid-LOS C (peak hour ICU less than 0.75) or existing LOS, whichever is greater, for existing intersections[1] for short-range conditions.

City: LOS D or existing LOS, whichever is greater, or LOS E as identified in the General Plan for select intersections.

Impact Thresholds

An intersection is considered to be significantly impacted if compared to the ICU in the no-project alternative, the ICU in the with-project alternative increases the ICU by the following:

County Thresholds:	Pre-Project ICU	Project Increment
	.71 - .80 (LOS C)[1]	greater than or equal to .04
	.81 - .90 (LOS D)	greater than or equal to .02
	.91 or more (LOS E & F)	greater than or equal to .01

City Thresholds:	With-Project ICU	Project Increment
	.81 - .90 (LOS D)	greater than or equal to .02
	.91 or more (LOS E & F)	greater than or equal to .01

[1]Note: The County guidelines do not address situations where pre-project conditions are less than .71. In that situation, County staff has interpreted the guidelines to mean that an increase that results in a with-project condition of .75 or more is considered significant. The interpretation is based on the following scenario, which is addressed by the guidelines: .71 (pre-project) + .04 (project increment) = .75 and is a significant impact.

Abbreviations:
V/C – Volume/Capacity Ratio
LOS – Level of Service
ICU – Intersection Capacity Utilization

The freeway V/C calculation methodology and associated impact criteria for the study area freeway system are summarized in Table 1-5. The County CMP specifies that LOS E or existing LOS, whichever is worse, represents the performance standard for freeway segments, and Caltrans goal is to maintain no worse than LOS E in urban areas.

1.5 DEFINITIONS

Certain terms used throughout this report are defined below to clarify their intended meaning:

ADT	Average Daily Traffic. Generally used to measure the total two-directional traffic volumes passing a given point on a roadway.
CMP	Congestion Management Program. A state mandated program administered by the Los Angeles County Metropolitan Transportation Authority (MTA) that provides a mechanism for coordinating land use and development decisions.
ICU	Intersection Capacity Utilization. A measure of the volume to capacity ratio for an intersection. Typically used to determine the peak hour level of service for a given set of intersection volumes.
LOS	Level of Service. A scale used to evaluate circulation system performance based on intersection ICU values or volume/capacity ratios of arterial segments.
Peak Hour	This refers to the hour during the AM peak period (typically 7 AM - 9 AM) or the PM peak period (typically 3 PM - 6 PM) in which the greatest number of vehicle trips are generated by a given land use or are traveling on a given roadway.
Tripend	A trip generation measure which represents the total trips entering and leaving a location.
V/C	Volume to Capacity Ratio. This is typically used to describe the percentage of capacity utilized by existing or projected traffic on a segment of an arterial or intersection.
VPH	Vehicles Per Hour. Used for roadway volumes (counts or forecasts) and trip generation estimates. Measures the number of vehicles in a one-hour period, typically the AM and PM peak hour.

Table 1-5: Freeway Mainline Performance Criteria

V/C Calculation Methodology

Level of service to be based on peak hour V/C values calculated using the following assumptions:

Saturation/Service Flow Rates:

Mainline Mixed-flow/General Purpose Lane:	2,200 vehicles/hour/lane
Mainline Mixed-flow/General Purpose Lane on an Extended Uphill Grade:	1,600 vehicles/hour/lane
High Occupancy Vehicle (HOV) Lane:	2,200 vehicles/hour/lane
Auxiliary Lane:	1,000 vehicles/hour/lane
Truck Lane:	1,200 vehicles/hour/lane

Saturation flow rates derived from Caltrans PeMS data and through discussions with Caltrans staff.

Performance Standard

LOS E or existing LOS, whichever is worse (applicable to Urban areas)

Impact Threshold

A freeway mainline segment is considered to be adversely impacted if each of the following conditions are met:

The segment is forecast to operate deficiently (i.e., worse than the performance standard).

Compared to the V/C in the no-project alternative, the V/C in the with-project alternative increases by greater than or equal to .02 (the impact threshold specified in the CMP).

Abbreviations:

V/C – Volume/Capacity Ratio
PeMS – Performance Monitoring System
LOS – Level of Service
CMP – Congestion Management Program

1.6 REFERENCES

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2. "Highway Capacity Manual 2000," Transportation Research Board, National Research Council, 2000.

3. "Traffic Impact Analysis Report Guidelines," County of Los Angeles Department of Public Works, January 1997.

4. "Preliminary Traffic Impact Report Guidelines," City of Santa Clarita, August 1990.

5. "Guide for the Preparation of Traffic Impact Studies," Caltrans, December 2002.

6. "One Valley One Vision Valley-Wide Traffic Study," Austin-Foust Associates, Inc., June 2010.

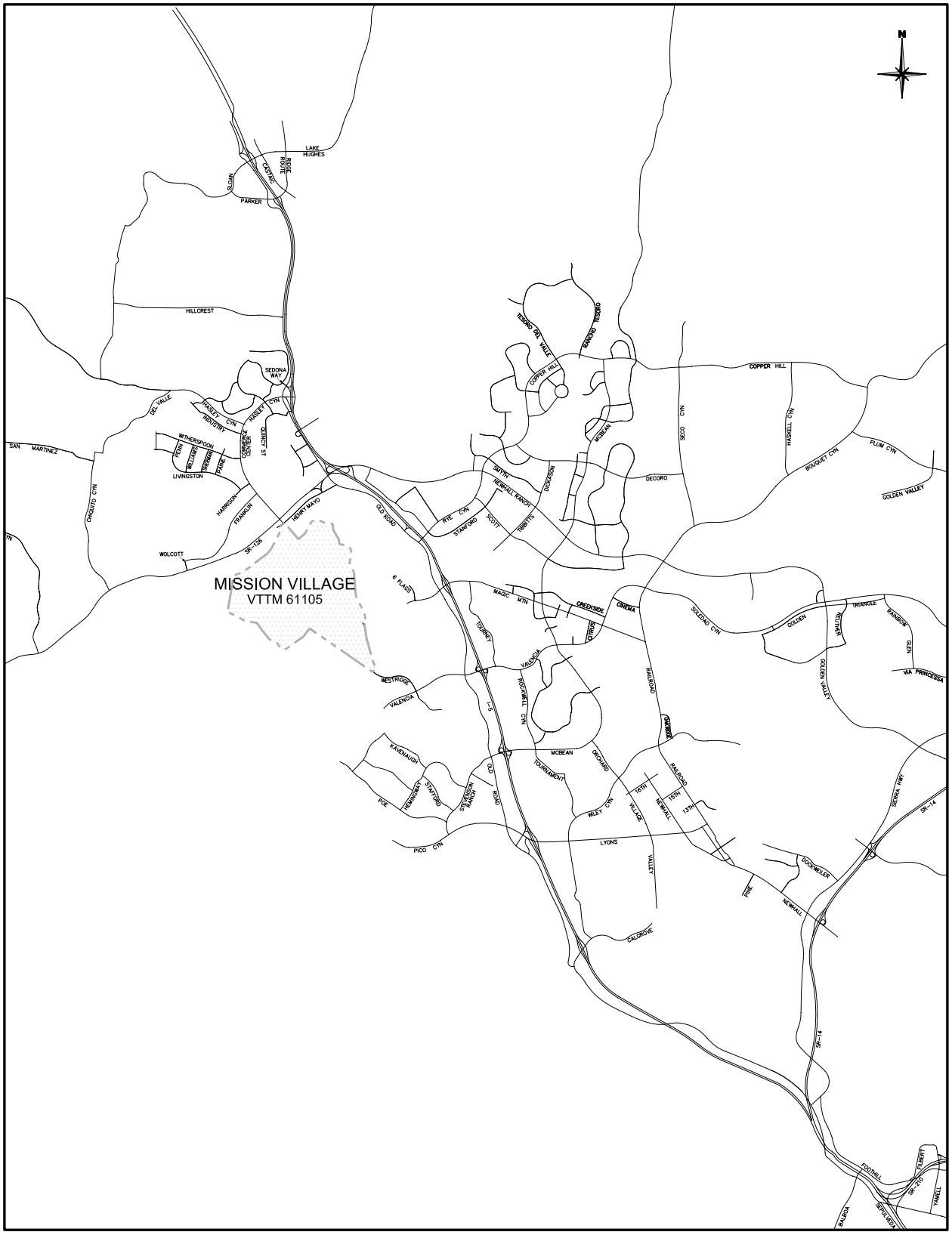
7. "Santa Clarita Valley Consolidated Traffic Model Report," County of Los Angeles Department of Public Works, 1994.

8. "Westside Santa Clarita Valley Roadway Phasing Analysis," Austin-Foust Associates, Inc., November 2006.

9. "Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita," Austin-Foust Associates, Inc., July 2006.

10. "I-5 HOV/Truck Lanes Project SR-14 to Parker Road Final Environmental Impact Report/Environmental Assessment with Finding of No Significant Impact" (SCH No. 2007051028), September 2009.

11. "Santa Clarita Valley Consolidated Traffic Model 2004 Update and Validation," County of Los Angeles Department of Public Works in association with City of Santa Clarita, March 2005.

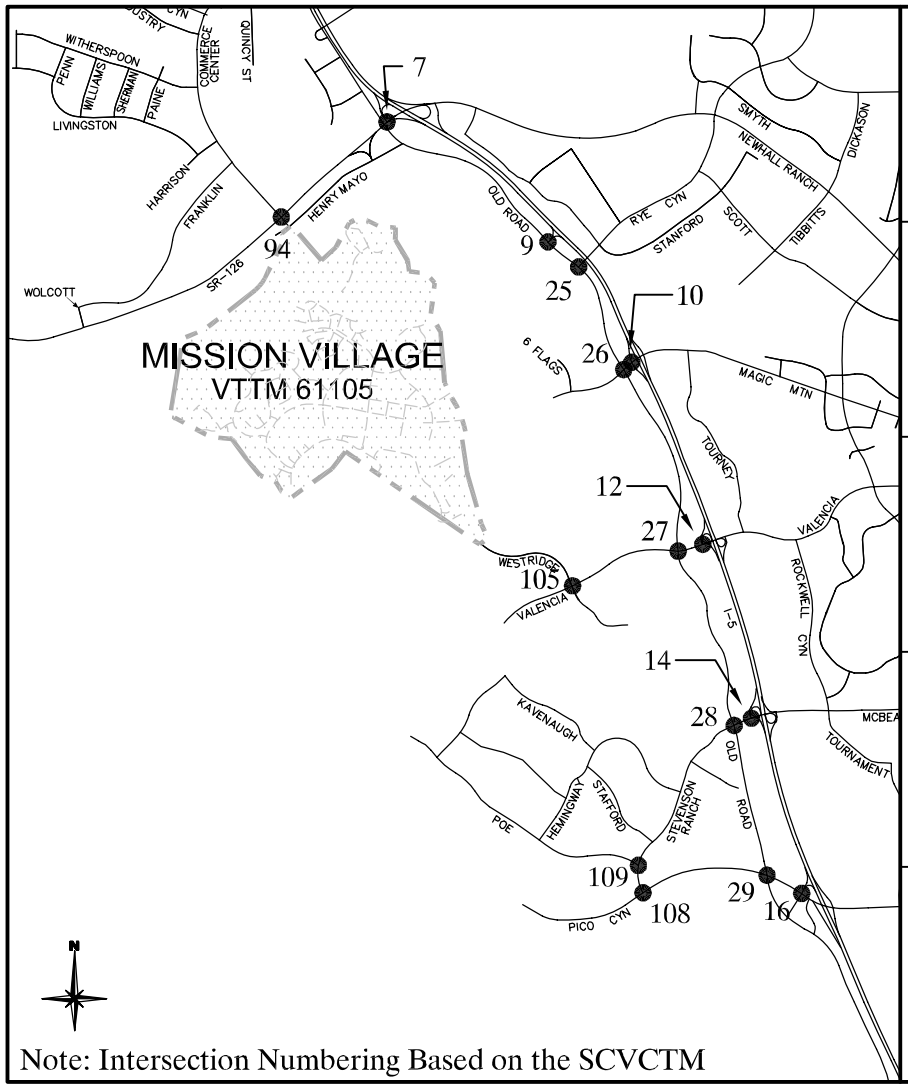


Legend

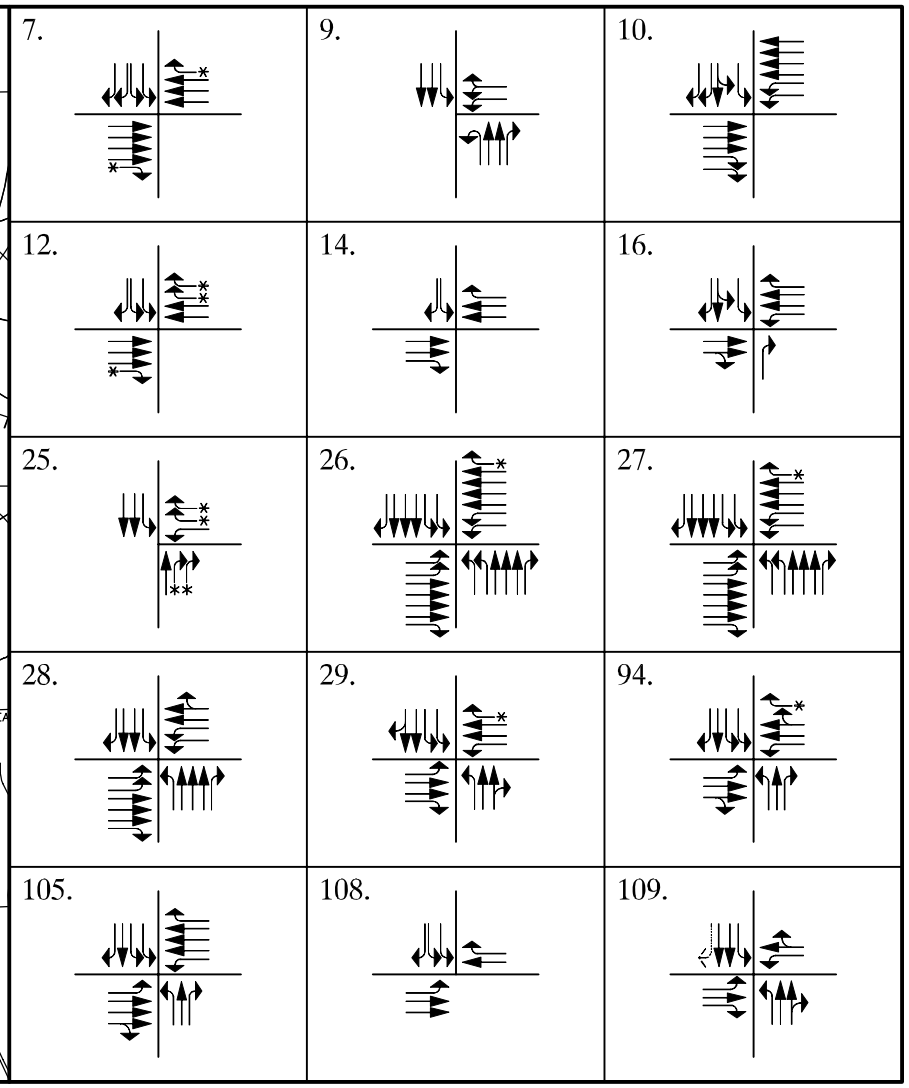
Project Boundary
Existing Roadway

Figure 2-1

EXISTING ROADWAY SYSTEM



Note: Intersection Numbering Based on the SCVCTM

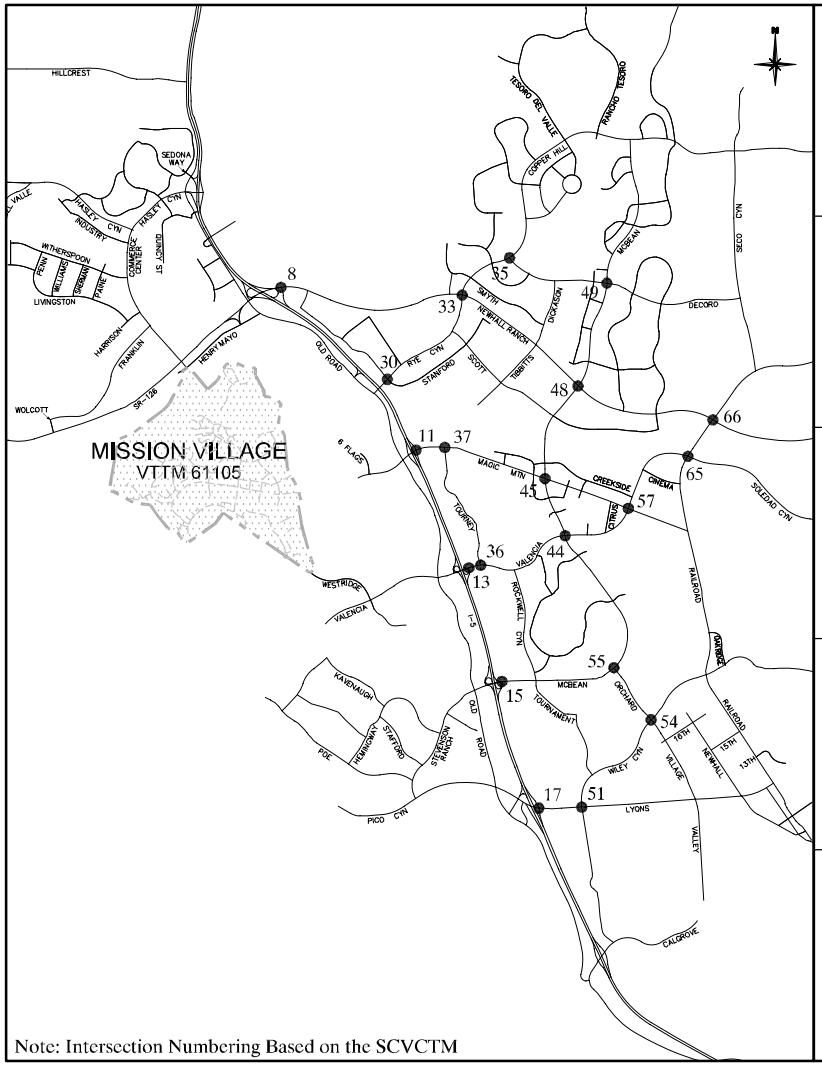


Legend

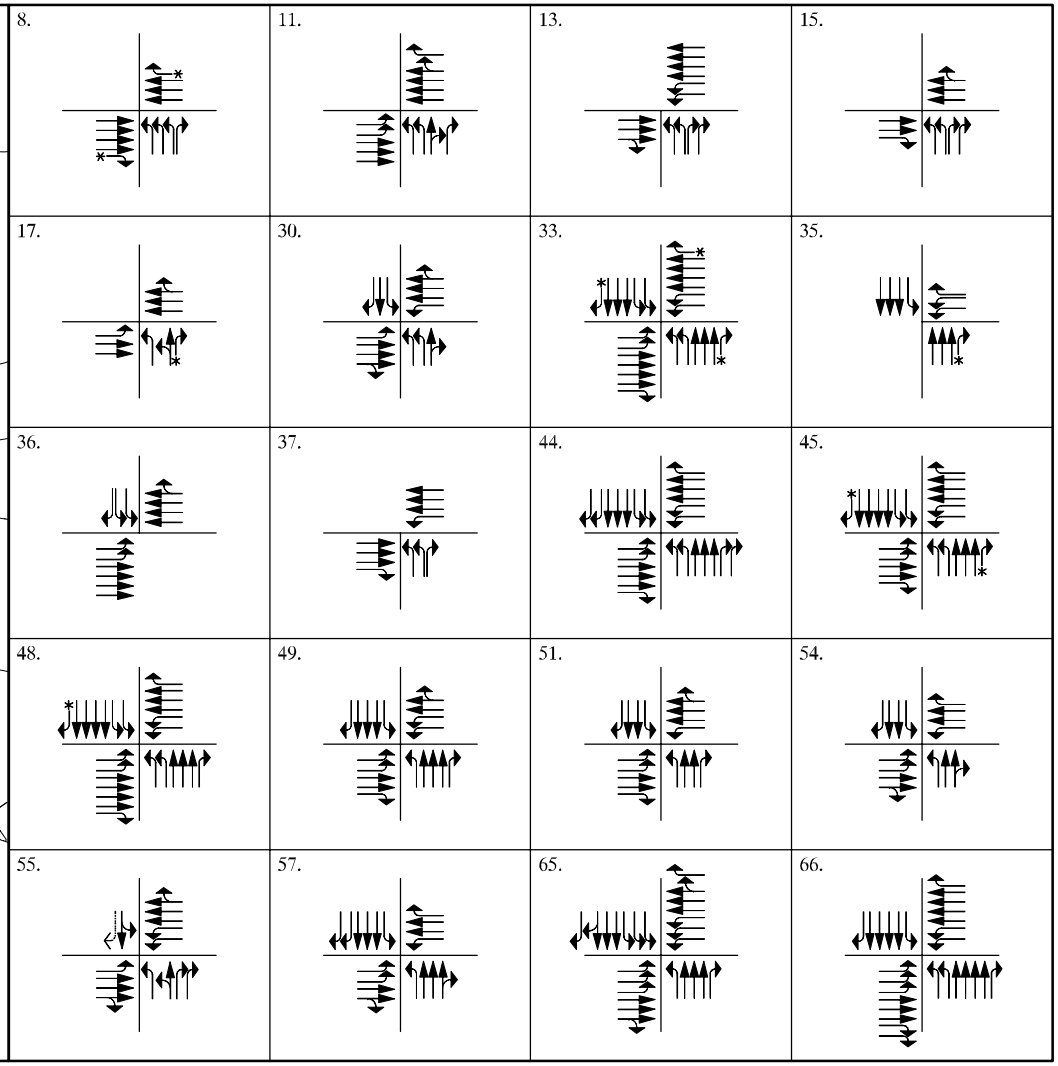
- Intersection Lane Geometry
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane

Figure 2-2

EXISTING INTERSECTION LANE CONFIGURATIONS - COUNTY INTERSECTIONS



Note: Intersection Numbering Based on the SCVCTM

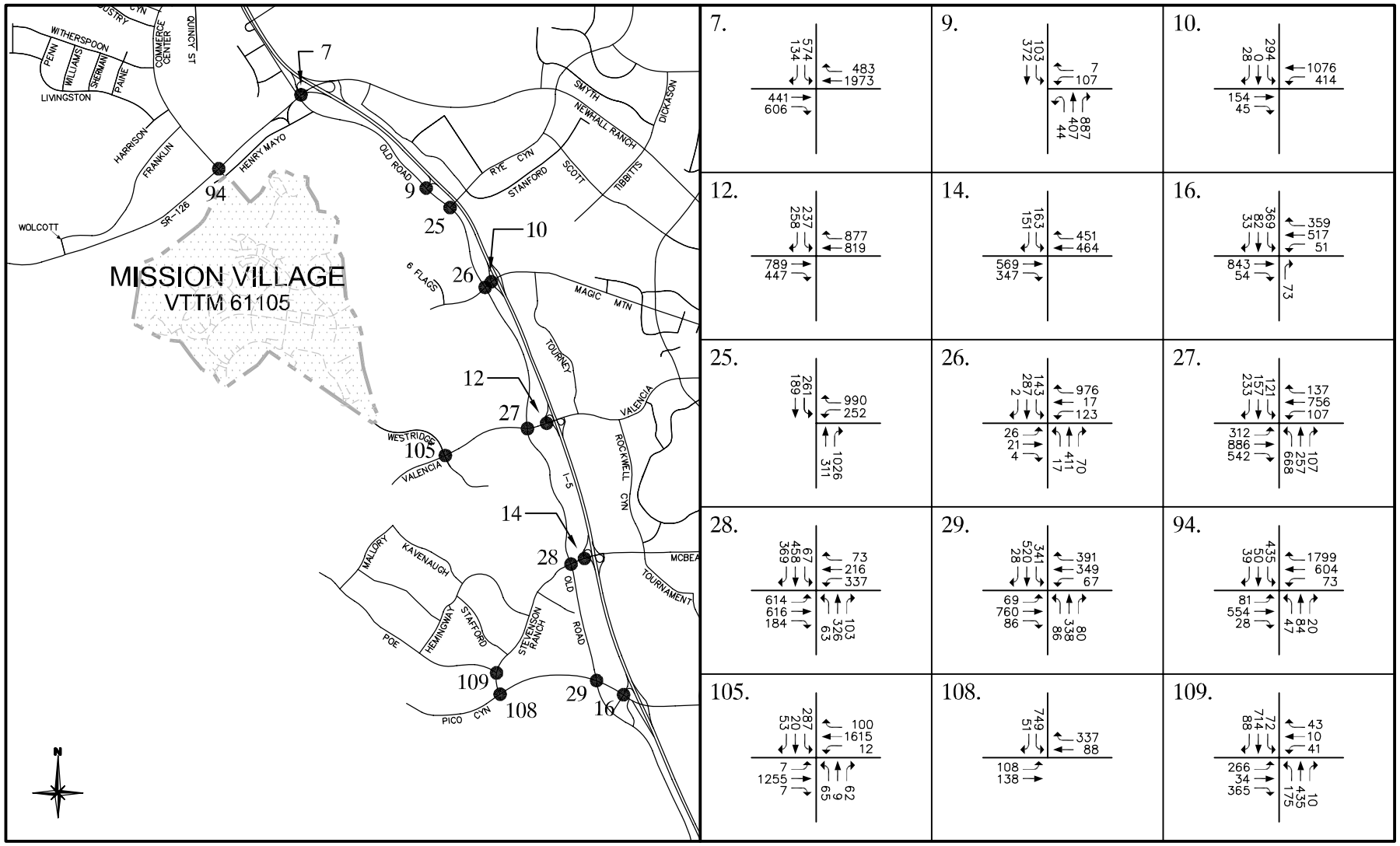


Legend

- Intersection Lane Geometry
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane

Figure 2-3

EXISTING INTERSECTION LANE CONFIGURATIONS - CITY INTERSECTIONS

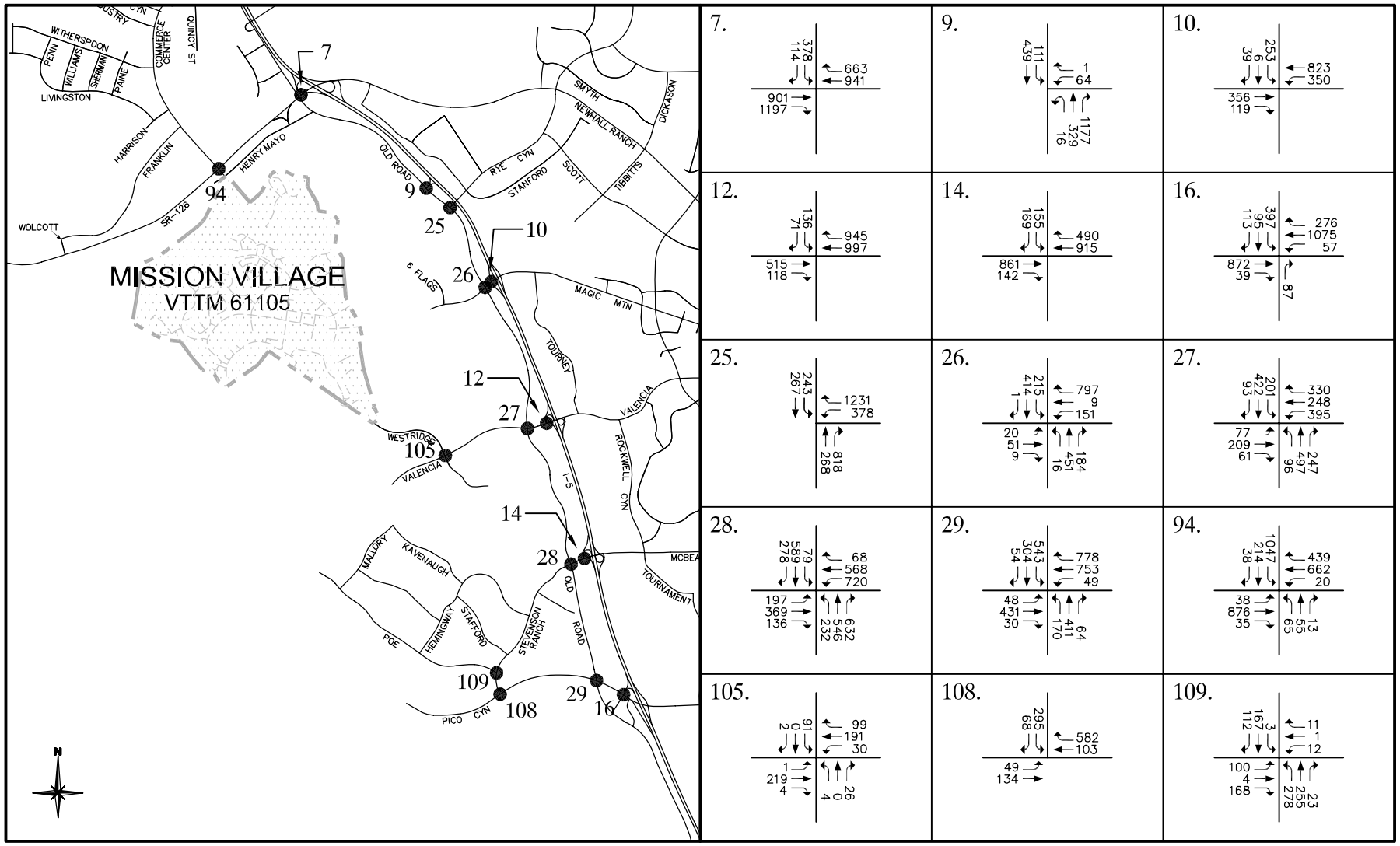


Legend

———	Existing Roadway
- - - - -	Future Roadway
═ ═ ═	Project Boundary
← XX	Peak Hour Intersection Volume

Figure 2-4

AM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS (COUNTY INTERSECTIONS)

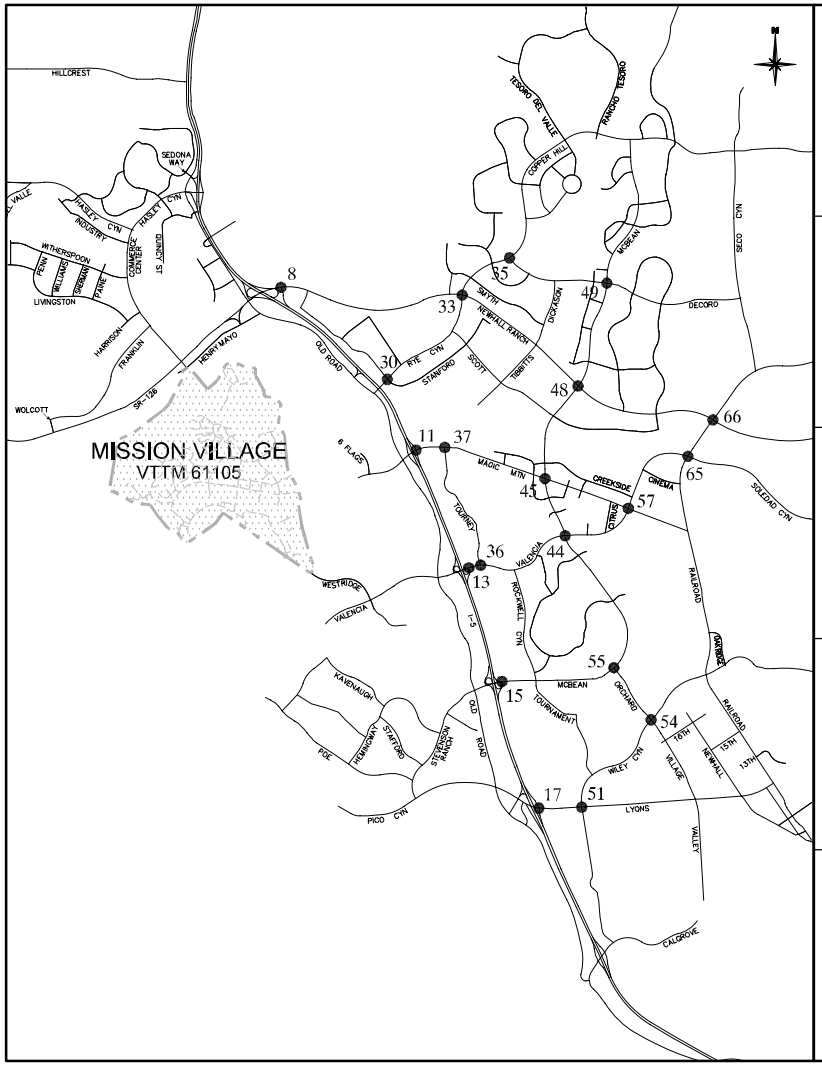


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 2-5

PM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS (COUNTY INTERSECTIONS)



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← 368

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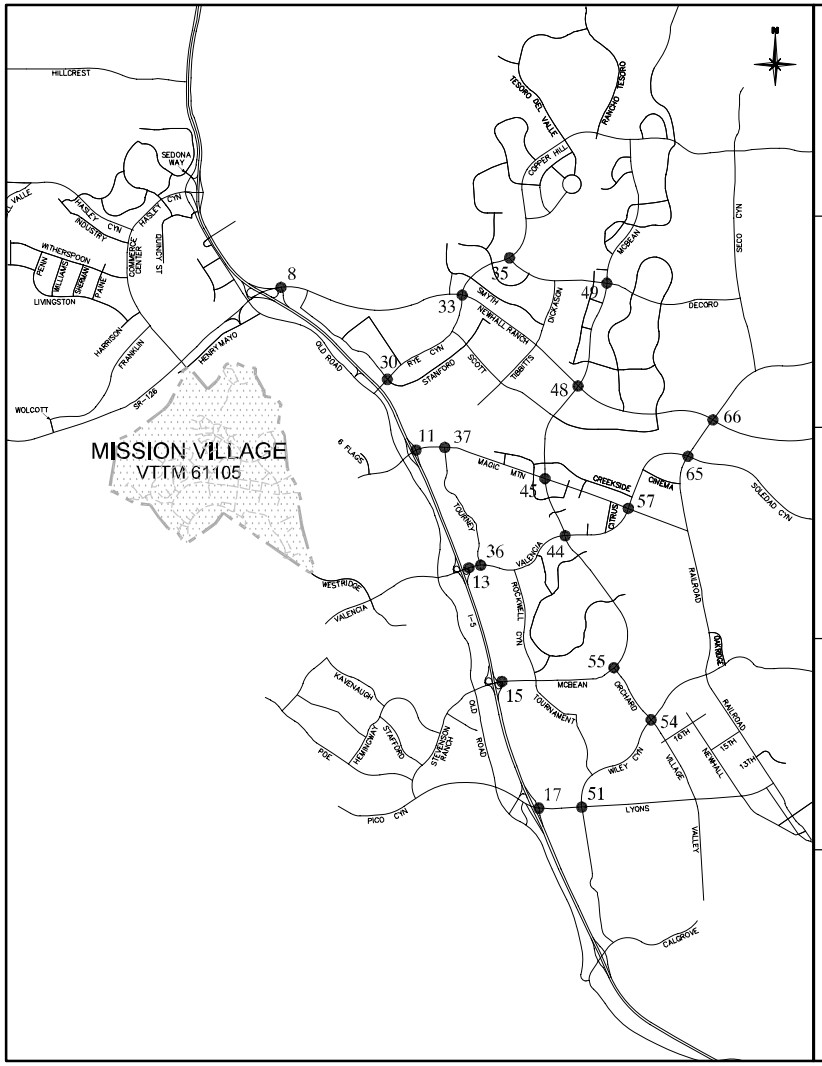
1139
307
182
399
21

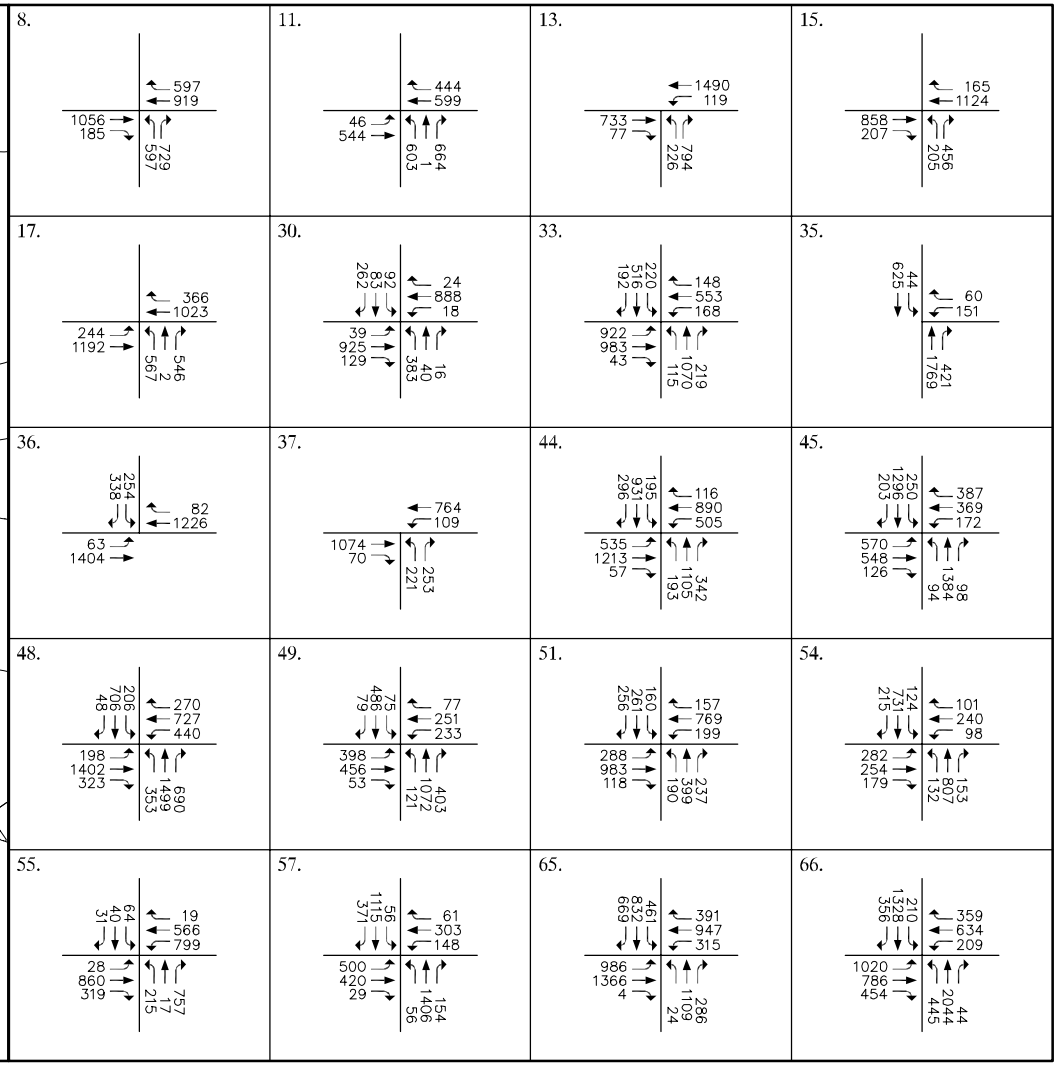
66.
260 → 369 → 261
324 2079 584
89
890
120
33
561
291

Legend
Existing Roadway
Future Roadway
Project Boundary
← xx Peak Hour Intersection Volume

Figure 2-6

AM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS (CITY INTERSECTIONS)





Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 2-7

PM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS (CITY INTERSECTIONS)

Clarita. Traffic count data was collected during the critical AM and PM peak hours in late 2009 and early 2010 for each of the study area intersections. Printouts of the traffic count data sheets are provided in Appendix D.

As discussed in the section on performance criteria in Chapter 1.0, LOS is a concept developed to quantify the degree of comfort afforded to drivers as they travel on a given roadway. The degree of comfort includes such elements as travel time, number of stops, total amount of stopped delay, etc. As defined in the HCM 2000, six grades are used to denote the various LOS. The six are denoted A through F and a discussion on these was given in Section 1.4.

The results of the ICU LOS analyses for project area intersections are shown in Table 2-1 (detailed ICU worksheets are provided in Appendix A). The table shows that the intersections currently operate at LOS D or better, with the following exception:

9. The Old Road & I-5 SB Ramps (ICU = .91/LOS E, PM)

No intersections currently operate at LOS F conditions.

A summary of the existing traffic volumes on the I-5 freeway is provided in Table 2-2 along with the resulting V/C calculations. These volumes were derived using data obtained from the Caltrans Performance Measurement System (PeMS) along with traffic counts collected at the ramps. The table indicates that most of the freeway segments currently operate within the capacity of the freeway, with the following exceptions:

411. Southbound I-5 between Calgrove & SR-14 (V/C = 1.08/LOS F, AM; V/C = 1.02/LOS, PM)
412. Southbound I-5 south of SR-14 (V/C = 1.04/LOS F, AM)

2.1.3 Public Transportation

Santa Clarita Transit currently operates two fixed-route transit lines (Route 3 and 7) near to the Mission Village project. Route 3 provides service between Saugus Community and Six Flags Magic Mountain. Route 7 provides service between the Tesoro Del Valle area and Six Flags Magic Mountain. Additional routes, accessible from these routes, provide service to the greater Santa Clarita Valley area.

Table 2-1: ICU and LOS Summary - Existing Conditions

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour		Count Date
		ICU	LOS	ICU	LOS	
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	Caltrans/County	.71	C	.43	A	12/15/2009
8. I-5 NB Ramps & Henry Mayo Drive (SR-126)	Caltrans/City	.66	B	.68	B	12/16/2009
9. The Old Road & I-5 SB Ramps	Caltrans/County	.72	C	.91	E	12/03/2009
10. I-5 SB Ramps & Magic Mountain Parkway	Caltrans/County	.36	A	.37	A	12/02/2009
11. I-5 NB Ramps & Magic Mountain Parkway	Caltrans/City	.42	A	.42	A	12/02/2009
12. I-5 SB Ramps & Valencia Boulevard	Caltrans/County	.52	A	.46	A	12/02/2009
13. I-5 NB Ramps & Valencia Boulevard	Caltrans/City	.59	A	.49	A	12/02/2009
14. I-5 SB Ramps & McBean Parkway	Caltrans/County	.38	A	.50	A	12/16/2009
15. I-5 NB Ramps & McBean Parkway	Caltrans/City	.43	A	.48	A	12/02/2009
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	Caltrans/County	.58	A	.59	A	12/09/2009
17. I-5 NB On/Off & Lyons Avenue	Caltrans/City	.53	A	.66	B	12/15/2009
25. The Old Road & Rye Canyon	County	.61	B	.66	B	12/03/2009
26. The Old Road & Magic Mountain Parkway	County	.28	A	.32	A	12/09/2009
27. The Old Road & Valencia Boulevard	County	.67	B	.44	A	12/15/2009
28. The Old Road & McBean Parkway	County	.58	A	.76	C	12/16/2009
29. The Old Road & Pico Canyon Road	County	.63	B	.71	C	12/16/2009
30. Avenue Stanford & Rye Canyon Road	City	.51	A	.54	A	4/29/2010
33. Copper Hill Drive & Newhall Ranch Road	City	.63	B	.70	B	4/22/2010
35. Copper Hill Drive & Decoro Drive	City	.57	A	.51	A	4/27/2010
36. Tourney Road & Valencia Boulevard	City	.45	A	.48	A	4/20/2010
37. Tourney Road & Magic Mountain Parkway	City	.49	A	.45	A	4/28/2010
44. McBean Parkway & Valencia Boulevard	City	.61	B	.74	C	4/28/2010
45. McBean Parkway & Magic Mountain Parkway	City	.61	B	.76	C	4/22/2010
48. McBean Parkway & Newhall Ranch Road	City	.73	C	.78	C	4/27/2010
49. McBean Parkway & Decoro Drive	City	.77	C	.54	A	4/21/2010
51. Wiley Canyon Road & Lyons Avenue	City	.60	B	.69	B	4/21/2010
54. Orchard Village Road & Wiley Canyon Road	City	.60	A	.62	B	4/21/2010
55. Orchard Village Road & McBean Parkway	City	.57	A	.68	B	4/20/2010
57. Valencia Boulevard & Magic Mountain Parkway	City	.58	A	.66	B	4/22/2010
65. Bouquet Canyon Road & Soledad Canyon Road	City	.68	B	.77	C	4/28/2010
66. Bouquet Canyon Road & Newhall Ranch Road	City	.66	B	.82	D	4/27/2010
94. Commerce Center Drive & SR-126	Caltrans/County	.54	A	.78	C	12/16/2009

(Continued)

Table 2-1: ICU and LOS Summary - Existing Conditions (Continued)

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour		Count Date
		ICU	LOS	ICU	LOS	
105. Westridge Parkway & Valencia Boulevard	County	.55	A	.20	A	1/27/2010
108. Stevenson Ranch Parkway & Pico Canyon Road	County	.49	A	.51	A	12/01/2009
109. Stevenson Ranch Parkway & Poe Parkway/Chase	County	.63	B	.39	A	12/01/2009

Level of service ranges:							
	.00 - .60	A	.61 - .70	B	.71 - .80	C	
	.81 - .90	D	.91 – 1.00	E	Above 1.00	F	

Table 2-2: Freeway Volumes and V/C Ratios - Existing (2010) Conditions

Segment	Lanes	Capacity	AM Peak Hour				PM Peak Hour			
			Northbound		Southbound		Northbound		Southbound	
			Vol	V/C	Vol	V/C	Vol	V/C	Vol	V/C
401. North of Lake Hughes	4M	8,000	1,300	.16	1,400	.18	2,200	.28	1,800	.23
402. Between Lake Hughes & Parker	4M	8,000	1,400	.18	1,700	.21	2,500	.31	2,000	.25
403. Between Parker & Hasley Canyon	4M	8,000	1,700	.21	2,200	.28	3,100	.39	2,400	.30
404. Between Hasley Canyon & SR-126	4M	8,000	2,300	.29	3,100	.39	4,100	.51	3,000	.38
405. Between SR-126 & Rye Canyon	4M	8,000	3,200	.40	3,500	.44	4,400	.55	4,200	.53
406. Between Rye Canyon & Magic Mtn	4M	8,000	3,200	.40	4,400	.55	4,400	.55	5,400	.68
407. Between Magic Mtn & Valencia	4M	8,000	4,100	.51	4,600	.58	5,200	.65	5,600	.70
408. Between Valencia & McBean	4M	8,000	5,200	.65	5,600	.70	6,000	.75	6,400	.80
409. Between McBean & Pico/Lyons	4M	8,000	5,200	.65	6,200	.78	6,300	.79	6,700	.84
410. Between Pico/Lyons & Calgrove	4M	8,000	5,100	.64	6,700	.84	6,800	.85	6,500	.81
411. Between Calgrove & SR-14	4M (NB) 4M* (SB)	8,000 6,400	5,100	.64	6,900	1.08	6,800	.85	6,500	1.02
412. South of SR-14	6M + 2T (NB) 5M + 2T (SB)	14,400 12,400	6,700	.47	13,900	1.12	13,500	.94	9,300	.75

M = Mixed-Flow/General Purpose Lane (Capacity = 2,000 vehicles per hour)
M* = Mixed-Flow Lane on an Extended Uphill Grade, Without a Truck Lane (Capacity = 1,600 vehicles per hour)
T = Truck Lane (Capacity = 1,200 vehicles per hour)

Capacities derived from PeMS data and through discussions with Caltrans staff.

Santa Clarita Transit Commuter Express offers express commuter bus travel to Los Angeles, Warner Center, Van Nuys, Century City and the Antelope Valley. Three Metrolink stations exist within the City of Santa Clarita, which serve the Antelope Valley line. This line travels between Lancaster and Union Station, Los Angeles.

Future bus transit routes will be extended along Magic Mountain Parkway and Commerce Center Drive in the project area by Santa Clarita Transit as part of a comprehensive valley-wide transit system.

2.2 FUTURE CONDITIONS

The following section describes the long-range buildout conditions in the study area. It includes a description of the planned roadway system in the vicinity of the project site and a summary of the anticipated increase of land use.

2.2.1 Future Roadway System

The Los Angeles County Highway Plan and the Newhall Ranch Specific Plan include future roadways near and within the project site. These plans designate the extension of Magic Mountain Parkway within the project as a six lane Major Highway for the segment east of Westridge Parkway and a four lane Secondary Highway for the segment west of Westridge Parkway. Furthermore, an extension of Commerce Center Drive is currently designated within the project as a six lane Major Highway. Finally, the extension of Westridge Parkway within the project site has been planned as a four lane collector roadway.

The I-5 Freeway is currently built to eight lanes, and Caltrans and the Metropolitan Transportation Authority (Metro) have plans to expand the freeway to include HOV and truck lanes. In September 2009, Caltrans approved a Final Environmental Impact Report/Environmental Assessment for the I-5 HOV/Truck Lanes Project SR-14 to Parker Road. The project will add: (1) one HOV lane in each direction on I-5 from the SR-14 interchange north to Parker Road; (2) truck climbing lanes in each direction from the SR-14 interchange to Calgrove Boulevard (northbound) and Pico Canyon Road/Lyons Avenue (southbound); and (3) full auxiliary lanes within portions of the Project study area. The Caltrans EIR/EIS reports the project is included in the 2008 Regional Transportation Plan and is fully funded, and construction is anticipated to begin in 2011, with completion scheduled for 2015 (see Reference 10 in Section 1.6).

2.2.2 Future Land Use Development

Future land development is anticipated for the Santa Clarita Valley as quantified in the SCVCTM. The SCVCTM includes a land use database prepared by Los Angeles County and the City of Santa Clarita that is based on the approved General Plans of each jurisdiction. This database is regularly updated as specific projects are proposed and thus is a comprehensive listing of cumulative projects. In addition, the land use database has also been updated based on the proposed One Valley One Vision plan (See Reference 6 in Section 1.6). Additionally, because the SCVCTM was developed from regional models prepared by SCAG, the SCVCTM forecasts traffic in a regional context. This means that trips to and from the Santa Clarita Valley, as well as through-trips are included in the forecasts; thus, regional growth, which is traffic volume increases occurring outside of the SCVCTM area, is incorporated into the model.

Table 2-3 summarizes the SCVCTM land use databases for the base year of the model (2004) and the Long-range Buildout/Cumulative horizon, which is referred to as 2035. From the land use summarized here, the SCVCTM calculates vehicle trip generation estimates for the Santa Clarita Valley.

As noted above, the SCVCTM is regularly updated as specific development projects are proposed. Pending, recorded and approved projects are incorporated into the Long-range Buildout/Cumulative database. A partial listing of these known cumulative projects that are in the vicinity of the project site is provided Table 2-4. It is important to reiterate that where future development will occur but specific projects have not been developed, the SCVCTM Long-range Buildout/Cumulative database utilizes land use projections based on the allowable uses shown in the proposed One Valley One Vision County Area Plan/City General Plan update.

2.2.3 Future Traffic Volumes

Long-range cumulative (2035) buildout traffic conditions are derived by the SCVCTM based on the proposed County Area Plan and City of Santa Clarita General Plan updates. As part of this study effort, the SCVCTM was updated to reflect the specific characteristics of the proposed project. These traffic forecasts are presented in the subsequent chapters.

Year 2021 cumulative conditions have been derived using data interpolated from the long-range cumulative (2035) SCVCTM traffic forecasts. To derive 2021 cumulative conditions, SCVCTM long-

Table 2-3: Land Use and ADT Summary - Cumulative Conditions

Land Use Type	Units	Existing[1]		Long-Range General Plan/Cumulative (2035)[2]	
		Amount	ADT	Amount	ADT
Single Family Residential	DU	48,300	471,200	81,500	796,400
Multi-Family Residential	DU	24,400	191,000	67,000	504,400
Commercial Retail	MSF	9,200	515,700	23,300	1,215,700
Commercial Office	MSF	2,100	26,000	18,100	214,400
Industrial Park	MSF	18,300	107,600	40,700	240,700
Hotel	Rooms	1,000	8,000	2,500	20,800
Elem/Middle School	Stu.	29,900	43,400	51,900	75,200
High School	Stu.	10,500	18,800	18,500	33,100
Other	--	--	106,300	--	174,100
TOTAL	--	--	1,488,000	--	3,274,800

Notes:
DU = Dwelling Units
MSF = Million Square Feet
Stu. = Students

Source: Santa Clarita Valley Consolidated Traffic Model

[1]Most current information available at time of report preparation (2004 conditions).
[2]Proposed One Valley One Vision County Area Plan/City General Plan update (includes the Proposed Project).

Table 2-4: Defined Projects Included in the Cumulative Database

No.	Name and/or Location	Description
1	Landmark Village/Tract 53108 – South of SR-126 at Wolcott & Chiquito Cyn Rd (Part of Approved Newhall Ranch Specific Plan)	1,444 DU Residential (308 Single Family, 1,136 Multi-Family) 1,033 TSF Commercial
2	Legacy Village/Tract 61996 – West of I-5, North of Pico Canyon, South of Six Flags Magic Mtn	3,455 DU Residential (536 Single Family, 1,574 Condominium/Townhome, 1,345 Senior Active) 186 TSF Commercial Retail 316 TSF Commercial Office 337 TSF Congregate Care Facility
3	Entrada/Tract 53295 – West of The Old Road, North of Valencia Boulevard, East of the proposed Legacy Village/Mission Village development	1,640 DU Residential (408 Single Family, 1,232 Condominium) 290 TSF Commercial Retail 436 TSF Commercial Office Elementary School
4	Homestead/Tract 60678 – West of the proposed Mission Village development, west and south of the proposed Landmark development, as well as south of the existing Val Verde community (via extensions of Valencia Boulevard and Magic Mountain Parkway, as well as intersections with State Route-126) (Part of Approved Newhall Ranch Specific Plan)	5,777 DU Residential (965 Single Family, 4,812 Condominium/Townhome) 1,310,000 TSF Commercial
5	PM 18108 – West of The Old Road, north of SR-126 (Part of Approved Valencia Commerce Center CUP 87-360)	3,500 TSF (including existing) Industrial/Business park at Buildout
6	Tract 60030 – West of Commerce Center Drive (via extension of Witherspoon Pkwy	1,221.36 TSF Industrial Park
7	Tract 60257 – East of Del Valle Road	233 DU 30 TSF Commercial Retail
8	Tract 60665 – East of Del Valle Road	7 DU
9	Tract 52475 – North of Hasley Canyon Road, west of Del Valle Road	46 DU
10	Tract 53725 - North of Hasley Canyon Road, west of Sloan Cyn Road	42 DU
11	PM 18654 - West of The Old Road, north of Magic Mtn. Parkway	200 TSF Office Building (under construction)
12	Northlake Phase 1/Tract 51852 – North of Lake Hughes Road, east of Ridge Route Road	1,696 DU Middle School
13	Castaic High School – North of Lake Hughes Road, east of Ridge Route Road	3,000 Students
14	Riverpark/Tract 53425 – North and south of Santa Clara River, terminus of Newhall Ranch Rd, south of Bouquet Cyn Rd and north of Soledad Cyn Rd	439 SF DU 650 MF DU 16 Thousand Square Feet (TSF) of Commercial Uses (under construction)
15	Heritage Hills/Tract 65806 – Northwest and southwest corner of Dockweiler and Sierra Highway	190 SF DU
16	UCLA Film Archives – North of McBean Pkwy and west of Rockwell Cyn Rd	250 TSF Commercial Office (under construction)

(Continued)

Table 2-4: Defined Projects Included in the Cumulative Database (Continued)

No.	Name and/or Location	Description
17	College of the Canyons Expansion – South of Valencia Blvd and west of Rockwell Cyn Rd	28 TSF Commercial Office 6,500 Students (additional)
18	Gate-King Industrial Park – South of San Fernando Rd, west of Sierra Hwy	4,200 TSF Industrial Park
19	Milestone/Tract 61811 – North side of Golden Valley Rd at Robert C. Lee Pkwy	167 SF DU (33 total acres) (under construction)
20	Porta Bella/Whittaker-Bermite (partial) – South side of Soledad Cyn Rd and east of Circle J Ranch area	1,244 SF DU 1,667 MF DU 2,911 TSF of Commercial Uses 448.7 Acres of Open Space (approximately 50% of total project shown above is included in the interim year horizon)
21	Lyons Ranch/Tract 53653 – West of I-5 and south of Calgrove Blvd	95 SF DU 95 Senior Housing
22	Tract 62595 – South of Friendly Valley, north of Golden Valley Rd and terminus of Avenue of the Oaks	33 MF DU
23	Northwest corner of Golden Valley Road and McKeon Drive	105 TSF of Commercial Uses
24	Tract 53419 – North of Golden Valley Rd and northwest of Sierra Highway	111 MF DU
25	Downtown Newhall Specific Plan area	712 net new DU (1,402 total DU) 297.1 net new TSF (1,107.4 total TSF)
26	North Newhall Specific Plan area	628 DU - 673 DU 585 TSF – 840 TSF Non-Residential 1 Elementary School (673 DU, 632.5 TSF, 1 Hotel and 1 Elem. School included in the interim year horizon)
27	Golden Valley Ranch/Tract 52414 – South of SR-14, north of Placerita Cyn Rd and west of Sand Cyn Rd	498 SF DU 618.8 TSF of Commercial Uses 1 Elementary School (under construction)
28	Bridgeport Market Place – Northeast corner of McBean Pkwy and Newhall Ranch Rd	130 TSF of Commercial Uses 30 TSF Church 5 Acre Park (under construction)
29	The Keystone – Northeast portion of the future intersection of Newhall Ranch Rd and Golden Valley Rd	319 SF DU 180 MF DU
30	Soledad Circle Estates – South of Soledad Cyn Rd at Penlon Court	147 SF DU
31	Soledad Village – South of Santa Clara River, north of Soledad Cyn Rd at Gladding Way	407 Condo DU (incl. 22 live/work units) 8 TSF of Commercial Uses
32	Henry Mayo Newhall Memorial Hospital Master Plan	127.4 net new TSF of Hospital 200.0 net new TSF of Medical Office

(Continued)

Table 2-4: Defined Projects Included in the Cumulative Database (Continued)

No.	Name and/or Location	Description
33	Town Center Mall Expansion	490 TSF of Commercial Uses
34	The Masters College Expansion	600 Students 54 Condominium DU

Sources:
Westside Santa Clarita Valley Roadway Phasing Analysis
Sterling Industrial – VTPM 060030 Traffic Impact Analysis
Northlake Phase 1 Traffic Impact Analysis
City of Santa Clarita Planning Division
Downtown Newhall Specific Plan
Draft North Newhall Specific Plan Land Use Matrix
Henry Mayo Newhall Memorial Hospital Master Plan Traffic Impact Analysis
Town Center Mall Expansion Traffic Impact Analysis
Masters College Master Plan Traffic Impact Analysis

Note: The buildout/2035 setting also includes planned future development in accordance with the land uses defined in the proposed One Valley One Vision County Area Plan/City General Plan update.

range cumulative (2035) traffic forecasts are first prepared for a roadway network consistent with the 2021 horizon. Project trips are then subtracted from these SCVCTM 2035 forecasts, and the amount of growth between existing conditions and 2021 no-project conditions is then interpolated. Specifically, the amount of growth between existing conditions and 2021 no-project conditions is estimated as 44 percent of the total growth between existing and 2035 no-project conditions (e.g., (2021-2010)/(2035-2010) = 0.44). The interpolated growth is then added to the existing traffic counts previously presented in Section 2.1 to derive the 2021 no-project baseline. Project trips are added to the 2021 no-project baseline to derive the 2021 with-project setting. These traffic forecasts are presented in the subsequent chapters.

3.0 PROJECT DESCRIPTION

This section describes the project site in terms of its transportation characteristics. Trip generation is summarized and the distribution of project trips on the adjoining roadway network is presented.

3.1 PROJECT OVERVIEW

Mission Village (Vesting Tentative Tract Map (VTTM) 61105) consists of a portion of the Newhall Ranch Specific Plan area and is located within the Santa Clarita Valley in unincorporated County of Los Angeles. The Mission Village project is generally bounded by the Santa Clara River to the north, the Six Flags Magic Mountain theme park to the east, and undeveloped land to the south and west. The site plan for the proposed project is provided in Section 1.1 (see Figure 1-2).

The general location of the project site is provided in Section 1.1 (see Figure 1-1). It consists of residential dwelling units (a mix of single family detached units and attached condominium units), commercial retail and office uses, a library, an elementary school, a bus transfer station, and public parks. The proposed uses are consistent with the approved Newhall Ranch Specific Plan.

Initially, site access will come from a westerly extension of Magic Mountain Parkway and a northerly extension of Westridge Parkway. A connection to the north will then be made via a southward extension of Commerce Center Drive. A future extension of Magic Mountain Parkway to the west will provide access to additional villages of the Newhall Ranch.

VTTM 61105 consists of a variety of land uses that include 382 single-family dwelling units, 1,824 condominiums, 905 apartment/condominiums, 459 age qualified condominiums, 491 mixed use residential units over commercial, and 351 continued care retirement community (CCRC) residential units, for a total of 4,412 residential dwelling units. VTTM 61105 also includes 1,488,700 square feet of mixed use commercial (retail and office) and 66,400 square feet of mixed use commercial (retail and office under residential), for a total of 1,555,100 square feet of commercial uses. In addition to the residential and commercial uses, VTTM 61105 includes 40.9 acres of parks and recreation centers, an elementary school, a fire station, a bus transfer station, and a library.

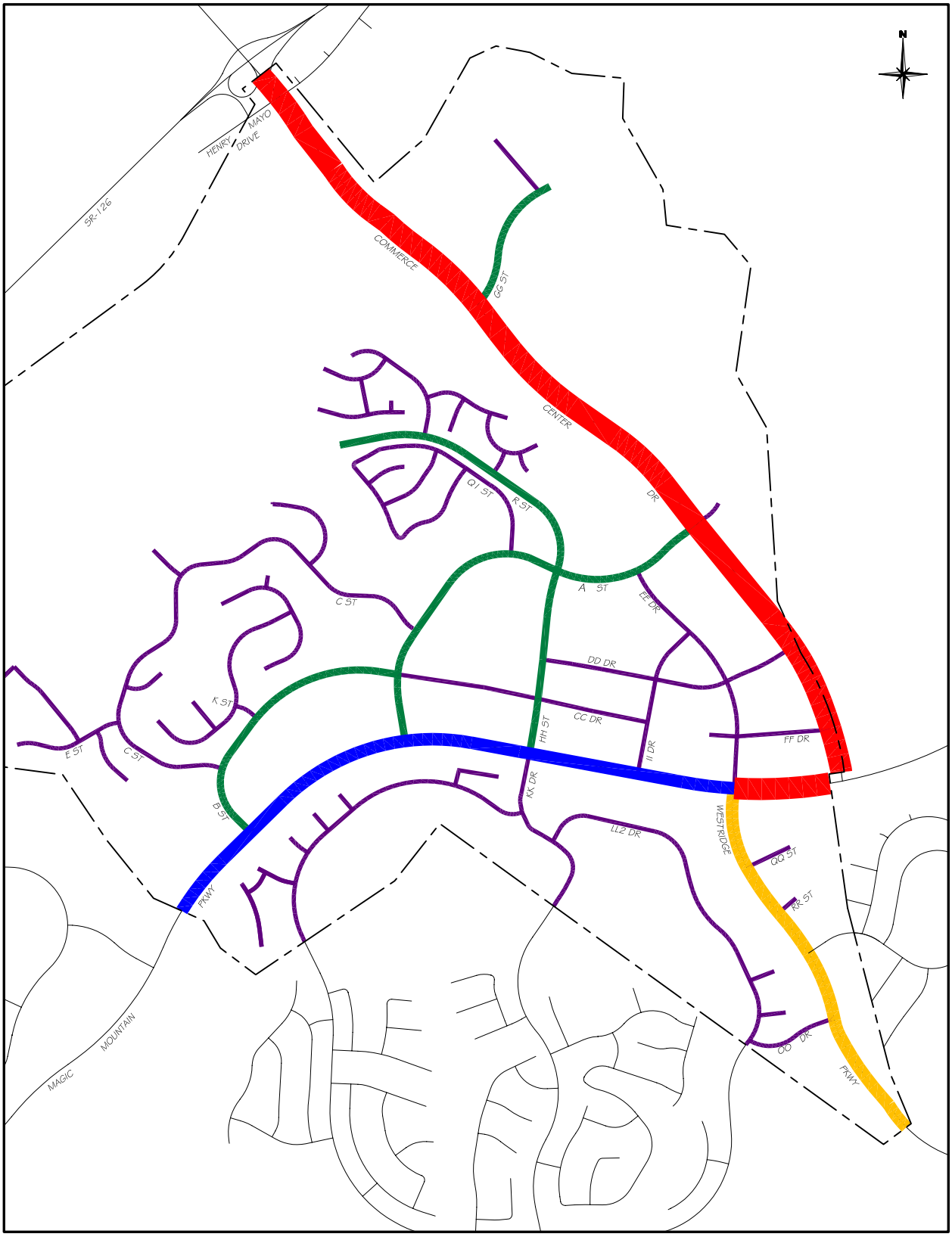
Figure 3-1 illustrates the proposed project site roadway classifications for VTTM 61996. Figure 3-2 illustrates the proposed intersection lane geometry for project access intersections and major intersections adjoining the project site.

As noted above, the proposed project includes the westerly extension of Magic Mountain Parkway, a northerly extension of Westridge Parkway, a connection to the north will then be made via a southward extension of Commerce Center Drive, and a future extension of Magic Mountain Parkway to the west will provide access to additional villages of the Newhall Ranch. The following section provides details regarding the project's trip generation statistics.

3.2 PROJECT TRIP GENERATION

Mission Village (VTTM 61105) consists of a variety of land uses as described in the preceding section. For the purpose of the traffic study, these land uses have been categorized based on the land use categories used by the SCVCTM and the Institute of Transportation Engineers (ITE) Trip Generation Manual. Regarding the specific types of land uses for trip generation purposes, the project trip generation is based on 382 single-family dwelling units with an average density of 6-10 dwelling units per acre, 2,315 condominiums/townhouses, 905 apartment units, 459 active senior dwelling units, and a 351 dwelling unit CCRC, for a grand total of 4,412 dwelling units. Furthermore, the study evaluates 224,100 square feet of retail shops, 697,000 square feet of business park, and 634,000 square feet of commercial office, for a grand total of 1,555,100 square feet of commercial office and retail. The analysis also includes 40.9 acres of developed parks (includes parks and private recreation centers), a 900 student elementary school, and a 36,000 square foot library.

The proposed mix of residential, commercial and schools results in a community able to serve many of the daily needs of those living and working there. Detailed trip generation estimates based on standard SCVCTM and ITE trip generation rates are provided in Table 3-1. The SCVCTM trip rates were calibrated to the specific conditions of the Santa Clarita Valley during the model development process, and the CCRC trip rates used in this summary were obtained from the ITE Trip Generation Manual, 8th Edition.



Legend

- Major Highway (6 lanes)
- Secondary (4 lanes)
- Collector (4 lanes)
- Collector (2 lanes)
- Local (2 lanes)

Figure 3-1

ROADWAY CLASSIFICATIONS
- ON-SITE

2.0 TRANSPORTATION SETTING

This chapter describes the transportation setting for the traffic analysis. Existing conditions are first discussed, followed by a description of the buildout of the circulation system.

2.1 EXISTING CONDITIONS

The following section describes existing traffic conditions in the study area. It includes a description of the study area roadway system, existing traffic volumes and corresponding levels of service as defined by the performance criteria outlined in the previous chapter.

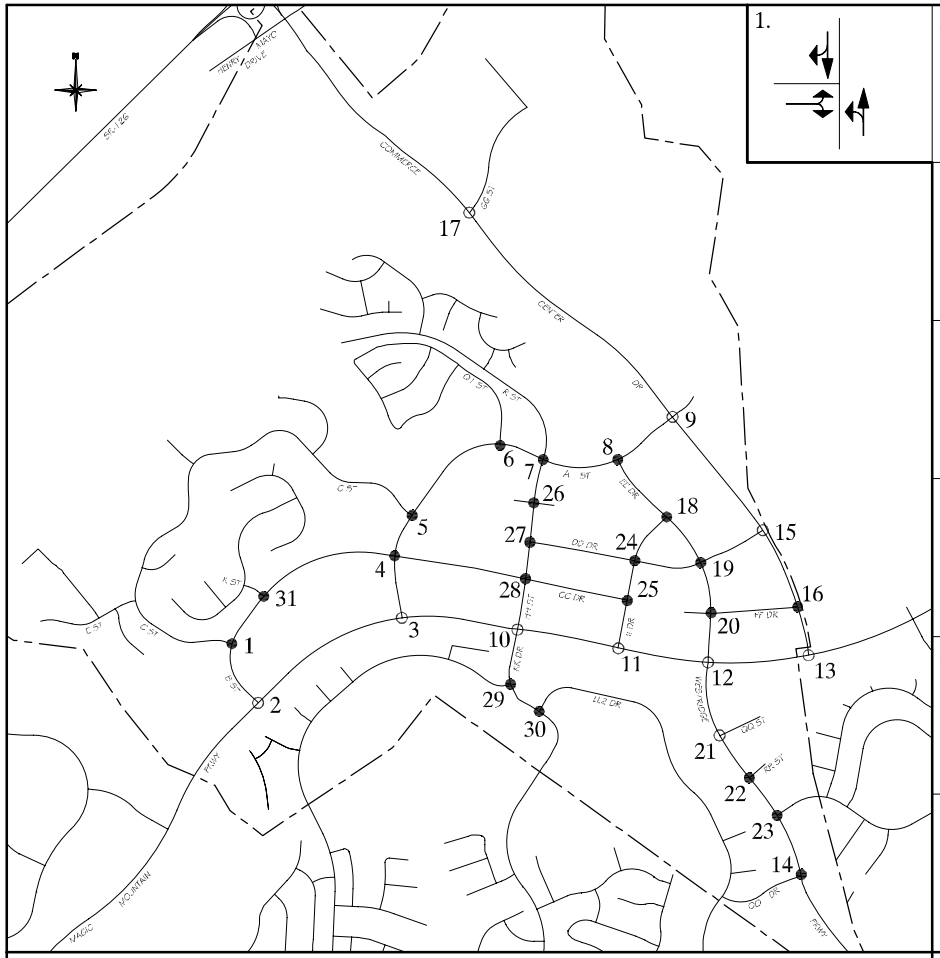
2.1.1 Existing Roadway System

The existing roadway network in the study area is illustrated in Figure 2-1. Existing intersection lane configurations are illustrated in Figure 2-2 for locations under County jurisdiction and in Figure 2-3 for locations under the jurisdiction of the City of Santa Clarita.

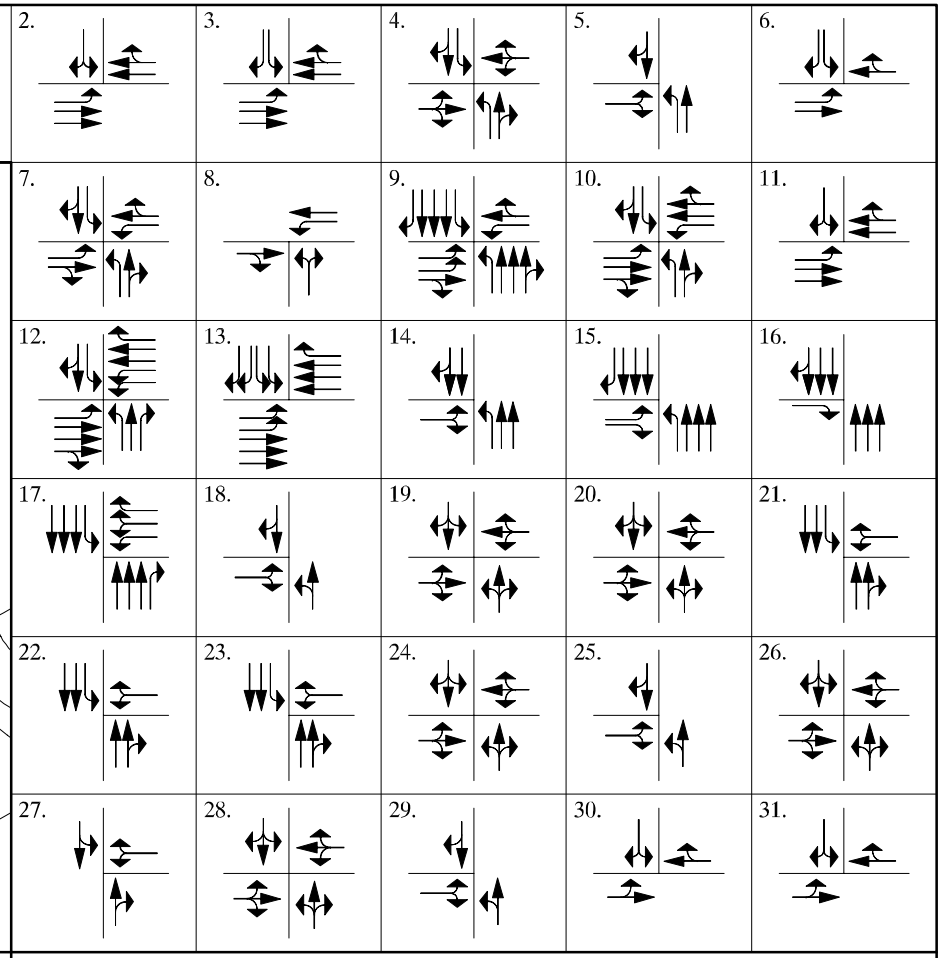
The Interstate 5 (I-5) Freeway, located east of the project site, provides for regional travel in the north/south direction. Regional access for future residents of the site will also be provided via State Route 126 (SR-126), which runs north of the project site in an east/west direction. There are currently two primary roadways (each designated as Major or Secondary Highways on the County Highway Plan) within or immediately adjacent to a portion of the project site itself. These roadways are Commerce Center Drive, which will pass through the project in a north/south direction, and Magic Mountain Parkway which will cross through the project in a east/west direction. Westridge Parkway, which has been planned as a four lane collector roadway, will pass through the southern portion of the project in a north/south direction.

2.1.2 Existing Traffic Volumes and Levels of Service

Illustrations of peak hour turning movement volumes can be found in Figure 2-4 for the AM peak hour and in Figure 2-5 for the PM peak hour for locations under the jurisdiction of the County of Los Angeles. Illustrations of peak hour turning movement volumes can be found in Figure 2-6 for the AM peak hour and in Figure 2-7 for the PM peak hour for locations under the jurisdiction of the City of Santa



INTERSECTION LOCATIONS



INTERSECTION LANES

Legend
- Intersection Location (Stop Sign Control)
- Intersection Location (Signal Control)
- Project Boundary
- Intersection Lane

Figure 3-2

INTERSECTION LANE CONFIGURATIONS - ON-SITE

Table 3-1: Land Use and Trip Generation Summary - Mission Village

		AM Peak Hour			PM Peak Hour			
Land Use Type	**Units**	**IB**	**OB**	**Total**	**IB**	**OB**	**Total**	**ADT**
3. Single Family (6-10 du/ac)	382 DU	73	213	286	244	143	387	3,783
4. Condominium/Townhouse	2,315 DU	234	1,110	1,344	1,086	604	1,690	18,520
5. Apartment	905 DU	73	388	461	370	190	560	6,244
7. Senior (Active)	459 DU	37	54	91	73	45	118	1,702
8. CCRC	351 DU	42	21	63	49	53	102	986
Residential Total	*4,412 DU*	*459*	*1,786*	*2,245*	*1,822*	*1,035*	*2,857*	*31,235*
13. Commercial Shops	224.1 TSF	162	107	269	404	404	808	8,306
20. Elementary/Middle School	900 STU	234	180	414	72	81	153	1,305
24. Library	36 TSF	27	11	38	122	133	255	3,059
31. Business Park	697 TSF	836	160	996	210	690	900	7,110
40. Commercial Office	634 TSF	983	120	1,103	132	819	951	7,329
51. Developed Park[1]	40.9 AC	0	0	0	1	1	2	108
Non-Residential Total		*2,242*	*578*	*2,820*	*941*	*2,128*	*3,069*	*27,217*
TOTAL		**2,701**	**2,364**	**5,065**	**2,763**	**3,163**	**5,926**	**58,452**
Trip Rates								
3. Single Family (6-10 du/ac)[2]	DU	.19	.56	.75	.64	.37	1.01	9.90
4. Condominium/Townhouse[2]	DU	.10	.48	.58	.47	.26	.73	8.00
5. Apartment[2]	DU	.08	.43	.51	.41	.21	.62	6.90
7. Senior (Active)[2]	DU	.08	.12	.20	.16	.10	.26	3.71
8. CCRC[3]	DU	.12	.06	.18	.14	.15	.29	2.81
13. Commercial Shops[2]	TSF	.72	.48	1.20	1.80	1.80	3.60	37.06
20. Elementary/Middle School[2]	STU	.26	.20	.46	.08	.09	.17	1.45
24. Library[2]	TSF	.76	.30	1.06	3.40	3.69	7.09	84.98
31. Business Park[2]	TSF	1.20	.23	1.43	.30	.99	1.29	10.20
40. Commercial Office[2]	TSF	1.55	.19	1.74	.21	1.29	1.50	11.56
51. Developed Park[2]	AC	.00	.00	.00	.03	.04	.07	2.60

DU = Dwelling Units
TSF = Thousand Square Feet
STU = Students
AC = Acres

[1]Includes private recreation centers.

Trip rate sources:
[2]Santa Clarita Valley Consolidated Transportation Model (SCVCTM)
[3]Institute of Transportation Engineers (ITE) Trip Generation 8th Edition, Category 255 (Continued Care Retirement Community)

As shown in the previously referenced Table 3-1, at buildout Mission Village would result in approximately 58,500 gross ADT, with approximately 5,100 gross trips during the AM peak hour (2,700 inbound), and approximately 5,900 gross trips during the PM peak hour (3,200 outbound), based on standard SCVCTM and ITE rates. However, due to the complementary mix of land uses planned for the site, many of the trips generated by the project will remain internal to the project site. To derive the amount of trips internal to the project site, a mixed-use development (MXD) trip generation estimate has been prepared for the project by Fehr & Peers based on a quantitative model developed in cooperation with the US Environmental Protection Agency (EPA) and ITE.

A description of the MXD model and the model's results for the Mission Village project is provided in Appendix E of this report (Technical Memorandum – Newhall Ranch Mission Village Mixed-Use Trip Generation Estimate, Fehr & Peers, December 30, 2009). The MXD analysis concluded that due to the specific characteristics of the proposed project, approximately one-third (33 percent) of the daily gross tripends remain internal to the project site. Additionally, approximately 29 percent of the AM peak hour tripends and approximately 30 percent of the PM peak hour tripends remain internal to the project site, as summarized in Table 3-2. This data was reviewed and approved by the County Department of Public Works Traffic and Lighting Division staff in February 2010 for use in this traffic impact analysis.

Table 3-2: Mission Village MXD Trip Generation and Internalization Estimate

Time Period	Gross Tripends	Net Tripends for External Trips	Vehicle Trip Internalization
Daily	57,878	38,922	33%
AM Peak Hour	5,101	3,615	29%
PM Peak Hour	5,889	4,123	30%

Source: Fehr & Peers

Note: Gross tripends derived using MXD model and these values differ slightly (<1%) from SCVCTM/ITE estimates.

To illustrate how the complementary mix of land uses interact with each other, an approximation of the split of internal and external trips has been derived for each of the individual project land use categories, and is presented in Table 3-3. The individual project land uses will have varying amounts of internal capture based on the specific type of land use that is planned. For example, commercial office

Table 3-3: Internal and External Trip Volumes and Percentages

Land Use	Units		AM Peak Hour IB	AM Peak Hour OB	AM Peak Hour Total	PM Peak Hour IB	PM Peak Hour OB	PM Peak Hour Total	ADT
Traditional Residential									
Single Family (6-10 du/ac)	382	DU	73	213	286	244	143	387	3,783
Condominium/Townhouse	2,315	DU	234	1,110	1,344	1,086	604	1,690	18,520
Apartment	905	DU	73	388	461	370	190	560	6,244
Sub-total	*3,602*	*DU*	*380*	*1,711*	*2,091*	*1,700*	*937*	*2,637*	*28,547*
Internal %			*30%*	*30%*		*25%*	*30%*		*30%*
Tripends for Trips Internal to Site			114	513	627	425	281	706	8,564
Tripends for Trips External to Site			266	1,198	1,464	1,275	656	1,931	19,983
Active Senior Residential									
Senior (Active)	459	DU	37	54	91	73	45	118	1,702
Internal %			*20%*	*25%*		*30%*	*30%*		*30%*
Tripends for Trips Internal to Site			7	14	21	22	14	36	511
Tripends for Trips External to Site			30	40	70	51	31	82	1,191
Continuing Care Senior Residential									
CCRC	351	DU	42	21	63	49	53	102	986
Internal %			*10%*	*10%*		*15%*	*15%*		*20%*
Tripends for Trips Internal to Site			4	2	6	7	8	15	197
Tripends for Trips External to Site			38	19	57	42	45	87	789
School, Library & Parks									
Elementary/Middle School	900	STU	234	180	414	72	81	153	1,305
Library	36	TSF	27	11	38	122	133	255	3,059
Developed Park	40.9	AC	0	0	0	1	1	2	108
Sub-total			*261*	*191*	*452*	*195*	*215*	*410*	*4,472*
Internal %			*90%*	*35%*		*45%*	*75%*		*50%*
Tripends for Trips Internal to Site			235	67	302	88	161	249	2,236
Tripends for Trips External to Site			26	124	150	107	54	161	2,236
Commercial Retail									
Commercial Shops	224.1	TSF	162	107	269	404	404	808	8,306
Internal %			*65%*	*65%*		*70%*	*55%*		*60%*
Tripends for Trips Internal to Site			105	70	175	283	222	505	4,984
Tripends for Trips External to Site			57	37	94	121	182	303	3,322
Commercial Office									
Business Park	697	TSF	836	160	996	210	690	900	7,110
Commercial Office	634	TSF	983	120	1,103	132	819	951	7,329
Sub-total	*1,331*	*TSF*	*1,819*	*280*	*2,099*	*342*	*1,509*	*1,851*	*14,439*
Internal %			*15%*	*15%*		*20%*	*15%*		*20%*
Tripends for Trips Internal to Site			273	42	315	68	226	294	2,888
Tripends for Trips External to Site			1,546	238	1,784	274	1,283	1,557	11,551
Total									
Total Tripends			2,701	2,364	5,065	2,763	3,163	5,926	58,452
Total Tripends for Trips Internal to Site			738	708	1,446	893	912	1,805	19,380
Total Internal %			27%	30%	29%	32%	29%	30%	33%
Total Tripends for Trips External to Site			1,963	1,656	3,619	1,870	2,251	4,121	39,072

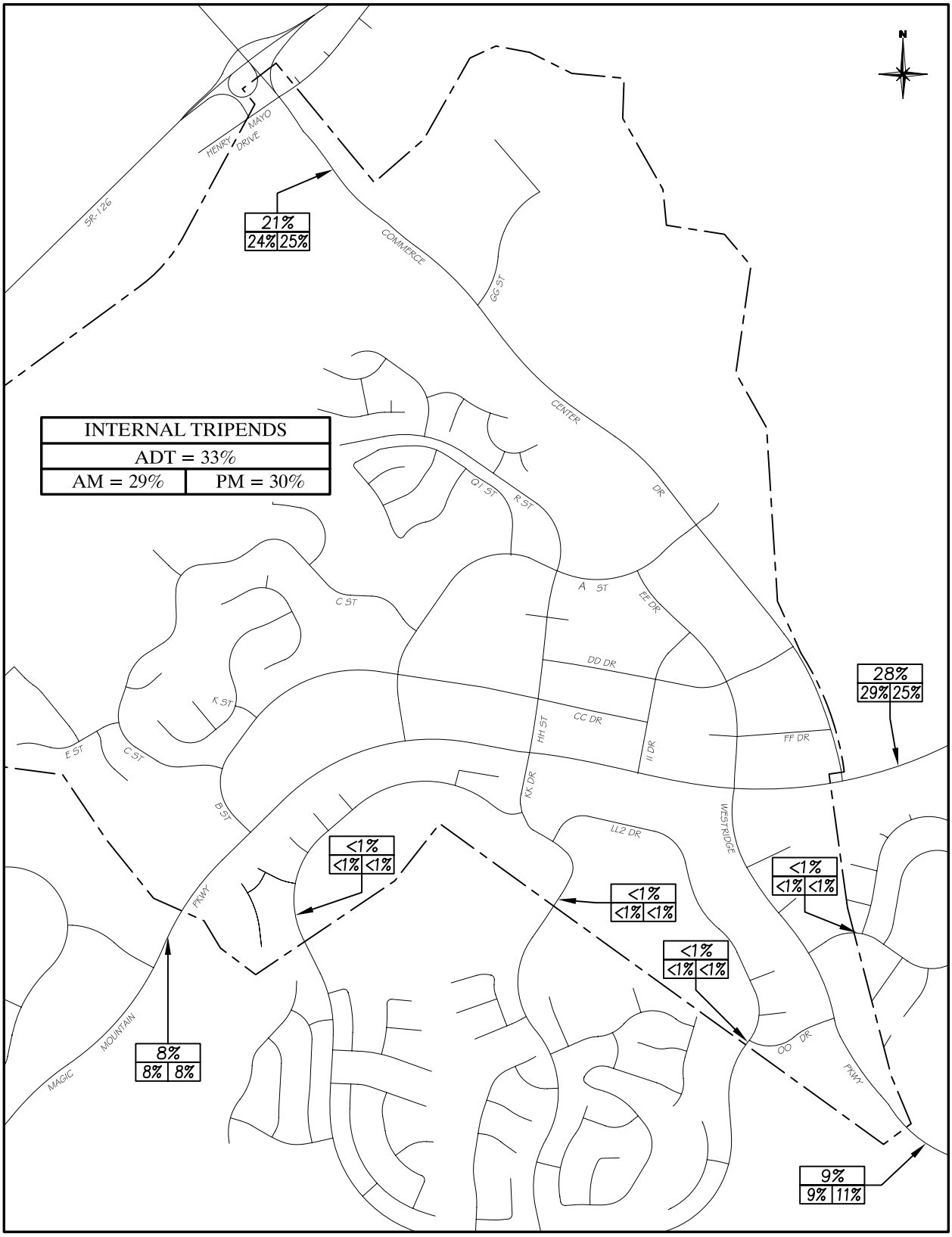
uses are anticipated to have approximately 20 percent overall internal capture, while the schools, library and parks are anticipated to have approximately 50 percent internal capture, with approximately 90 percent internalization during the peak hour in the peak direction. In addition, the balanced mix of project uses allows for approximately 30 percent of the overall residential tripends being for internal trips.

3.3 PROJECT TRIP DISTRIBUTION

The geographic distribution of project-generated trips was derived by utilizing the SCVCTM. The SCVCTM is a computerized travel demand model that utilizes a sophisticated trip distribution function to derive the distribution of vehicle trips and which has previously been calibrated to the existing conditions of the Santa Clarita Valley. The SCVCTM is jointly maintained by City of Santa Clarita and County of Los Angeles staff and is utilized for all major transportation planning efforts within the Santa Clarita Valley. Production and attraction trip data is generated by the model based on five separate trip purposes, and trip distribution patterns are then derived by the model. As a final step, the model assigns these trips to the roadway network based on the derived distribution patterns.

As discussed in the previous section, the volume of trips internal and external to the project site has been derived using a model developed specifically for mixed-use developments of this type (MXD model). To derive the distribution patterns of the external trips, a special select zone trip assignment was prepared using the SCVCTM based on the total volume of external trips estimated by the MXD model.

Illustrations of the project's trip distribution patterns are provided in Figure 3-3a and Figure 3-3b based on the adjusted SCVCTM select zone run. Approximately 28 percent of the project's traffic is distributed to Magic Mountain Parkway east of the project site and approximately 21 percent is distributed to Commerce Center Drive north of the site. Approximately 9 percent of the project' traffic is distributed to Westridge Parkway south of the project site and approximately 8 percent is distributed to Magic Mountain Parkway west of the project site. Less than one percent of the project traffic is distributed to each of the four local streets that also access the project site (three streets that provide access to the Legacy Village project site and one street that provides access to the Entrada project site).



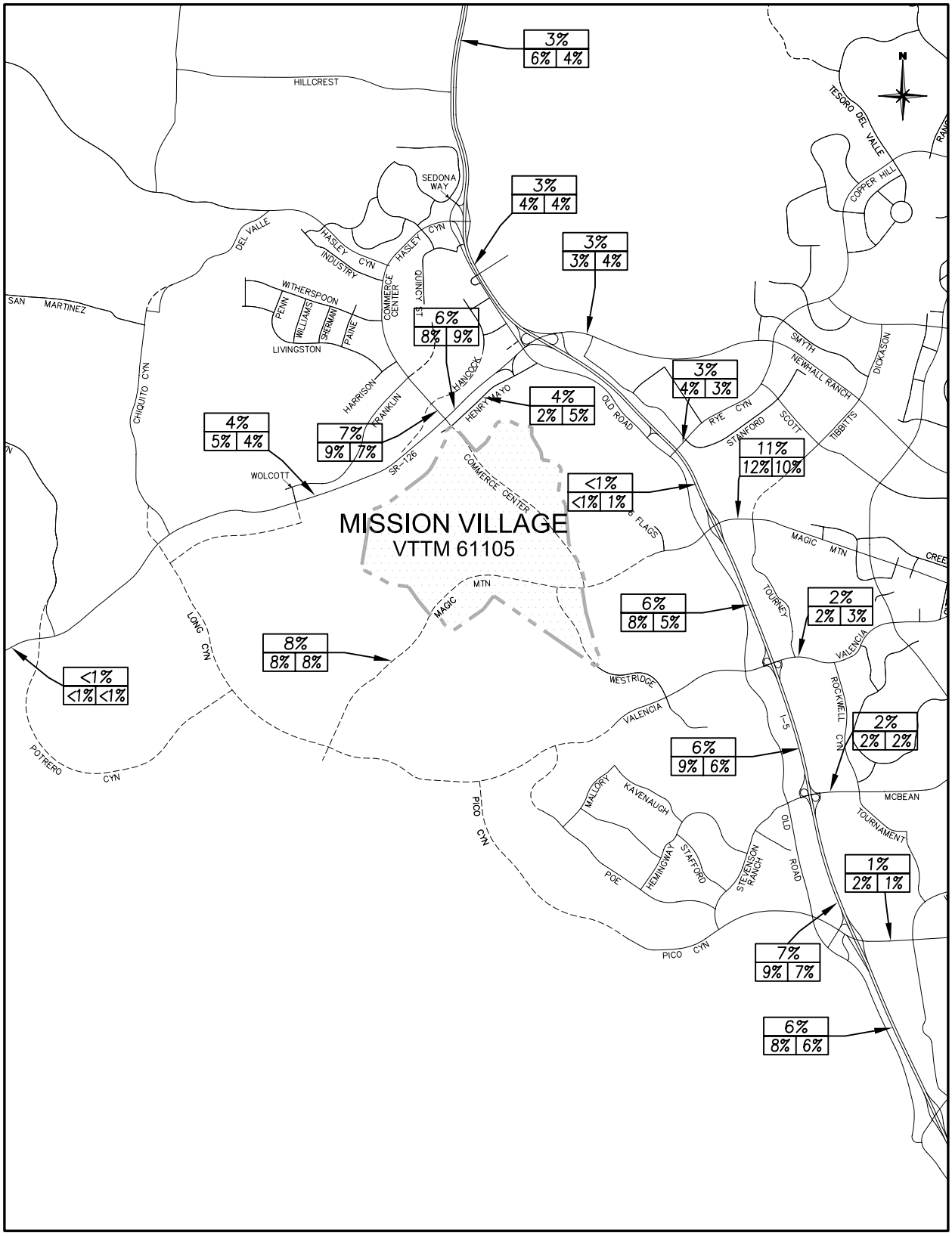
Legend

ADT%
AM% PM%

Distribution Percentages

Figure 3-3a

TRIP DISTRIBUTION (%)



Legend

Existing Roadway
Future Roadway
Project Boundary

Figure 3-3b

TRIP DISTRIBUTION (%)

3.4 PROJECT TRAFFIC FORECASTS – ON SITE

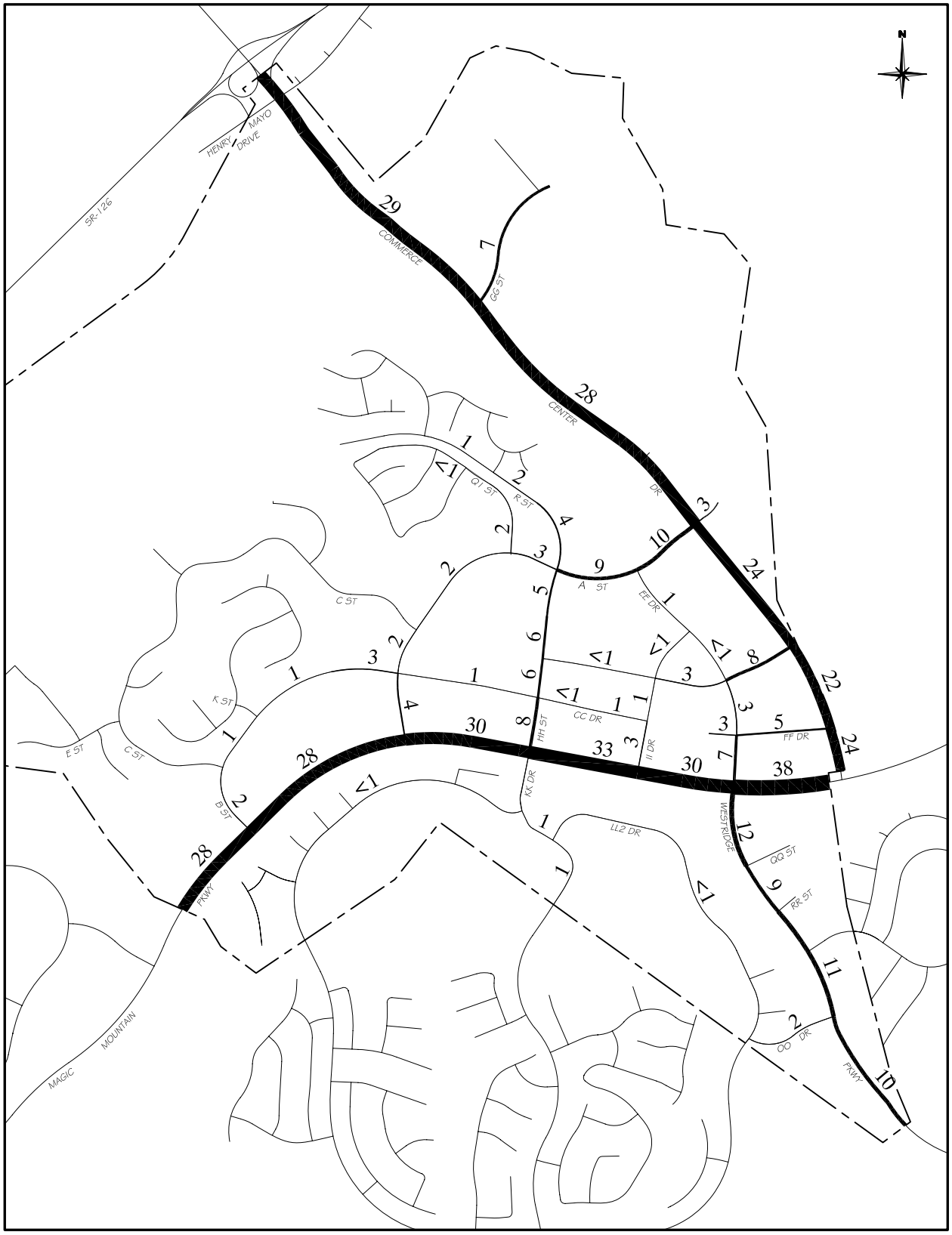
To derive traffic volume forecasts for the roadways within the project site, a focused traffic model was developed. Referred to here as the Mission Village Traffic Model (MVTM), the model was developed with the capability to derive detailed peak hour turning movement volumes at each of the on-site intersections. Forecast ADT volumes for buildout conditions (including Newhall Ranch plus other cumulative developments) within the project site were derived using this special model and are provided in Figure 3-4.

As noted in the previous section, the SCVCTM was used to calculate the general distribution of trips to and from the project site. From these overall distribution patterns, the MVTM was developed to provide an additional level of detail not possible with the SCVCTM. Figure 3-5 illustrates the intersection locations that were analyzed for peak hour volumes. Forecast traffic volumes for buildout conditions, including buildout of the entire Newhall Ranch Specific Plan, are illustrated in Figure 3-6 for the AM peak hour and in Figure 3-7 for the PM peak hour.

The peak hour traffic volumes referenced above were utilized to derive intersection lane configurations for the on-site intersections. An intersection capacity analysis based on these lanes and the forecast peak hour volumes is summarized in Table 3-4. As shown, each intersection of local and/or private street roadways is anticipated to operate at LOS C or better for buildout conditions. Two intersections along Magic Mountain Parkway, KK Drive/HH Street at Magic Mountain Parkway and Westridge Parkway at Magic Mountain Parkway, are forecast to operate at LOS D during the PM peak hour and LOS C during the AM peak hour. Detailed ICU calculation worksheets for each intersection are provided in Appendix B.

Each on-site intersection has been evaluated for the need of the installation of traffic signals based on peak hour traffic signal warrants. The warrant analysis is provided in Appendix I, which shows that the following intersections are anticipated to meet the peak hour warrants when the Newhall Ranch Specific Plan area is fully built out:

2. B St & Magic Mountain Pkwy
3. A St & Magic Mountain Pkwy
9. Commerce Center Dr & A St
10. KK Dr/HH St & Magic Mountain Pkwy
11. II Dr & Magic Mountain Pkwy
12. Westridge Pkwy & Magic Mountain Pkwy
13. Commerce Center Dr & Magic Mountain Pkwy
15. Commerce Center Dr & DD Dr
17. Commerce Center Dr & GG St
21. Westridge Pkwy & QQ St (Fire Station Signal)



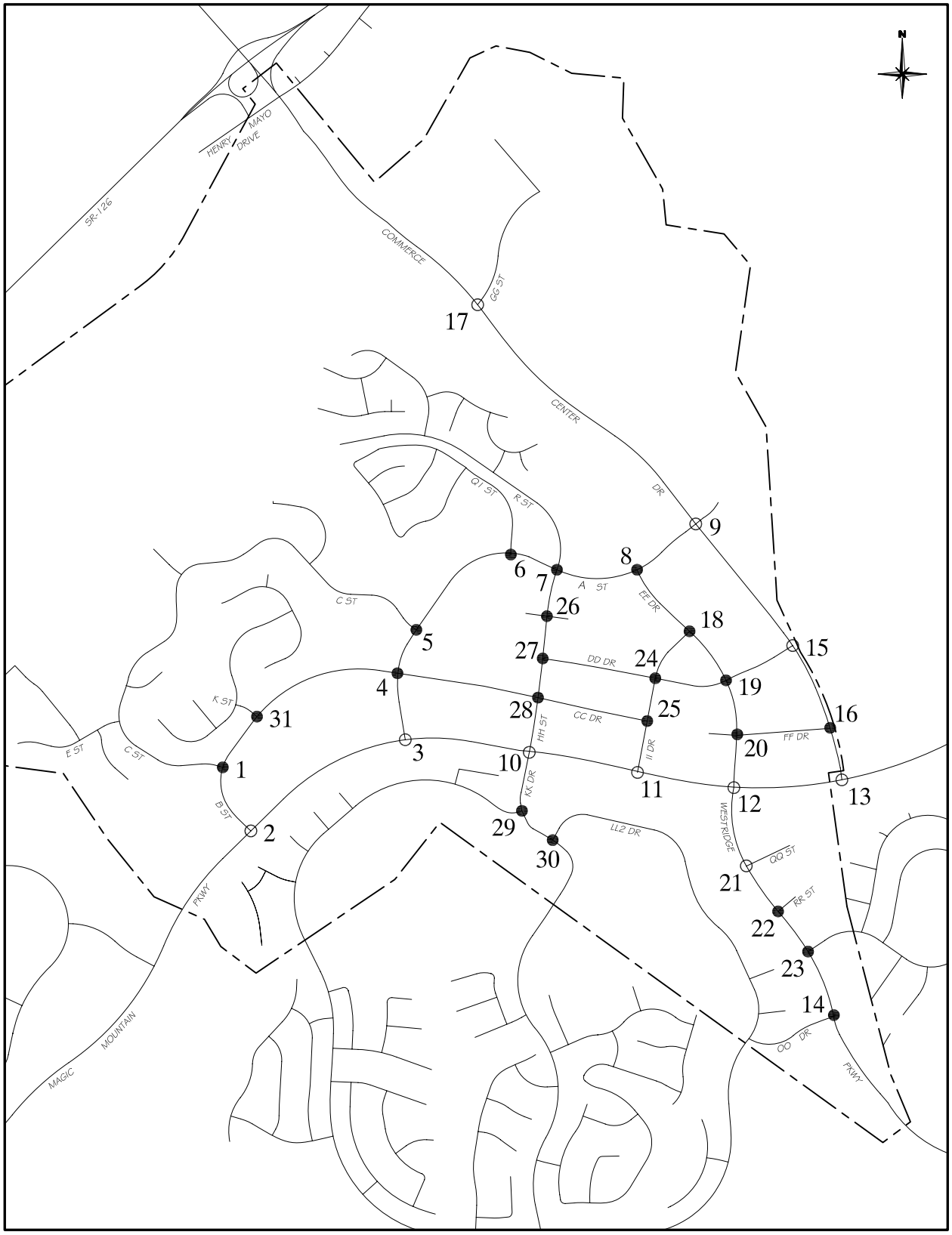
Legend

10 20 40 ADT Volumes (000s)

Project Boundary

Figure 3-4

ADT VOLUMES, NEWHALL RANCH AND OTHER CUMULATIVE DEVELOPMENT BUILDOUT CONDITIONS - ON-SITE

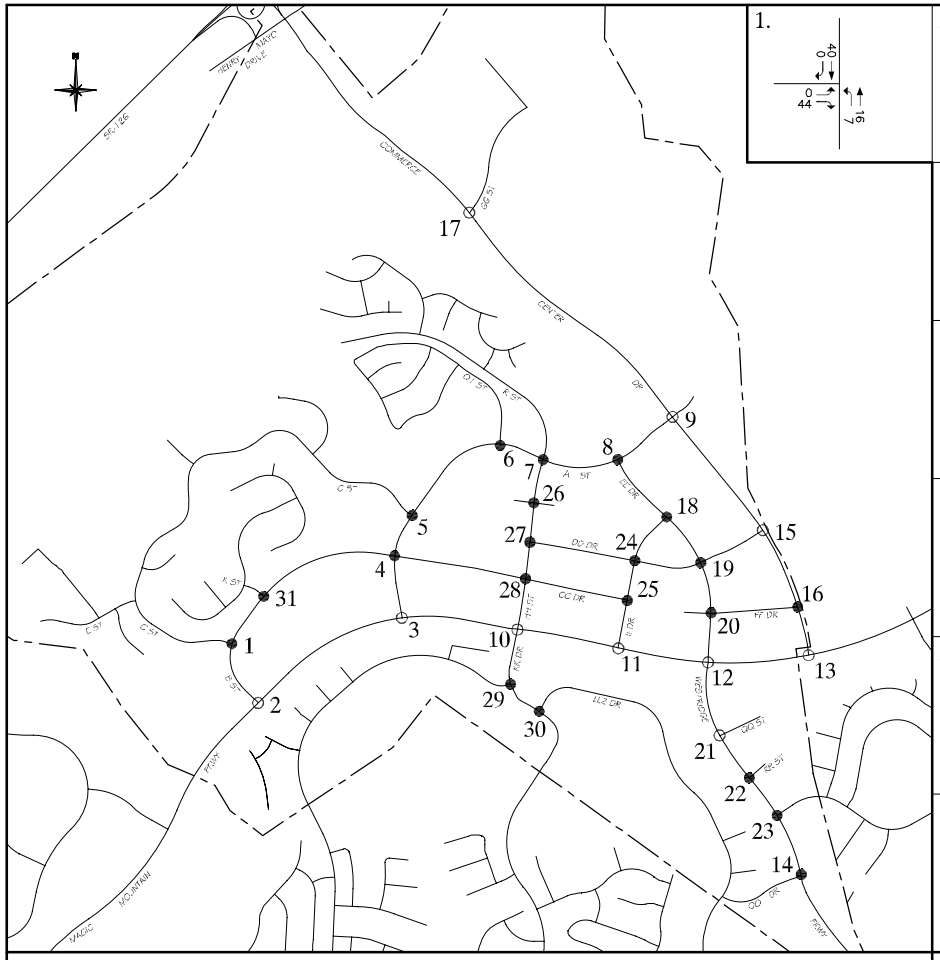


Legend

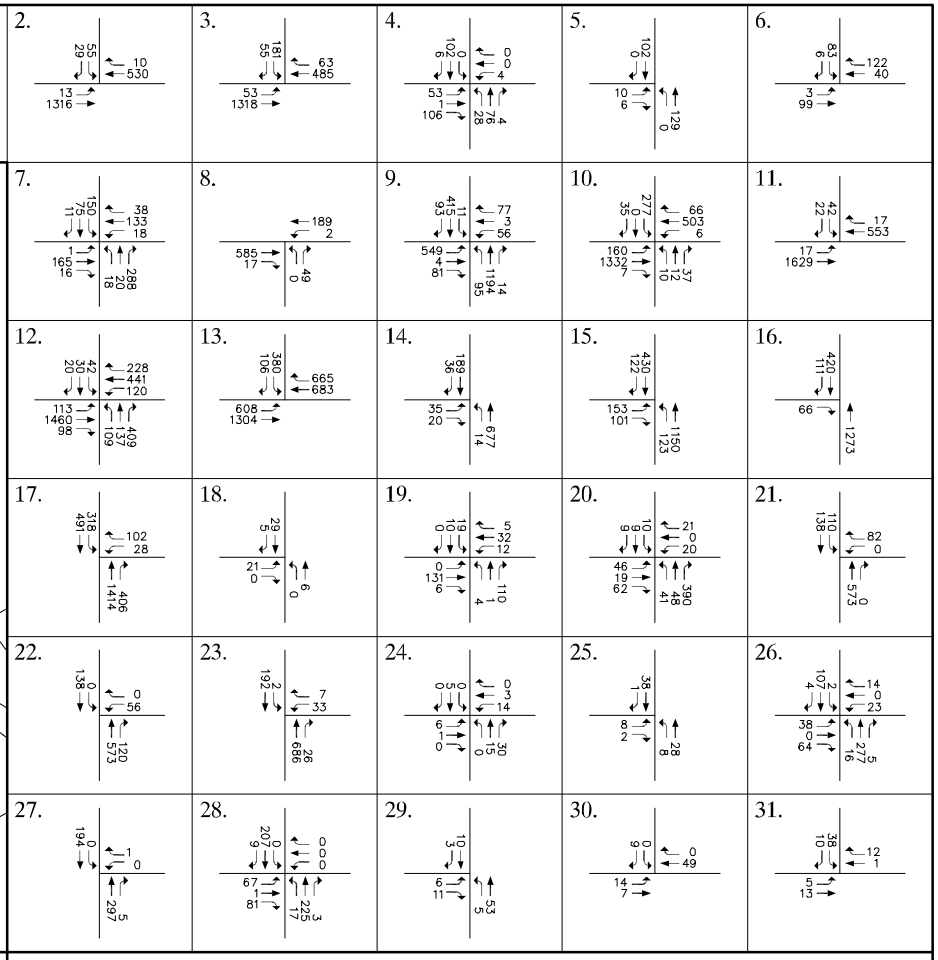
- ● Intersection Location (Stop Sign Control)
- ○ Intersection Location (Signal Control)
- —·— Project Boundary

Figure 3-5

INTERSECTION LOCATION MAP
- ON-SITE



INTERSECTION LOCATIONS



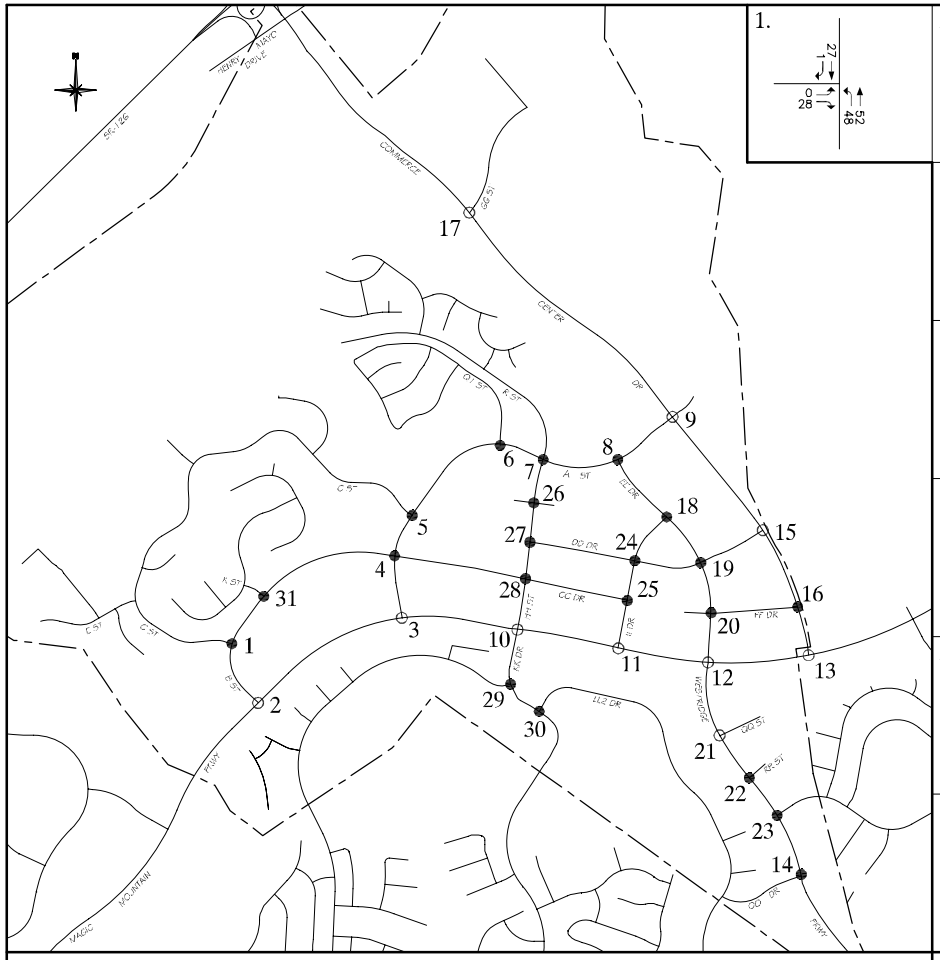
INTERSECTION VOLUMES - AM PEAK HOUR

Legend

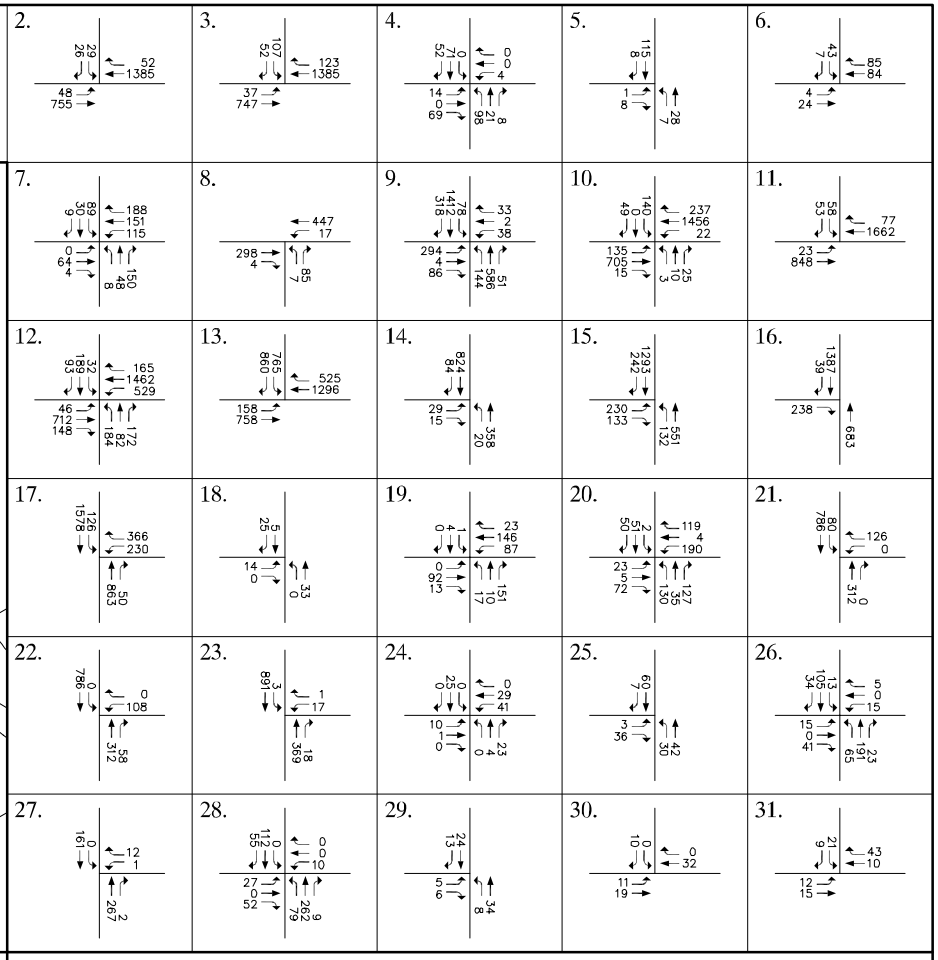
- ● Intersection Location (Stop Sign Control)
- ○ Intersection Location (Signal Control)
- —·— Project Boundary
- ↖ XX Intersection Volume

Figure 3-6

AM PEAK HOUR VOLUMES, NEWHALL RANCH AND OTHER CUMULATIVE DEVELOPMENT BUILDOUT CONDITIONS - ON-SITE



INTERSECTION LOCATIONS



INTERSECTION VOLUMES - PM PEAK HOUR

Legend

- ● Intersection Location (Stop Sign Control)
- ○ Intersection Location (Signal Control)
- —·— Project Boundary
- ↖ XX Intersection Volume

Figure 3-7

PM PEAK HOUR VOLUMES, NEWHALL RANCH AND OTHER CUMULATIVE DEVELOPMENT BUILDOUT CONDITIONS - ON-SITE

Table 3-4: ICU and LOS Summary - Buildout Conditions (On-Site)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	LOS	ICU	LOS
1. B St & C St	.16	A	.18	A
2. B St & Magic Mountain Pkwy	.56	A	.61	B
3. A St & Magic Mountain Pkwy	.62	B	.66	B
4. A St & B St	.29	A	.29	A
5. A St & C St	.19	A	.19	A
6. Q1 St & A St	.25	A	.24	A
7. R St & A St	.50	A	.49	A
8. EE Dr & A St	.51	A	.44	A
9. Commerce Center Dr & A St	.60	A	.60	A
10. KK Dr/HH St & Magic Mountain Pkwy	.72	C	.82	D
11. II Dr & Magic Mountain Pkwy	.65	B	.72	C
12. Westridge Pkwy & Magic Mountain Pkwy	.71	C	.89	D
13. Commerce Center Dr & Magic Mountain Pkwy	.73	C	.69	B
14. Westridge Pkwy & OO Dr	.34	A	.42	A
15. Commerce Center Dr & DD Dr	.44	A	.59	A
16. Commerce Center Dr & FF Dr	.37	A	.55	A
17. Commerce Center Dr & GG St	.60	A	.52	A
18. EE Dr & II Dr	.13	A	.13	A
19. EE Dr & DD Dr	.28	A	.37	A
20. EE Dr & FF Dr	.50	A	.49	A
21. Westridge Pkwy & QQ St	.40	A	.43	A
22. Westridge Pkwy & RR St	.36	A	.42	A
23. Westridge Pkwy & Entrada	.35	A	.39	A
24. II Dr & DD Dr	.14	A	.17	A
25. II Dr & CC Dr	.13	A	.18	A
26. HH St & Driveway	.36	A	.33	A
27. HH St & DD Dr	.29	A	.28	A
28. HH St & CC Dr	.34	A	.38	A
29. KK Dr & LL St	.15	A	.14	A
30. KK Dr & LL2 Dr	.15	A	.14	A
31. K St & B St	.14	A	.16	A

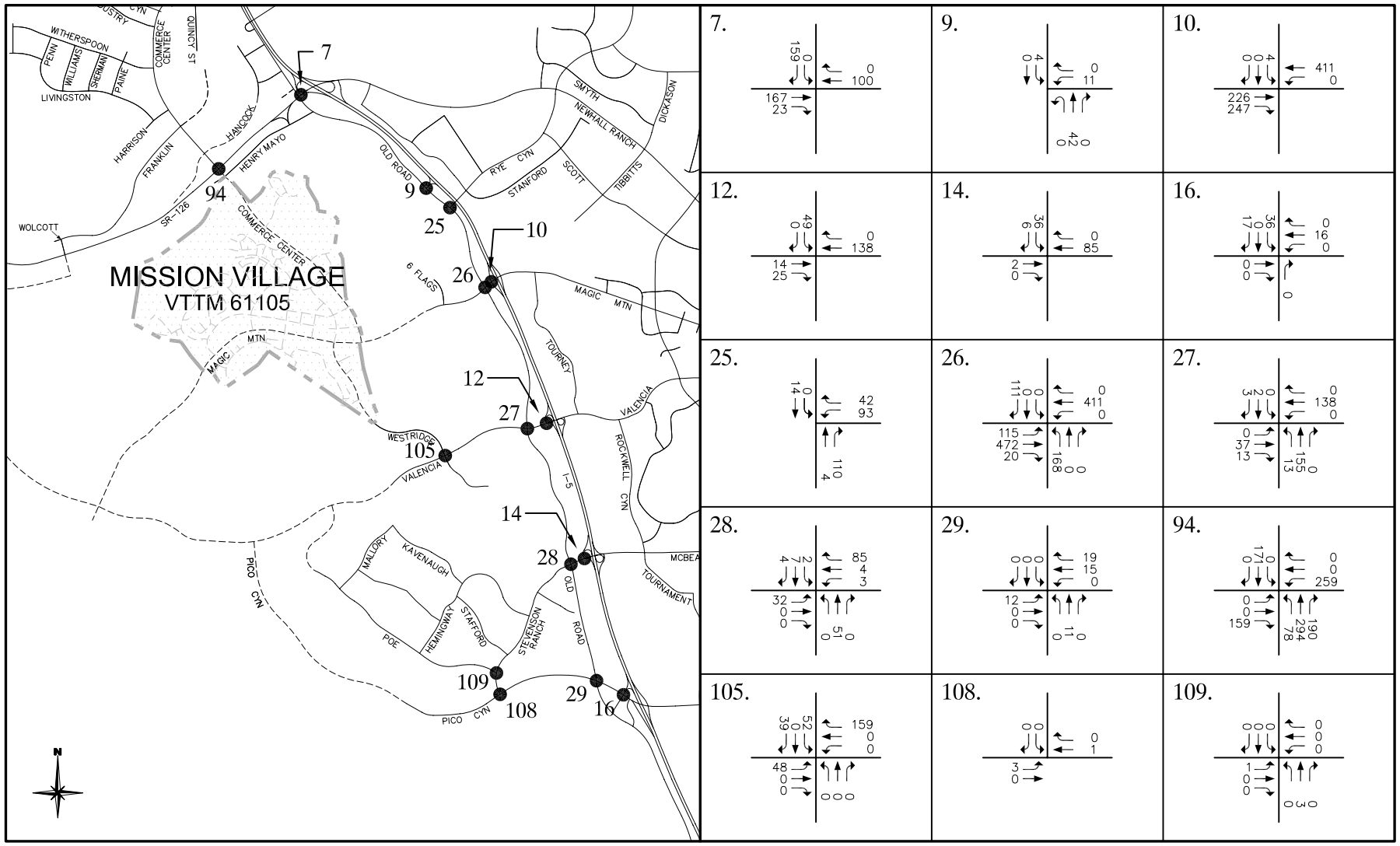
Level of service ranges:							
	.00 - .60	A	.61 - .70	B	.71 - .80	C	
	.81 - .90	D	.91 – 1.00	E	Above 1.00	F	

3.5 PROJECT TRAFFIC FORECASTS – OFF SITE

Project occupancies are anticipated to begin in 2014 and reach buildout in 2021. Therefore, a horizon year of 2021 is utilized as the basis for project impact analysis in accordance with the County of Los Angeles Traffic Study Guidelines. Traffic volume estimates for project trips outside of the project site are presented in Figure 3-8 for the AM peak hour and in Figure 3-9 for the PM peak hour for intersections within the County of Los Angeles for year 2021 conditions. Corresponding traffic volume estimates for project trips outside of the project site are presented in Figure 3-10 for the AM peak hour and in Figure 3-11 for the PM peak hour for intersections within the City of Santa Clarita for year 2021 conditions.

In accordance with the City of Santa Clarita Traffic Study Guidelines, project impacts are also evaluated under a scenario that includes all approved and planned development projects for a horizon year consistent with the buildout of the proposed project (2021). This represents a cumulative setting for which to identify project impacts. In addition, due to the long-range development horizon for the cumulative projects within the project area (see Section 2.2.2 for listing), a long-range cumulative scenario (2035) that reflects buildout conditions for the area is also evaluated. Figure 3-12 and Figure 3-13 show the AM peak hour and PM peak hour project trips for intersections within the County of Los Angeles for buildout (2035) conditions. Corresponding traffic volume estimates for project trips are presented in Figure 3-14 for the AM peak hour and in Figure 3-15 for the PM peak hour for intersections within the City of Santa Clarita for buildout (2035) conditions. Unlike the volumes in the previous section (on-site volumes), which reflect buildout conditions inclusive of the traffic from development outside of the project area, the volumes shown in the previously referenced figures are the traffic volumes generated by just the project alone. These volumes are used in the following chapter for addressing off-site impacts.

The volume of project traffic forecast to utilize the State highway system is summarized in Table 3-5. The table shows how the project's peak hour directional volumes within the Santa Clarita Valley vary from 0 to 269 vehicles per hour on I-5 and vary from 78 to 331 vehicles per hour on SR-126. South of the Santa Clarita Valley, the project's peak hour directional volumes are less than 150 vehicles per hour. North of the Santa Clarita Valley, the project's peak hour directional volumes are less than 90 vehicles per hour.

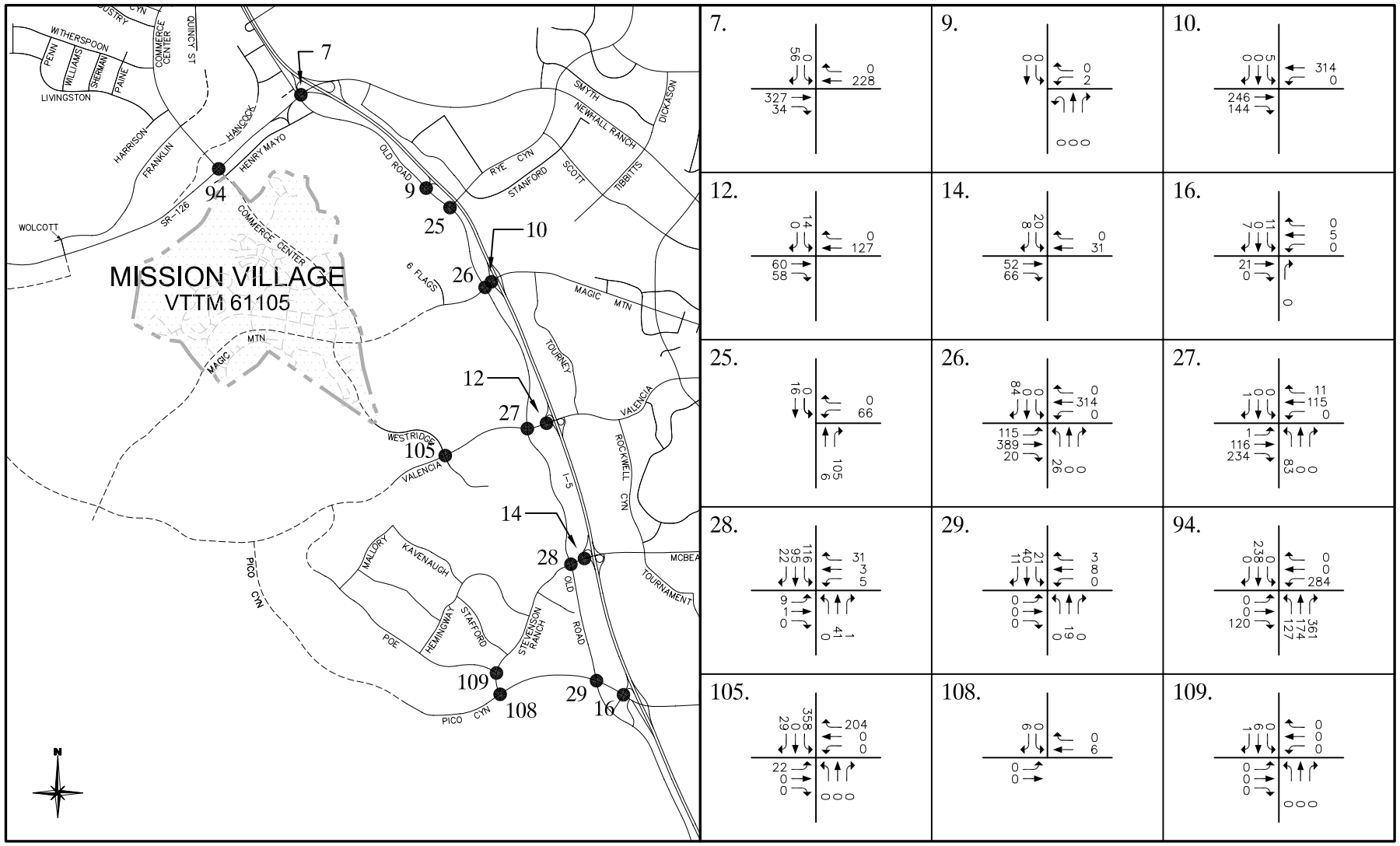


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 3-8

PROJECT ONLY AM PEAK HOUR TURNING MOVEMENT VOLUMES - YEAR 2021 CONDITIONS - OFF-SITE (COUNTY INTERSECTIONS)

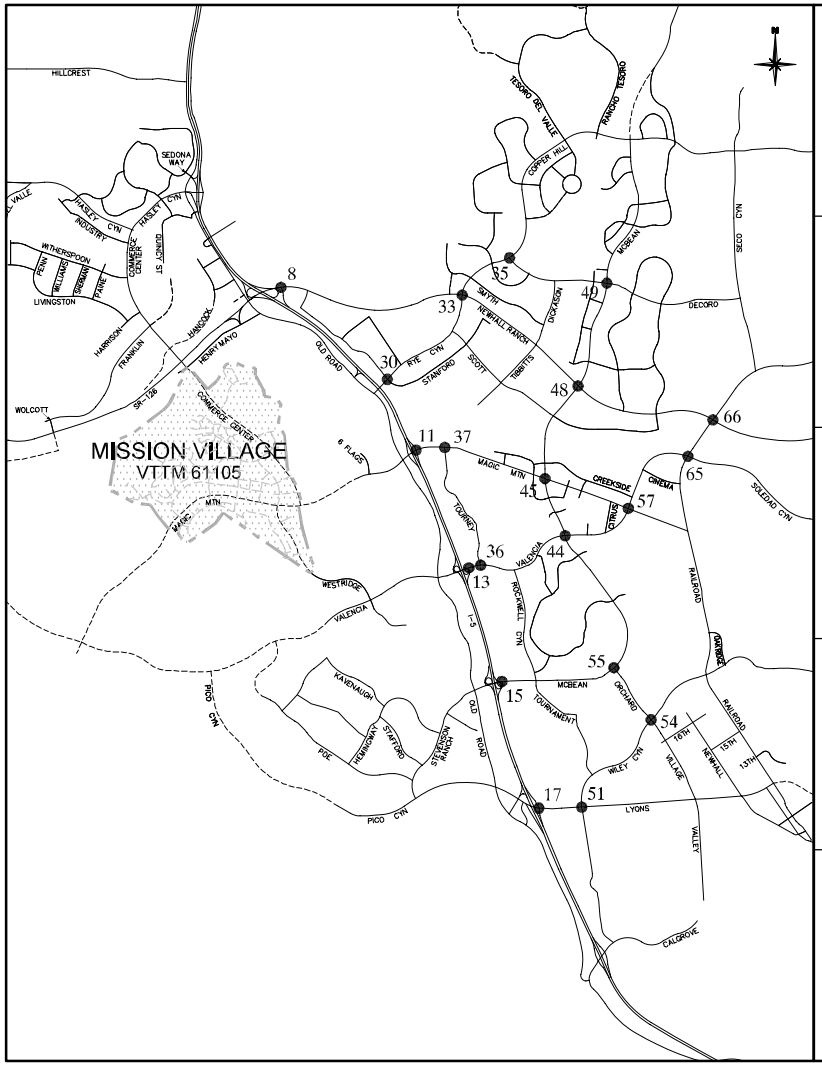


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 3-9

PROJECT ONLY PM PEAK HOUR TURNING MOVEMENT VOLUMES - YEAR 2021 CONDITIONS - OFF-SITE (COUNTY INTERSECTIONS)



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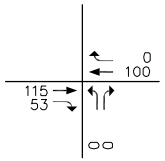

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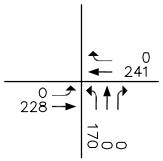

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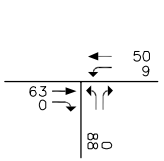

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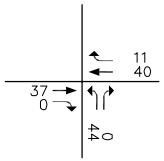

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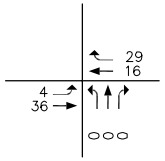

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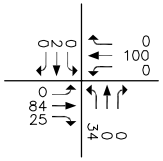

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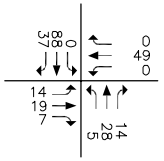

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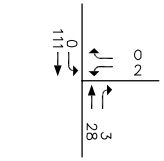

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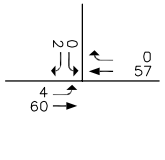

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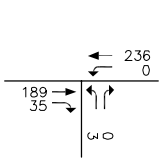

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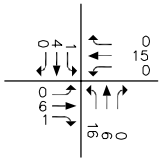

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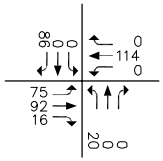

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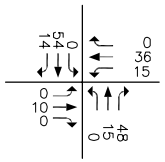

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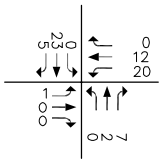

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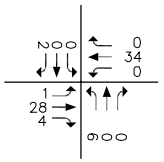

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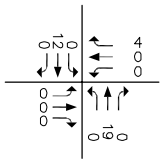

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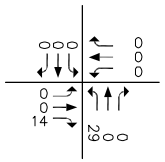

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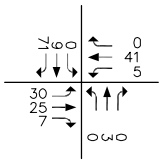

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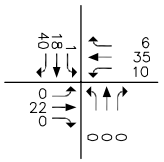

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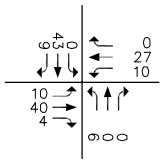
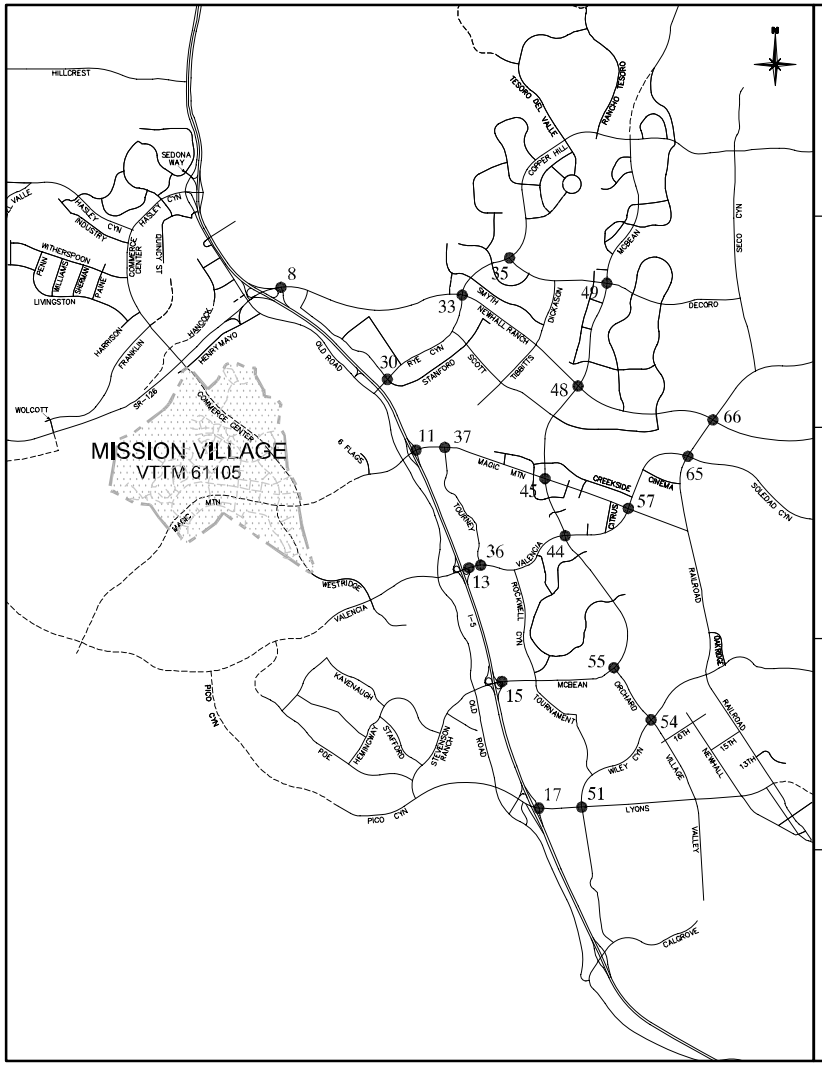


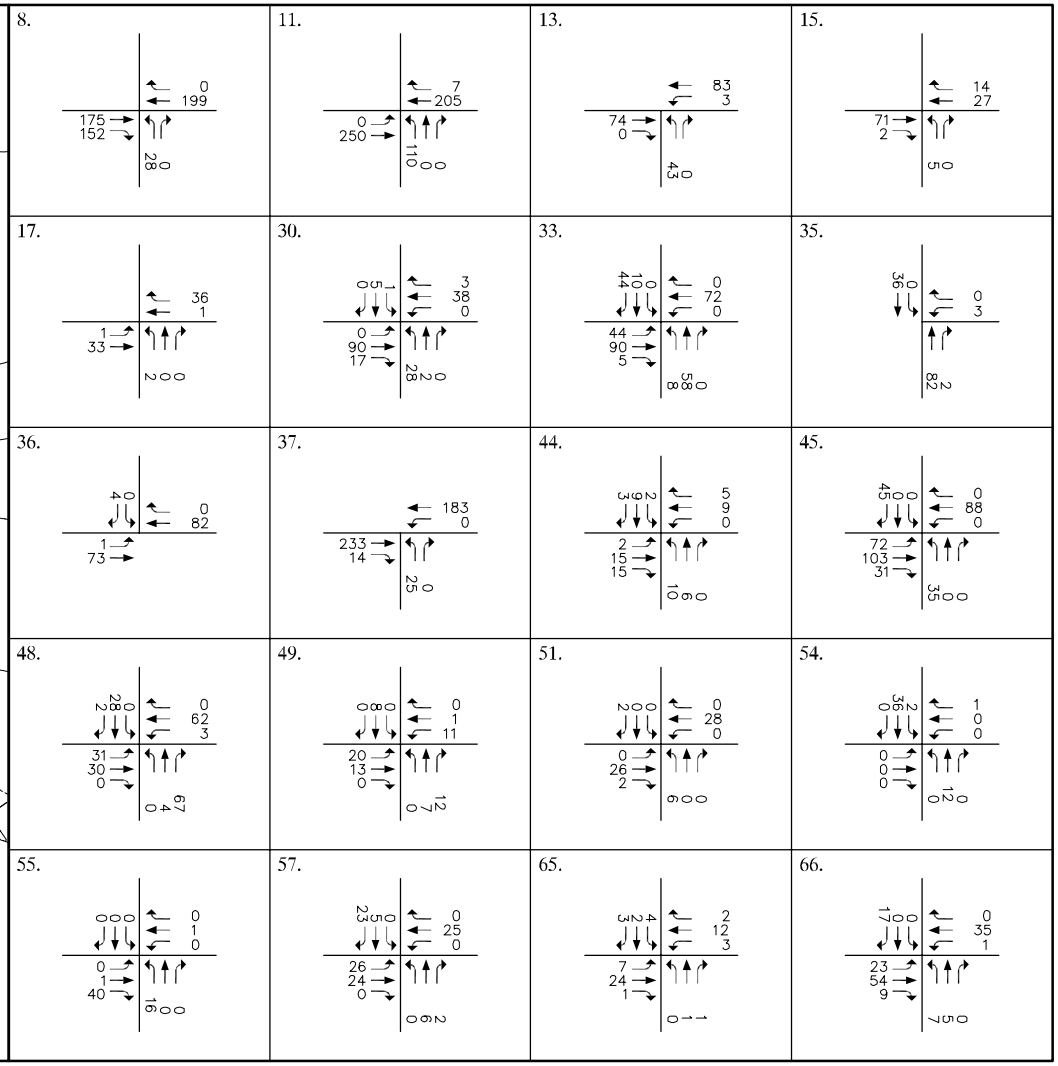
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 3-10

PROJECT ONLY AM PEAK HOUR TURNING MOVEMENT VOLUMES - YEAR 2021 CONDITIONS - OFF-SITE (CITY INTERSECTIONS)



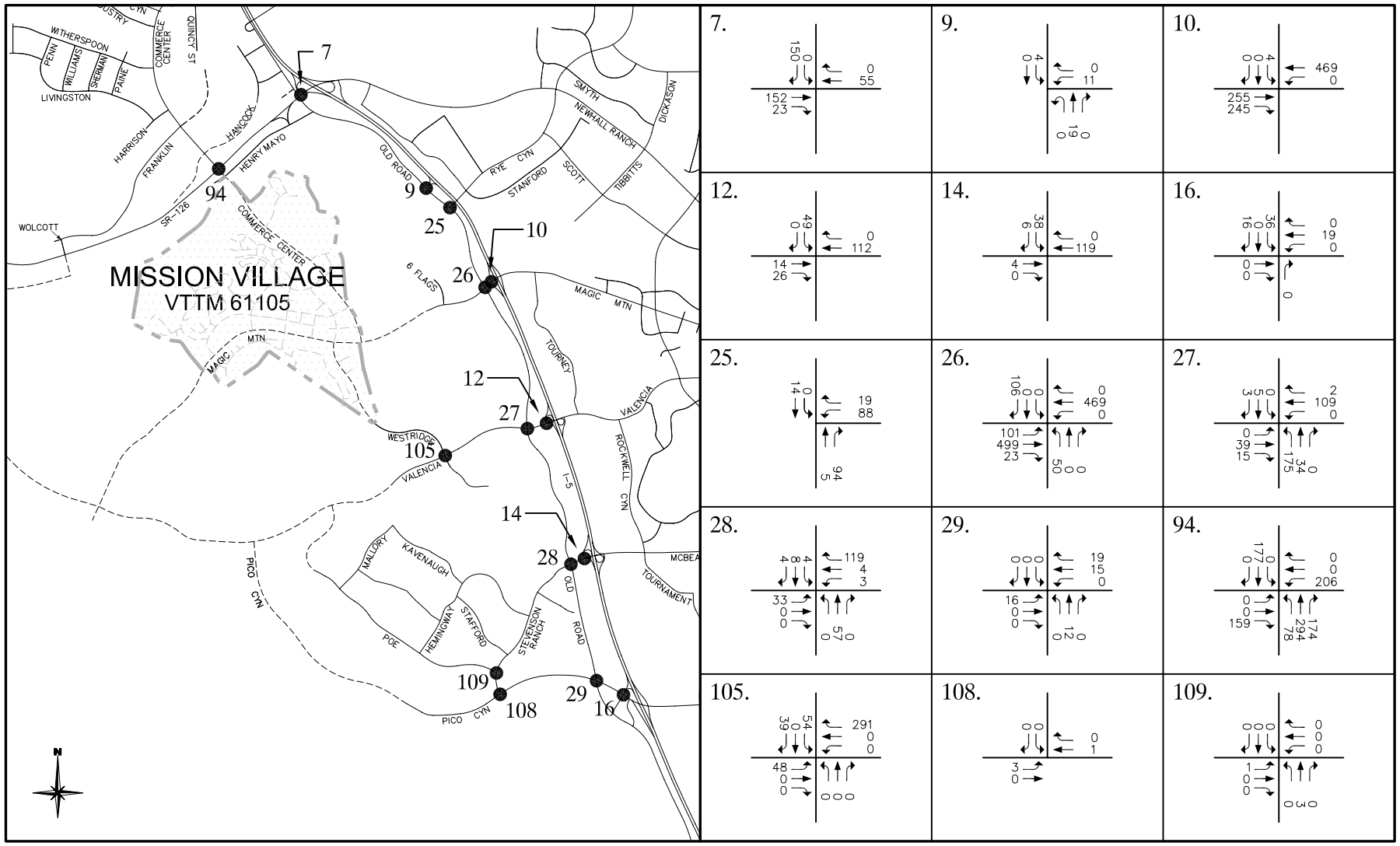


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 3-11

PROJECT ONLY PM PEAK HOUR TURNING MOVEMENT VOLUMES - YEAR 2021 CONDITIONS - OFF-SITE (CITY INTERSECTIONS)

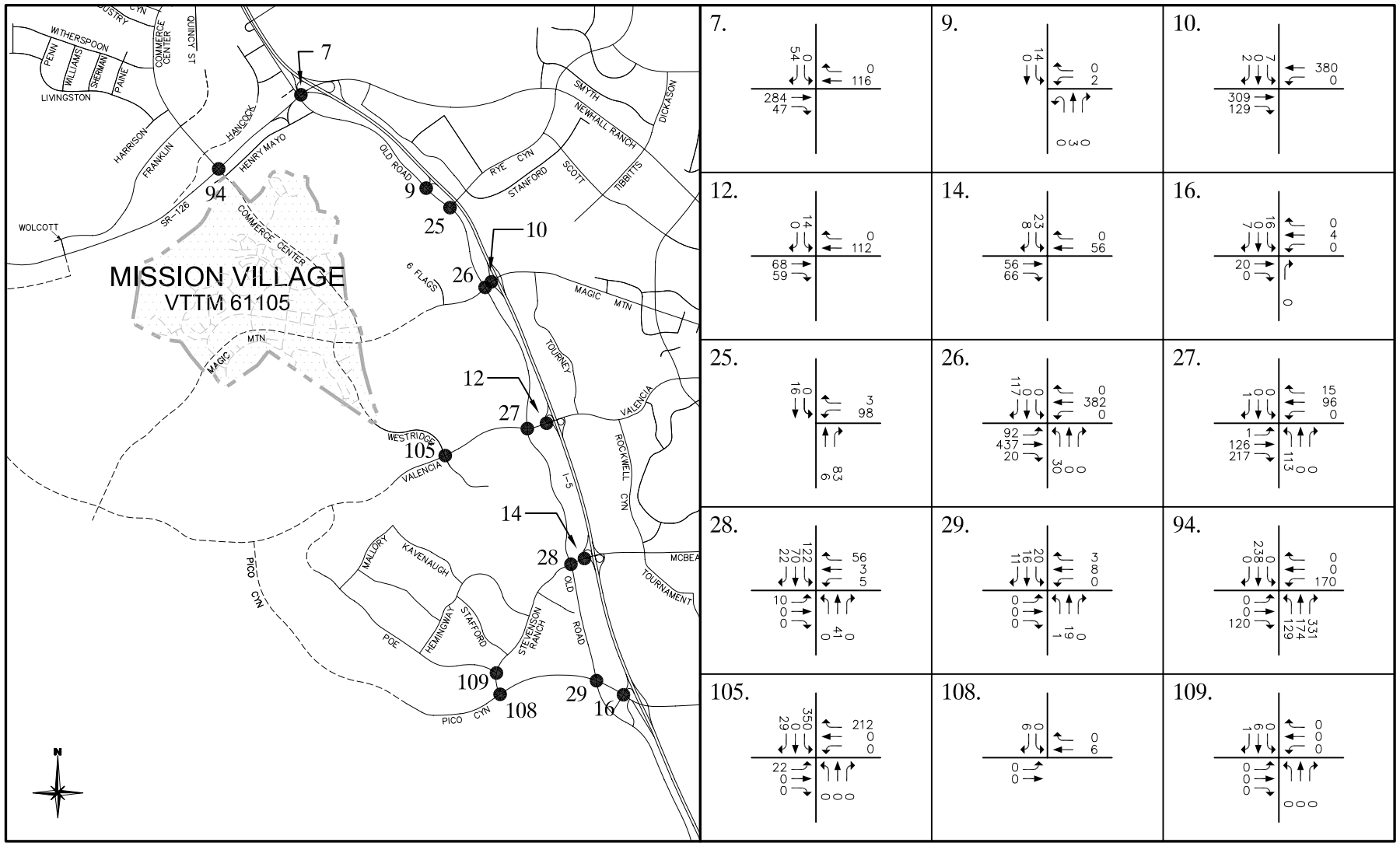


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 3-12

PROJECT ONLY AM PEAK HOUR TURNING MOVEMENT VOLUMES - BUILDOUT CONDITIONS - OFF-SITE (COUNTY INTERSECTIONS)

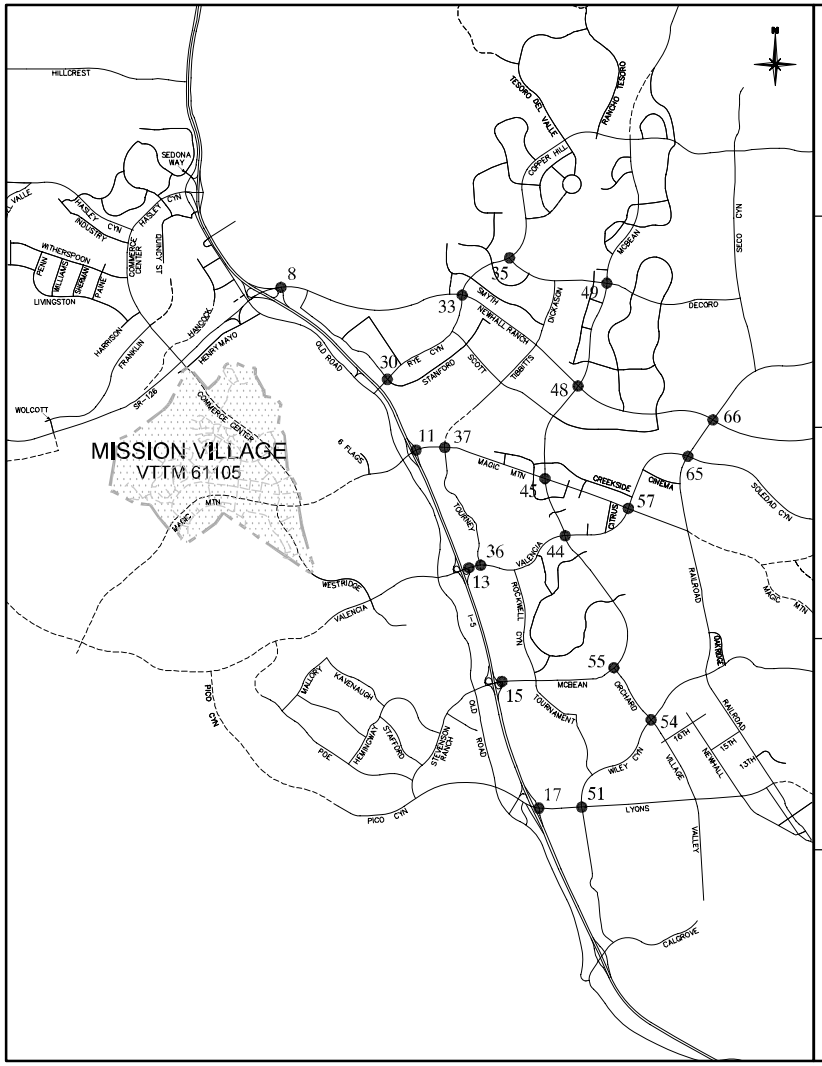


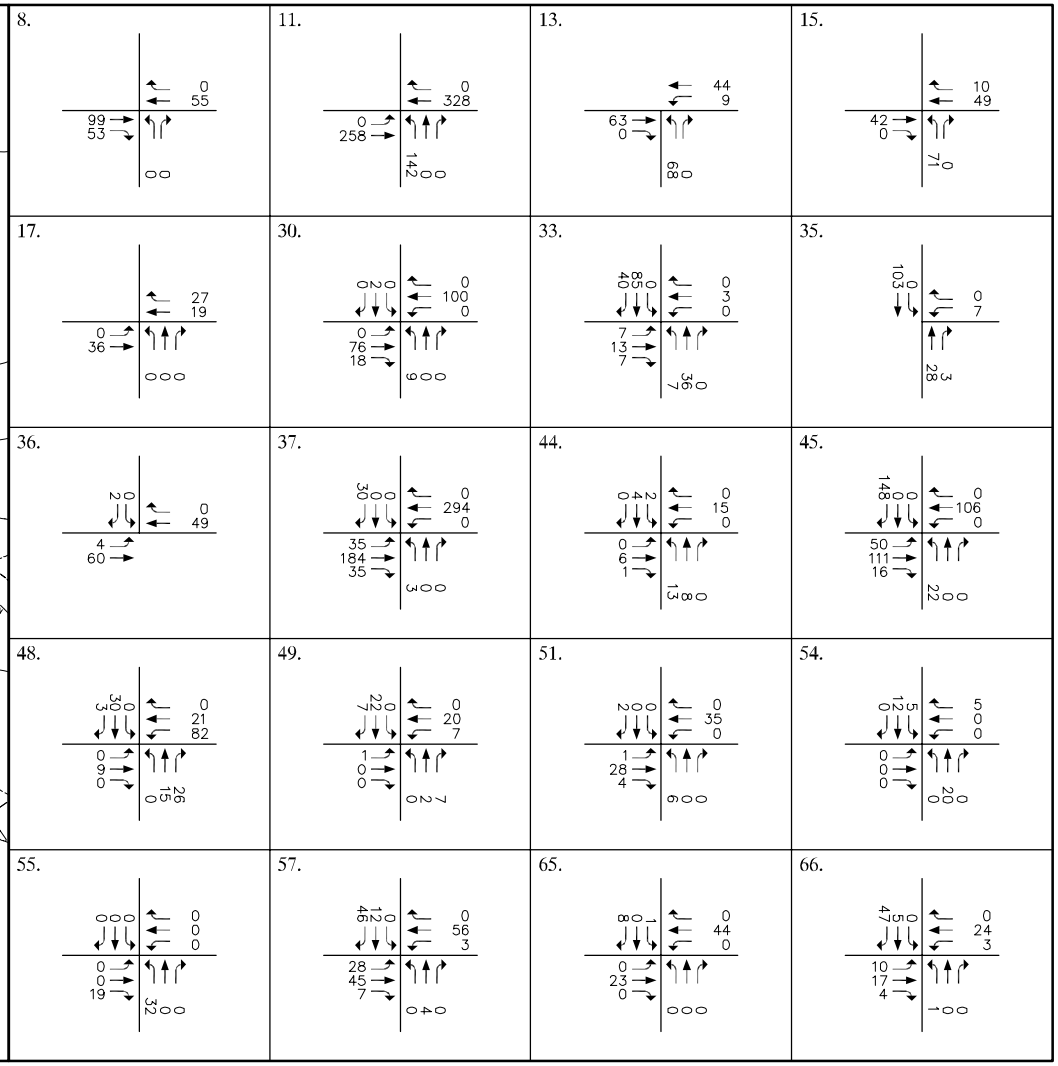
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 3-13

PROJECT ONLY PM PEAK HOUR TURNING MOVEMENT VOLUMES - BUILDOUT CONDITIONS - OFF-SITE (COUNTY INTERSECTIONS)



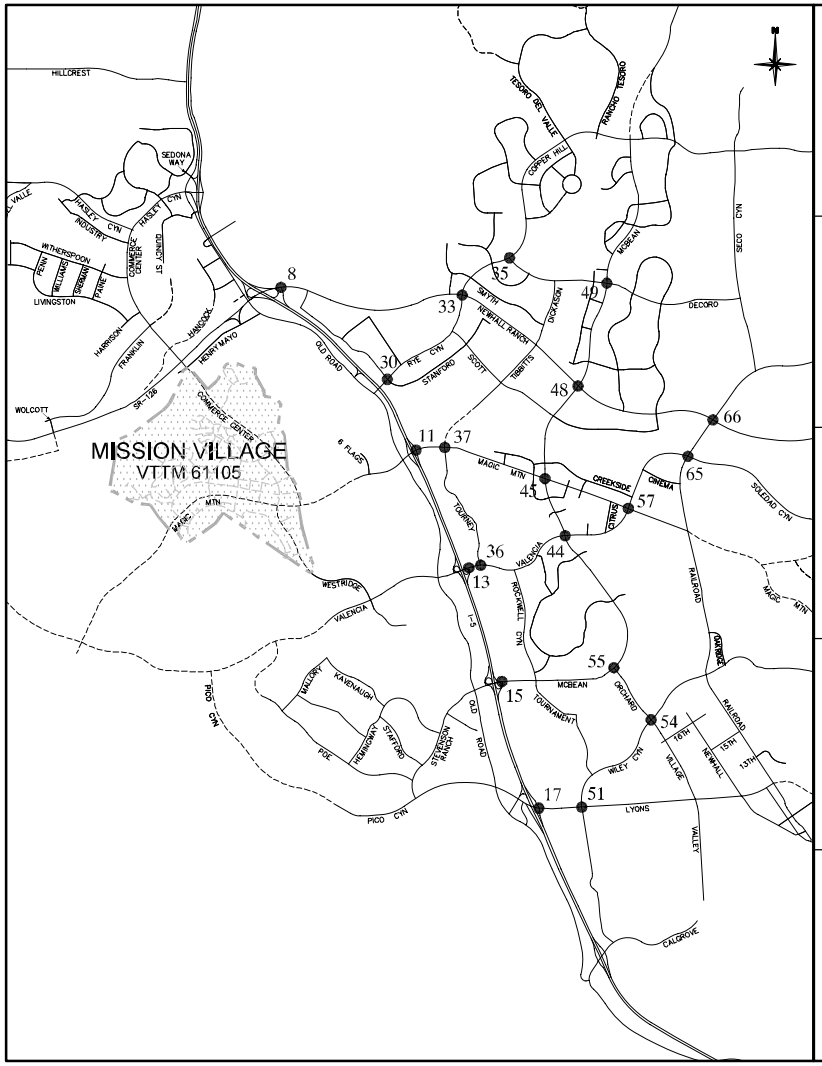


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 3-14

PROJECT ONLY AM PEAK HOUR TURNING MOVEMENT VOLUMES - BUILDOUT CONDITIONS - OFF-SITE (CITY INTERSECTIONS)



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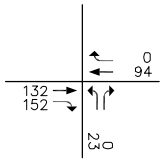

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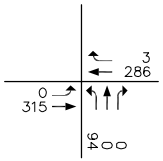

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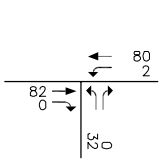

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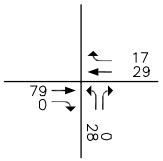

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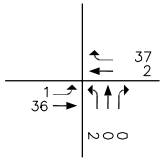

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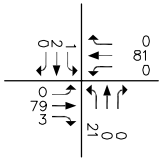

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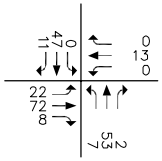

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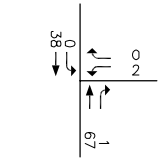

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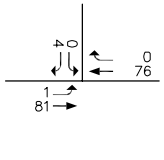

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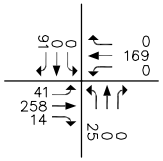

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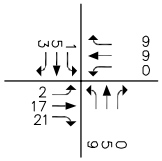

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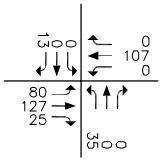

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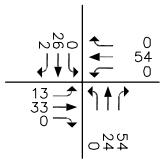

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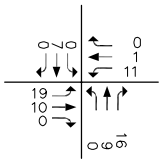

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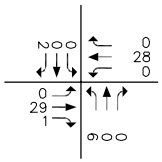

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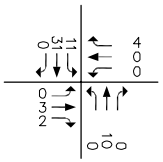

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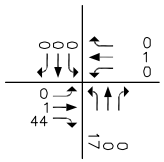

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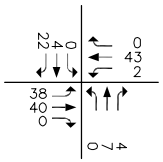

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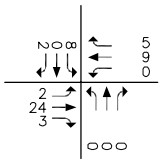

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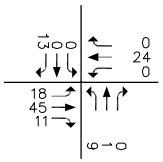


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 3-15

PROJECT ONLY PM PEAK HOUR TURNING MOVEMENT VOLUMES - BUILDOUT CONDITIONS - OFF-SITE (CITY INTERSECTIONS)

Table 3-5: Project Only Peak Hour Volumes - State Highway System (Buildout Conditions)

I-5 Freeway				
	AM Peak Hour		PM Peak Hour	
Segment	**NB**	**SB**	**NB**	**SB**
401. North of Lake Hughes	32	87	66	34
402. Between Lake Hughes & Parker	45	129	112	50
403. Between Parker & Hasley Canyon	53	174	152	72
404. Between Hasley Canyon & SR-126	53	162	152	59
405. Between SR-126 & Rye Canyon	0	33	23	52
406. Between Rye Canyon & Magic Mtn	0	27	23	61
407. Between Magic Mtn & Valencia	142	269	113	183
408. Between Valencia & McBean	200	243	144	227
409. Between McBean & Pico/Lyons	261	201	155	263
410. Between Pico/Lyons & Calgrove	233	150	123	241
411. Between Calgrove & SR-14	217	120	109	225
412. South of SR-14	133	109	90	141
SR-126 Highway				
	AM Peak Hour		PM Peak Hour	
Segment	**EB**	**WB**	**EB**	**WB**
501. Between I-5 and Commerce Center	174	206	331	170
502. West of Commerce Center	154	78	110	129

4.0 IMPACT ANALYSIS

This chapter addresses the traffic impacts of the proposed project. Future conditions with project traffic and with traffic from cumulative projects are described in the following sections, and project impacts and cumulative impacts are identified using the criteria outlined in Chapter 1.0.

4.1 PROJECT IMPACT ANALYSIS

4.1.1 Year 2021 Cumulative Conditions With and Without Project

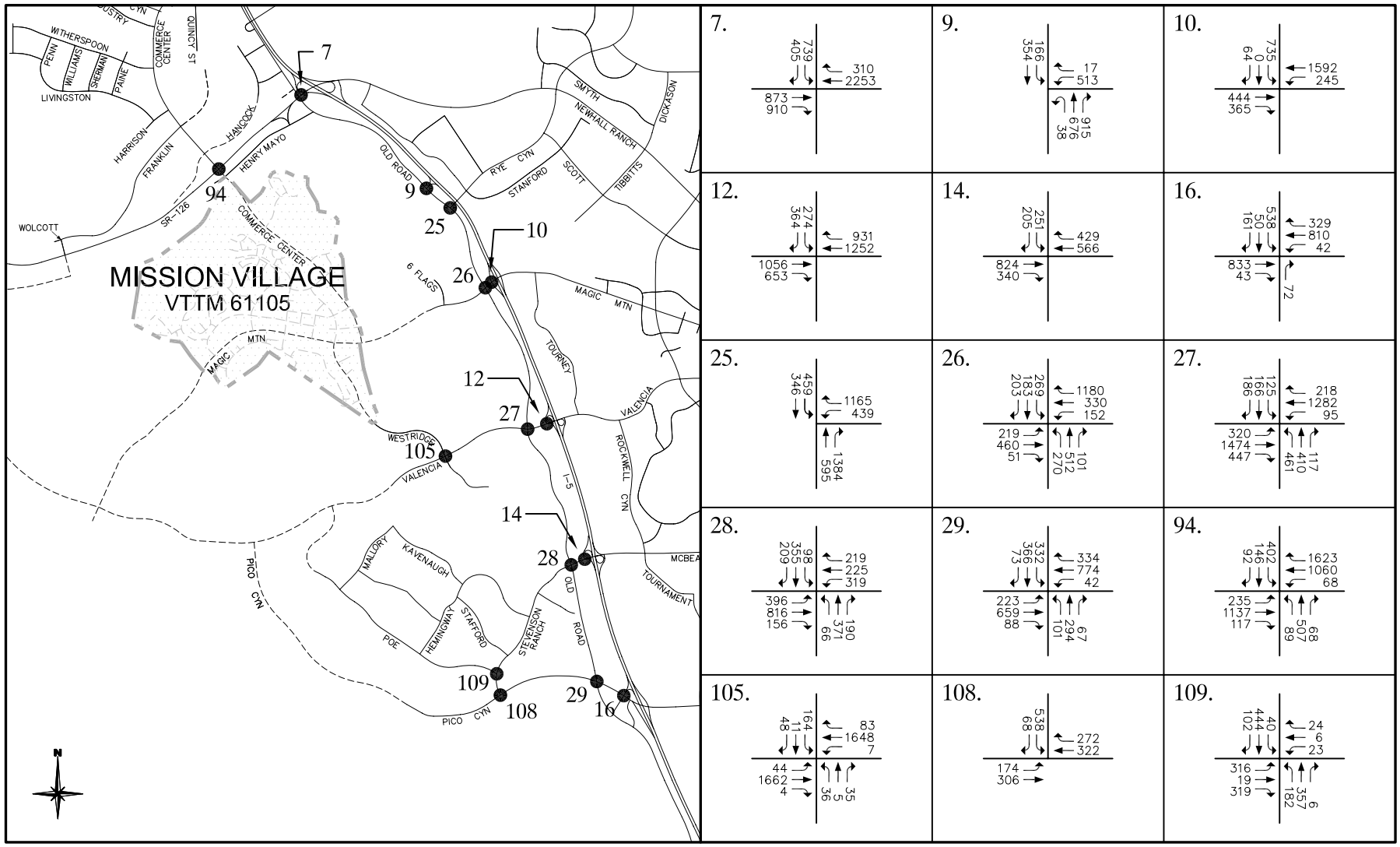
Project occupancies are anticipated to begin in 2014 and reach buildout in 2021. Therefore, a horizon year of 2021 is utilized to evaluate project impacts. Year 2021 cumulative conditions have been derived as previously discussed in Section 2.2.3.

The 2021 no-project cumulative conditions peak hour turning movement volumes are provided in Figure 4-1 and Figure 4-2 for the intersections under the jurisdiction of the County of Los Angeles and in Figure 4-3 and Figure 4-4 for the intersections within the City of Santa Clarita. 2021 with-project traffic volumes are provided in Figure 4-5 and Figure 4-6 for the intersections within the County of Los Angeles and in Figure 4-7 and Figure 4-8 for the intersections within the City of Santa Clarita.

Peak hour ICU values that correspond with the 2021 cumulative conditions traffic forecasts referenced above can be found in Table 4-1, which provides a comparison between the no-project and the with-project conditions. The table indicates that under 2021 cumulative conditions, the following intersections are forecast to be significantly impacted by the project:

7. I-5 SB Ramps & Henry Mayo Drive (SR-126) (Caltrans/County)
12. I-5 SB Ramps & Valencia Boulevard (Caltrans/County)
25. The Old Road & Rye Canyon Road (County)
28. The Old Road & McBean Parkway (County)
45. McBean Parkway & Magic Mountain Parkway (City)
48. McBean Parkway & Newhall Ranch Road (City)
55. Orchard Village Road & McBean Parkway (City)
66. Bouquet Canyon Road & Newhall Ranch Road (City)
94. Commerce Center Drive & SR-126 (Caltrans/County)

Mitigation that addresses the above impacts is presented in Section 4.2.

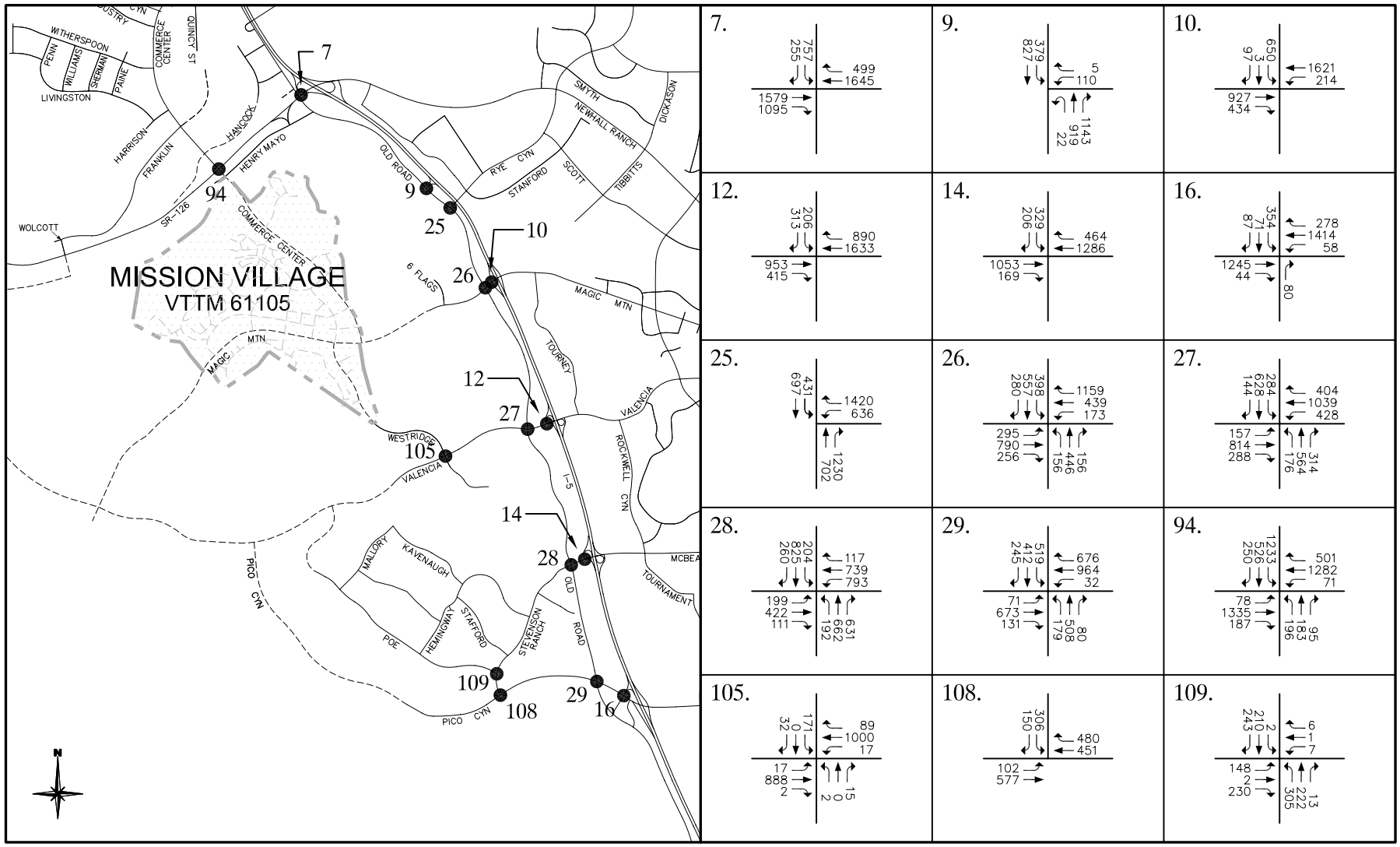


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-1

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE NO-PROJECT CONDITIONS (COUNTY INTERSECTIONS)

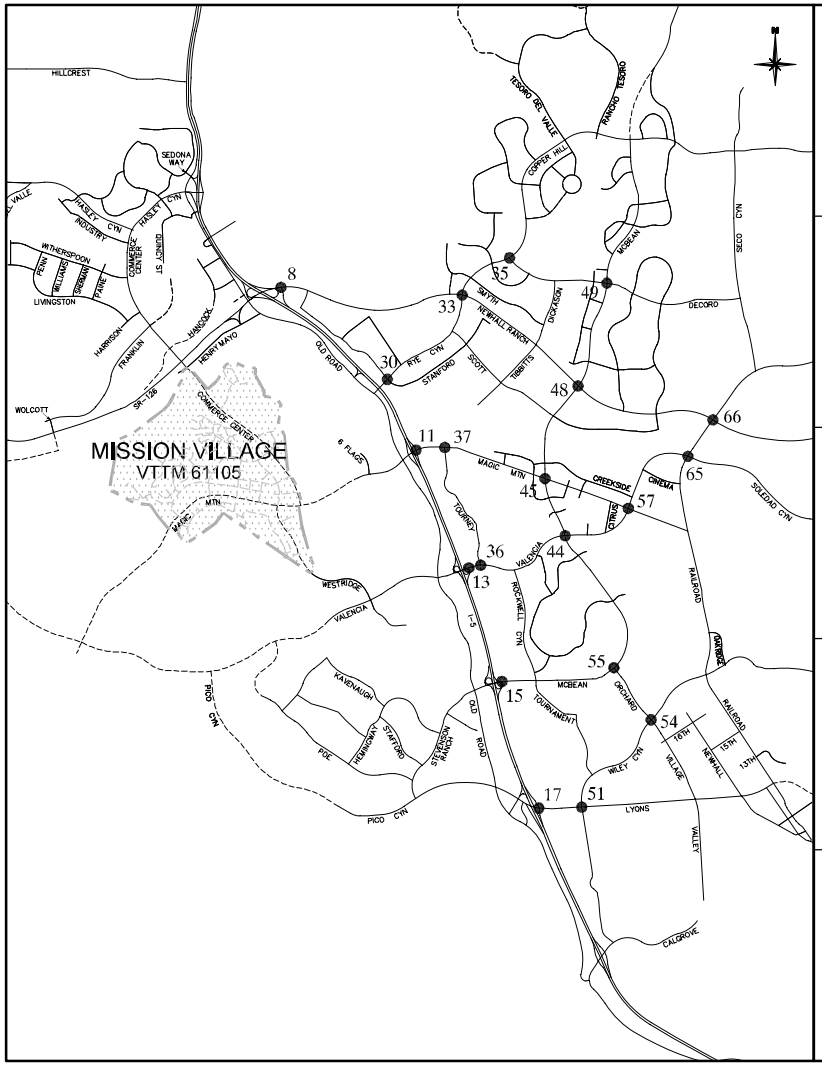


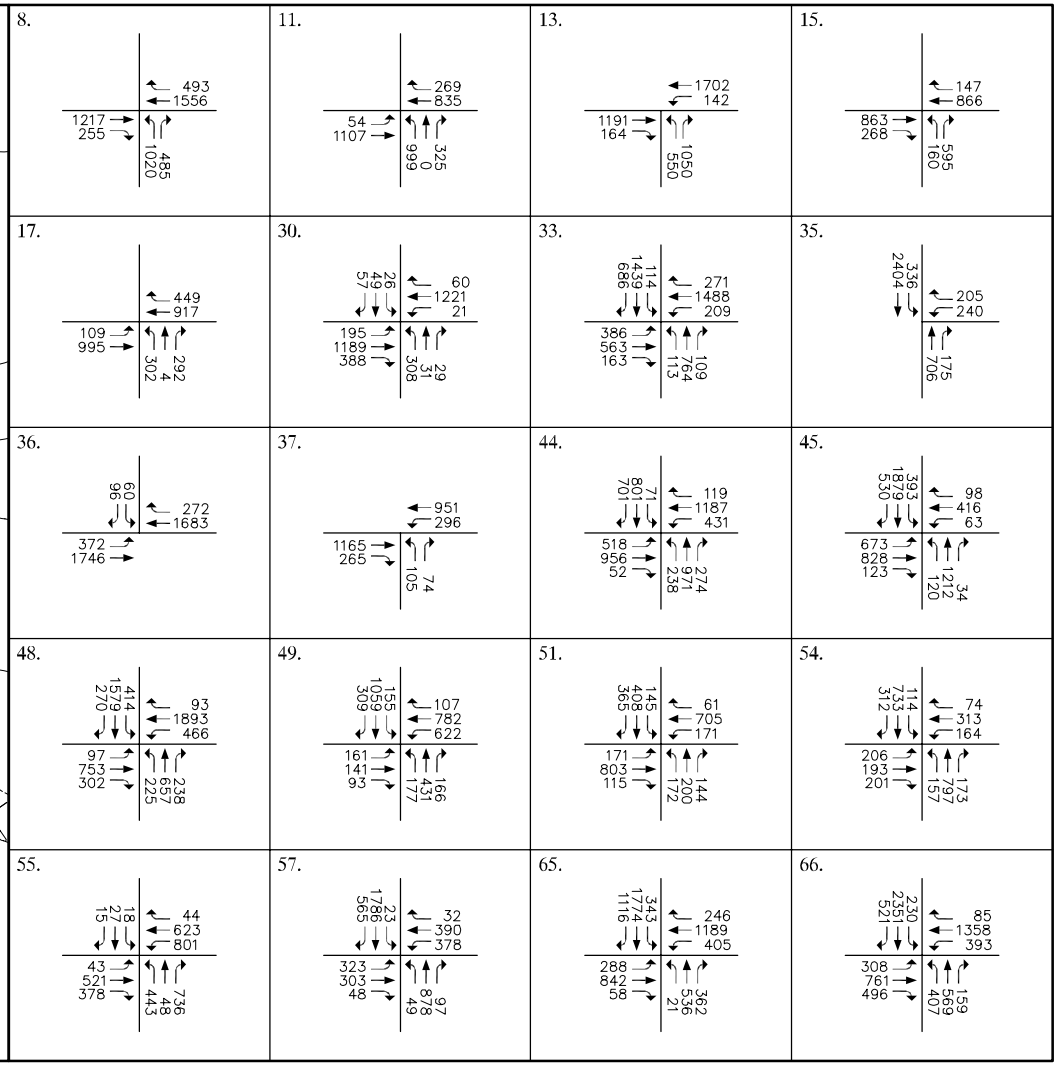
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-2

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE NO-PROJECT CONDITIONS (COUNTY INTERSECTIONS)



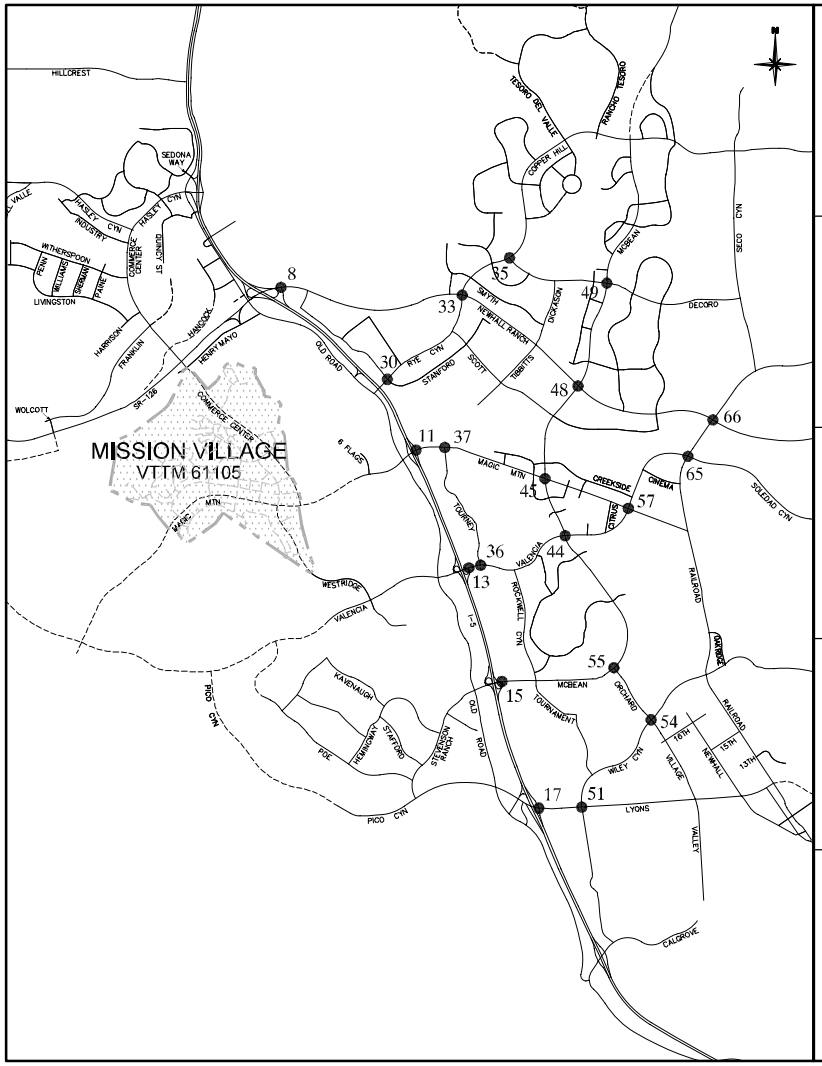


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-3

AM PEAK HOUR TURNING MOVEMENT VOLUMES
- 2021 CUMULATIVE NO-PROJECT CONDITIONS
(CITY INTERSECTIONS)



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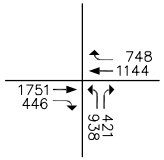

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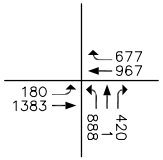

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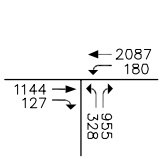

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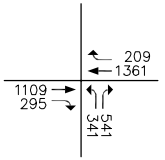

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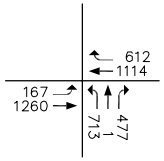

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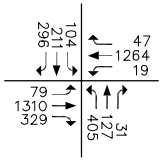

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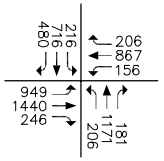

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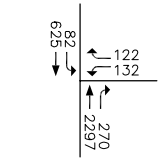

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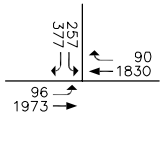

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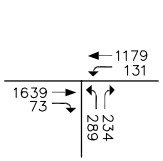

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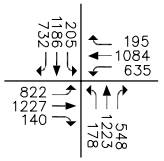

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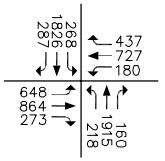

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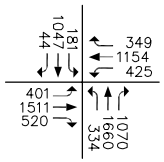

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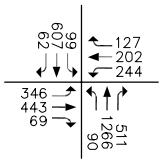

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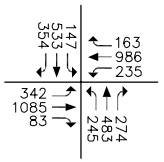

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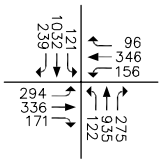

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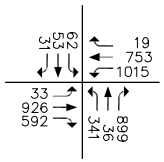

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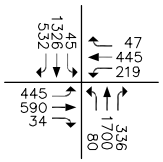

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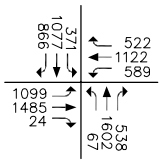

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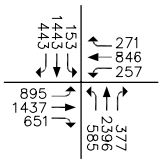
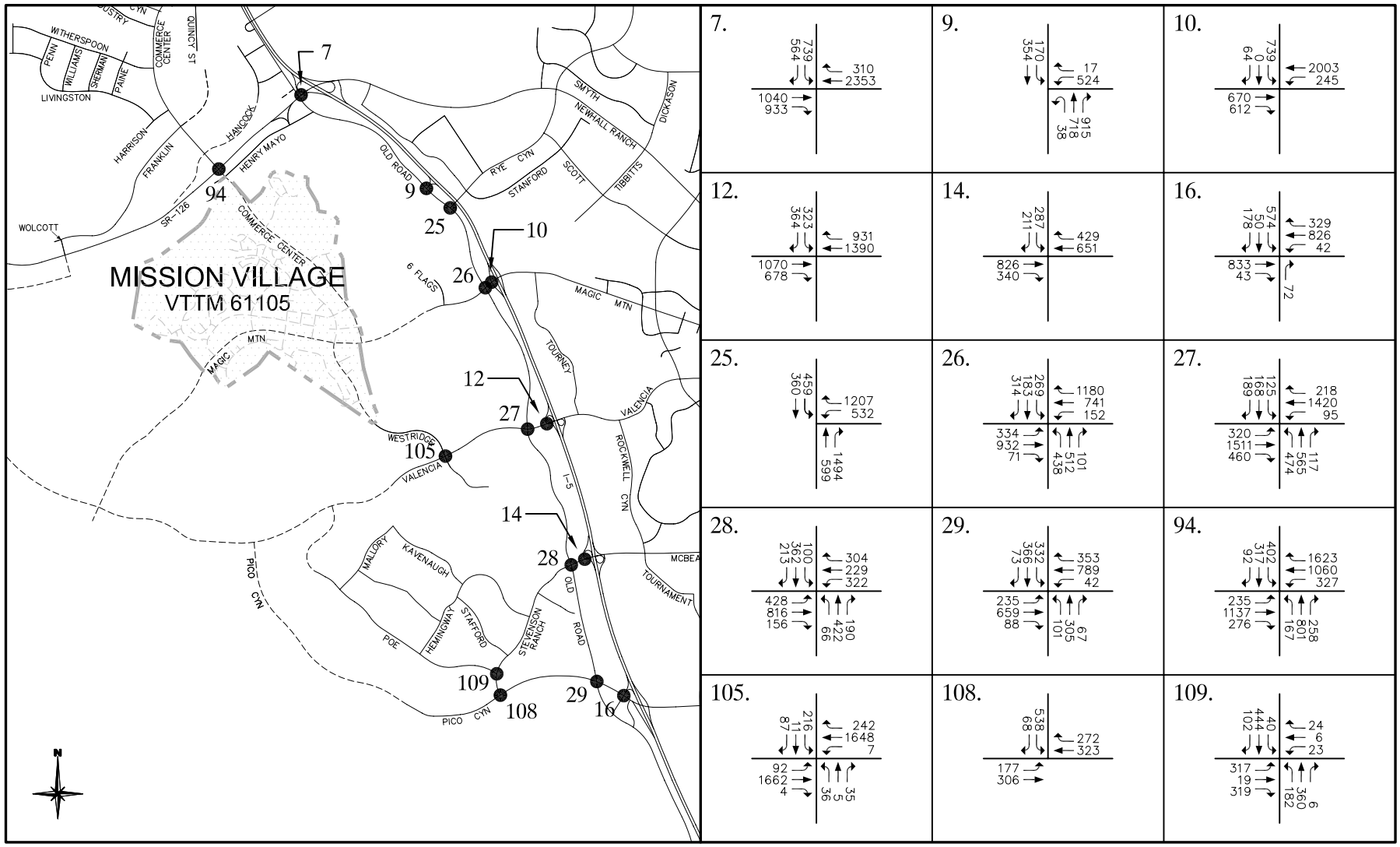


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-4

PM PEAK HOUR TURNING MOVEMENT VOLUMES
- 2021 CUMULATIVE NO-PROJECT CONDITIONS
(CITY INTERSECTIONS)

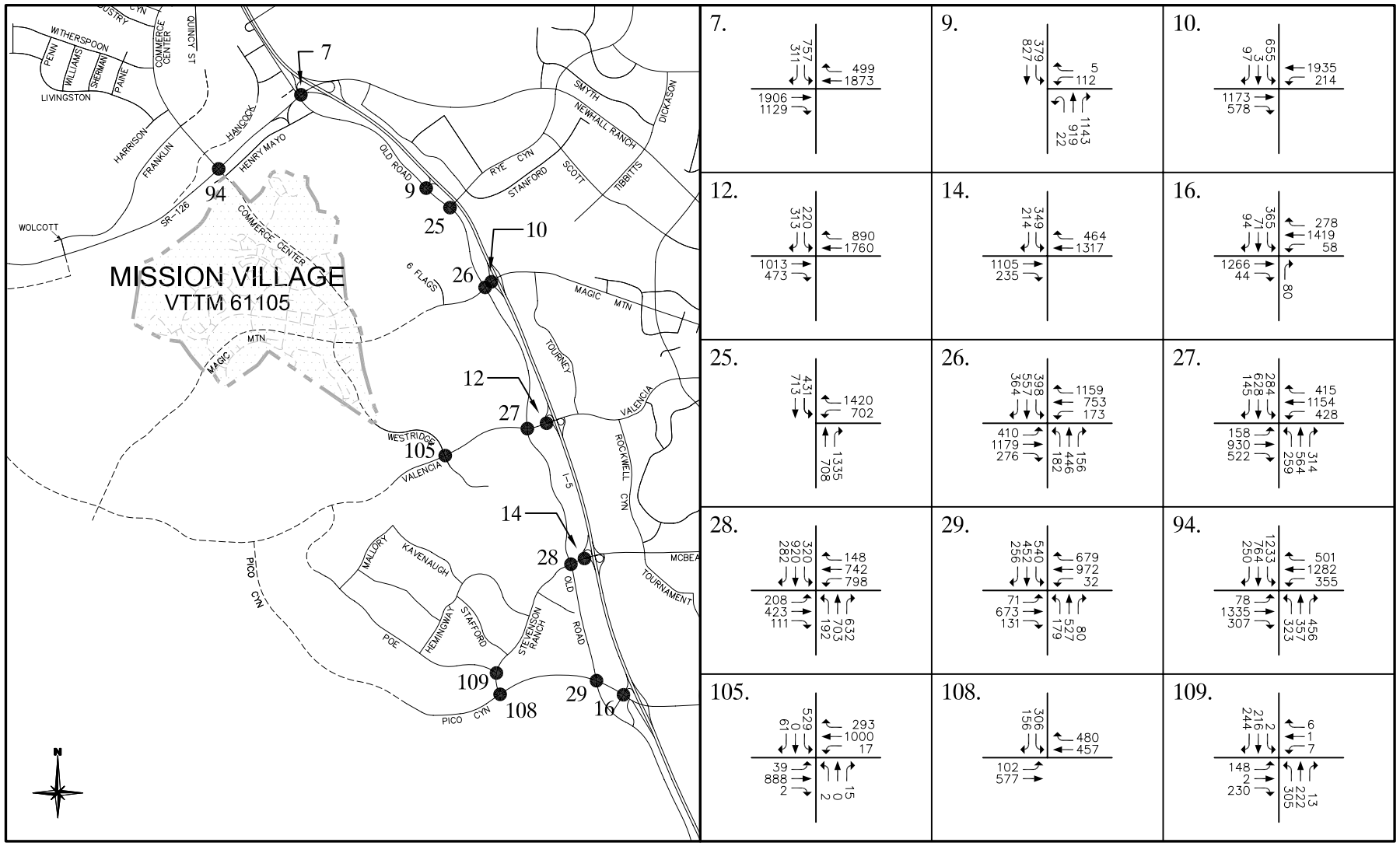


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-5

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE WITH-PROJECT CONDITIONS (COUNTY INTERSECTIONS)

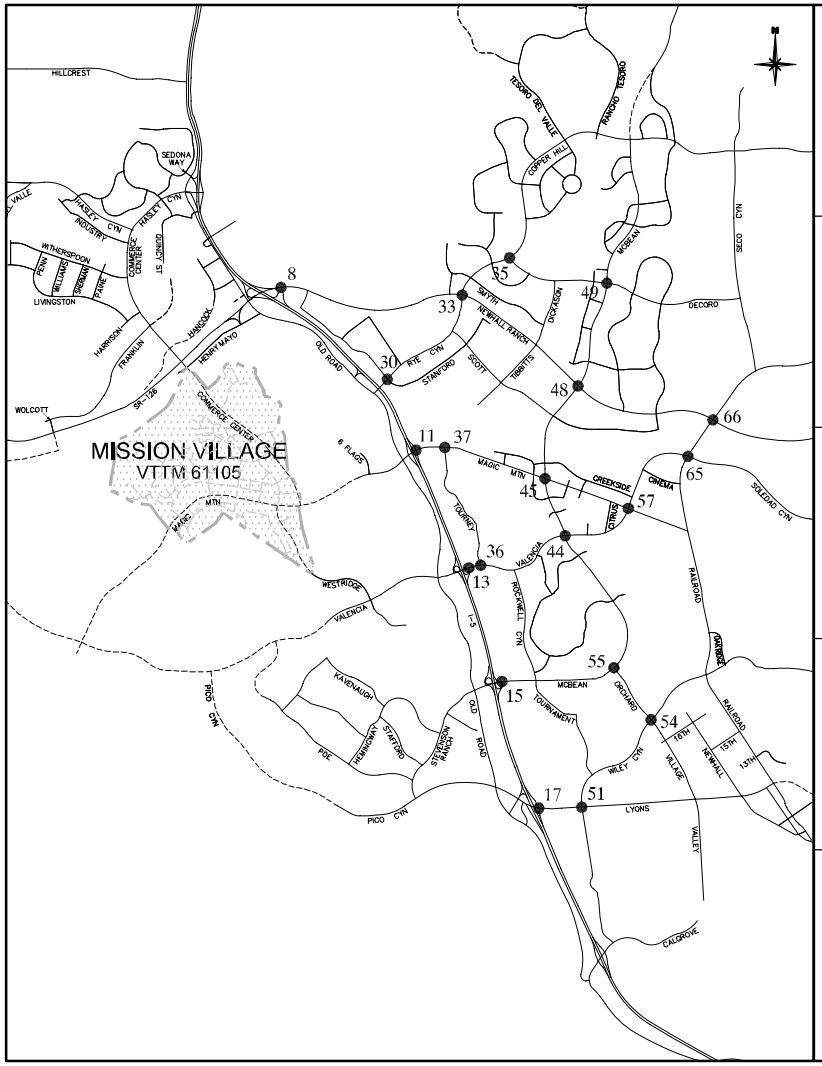


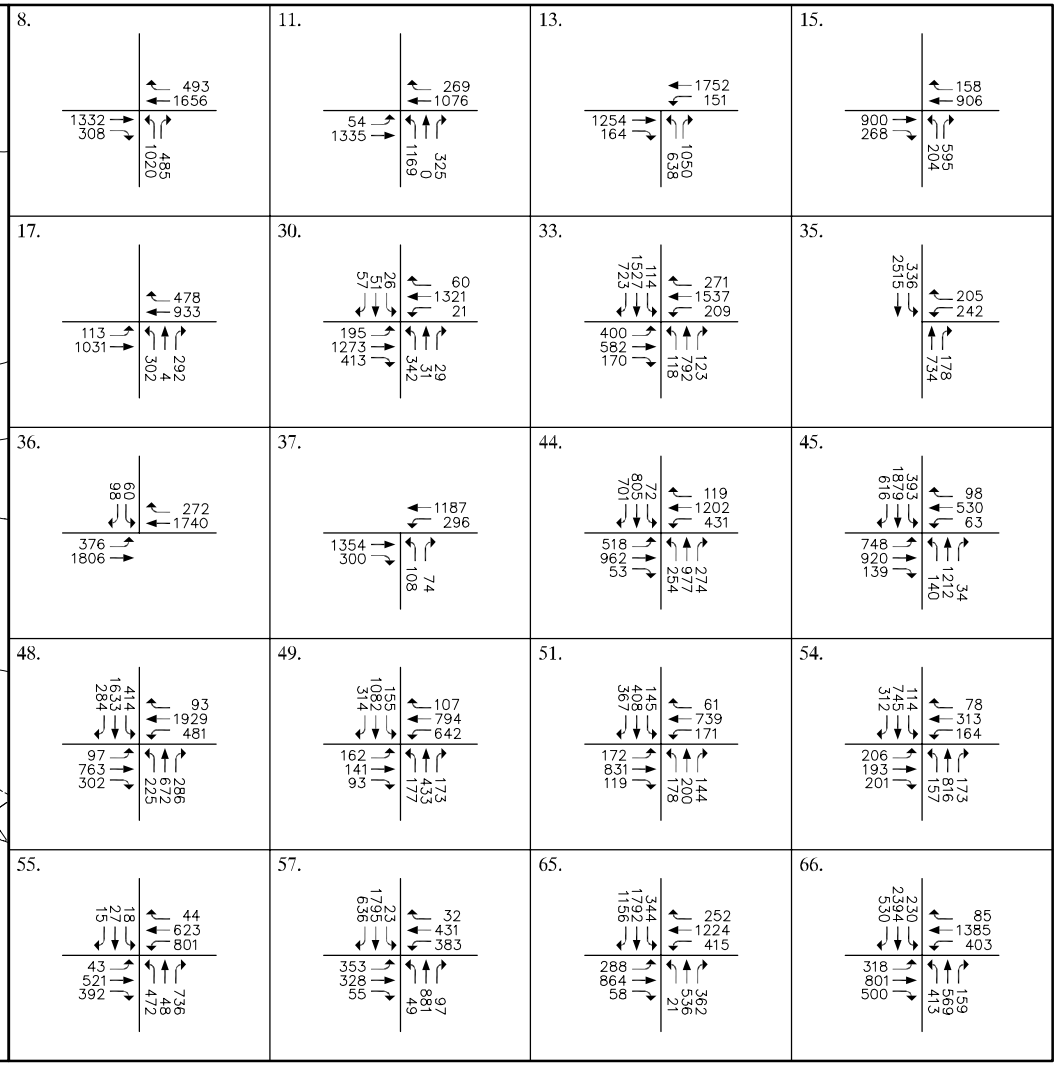
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-6

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE WITH-PROJECT CONDITIONS (COUNTY INTERSECTIONS)



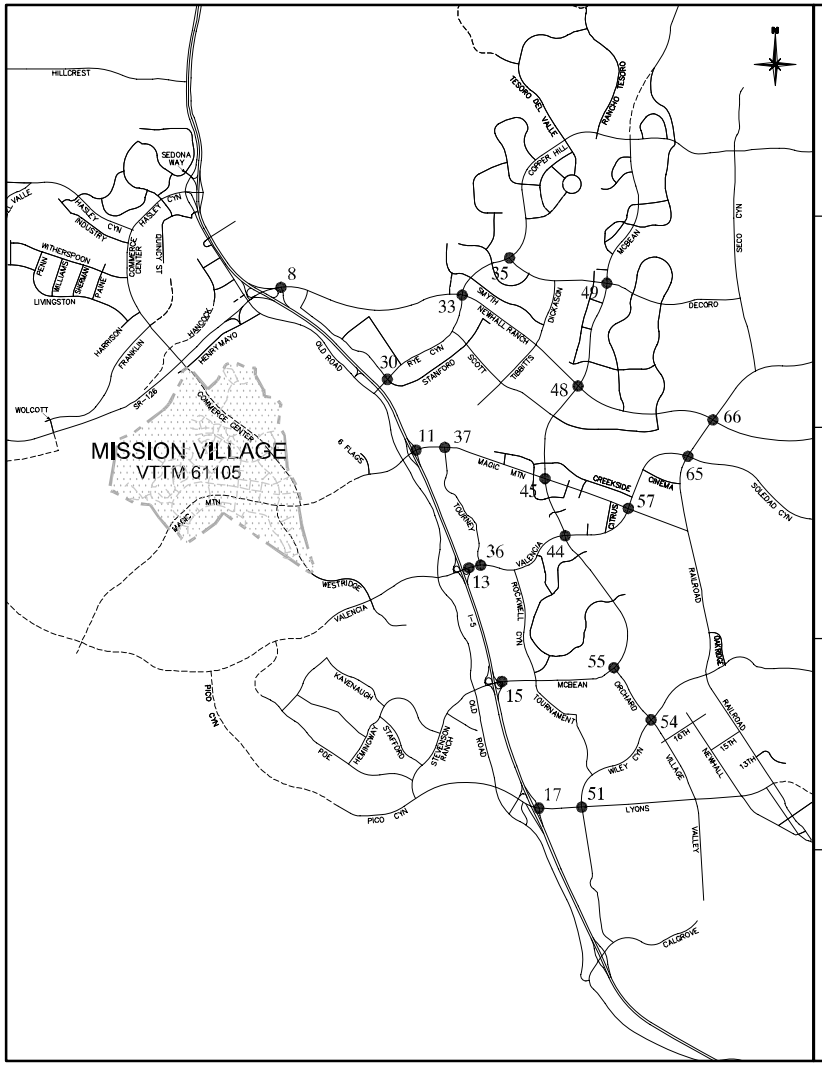


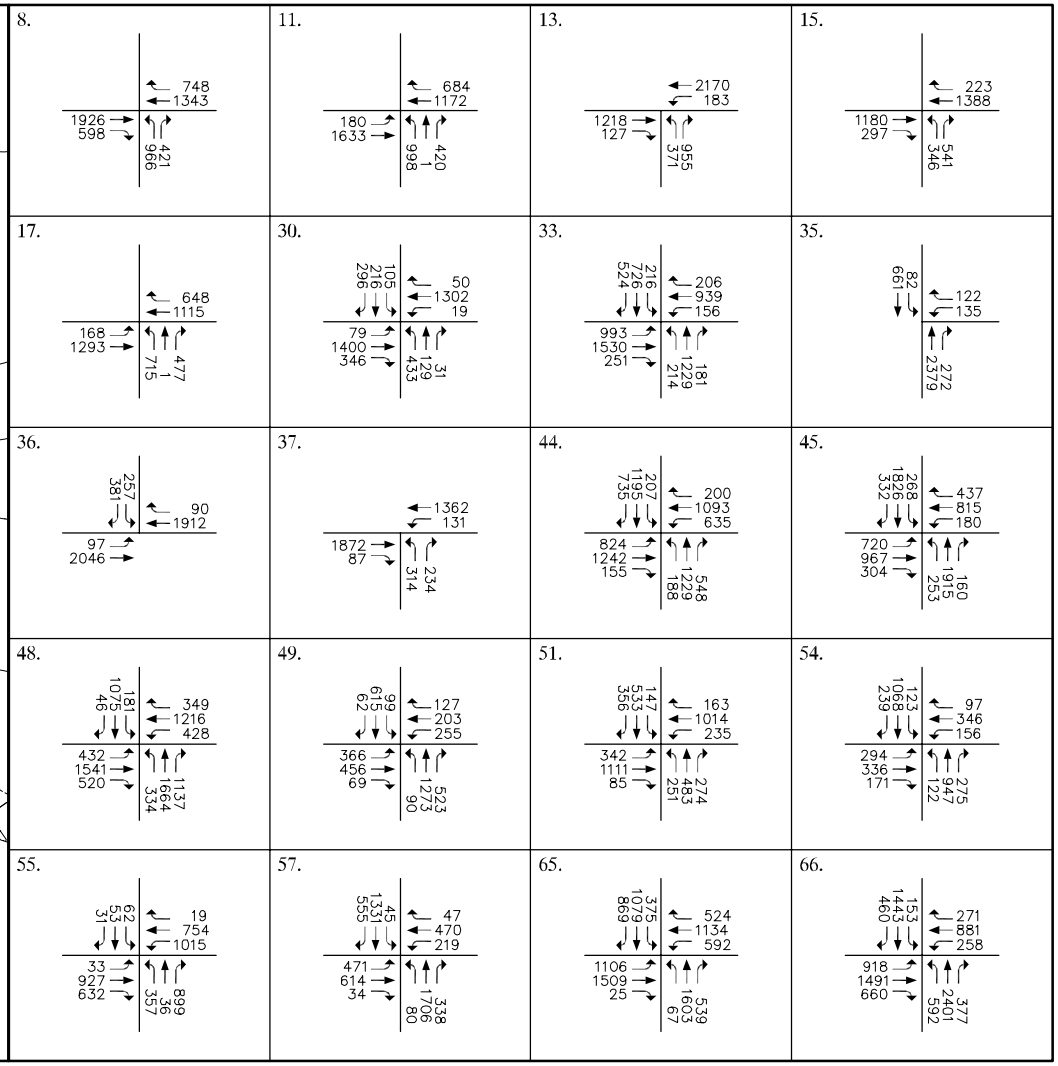
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-7

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE WITH-PROJECT CONDITIONS (CITY INTERSECTIONS)





Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-8

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2021 CUMULATIVE WITH-PROJECT CONDITIONS (CITY INTERSECTIONS)

Table 4-1: ICU and LOS Summary – 2021 Cumulative Conditions with and without Project

	2021 Cumulative without Project				2021 Cumulative with Project					
	AM		PM		AM		PM		Increase	
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.83	D	.70	B	.85	D	.75	C	**.02**	**.05**
9. The Old Road & I-5 SB Ramps	.81	D	1.06	F	.82	D	1.06	F	.01	.00
10. I-5 SB Ramps & Magic Mountain Parkway	.58	A	.56	B	.64	B	.62	B	.06	.06
12. I-5 SB Ramps & Valencia Boulevard	.72	C	.81	D	.76	C	.85	D	**.04**	**.04**
14. I-5 SB Ramps & McBean Parkway	.52	A	.71	C	.54	A	.73	C	.02	.02
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.61	B	.69	B	.62	B	.71	C	.01	.02
Freeway Ramp Intersections (City)										
8. I-5 NB Ramps & Henry Mayo Drive (SR-126)	.59	A	.59	A	.61	B	.62	B	.02	.03
11. I-5 NB Ramps & Magic Mountain Parkway	.60	A	.61	B	.68	B	.70	B	.08	.09
13. I-5 NB Ramps & Valencia Boulevard	.67	B	.62	B	.68	B	.64	B	.01	.02
15. I-5 NB Ramps & McBean Parkway	.52	A	.57	A	.53	A	.59	A	.01	.02
17. I-5 NB On/Off & Lyons Avenue	.51	A	.75	C	.52	A	.77	C	.01	.02
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.03	F	1.21	F	1.09	F	1.25	F	**.06**	**.04**
26. The Old Road & Magic Mountain Parkway	.43	A	.51	A	.60	A	.59	A	.17	.08
27. The Old Road & Valencia Boulevard	.68	B	.60	A	.71	C	.73	C	.03	.13
28. The Old Road & McBean Parkway	.53	A	.85	D	.54	A	.88	D	.01	**.03**
29. The Old Road & Pico Canyon Road	.71	C	.80	C	.74	C	.82	D	.03	.02
94. Commerce Center Drive & SR-126	1.04	F	1.17	F	1.44	F	1.53	F	**.40**	**.36**
105. Westridge Parkway & Valencia Boulevard	.53	A	.38	A	.58	A	.51	A	.05	.13
108. Stevenson Ranch Parkway & Pico Canyon Road	.60	A	.55	A	.60	A	.56	A	.00	.01
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.57	A	.46	A	.57	A	.46	A	.00	.00
City Arterial Intersections										
30. Avenue Stanford & Rye Canyon Road	.57	A	.66	B	.60	A	.68	B	.03	.02
33. Copper Hill Drive & Newhall Ranch Road	.72	C	.77	C	.75	C	.80	C	.03	.03

(Continued)

Table 4-1: ICU and LOS Summary – 2021 Cumulative Conditions with and without Project (Continued)

	2021 Cumulative without Project				2021 Cumulative with Project					
	AM		PM		AM		PM		Increase	
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
City Arterial Intersections										
35. Copper Hill Drive & Decoro Drive	.63	B	.63	B	.65	B	.64	B	.02	.01
36. Tourney Road & Valencia Boulevard	.51	A	.60	A	.52	A	.62	B	.01	.02
37. Tourney Road & Magic Mountain Parkway	.52	A	.56	A	.56	A	.62	B	.04	.06
44. McBean Parkway & Valencia Boulevard	.70	B	.83	D	.70	B	.84	D	.00	.01
45. McBean Parkway & Magic Mountain Parkway	.71	C	.92	E	.75	C	.94	E	.04	**.02**
48. McBean Parkway & Newhall Ranch Road	.78	C	1.01	F	.79	C	1.05	F	.01	**.04**
49. McBean Parkway & Decoro Drive	.70	B	.60	A	.72	C	.61	B	.02	.01
51. Wiley Canyon Road & Lyons Avenue	.65	B	.83	D	.66	B	.84	D	.01	.01
54. Orchard Village Road & Wiley Canyon Road	.65	B	.75	C	.65	B	.75	C	.00	.00
55. Orchard Village Road & McBean Parkway	.65	B	.83	D	.66	B	.85	D	.01	**.02**
57. Valencia Boulevard & Magic Mountain Parkway	.79	C	.83	D	.80	C	.84	D	.01	.01
65. Bouquet Canyon Road & Soledad Canyon Road	.79	C	.91	E	.80	C	.91	E	.01	.00
66. Bouquet Canyon Road & Newhall Ranch Road	.89	D	1.01	F	.91	E	1.03	F	**.02**	**.02**

Bold = Significant Impact (See criteria in Table 1-4)

Level of service ranges:						
	.00 - .60	A	.71 - .80	C	.91 – 1.00	E
	.61 - .70	B	.81 - .90	D	Above 1.00	F

4.1.2 Existing plus Ambient Growth Conditions With and Without Project

As noted above, project occupancies are anticipated to begin in 2014 and reach buildout in 2021. Therefore, in accordance with the County of Los Angeles Traffic Study Guidelines, a 2021 horizon has been derived based on an average annual growth rate. A 2.0 percent per year ambient growth rate was specified by the County of Los Angeles Department of Public Works to represent growth that would occur absent any other cumulative developments, for a total ambient growth (i.e., growth not including cumulative development) of 24 percent between the 2009 traffic counts and the year 2021. Note that the purpose of this scenario is to evaluate the impacts of the project in a setting that does not include the

traffic from other future developments, hence the use of this ambient growth factor. Future conditions inclusive of traffic generated by other future cumulative development projects are provided in Sections 4.1.1 and 4.3.

A 2.0 percent annual growth rate was not used to estimate traffic into and out of the Commerce Center area since development in that area is currently capped at 9.3 million square feet until the Commerce Center Drive/SR-126 interchange is constructed. For the intersection of Commerce Center Drive at SR-126 only, Public Works staff determined that the ambient growth into the Commerce Center area during the AM peak hour and out of the Commerce Center area during the PM peak hour shall be determined based on the specific volume of traffic allowed to occur prior to reaching the existing cap on development. All other traffic movements through the intersection are evaluated based on the standard 2.0 percent annual growth rate.

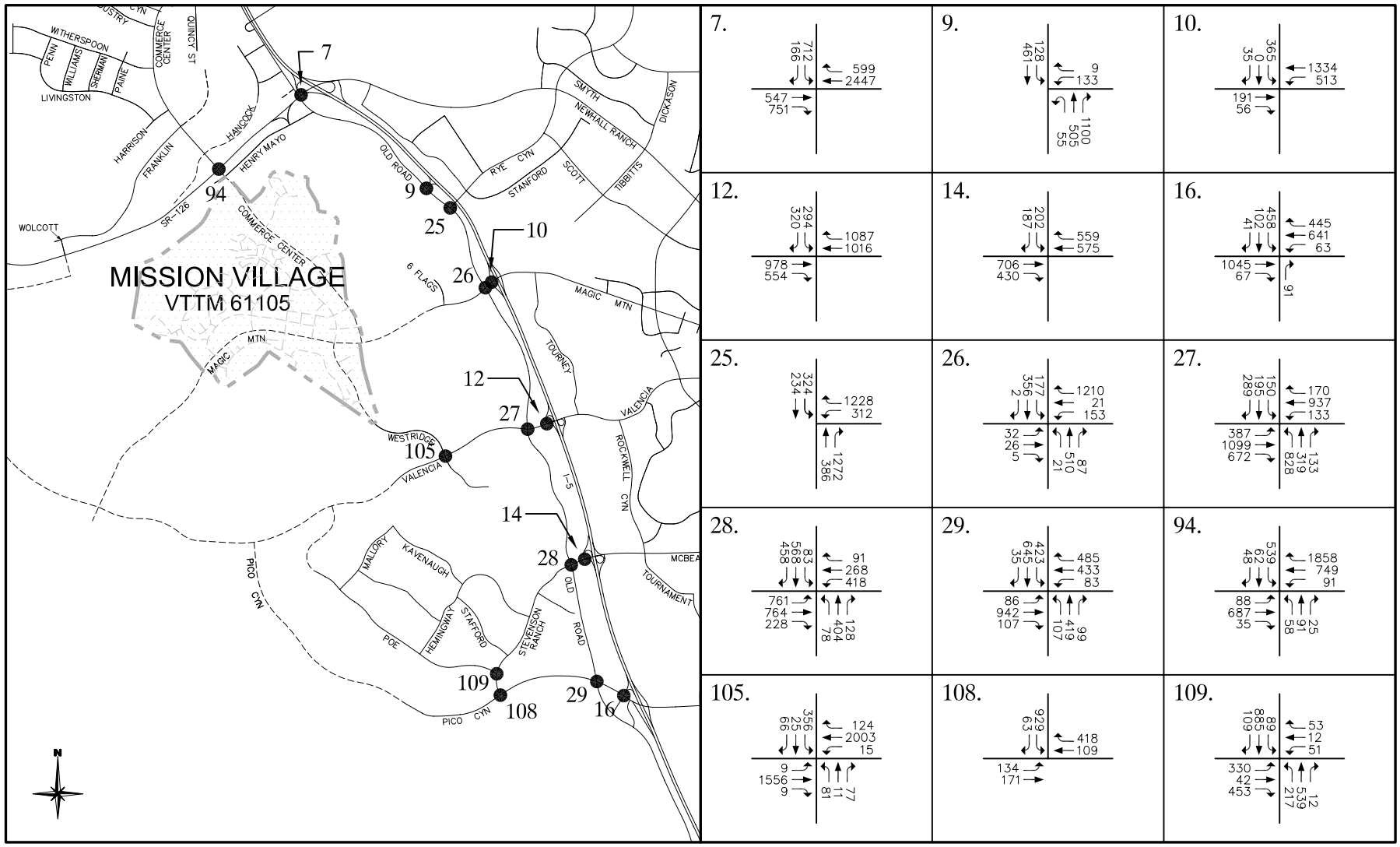
The existing conditions plus ambient growth (2021 no-project) peak hour turning movement volumes are provided in Figure 4-9 and Figure 4-10 for the intersections under the jurisdiction of the County of Los Angeles. As noted previously, the City of Santa Clarita does not consider this hypothetical scenario for impacts within the City.

As described in Chapter 3.0, the project includes construction of the extensions of Commerce Center Drive, Westridge Parkway, and Magic Mountain Parkway. In addition to carrying project traffic, these roadways will result in a redistribution of existing traffic volumes by providing new routes for north/south and east/west travel. Traffic forecasts for existing plus ambient plus project conditions reflect the redistribution of non-project traffic to these new roadways.

The existing plus ambient plus project peak hour turning movement volumes are provided in Figure 4-11 and Figure 4-12. The corresponding peak hour ICU values can be found in Table 4-2, which provides a comparison between the no-project and the with-project conditions. Consistent with the County's traffic study guidelines, project impacts are determined based on this scenario. The table shows the following County intersections to be significantly impacted by the proposed project:

28. The Old Road & McBean Parkway (County)
94. Commerce Center Drive & SR-126 (Caltrans/County)

Mitigation that addresses the above impacts is presented in Section 4.2.

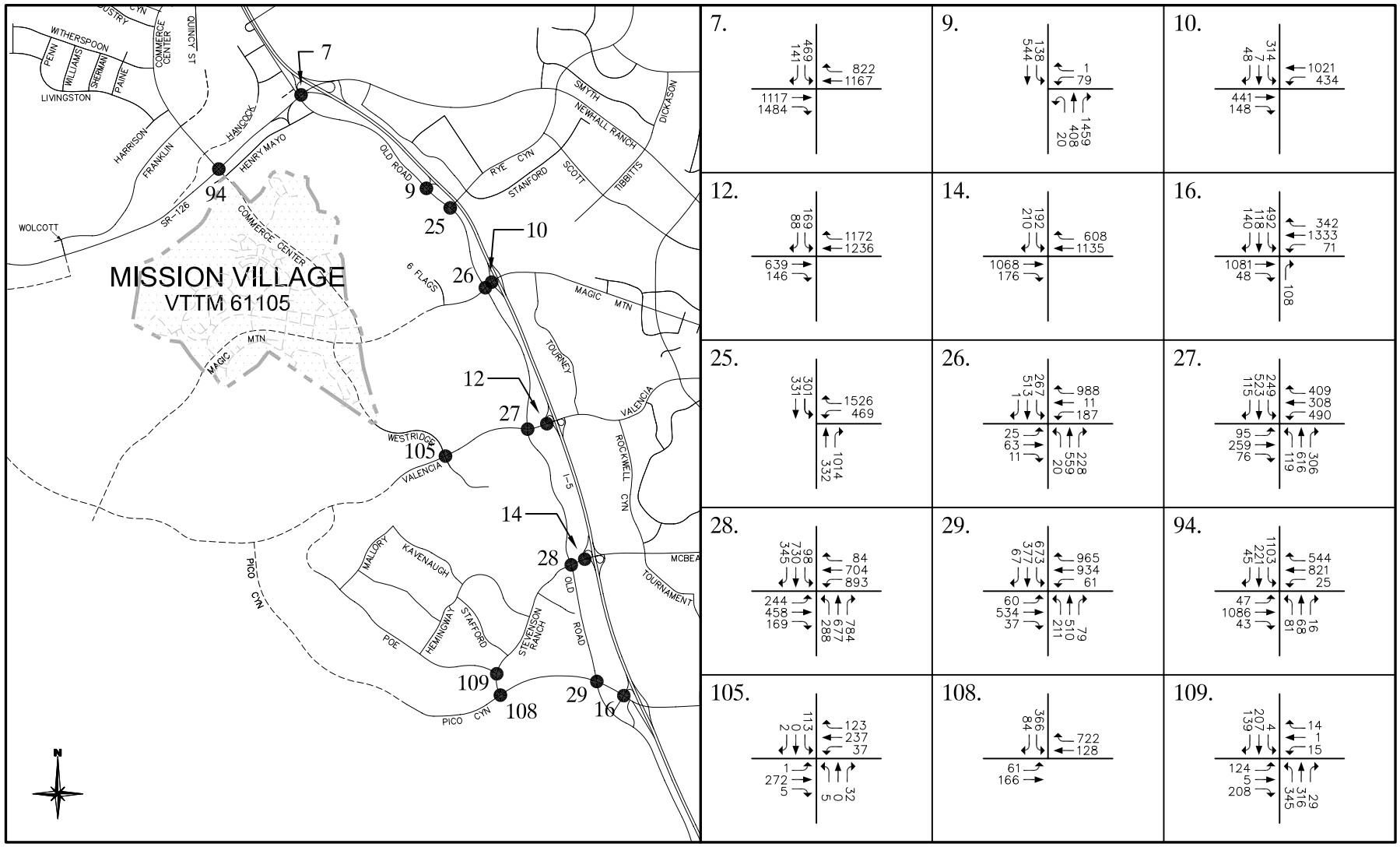


Legend

———	Existing Roadway
- - - - -	Future Roadway
═ ═ ═	Project Boundary
← XX	Peak Hour Intersection Volume

Figure 4-9

AM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING PLUS AMBIENT CONDITIONS (COUNTY INTERSECTIONS)

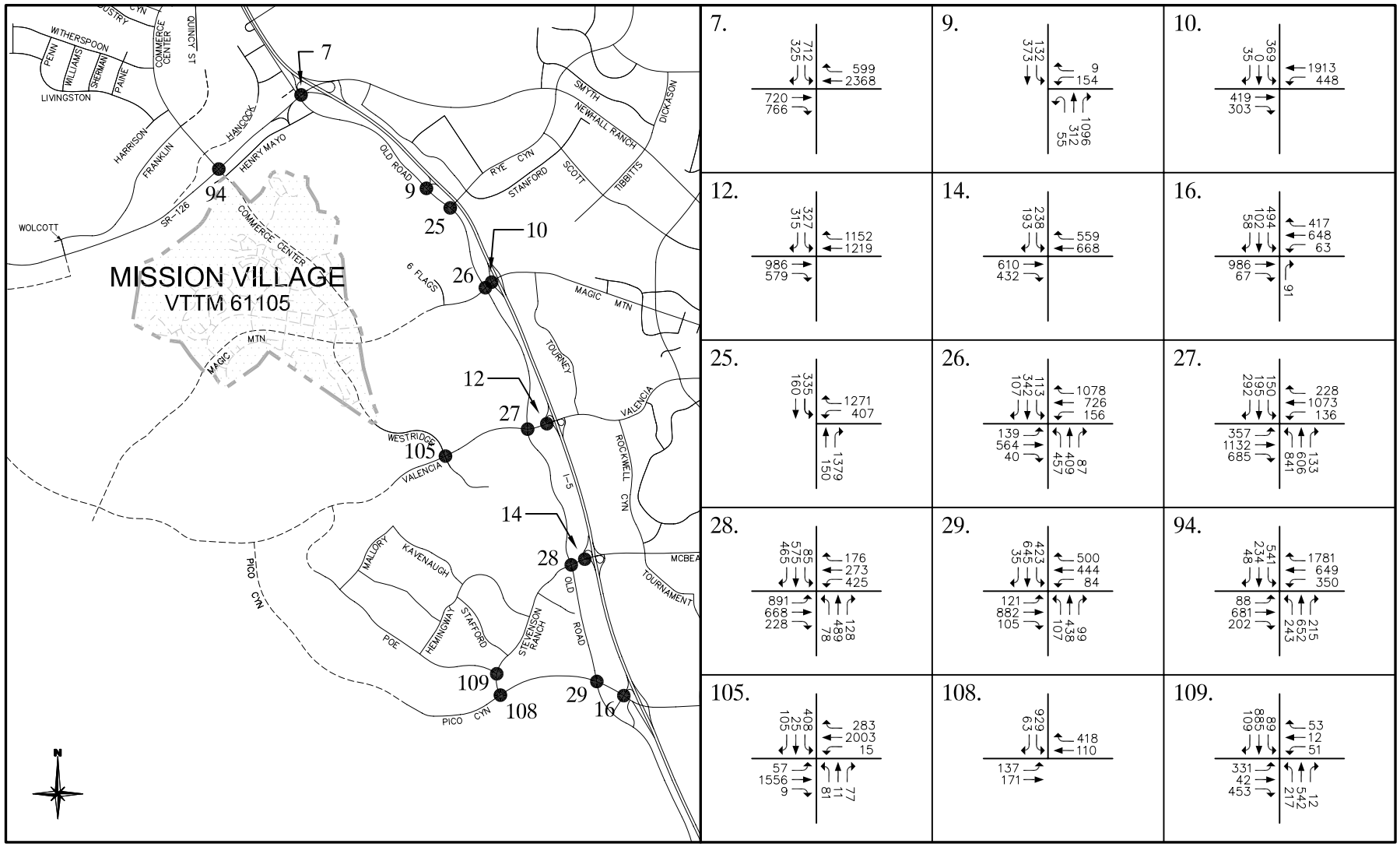


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-10

PM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING PLUS AMBIENT CONDITIONS (COUNTY INTERSECTIONS)

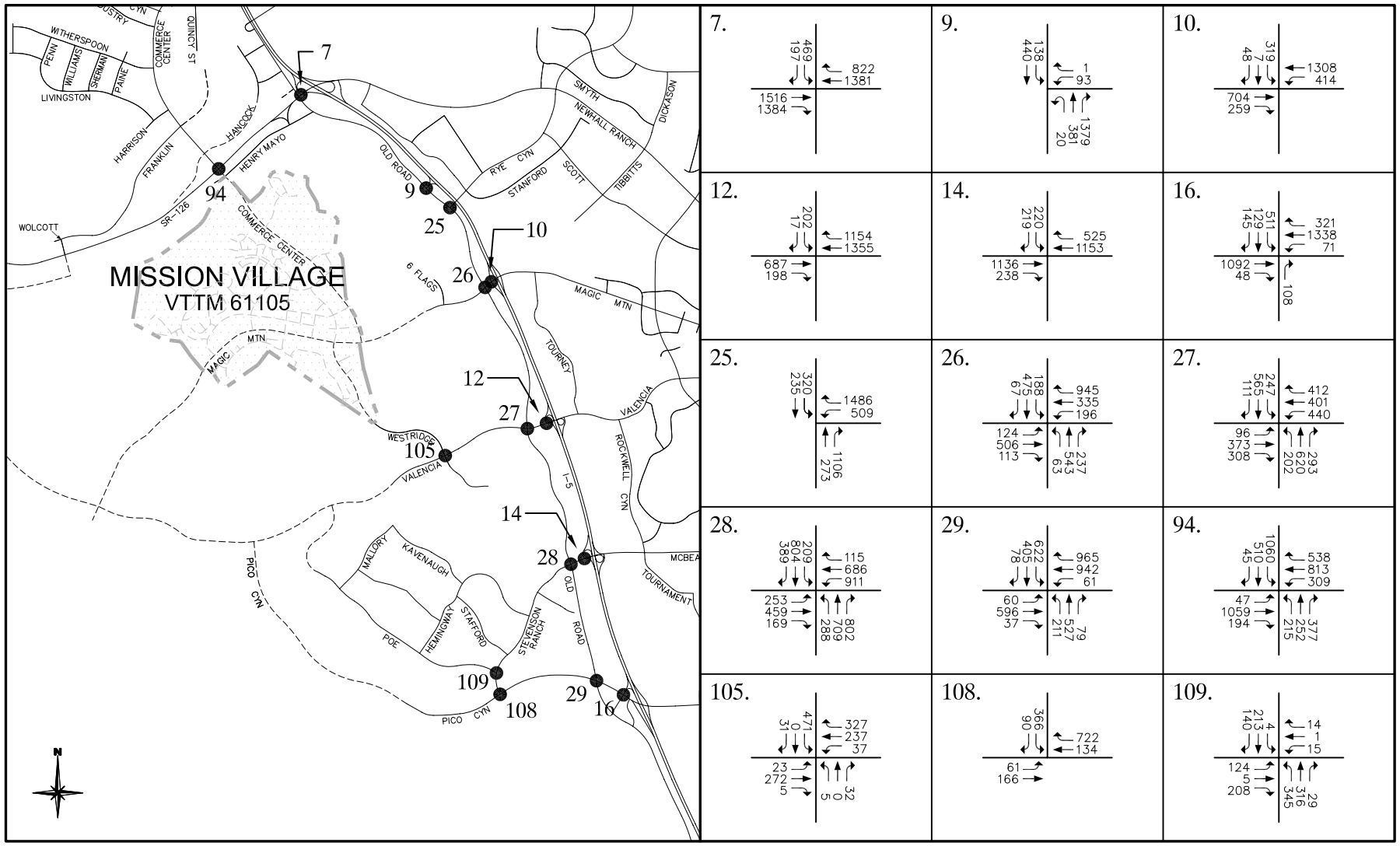


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-11

AM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING PLUS AMBIENT PLUS PROJECT CONDITIONS (COUNTY INTERSECTIONS)



Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-12

PM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING PLUS AMBIENT PLUS PROJECT CONDITIONS (COUNTY INTERSECTIONS)

Table 4-2: ICU and LOS Summary – Existing plus Ambient Conditions with and without Project

	Existing plus Ambient				Existing plus Ambient plus Project				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.86	D	.50	A	.84	D	.55	A	-.02	.05
9. The Old Road & I-5 SB Ramps	.88	D	1.11	F	.88	D	1.06	F	.00	-.05
10. I-5 SB Ramps & Magic Mountain Parkway	.43	A	.44	A	.52	A	.49	A	.09	.05
12. I-5 SB Ramps & Valencia Boulevard	.62	B	.55	A	.68	B	.59	A	.06	.04
14. I-5 SB Ramps & McBean Parkway	.45	A	.58	A	.46	A	.60	A	.01	.02
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.69	B	.73	C	.69	B	.74	C	.00	.01
County Arterial Intersections										
25. The Old Road & Rye Canyon	.74	C	.79	C	.65	B	.79	C	-.09	.00
26. The Old Road & Magic Mountain Parkway	.32	A	.38	A	.49	A	.43	A	.17	.05
27. The Old Road & Valencia Boulevard	.80	C	.53	A	.82	D	.58	A	.02	.05
28. The Old Road & McBean Parkway	.70	B	.92	E	.78	C	.95	E	**.08**	**.03**
29. The Old Road & Pico Canyon Road	.75	C	.84	D	.75	C	.84	D	.00	.00
94. Commerce Center Drive & SR-126	.64	B	.89	D	1.13	F	1.15	F	**.49**	**.26**
105. Westridge Parkway & Valencia Boulevard	.66	B	.22	A	.71	C	.35	A	.05	.13
108. Stevenson Ranch Parkway & Pico Canyon Road	.57	A	.62	B	.58	A	.62	B	.01	.00
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.77	C	.47	A	.77	C	.48	A	.00	.01

Bold = Significant Impact (See criteria in Table 1-4)

Level of service ranges:							
	.00 - .60	A	.71 - .80	C	.91 – 1.00	E
	.61 - .70	B	.81 - .90	D	Above 1.00	F

4.1.3 State Highways

The project is located approximately 1.25 miles west of I-5, and approximately 0.5 miles south of SR-126. In the vicinity of the project site, I-5 is generally an eight-lane (four lanes in each direction) freeway. SR-126 is generally a four-lane highway between I-5 and Commerce Center Drive and it transitions to a two-lane highway west of Commerce Center Drive.

As shown previously in Section 2-1, the I-5 freeway currently operates at an acceptable level of service within the Santa Clarita Valley, with the exception of the southbound segments just north and south of the SR-14 interchange. A current project is underway to add one HOV lane in each direction to the I-5 within the Santa Clarita Valley from SR-14 to Parker Road, as well as add new dedicated truck lanes south of Pico Canyon Road. The first stage of that project will address the existing deficiency between Calgrove and SR-14 by adding dedicated truck lanes to that segment.

South of the SR-14, Caltrans is currently constructing the I-5/SR-14 Direct HOV Connector project. This project involves the construction of an elevated two-lane direct HOV connector at the I-5 and SR-14 interchange and construction of HOV lanes in the north- and southbound directions of I-5 at the interchange, which will address the existing deficiency south of SR-14.

An evaluation of the I-5 freeway for conditions with and without the project is provided in Table 4-3. The analysis is based on a 2021 horizon, which represents the estimated buildout year of the project. Year 2021 traffic volumes have been derived by interpolating between existing (2010) traffic counts and the SCVCTM Year 2035 long range cumulative buildout conditions traffic forecasts. Since the entire I-5 Truck Lane and HOV project is anticipated to be completed prior to the project's anticipated buildout date of 2021 (source: Caltrans, see correspondence in Appendix K), the I-5 Truck Lane and HOV project has been assumed in place for the analysis of the 2021 horizon.

The freeway impact analysis presented here is based on the Los Angeles County Congestion Management Program (CMP) impact criteria. This criteria identifies a significant project impact as when project traffic causes or worsens LOS F conditions by a V/C of .02 or more. As previously discussed in Section 1.4, Caltrans does not have an adopted criteria for the evaluation of impacts due to private developments such as the proposed project, therefore the CMP impact criteria is applied for this analysis.

Table 4-3: Freeway Volumes and V/C Ratios - 2021 Conditions

Segment	Lanes	Capacity	2021 Without Project				2021 With Project				Project Increment	
			AM Pk Hr		PM Pk Hr		AM Pk Hr		PM Pk Hr			
			Vol	V/C	Vol	V/C	Vol	V/C	Vol	V/C	AM	PM
Northbound												
401. North of Lake Hughes	4M	8,000	2,200	.28	4,000	.50	2,232	.28	4,066	.51	.00	.01
402. Between Lake Hughes & Parker	4M	8,000	2,400	.30	4,700	.59	2,445	.31	4,812	.60	.01	.01
403. Between Parker & Hasley Canyon	4M + 1H	10,000	2,700	.27	5,600	.56	2,753	.28	5,752	.58	.01	.02
404. Between Hasley Canyon & SR-126	4M + 1H + 1A	11,000	3,800	.35	6,300	.57	3,853	.35	6,452	.59	.00	.02
405. Between SR-126 & Rye Canyon	4M + 1H	10,000	4,400	.44	6,000	.60	4,400	.44	6,023	.60	.00	.00
406. Between Rye Canyon & Magic Mtn	4M + 1H	10,000	4,400	.44	6,000	.60	4,400	.44	6,023	.60	.00	.00
407. Between Magic Mtn & Valencia	4M + 1H+ 1A	11,000	5,300	.48	6,400	.58	5,442	.49	6,513	.59	.01	.01
408. Between Valencia & McBean	4M + 1H	10,000	6,300	.63	7,200	.72	6,500	.65	7,344	.73	.02	.01
409. Between McBean & Pico/Lyons	4M + 1H	10,000	6,300	.63	7,200	.72	6,561	.66	7,355	.74	.03	.02
410. Between Pico/Lyons & Calgrove	4M + 1H+ 1A	11,000	6,200	.56	7,400	.67	6,433	.58	7,523	.68	.02	.01
411. Between Calgrove & SR-14	4M + 1H + 1T	11,200	6,200	.55	7,400	.66	6,417	.57	7,509	.67	.02	.01
412. South of SR-14	6M + 1H + 2T	16,400	8,200	.50	15,200	.93	8,333	.51	15,290	.93	.01	.00
Southbound												
401. North of Lake Hughes	4M	8,000	2,800	.35	3,800	.48	2,887	.36	3,834	.48	.01	.00
402. Between Lake Hughes & Parker	4M	8,000	3,400	.43	4,100	.51	3,529	.44	4,150	.52	.01	.01
403. Between Parker & Hasley Canyon	4M + 1H	10,000	4,300	.43	4,800	.48	4,474	.45	4,872	.49	.02	.01
404. Between Hasley Canyon & SR-126	4M + 1H	10,000	5,000	.50	5,700	.57	5,162	.52	5,759	.58	.02	.01
405. Between SR-126 & Rye Canyon	4M + 1H+ 1A	11,000	5,200	.47	6,300	.57	5,233	.48	6,352	.58	.01	.01
406. Between Rye Canyon & Magic Mtn	4M + 1H+ 1A	11,000	5,700	.52	7,500	.68	5,727	.52	7,561	.69	.00	.01
407. Between Magic Mtn & Valencia	4M + 1H	10,000	5,800	.58	7,400	.74	6,069	.61	7,583	.76	.03	.02
408. Between Valencia & McBean	4M + 1H+ 1A	11,000	6,900	.63	8,100	.74	7,143	.65	8,327	.76	.02	.02
409. Between McBean & Pico/Lyons	4M + 1H	10,000	7,100	.71	8,000	.80	7,301	.73	8,263	.83	.02	.03
410. Between Pico/Lyons & Calgrove	4M + 1H + 1T	11,200	7,300	.65	8,200	.73	7,450	.67	8,441	.75	.02	.02
411. Between Calgrove & SR-14	4M + 1H + 2T	12,400	7,500	.60	8,300	.67	7,620	.61	8,525	.69	.01	.02
412. South of SR-14	6M + 1H + 2T	16,400	15,100	.92	11,300	.69	15,209	.93	11,441	.70	.01	.01

M = Mixed-Flow/General Purpose Lane (Capacity = 2,000 vehicles per hour)
H = HOV Lane (Capacity = 2,000 vehicles per hour)
A = Auxiliary Lane (Capacity = 1,000 vehicles per hour)
T = Truck Lane (Capacity = 1,200 vehicles per hour)

Capacities derived from PeMS data and through discussions with Caltrans staff.

As shown in the previously referenced Table 4-3, the project does not result in a significant impact to the I-5 freeway for the project's buildout horizon year of 2021.

An evaluation of the I-5 freeway for long-range cumulative buildout conditions is provided in Table 4-4. As shown, the project does not result in a significant impact to the I-5 freeway for long-range cumulative buildout conditions.

4.2 PROJECT WITH MITIGATION

Roadway improvements have been identified to mitigate the project impacts identified in the previous sections. Table 4-5 lists the proposed mitigation measures for 2021 cumulative conditions. The project's share of the future traffic at the impacted intersections is listed in the aforementioned table (the traffic shares are calculated using the methodology of the County of Los Angeles Department of Public Works – see Appendix J for calculations), and the recommended timing of these improvements is identified by the Westside Santa Clarita Valley Roadway Phasing Analysis (see Section 4.3.2 for discussion).

The project site is within an area proposed to be included in a new Bridge and Thoroughfare (B&T) District (referred to here as the Westside B&T District). After the formation of the Westside B&T District, the project's payment of Westside B&T District fees will represent the project's fair-share of the cumulative mitigation measures that are included within the Westside B&T District. Additional cumulative mitigation measures are identified in the previously referenced Table 4-5 that are located outside of the Westside B&T District boundary, but are instead part of the already established Valencia and Via Princessa B&T Districts. The Valencia and Via Princessa B&T Districts are full mitigation districts, which means that the B&T fees paid by development within those districts, combined with other funding sources (e.g. state and federal transportation funding), have been calculated to cover the full cost of all improvements necessary to construct the arterial network as described in the respective county and city general plan transportation elements to accommodate both local and cumulative traffic from outside the district without Mission Village participation. Similarly, once the new Westside B&T District is formed, the fees paid by the Mission Village project will be calculated to support not only Westside development, but also the future development occurring within other B&T Districts. With the construction of the improvements identified in the previously referenced Table 4-5, the identified project impacts will be reduced to a level below significant and no further mitigation is required.

Table 4-4: Freeway Volumes and V/C Ratios - Buildout Conditions

Segment	Lanes	Capacity	Long-Range Without Project				Long-Range With Project				Project Increment	
			AM Pk Hr		PM Pk Hr		AM Pk Hr		PM Pk Hr			
			Vol	V/C	Vol	V/C	Vol	V/C	Vol	V/C	AM	PM
Northbound												
401. North of Lake Hughes	4M	8,000	3,368	.42	6,334	.79	3,400	.43	6,400	.80	.01	.01
402. Between Lake Hughes & Parker	4M	8,000	3,655	.46	7,388	.92	3,700	.46	7,500	.94	.00	.02
403. Between Parker & Hasley Canyon	4M + 1H	10,000	4,047	.40	8,848	.88	4,100	.41	9,000	.90	.01	.02
404. Between Hasley Canyon & SR-126	4M + 1H + 1A	11,000	5,647	.51	9,148	.83	5,700	.52	9,300	.85	.01	.02
405. Between SR-126 & Rye Canyon	4M + 1H	10,000	6,000	.60	8,077	.81	6,000	.60	8,100	.81	.00	.00
406. Between Rye Cyn & Magic Mtn	4M + 1H	10,000	6,000	.60	8,077	.81	6,000	.60	8,100	.81	.00	.00
407. Between Magic Mtn & Valencia	4M + 1H+ 1A	11,000	6,758	.61	7,987	.73	6,900	.63	8,100	.74	.02	.01
408. Between Valencia & McBean	4M + 1H	10,000	7,700	.77	8,656	.87	7,900	.79	8,800	.88	.02	.01
409. Between McBean & Pico/Lyons	4M + 1H	10,000	7,739	.77	8,245	.82	8,000	.80	8,400	.84	.03	.02
410. Between Pico/Lyons & Calgrove	4M + 1H+ 1A	11,000	7,567	.69	8,277	.75	7,800	.71	8,400	.76	.02	.01
411. Between Calgrove & SR-14	4M + 1H + 1T	11,200	7,583	.68	8,191	.73	7,800	.70	8,300	.74	.02	.01
412. South of SR-14	6M + 2H + 2T	18,400	10,067	.55	17,310	.94	10,200	.55	17,400	.95	.00	.01
Southbound												
401. North of Lake Hughes	4M	8,000	4,613	.58	6,366	.80	4,700	.59	6,400	.80	.01	.00
402. Between Lake Hughes & Parker	4M	8,000	5,571	.70	6,850	.86	5,700	.71	6,900	.86	.01	.00
403. Between Parker & Hasley Canyon	4M + 1H	10,000	7,026	.70	7,928	.79	7,200	.72	8,000	.80	.02	.01
404. Between Hasley Canyon & SR-126	4M + 1H	10,000	7,338	.73	9,241	.92	7,500	.75	9,300	.93	.02	.01
405. Between SR-126 & Rye Canyon	4M + 1H+ 1A	11,000	7,367	.67	9,048	.82	7,400	.67	9,100	.83	.00	.01
406. Between Rye Cyn & Magic Mtn	4M + 1H+ 1A	11,000	7,373	.67	10,239	.93	7,400	.67	10,300	.94	.00	.01
407. Between Magic Mtn & Valencia	4M + 1H	10,000	7,231	.72	9,717	.97	7,500	.75	9,900	.99	.03	.02
408. Between Valencia & McBean	4M + 1H+ 1A	11,000	8,457	.77	10,273	.93	8,700	.79	10,500	.95	.02	.02
409. Between McBean & Pico/Lyons	4M + 1H	10,000	8,299	.83	9,737	.97	8,500	.85	10,000	1.00	.02	.03
410. Between Pico/Lyons & Calgrove	4M + 1H + 1T	11,200	8,050	.72	10,259	.92	8,200	.73	10,500	.94	.01	.02
411. Between Calgrove & SR-14	4M + 1H + 2T	12,400	8,180	.66	10,675	.86	8,300	.67	10,900	.88	.01	.02
412. South of SR-14	6M + 2H + 2T	18,400	16,691	.91	13,859	.75	16,800	.91	14,000	.76	.00	.01

M = Mixed-Flow/General Purpose Lane (Capacity = 2,000 vehicles per hour)
H = HOV Lane (Capacity = 2,000 vehicles per hour)
A = Auxiliary Lane (Capacity = 1,000 vehicles per hour)
T = Truck Lane (Capacity = 1,200 vehicles per hour)

Capacities derived from PeMS data and through discussions with Caltrans staff.

Table 4-5: Off-Site Mitigation Measures for Project Impacts – 2021 Cumulative Conditions

Location	Jurisdiction	Mitigation	Project Traffic Share %
7. I-5 SB Ramps & SR-126	Caltrans/County	Stripe a 4th westbound through lane	14.3%
12. I-5 SB Ramps & Valencia	Caltrans/County	Re-stripe the 2nd westbound free-flow right-turn lane to a 3rd westbound through lane/shared free-flow right-turn lane.	7.5%
25. The Old Road & Rye Canyon Road	County	Add a 2nd northbound through lane and a 2nd southbound left-turn lane. Convert the northbound and westbound free-flow right-turn lanes to conventional right-turn lanes with overlap phasing.	7.1%
28. The Old Road & McBean	County	Stripe a 3rd southbound through lane and a westbound right-turn lane.	27.0%*
45. McBean Parkway & Magic Mountain Parkway	City	Re-stripe for 3rd eastbound through lane and add right-turn overlap phase for the westbound right-turn lane.	11.2%
48. McBean Parkway & Newhall Ranch Road	City	Re-stripe for 4th westbound through lane. Reconstruct the northbound approach to remove the pork-chop island and reconfigure as conventional dual right-turn lanes.	7.3%
55. Orchard Village & McBean Parkway	City	Add a separate southbound left-turn lane, a separate southbound through lane, a separate southbound right-turn lane, and reconfigure the existing southbound right-turn lane as a shared left-turn/through lane, as identified in the mitigation for the Hospital expansion project.	2.6%
66. Bouquet Canyon Road & Newhall Ranch Road	City	Stripe a 3rd eastbound through lane while maintaining 3 eastbound left-turn lanes and 2 eastbound right-turn lanes.	4.0%
94. Commerce Center & SR-126	Caltrans/County	Existing intersection to be replaced by a grade separated interchange. (Project is in the final design stage)	44.8%*
See Appendix J for Fair-Share Calculations *Due to the project-specific impact at these locations, the indicated mitigation will be implemented and participatory funding from other sources will be utilized as applicable. The fair-share percentage for these locations is provided for reference.			

Table 4-6 lists the proposed mitigation measures for existing plus ambient (year 2021) plus project conditions. The policy of the County Department of Public Works is that these improvements are to be implemented prior to the occupancy of the project, unless indicated otherwise by an approved phasing analysis (see Section 4.4 for the timing of the implementation of the Commerce Center Drive Grade-Separated Interchange).

Table 4-6: Off-Site Mitigation Measures for Project Impacts – Existing plus Ambient Conditions (Year 2021)

Location	Jurisdiction	Mitigation
28. The Old Road & McBean	County	Stripe a 3rd southbound through lane and a westbound right-turn lane
94. Commerce Center & SR-126	Caltrans/County	Existing intersection to be replaced by a grade separated interchange. (Project is in the final design stage)

Table 4-7 summarizes the resulting ICUs and LOS with the mitigation in place.

Table 4-7: ICU and LOS Summary – With Mitigation

	Existing plus Ambient without Project				Existing plus Ambient plus Project with Mitigation				Change	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
28. The Old Road & McBean	.70	B	.92	E	.67	B	.91	E	-.03	-.01
94. Commerce Center & SR-126	.57	A	.84	D	n/a (Grade Separated Interchange)					
	2021 Cumulative Conditions without Project				**2021 Cumulative Conditions with Project with Mitigation**				**Change**	
	AM		**PM**		**AM**		**PM**			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & SR-126	.83	D	.70	B	.73	C	.66	B	-.10	-.04
12. I-5 SB Ramps & Valencia	.72	C	.81	D	.62	B	.67	B	-10	-.14
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.03	F	1.21	F	.78	C	.91	E	-.25	-.30
28. The Old Road & McBean Parkway	.53	A	.85	D	.54	A	.86	D	.01	.01
94. Commerce Center & SR-126	1.04	F	1.17	F	n/a (Grade Separated Interchange)					
City Arterial Intersections										
45. McBean Parkway & Magic Mountain Parkway	.71	C	.92	E	.75	C	.92	E	.04	.00
48. McBean Parkway & Newhall Ranch Road	.78	C	1.01	F	.70	B	.81	D	-.08	-.20
55. Orchard Village & McBean Parkway	.65	B	.83	D	.64	B	.80	C	-.01	-.03
66. Bouquet Canyon Road & Newhall Ranch Road	.89	D	1.01	F	.83	D	.88	D	-.06	-.13

Level of service ranges: .00 - .60 A; .61 - .70 B; .71 - .80 C; .81 - .90 D; .91 – 1.00 E; Above 1.00 F

4.3 CUMULATIVE CONDITIONS

4.3.1 Year 2035 Cumulative Buildout Conditions With and Without Project

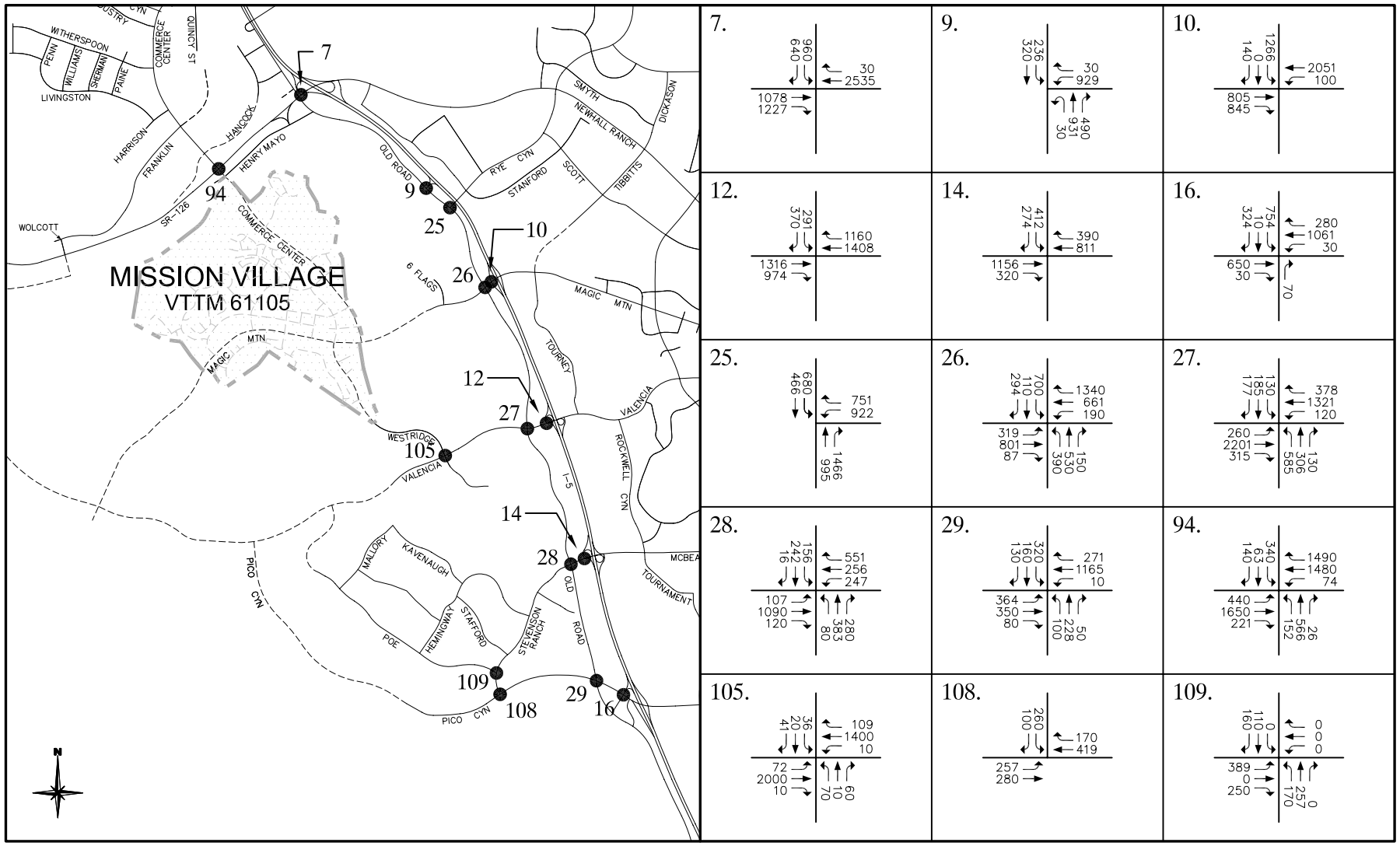
As discussed in Section 2.2.3, the OVOV version of the SCVCTM provides forecasts of cumulative buildout conditions generally considered applicable to the year 2035, and it was updated specifically for this study to include the proposed project and the current proposals for nearby cumulative projects. To estimate buildout conditions for a scenario without the project, the project traffic illustrated in the previous chapter for buildout conditions (derived from a SCVCTM select-zone model run) was subtracted from the SCVCTM forecasts for buildout conditions.

The 2035 no-project cumulative conditions peak hour turning movement volumes are provided in Figure 4-13 and Figure 4-14 for the intersections under the jurisdiction of the County of Los Angeles and in Figure 4-15 and Figure 4-16 for the intersections within the City of Santa Clarita. 2035 with-project traffic volumes are provided in Figure 4-17 and Figure 4-18 for the intersections within the County of Los Angeles and in Figure 4-19 and Figure 4-20 for the intersections within the City of Santa Clarita.

Peak hour ICU values can be found in Table 4-8, which provides a comparison between the no-project and the with-project conditions for 2035 cumulative conditions. The table indicates that under 2035 cumulative buildout conditions, several intersections are forecast to exceed the County's or the City of Santa Clarita's intersection LOS performance standard while having a project impact that is considered cumulatively considerable. The following intersections are those significantly impacted for cumulative buildout conditions:

7. I-5 SB Ramps & SR-126 (Caltrans/County)
9. The Old Road & I-5 SB Ramps (Caltrans/County)
10. I-5 SB Ramps & Magic Mountain Parkway (Caltrans/County)
11. I-5 NB Ramps & Magic Mountain Parkway (Caltrans/City)
12. I-5 SB Ramps & Valencia Boulevard (Caltrans/County)
14. I-5 SB Ramps & McBean Parkway (Caltrans/County)
16. I-5 SB Ramps/Marriott Way & Pico Canyon Road (Caltrans/County)
17. I-5 NB On/Off & Lyons Avenue (Caltrans/City)
25. The Old Road & Rye Canyon Road (County)

(Continued on Page 4-34)

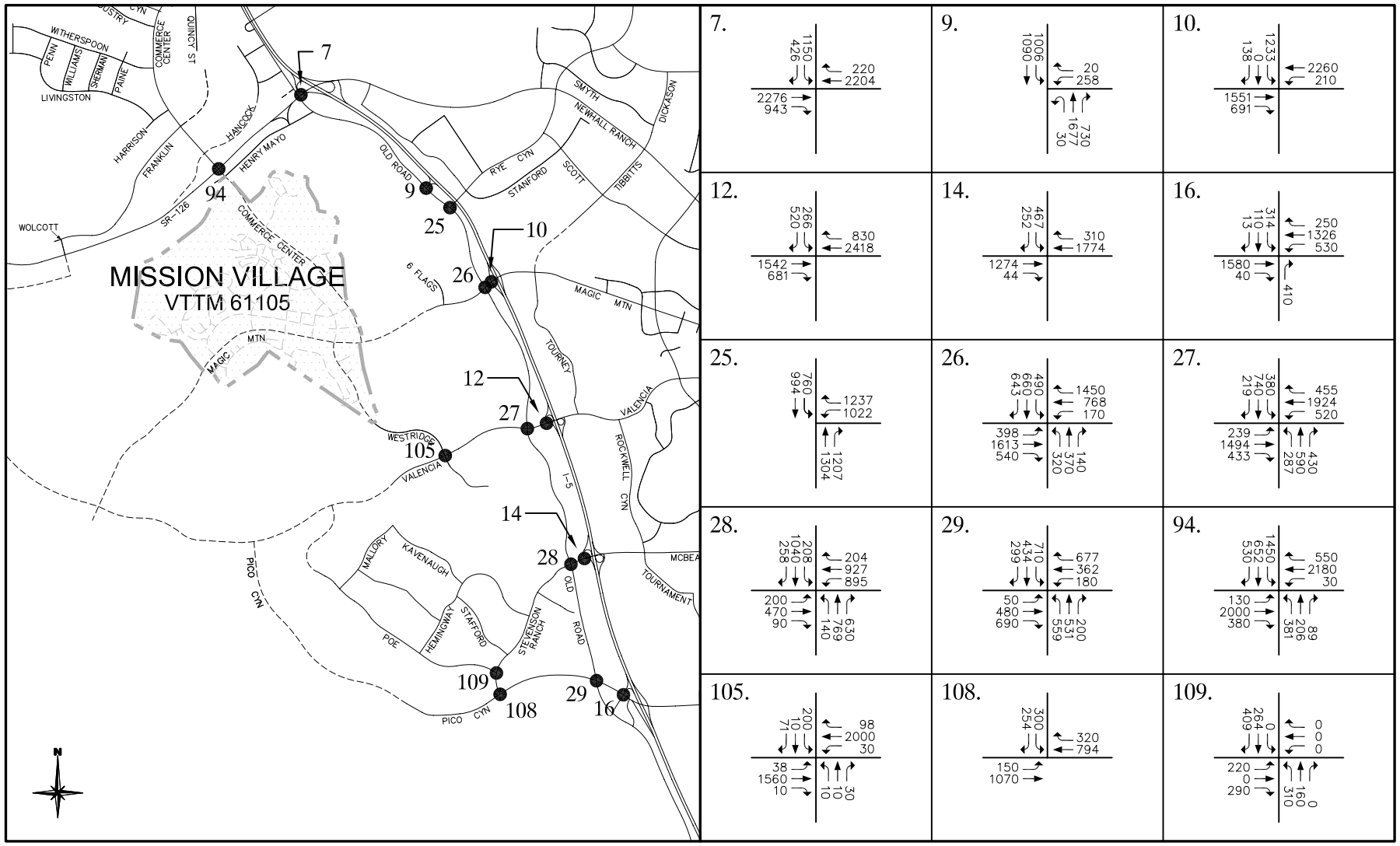


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-13

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE NO-PROJECT CONDITIONS (COUNTY INTERSECTIONS)

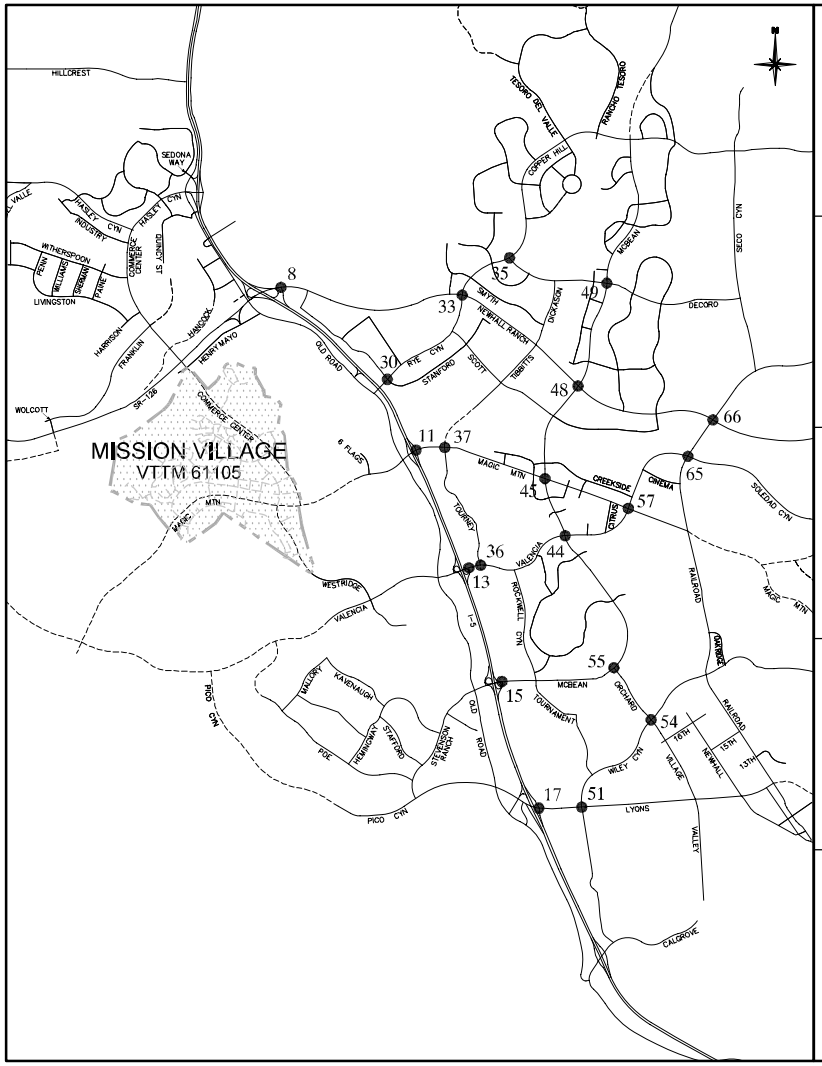


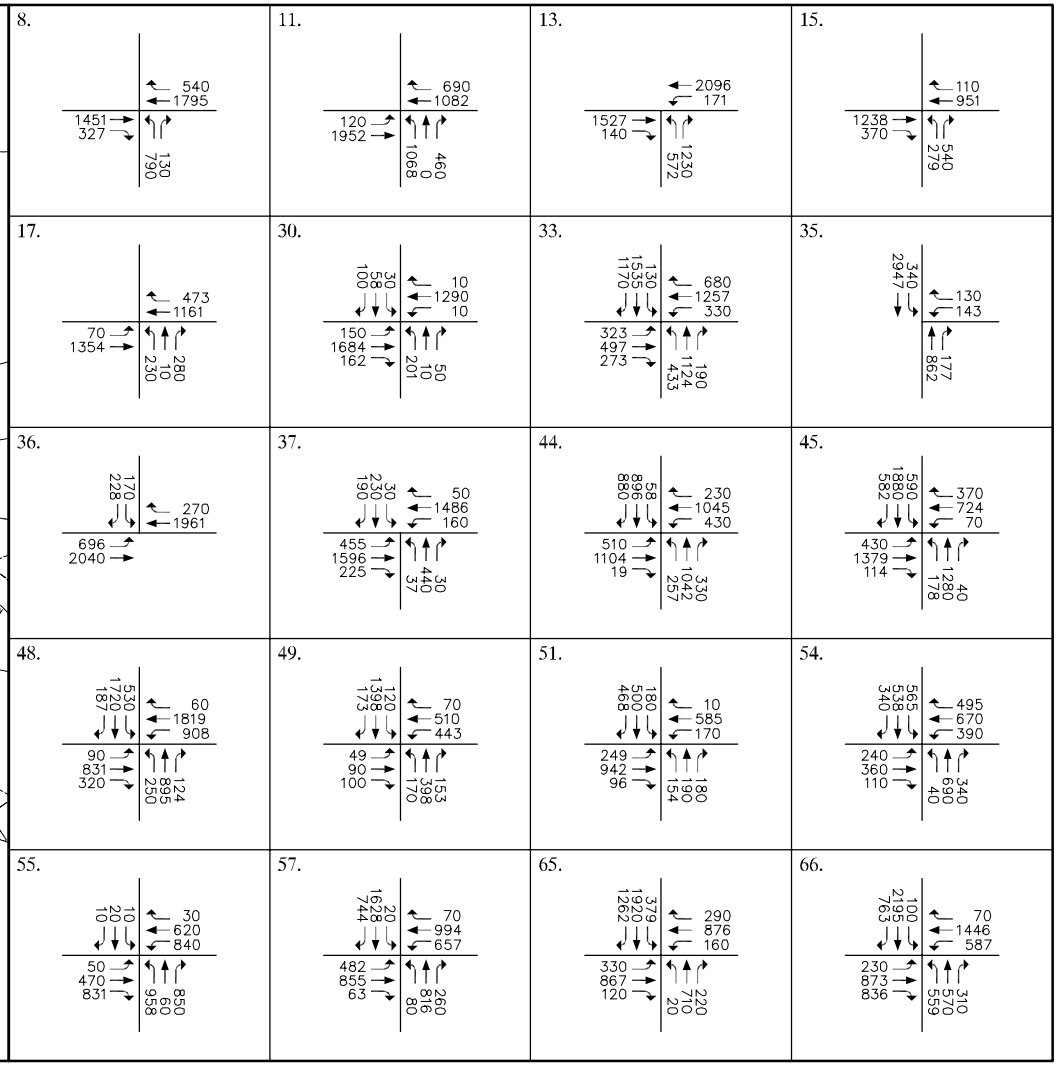
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-14

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE NO-PROJECT CONDITIONS (COUNTY INTERSECTIONS)



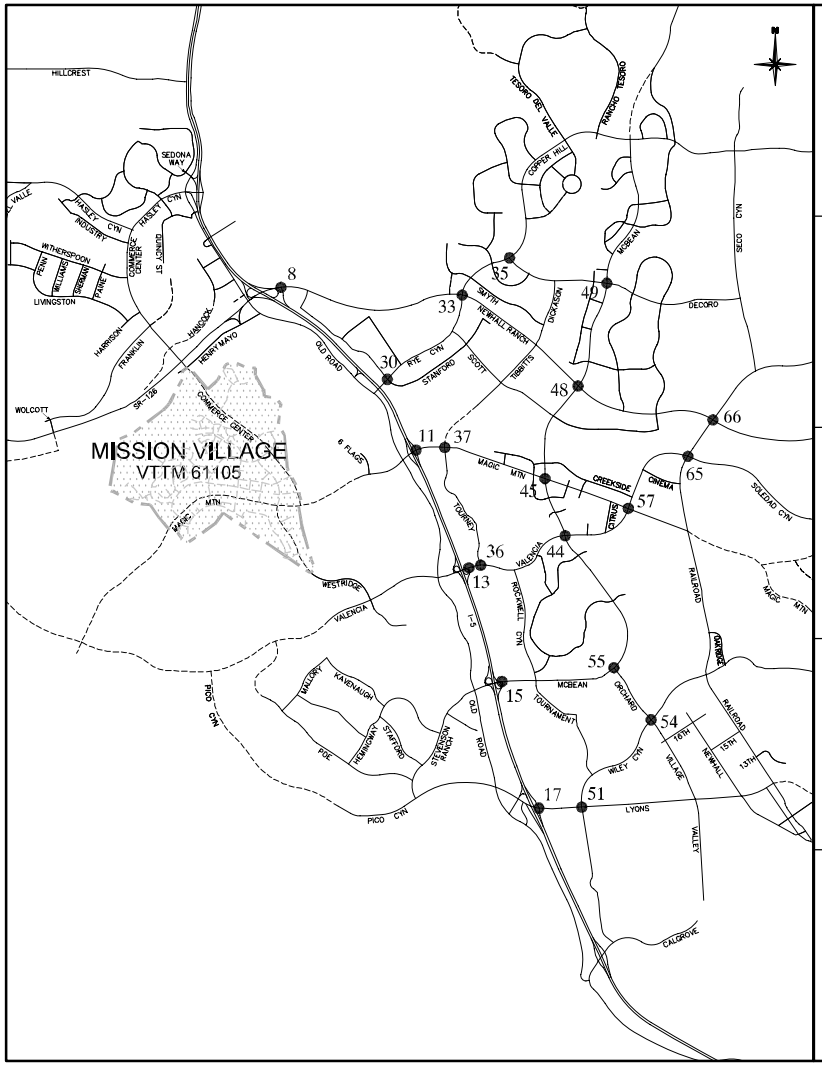


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-15

AM PEAK HOUR TURNING MOVEMENT VOLUMES
- 2035 CUMULATIVE NO-PROJECT CONDITIONS
(COUNTY INTERSECTIONS)



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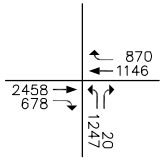

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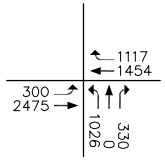

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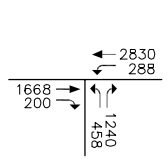

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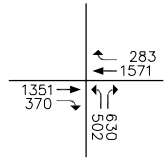

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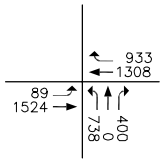

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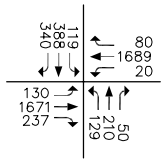

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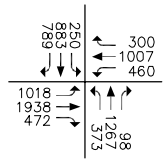

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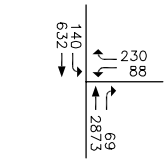

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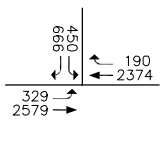

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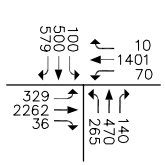

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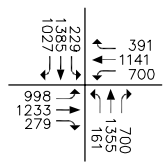

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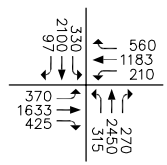

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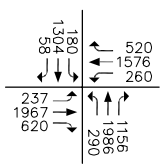

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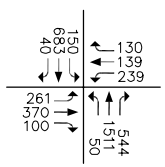

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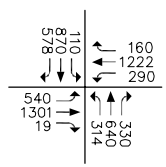

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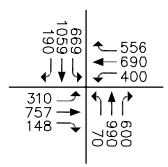

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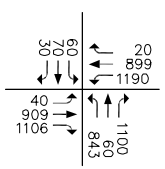

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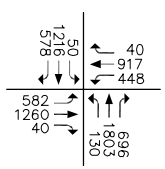

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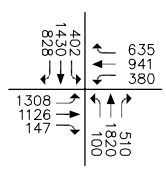

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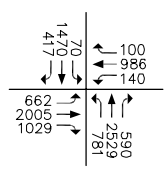
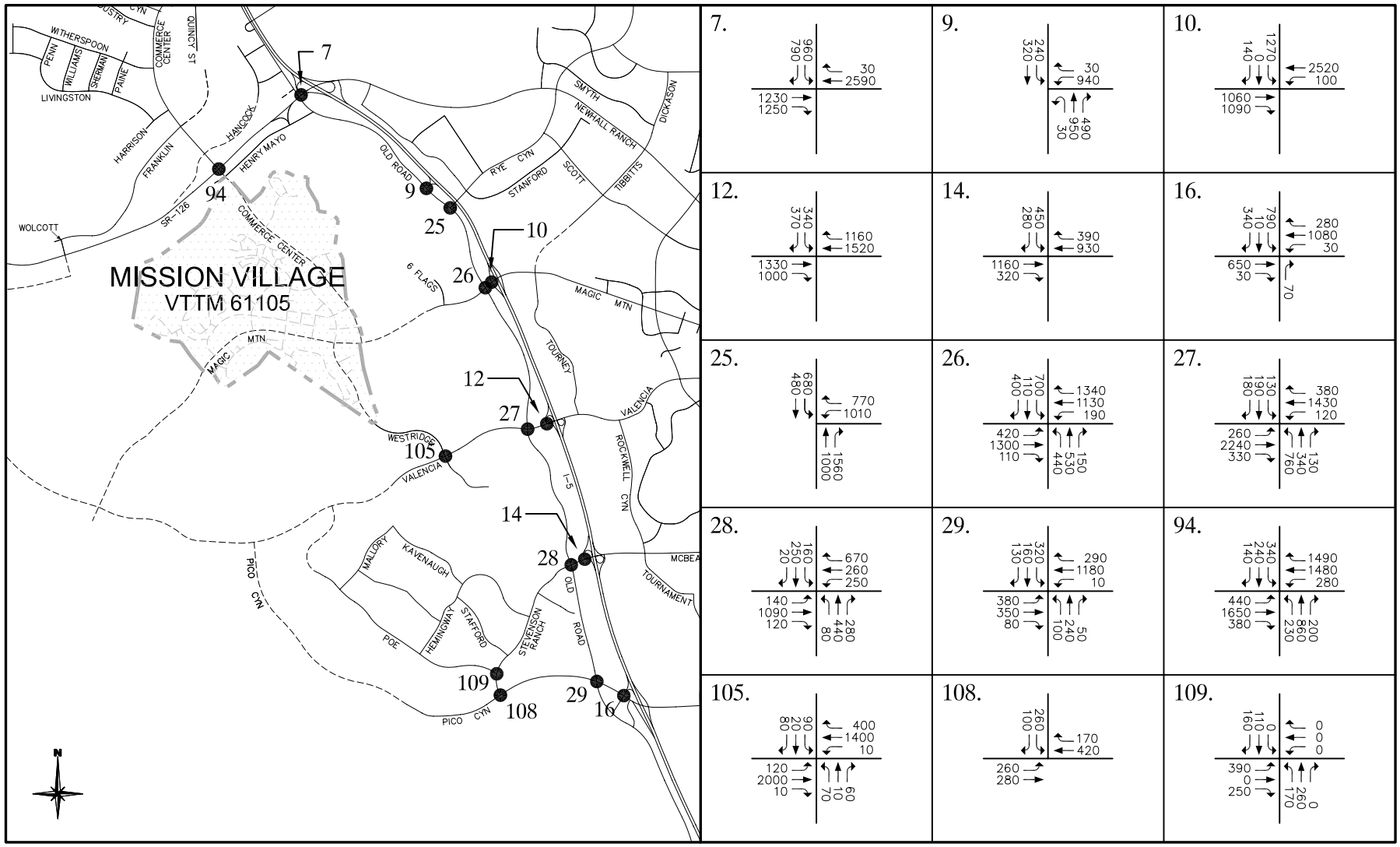


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-16

PM PEAK HOUR TURNING MOVEMENT VOLUMES
- 2035 CUMULATIVE NO-PROJECT CONDITIONS
(COUNTY INTERSECTIONS)

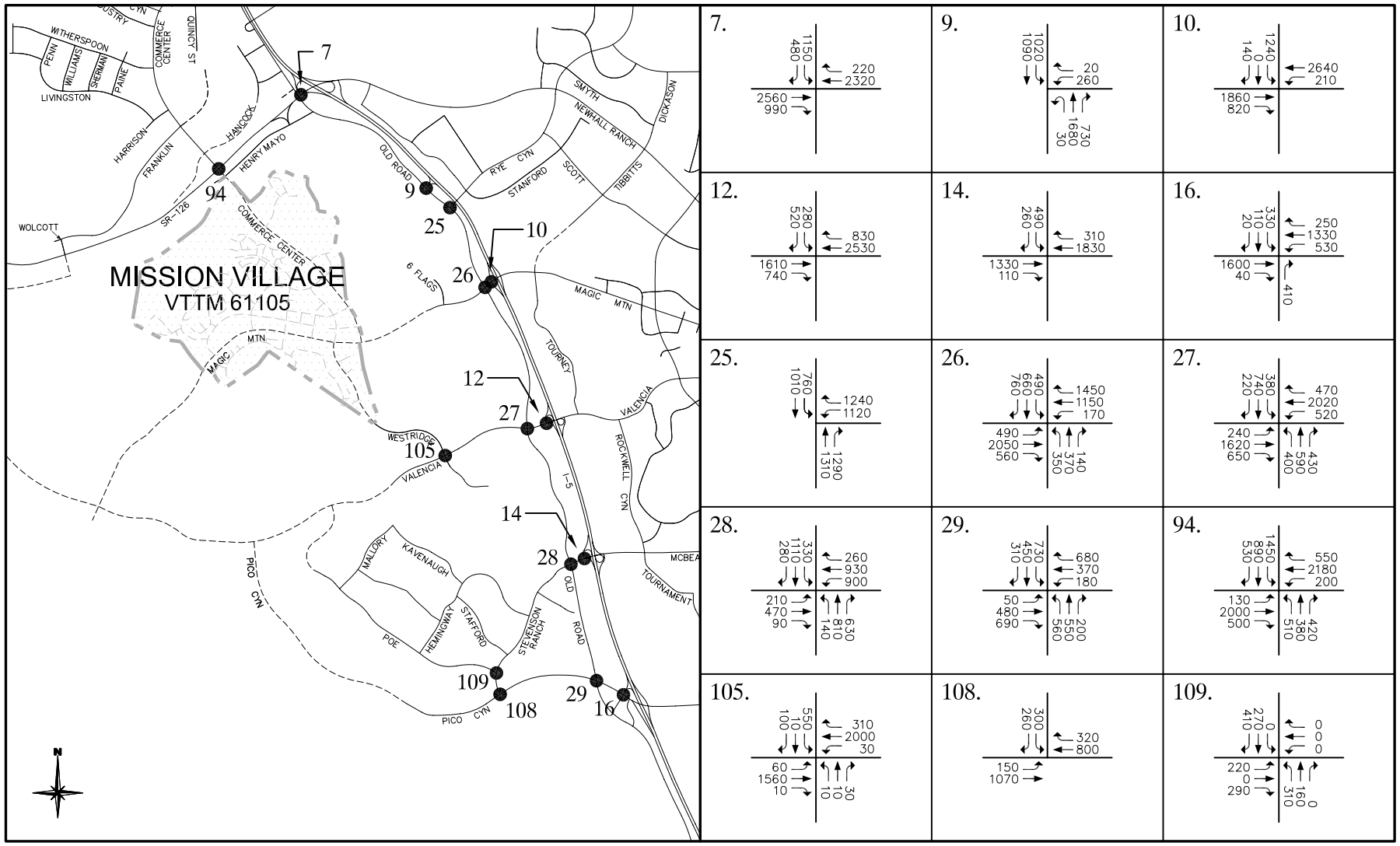


Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-17

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE WITH-PROJECT CONDITIONS (COUNTY INTERSECTIONS)

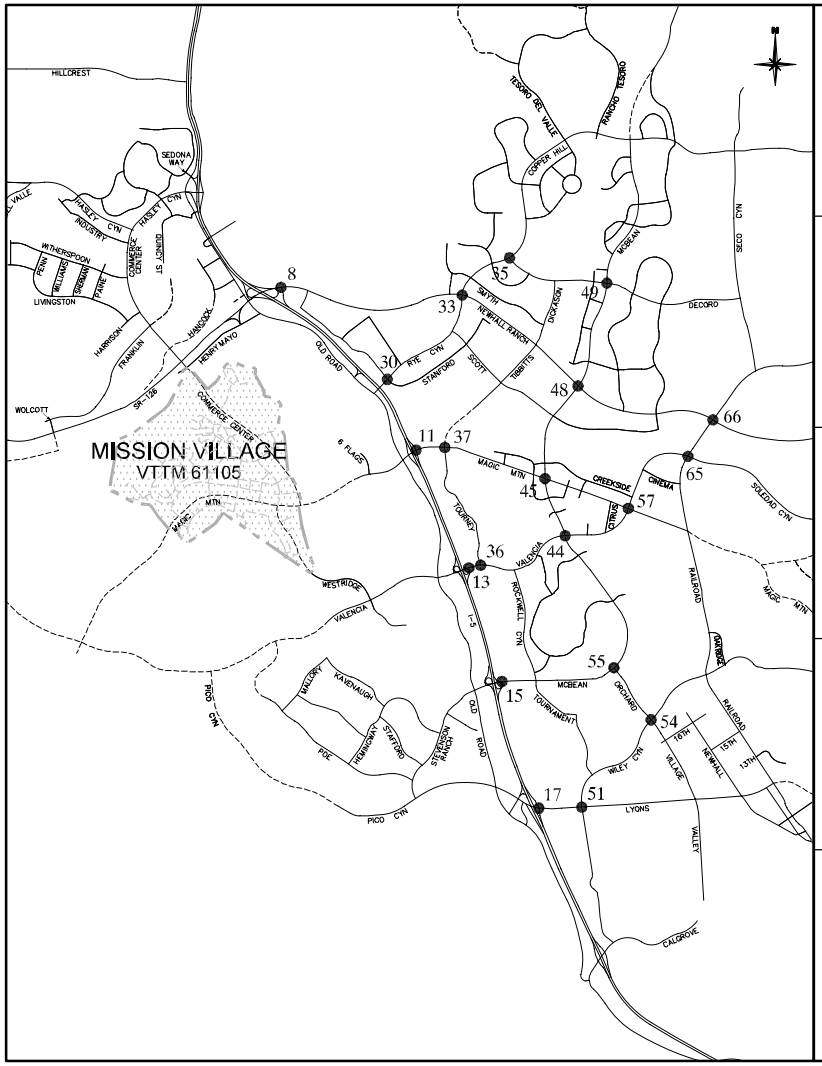


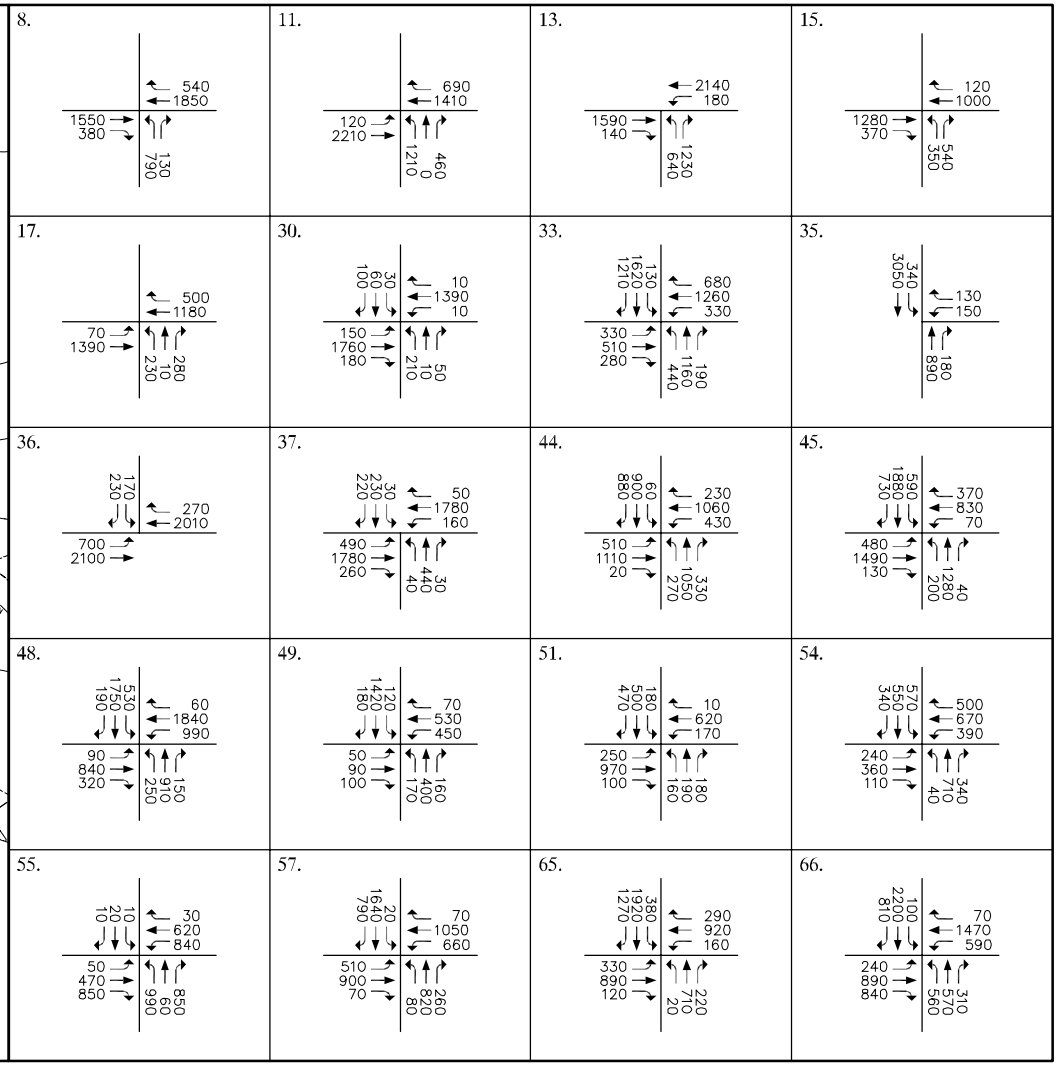
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← XX Peak Hour Intersection Volume

Figure 4-18

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE WITH-PROJECT CONDITIONS (COUNTY INTERSECTIONS)



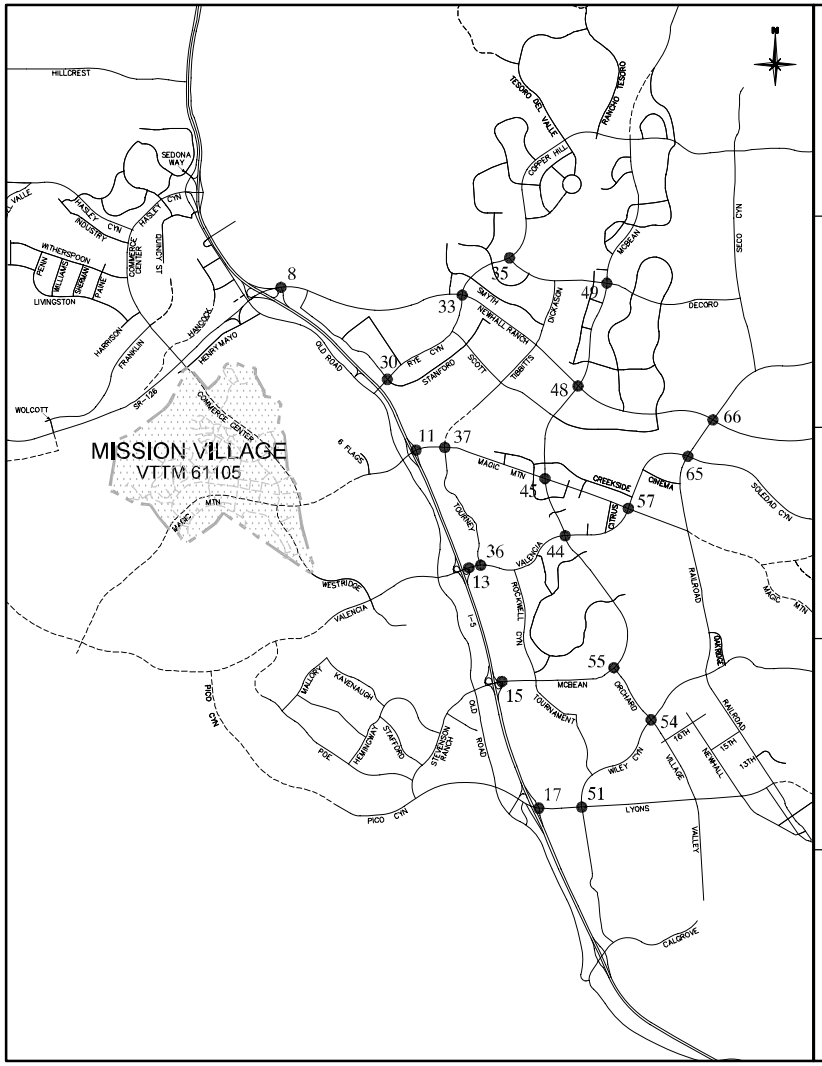


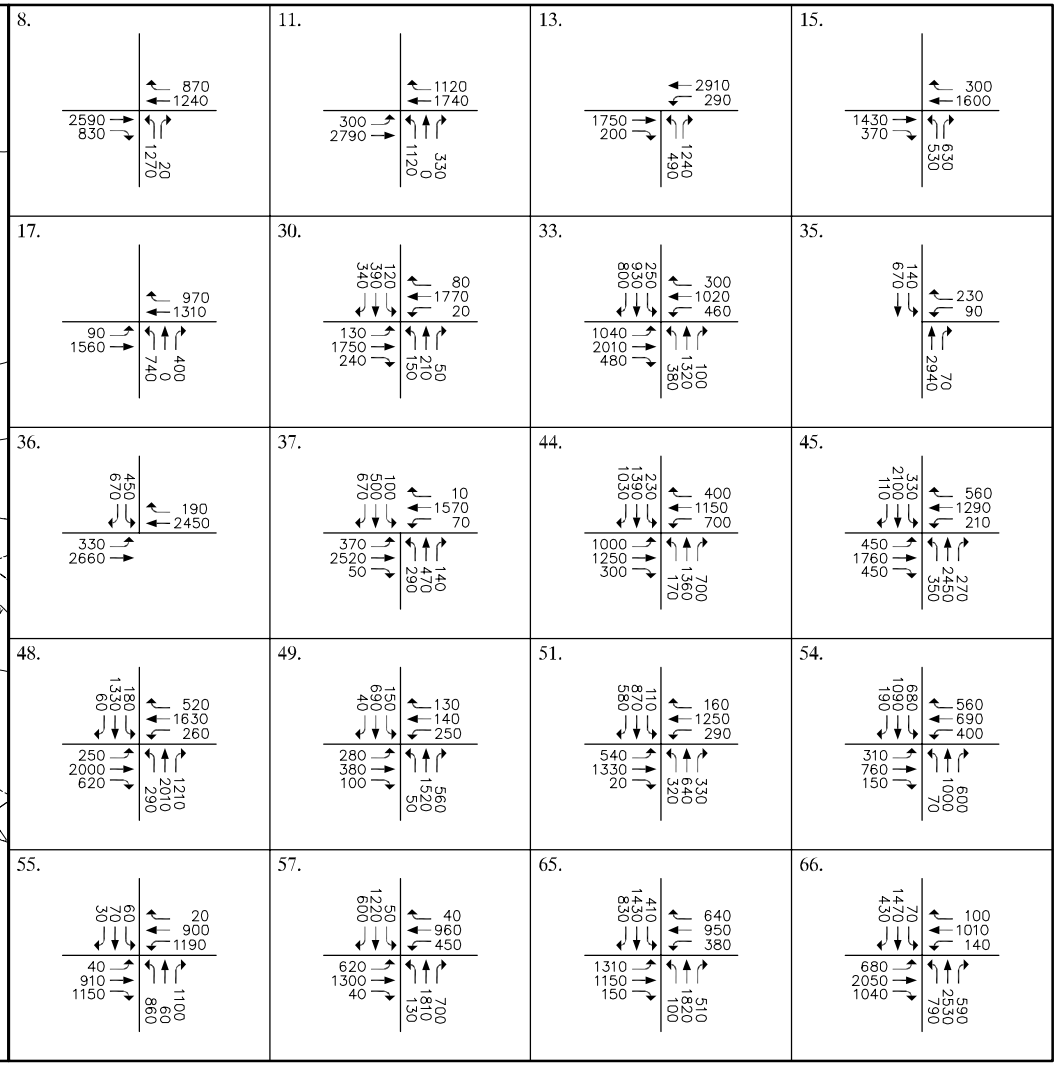
Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-19

AM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE WITH-PROJECT CONDITIONS (CITY INTERSECTIONS)





Legend

- Existing Roadway
- Future Roadway
- Project Boundary
- ← xx Peak Hour Intersection Volume

Figure 4-20

PM PEAK HOUR TURNING MOVEMENT VOLUMES - 2035 CUMULATIVE WITH-PROJECT CONDITIONS (CITY INTERSECTIONS)

Table 4-8: ICU and LOS Summary – Buildout Conditions with and without Project

	Year 2035 Cumulative Conditions without Project				Year 2035 Cumulative Conditions with Project				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.96	E	.96	E	.97	**E**	.98	**E**	**.01**	**.02**
9. The Old Road & I-5 SB Ramps	.84	D	1.34	F	.85	D	1.35	**F**	.01	**.01**
10. I-5 SB Ramps & Magic Mountain Parkway	.82	D	.88	D	.89	D	.95	**E**	.07	**.07**
12. I-5 SB Ramps & Valencia Boulevard	.77	C	1.19	F	.81	D	1.22	**F**	.04	**.03**
14. I-5 SB Ramps & McBean Parkway	.72	C	.94	E	.74	C	.98	**E**	.02	**.04**
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.67	B	1.08	F	.69	B	1.09	**F**	.02	**.01**
Freeway Ramp Intersections (City)										
8. I-5 NB Ramps & SR-126	.59	A	.69	B	.60	A	.71	C	.01	.02
11. I-5 NB Ramps & Magic Mountain	.78	C	.86	D	.87	D	.95	**E**	.09	**.09**
13. I-5 NB Ramps & Valencia	.78	C	.83	D	.79	C	.84	D	.01	.01
15. I-5 NB Ramps & McBean	.60	A	.67	B	.62	B	.69	B	.02	.02
17. I-5 NB On/Off & Lyons Ave	.56	A	.89	D	.57	A	.91	**E**	.01	**.02**
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.73	F	2.04	F	1.79	**F[1]**	2.10	**F[1]**	**.06**	**.06**
26. The Old Road & Magic Mountain Parkway	.66	B	.79	C	.78	C	.93	**E**	.12	**.14**
27. The Old Road & Valencia Boulevard	.72	C	.83	D	.79	C[1]	.89	D[1]	.07	.06
28. The Old Road & McBean Parkway	.63	B	.94	E	.70	B	.98	**E**	.07	**.04**
29. The Old Road & Pico Canyon Road	.89	D	.96	E	.91	E[1]	.97	E[1]	.02	.01
94. Commerce Center Drive & SR-126	1.31	F	1.60	F	1.60	**F**	1.89	**F**	**.29**	**.29**
105. Westridge Parkway & Valencia Boulevard	.58	A	.62	B	.59	A	.76	C	.01	.14
108. Stevenson Ranch Parkway & Pico Canyon Road	.61	B	.79	D	.61	B	.79	C	.00	.00
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.48	A	.58	A	.48	A	.58	A	.00	.00
City Arterial Intersections										
30. Stanford & Rye Canyon	.55	A	.77	C	.57	A	.78	C	.02	.01
33. Copper Hill & Newhall Ranch	.78	C	.84	D	.81	D	.87	D	.03	.03
35. Copper Hill & Decoro	.70	B	.80	C	.72	C	.81	D	.02	.01
36. Tourney & Valencia	.67	B	.87	D	.68	B	.88	D	.01	.01
37. Tourney & Magic Mountain	.67	B	.86	D	.74	C	.93	**E**	.07	**.07**
44. McBean & Valencia	.69	B	.94	E	.70	B	.94	E	.01	.00

(Continued)

Table 4-8: ICU and LOS Summary – Buildout Conditions with and without Project (Continued)

	Year 2035 Cumulative Conditions without Project				Year 2035 Cumulative Conditions with Project				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
45. McBean & Magic Mountain	.92	E	1.19	F	.96	E[1]	1.22	**F[1]**	.04	**.03**
48. McBean & Newhall Ranch	.81	D	1.11	F	.83	D	1.15	**F**	.02	**.04**
49. McBean & Decoro	.65	B	.66	B	.65	B	.66	B	.00	.00
51. Wiley Canyon & Lyons Cyn	.70	B	1.07	F	.71	C	1.08	**F**	.01	**.01**
54. Orchard Village & Wiley Cyn	1.06	F	1.42	F	1.08	**F[1]**	1.44	**F[1]**	**.02**	**.02**
55. Orchard Village & McBean	.90	D	1.20	F	.92	E[1]	1.23	**F[1]**	.02	**.03**
57. Valencia & Magic Mountain	1.10	F	1.24	F	1.12	**F**	1.25	**F**	**.02**	**.01**
65. Bouquet & Soledad	.78	C	.99	E	.79	C	.99	E	.01	.00
66. Bouquet & Newhall Ranch	.99	E	1.14	F	.99	**E**	1.17	**F**	.00	**.03**

Bold = Significant Impact (See criteria in Table 1-4)

Intersection Level of Service Performance Criteria is LOS D, unless noted otherwise.

[1]LOS E is the Level of Service Performance Criteria for this location (See Reference 6 in Section 1.6).

Level of service ranges:						
	.00 - .60	A	.71 - .80	C	.91 – 1.00	E
	.61 - .70	B	.81 - .90	D	Above 1.00	F

26. The Old Road & Magic Mountain Parkway (County)
28. The Old Road & McBean Parkway (County)
37. Tourney Road & Magic Mountain Parkway (City)
45. McBean Parkway & Magic Mountain Parkway (City)
48. McBean Parkway & Newhall Ranch Road (City)
51. Wiley Canyon Road & Lyons Avenue (City)
54. Orchard Village Road & Wiley Canyon (City)
55. Orchard Village Road & McBean (City)
57. Valencia Boulevard & Magic Mountain Parkway (City)
66. Bouquet Canyon Road & Newhall Ranch Road (City)
94. Commerce Center Drive & SR-126 (County/Caltrans)

Mitigation is listed in Table 4-9 for each of the intersections noted above that are forecast to exceed their LOS performance standard while having a project impact that is considered cumulatively considerable. Table 4-10 summarizes the resulting ICUs and LOS with the mitigation in place. As

Table 4-9: Off-Site Mitigation Measures for Project Impacts – Buildout 2035 Cumulative Conditions

Location	Jurisdiction	Mitigation	Project Traffic Share %
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	Caltrans/County	Stripe a 4th westbound through lane.	14.3%
9. The Old Road & I-5 SB Ramps	Caltrans/County	Add a 2nd northbound right-turn lane, a 2nd southbound left-turn lane, and a 3rd southbound through lane. Convert the shared westbound left/right-turn lane to a 2nd westbound left-turn lane and add a westbound right-turn lane.	1.4%
10. I-5 SB Ramps & Magic Mountain Parkway	Caltrans/County	Re-stripe the shared southbound left-turn/through lane to a left-turn lane and the 1st southbound right-turn lane to a shared through/left-turn lane.	19.7%
11. I-5 NB Ramps & Magic Mountain	Caltrans/City	Re-stripe the shared northbound through/right-turn lane to a shared left-turn/through/right-turn lane.	17.6%
12. I-5 SB Ramps & Valencia Boulevard	Caltrans/County	Re-stripe the 2nd westbound free-flow right-turn lane to a 3rd westbound through lane/shared free-flow right-turn lane.	7.5%
14. I-5 SB Ramps & McBean Parkway	Caltrans/County	Add a 2nd southbound left-turn lane.	12.6%
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	Caltrans/County	Add a left-turn phase for the westbound left-turn lane (can be protected/permissive configuration) and right-turn overlap phasing for the northbound right-turn lane.	4.7%
17. I-5 NB On/Off & Lyons Avenue (Caltrans/City)	Caltrans/City	Re-stripe the 3rd westbound through lane to a right-turn lane and restripe the 2nd westbound through lane to a shared through/right-turn lane.	7.2%
25. The Old Road & Rye Canyon	County	Add a 2nd and 3rd northbound through lane, convert the northbound free right-turn lanes to two conventional right-turn lanes, add a 2nd southbound left-turn lane and a 3rd southbound through lane. Add a 2nd and 3rd westbound left-turn lane and convert the westbound free right-turn lanes to two conventional right-turn lanes. Add right-turn overlap phasing for the westbound right-turn and northbound right-turns.	7.1%
26. The Old Road & Magic Mountain Parkway	County	Add right-turn overlap phasing for the southbound right-turn lane.	21.1%
28. The Old Road & McBean Parkway	County	Stripe a 3rd southbound through lane and a westbound right-turn lane.	27.0%*
37. Tourney & Magic Mountain Parkway	City	Stripe a 4th eastbound through lane.	14.0%

(Continued)

Table 4-9: Off-Site Mitigation Measures for Project Impacts – Buildout 2035 Cumulative Conditions (Continued)

Location	Jurisdiction	Mitigation	Project Traffic Share %
45. McBean Parkway & Magic Mountain Parkway	City	Re-stripe for 3rd eastbound through lane and add right-turn overlap phase for westbound right-turn lane.	11.2%
48. McBean Parkway & Newhall Ranch Road	City	Re-stripe for 4th westbound through lane. Reconstruct the northbound approach to remove the pork-chop island and reconfigure as conventional dual right-turn lanes	7.3%
51. Wiley Canyon & Lyons	City	Re-stripe eastbound right-turn lane to 3rd through lane (shared through/right-turn lane).	4.9%
54. Orchard Village & Wiley Canyon	City	Stripe a northbound right-turn lane.	2.2%
55. Orchard Village & McBean Parkway	City	Add a separate southbound left-turn lane, a separate southbound through lane, a separate southbound right-turn lane, and reconfigure the existing southbound right-turn lane as a shared left-turn/through lane, as identified in the mitigation for the Hospital expansion project.	2.6%
57. Valencia Boulevard & Magic Mountain	City	Add a 2nd westbound left-turn lane by removing or relocating the existing east leg raised median.	5.6%
66. Bouquet Canyon Road & Newhall Ranch Road	City	Stripe a 3rd eastbound through lane while maintaining 3 eastbound left-turn lanes and 2 eastbound right-turn lanes.	4.0%
94. Commerce Center Drive & SR-126	Caltrans/County	Existing intersection to be replaced by a grade separated interchange. (Project is in the final design stage)	44.8%*

See Appendix J for Fair-Share Calculations

*Due to the project-specific impact at these locations, the indicated mitigation will be implemented and participatory funding from other sources will be utilized as applicable. The fair-share percentage for these locations is provided for reference.

Table 4-10: ICU and LOS Summary – 2035 Cumulative Conditions with Mitigation

	Buildout Conditions (Year 2035) without Project				Buildout Conditions (Year 2035) with Project with Mitigation				Change	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.96	E	.96	E	.83	D	.90	D	-.13	-.06
9. The Old Road & I-5 SB Ramps	.84	D	1.34	F	.81	D	1.06	F	-.03	-.28
10. I-5 SB Ramps & Magic Mountain Parkway	.82	D	.88	D	.75	C	.82	D	-.07	-.06
12. I-5 SB Ramps & Valencia Boulevard	.77	C	1.19	F	.65	B	.96	E	-.12	-.23
14. I-5 SB Ramps & McBean Parkway	.72	C	.94	E	.62	B	.84	D	-.10	-.10
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.67	B	1.08	F	.69	B	1.08	F	.02	.00
Freeway Ramp Intersections (City)										
11. I-5 NB Ramps & Magic Mountain	.78	C	.86	D	.76	C	.84	D	-.02	-.02
17. I-5 NB On/Off & Lyons Ave	.56	A	.89	D	.57	A	.79	C	.01	-.10
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.73	F	2.04	F	.83	D[1]	.89	D[1]	-.90	-1.15
26. The Old Road & Magic Mountain Parkway	.66	B	.79	C	.78	C	.89	D	.12	.10
28. The Old Road & McBean Parkway	.63	B	.94	E	.70	B	.89	D	.07	-.05
94. Commerce Center Drive & SR-126	1.31	F	1.60	F	n/a (Grade Separated Intersection)					
City Arterial Intersections										
37. Tourney & Magic Mountain	.67	B	.86	D	.74	C	.82	D	.07	-.04
45. McBean & Magic Mountain	.92	E	1.19	F	.81	D[1]	1.06	F[1]	-.11	-.13
48. McBean & Newhall Ranch	.81	D	1.11	F	.83	D	.89	D	.02	-.22
51. Wiley Canyon & Lyons Cyn	.70	B	1.07	F	.63	B	.96	E	-.07	-.11
54. Orchard Village & Wiley Cyn	1.06	F	1.42	F	.98	E[1]	1.27	F[1]	-.08	-.15
55. Orchard Village & McBean	.90	D	1.20	F	.91	E[1]	1.18	F[1]	.01	-.02
57. Valencia & Magic Mountain	1.10	F	1.24	F	.93	E	1.12	F	-.17	-.12
66. Bouquet & Newhall Ranch	.99	E	1.14	F	.95	E	.97	D	-.04	-.17

Intersection Level of Service Performance Criteria is LOS D, unless noted otherwise.

[1]LOS E is the Level of Service Performance Criteria for this location (See Reference 6 in Section 1.6).

Level of service ranges:					
.00 - .60	A	.71 - .80	C	.91 – 1.00	E
.61 - .70	B	.81 - .90	D	Above 1.00	F

discussed in Section 4.2, the mitigation measures will be funded either through the project's payment of a fair-share contribution towards the improvement, by an established B&T District, or by a combination of both.

4.3.2 Cumulative Conditions Phasing Analysis

This cumulative condition phasing analysis is a summary of the Westside Phasing Analysis discussed in Section 1.3. The phasing analysis identifies the timing for specific roadway and intersection improvements that are necessary to support Westside development. The cumulative mitigation measures identified in the previous section are derived from the improvements identified in the phasing analysis and, consequently, represent a subset of the phasing analysis improvements. Importantly, the phasing analysis considered the impacts associated with all development in the Santa Clarita Valley, not just the proposed Mission Village project. As such, the improvements identified in the phasing study address all the Westside projects. The Westside Phasing Analysis also identifies milestones based on residential unit counts and commercial square footages to specify when the specific improvements should be in place. As such, the proposed project will be developed in accordance with these milestones and the corresponding specific improvements as identified in the phasing analysis. The project applicant intends to regularly document the amount of Westside development that has occurred and that the required improvements have been constructed at the identified milestones.

A complete listing of the required roadway construction, by phase, and the proportion of the future traffic at each location that is generated by the Mission Village project is provided in Table 4-11. Detailed intersection improvements, by phase, and the proportion of the future traffic at each location that is generated by the Mission Village project is provided in Table 4-12 for County and/or Caltrans intersections and in Table 4-13 for City of Santa Clarita intersections. The resulting ICU values are provided in Table 4-14 and the corresponding intersection LOS is provided in Table 4-15 for the AM peak hour and the PM peak hours.

The Mission Village project, together with the other Westside projects, will develop in accordance with the current Phasing Study unless an updated Phasing Study is prepared to the satisfaction of the County of Los Angeles Department of Public Works at some future date.

Table 4-11: Roadway Construction Stages

Stage	Description	Project Traffic Share %
1	Construct access to Landmark Village from SR-126	1.9%
	Construct access to Water Treatment Plant from SR-126	n/a
	Extend Magic Mountain Parkway into Mission Village.	32.1%
	Extend Westridge Parkway to Magic Mountain Parkway	60.4%
	Widen The Old Road between Feedmill Road & the relocated Rye Canyon interchange	1.8%
	Extend Magic Mountain Parkway into Homestead	22.5%
2	Construct Commerce Center Drive Bridge/connect Mission Village to SR-126	54.4%
	Extend Valencia Boulevard into Legacy Village	0.9%
	Extend Poe Parkway to Valencia Boulevard	n/a
3	Extend Magic Mountain Parkway into Potrero Village	30.7%
	Construct segments of Valencia Blvd (Potrero Village) & Long Canyon Road	5.7%
	Construct Long Canyon Road Bridge/connect Legacy Village (South) to SR-126	1.4%
	Widen SR-126 to 8-lanes between Commerce Center Drive and Long Canyon Road	6.5%
4	Extend Valencia Boulevard to Potrero Village/Magic Mountain Parkway	0.6%
	Widen The Old Road between the relocated Rye Canyon interchange to just north of SR-126	3.9%
5	Construct Valencia Blvd west of Long Canyon Road	2.4%
	Construct access to Legacy Village (North) from SR-126 at Chiquito Cyn Rd and at San Martinez Grande Cyn Rd	3.0%
	Extend Pico Canyon Road to Valencia Blvd	0.9%
6	Construct access to Legacy Village (North) from SR-126 at County Line	4.5%
7	Construct 3rd river crossing Bridge (Potrero/Valencia)	2.6%

Source: Westside Santa Clarita Valley Roadway Phasing Analysis

n/a = not applicable

See Appendix J for Fair-Share Calculations

Table 4-12: Intersection Improvements by Stage (County and Caltrans Locations)

Stage	Intersection	Improvements	Project Traffic Share %
1	7. I-5 SB Ramps & SR-126	Stripe 4th WBT	14.3%
	9. The Old Road & I-5 SB Ramps (at Rye Canyon Road)	Relocate intersection north of the existing location. Provide 1 NBL (U-Turns only), 2 NBT, 2 NBR, 2 SBL, 3 SBT, 2 WBL, and 1 WBR	1.4%
	10. I-5 SB Ramps & Magic Mountain Pkwy	Add 2nd SBR, 3rd EBT, 2nd EBR, 2nd WBL, and 4th WBT (part of the Magic Mountain Interchange Phase 2 project)	19.7%
	11. I-5 NB Ramps & Magic Mountain Pkwy	Add shared NBL/NBR, 2nd EBL, 3rd EBT and convert 4th WBT to shared WBT/WBR (part of the Magic Mountain Interchange Phase 2 project)	17.6%
	25. The Old Road & Rye Canyon Road	Add 2nd & 3rd NBT, 2nd SBL, and 3rd SBT. Restripe 1st WBR to a shared WBL/WBR. Convert the northbound and westbound free-flow right-turn lanes to conventional right-turn lanes with overlap phasing.	7.1%
	26. The Old Road & Magic Mountain Pkwy	Add 2nd NBL, 3rd NBT, 1st NBR, 2nd SBL, 3rd SBT, 1st SBR, 2nd EBL, 3rd & 4th EBT, 2nd WBL, and 4th WBT	21.1%
	28. The Old Road & McBean Pkwy	Signal modification to add a northbound right-turn overlap phase.	27.0%
	80. Wolcott Way & SR-126	Add 1st NBL, 1st & 2nd NBR, 2nd SBL, 3rd EBT, 1st EBR, 2nd WBL, and 3rd WBT	6.4%
	81. Commerce Center Drive & Henry Mayo Drive	Add 1st EBL, 1st & 2nd EBT, and 1st WBT (part of SR-126 grade separation project)	49.3%
	94 (82/83). Commerce Center Drive & SR-126	Construct grade separation for Commerce Center Drive at SR-126 to include direct on- and off-ramps for WB SR-126, a loop on-ramp for SB Commerce Center Drive to EB SR-126, a direct on-ramp for NB Commerce Center Drive to EB SR-126, and a direct off-ramp for EB SR-126 to Commerce Center Drive	44.8%*
	106. Commerce Center Drive & Magic Mountain Pkwy	Construct new intersection. Provide 2 SBL, 2 SBR, 2 EBL, 3 EBT, 3 WBT, and 1 WBR with right-of-way reserved for future conversion to a free-flow right-turn lane (part of the project to extend Magic Mountain Parkway to west of Commerce Center Drive)	53.9%
	107. Westridge Pkwy & Magic Mountain Pkwy	Construct new intersection. Provide 1 NBL, 1 NBT, 1 NBR, 1 SBL, 1 Shared SBT/SBR, 1 EBL, 2 EBT, 1 Shared EBT/EBR, 2 WBL, 2 WBT, and 1 WBR	66.9%
	110. Chiquito Canyon Road/Long Canyon Road & SR-126	Add 1st NBL, 1st & 2nd NBT, 1st & 2nd NBR, 2nd SBL, convert SBR to 1st SBT, add 2nd SBT, 1st EBR, and 1st & 2nd WBL (part of the project to construct Long Canyon Road south of SR-126)	3.7%
	118. Six Flags Entrance & Magic Mountain Pkwy	Add 1st SBR, 1st & 2nd EBL, 2nd, 3rd & 4th EBT, and 2nd, 3rd & 4th WBT (part of the project to extend Magic Mountain Parkway to west of Commerce Center Drive)	32.3%
2	28. The Old Road & McBean Pkwy	Restripe southbound approach to add a 3rd SBT.	27.0%*
	81. Commerce Center Drive & Henry Mayo Drive	Add 1st NBL, 1st, 2nd & 3rd NBT, 2nd SBL, 1st, 2nd & 3rd SBT, 1st EBR, 1st WBL, (part of the project to extend Commerce Center Drive south over the Santa Clara River)	49.3%
	104. Poe Pkwy & Valencia Blvd	Construct new intersection. Provide 1 NBL, 1 NBR, 2 EBT, 1 EBR, 1 WBL, and 2 WBT (part of the project to extend Poe Parkway to Valencia Boulevard)	1.1%
3	101. Long Canyon Road & Valencia Blvd	Construct new intersection. Provide 2 SBL and 1 free-flow WBR (part of the project to construct Valencia Boulevard between Long Canyon Road & Magic Mountain Parkway)	2.1%
	102. Magic Mountain Pkwy & Valencia Blvd (Newhall Ranch)	Construct new intersection. Provide 1 free-flow SBR, and 2 EBL (part of the project to construct Valencia Boulevard between Long Canyon Road & Magic Mountain Parkway)	7.0%

(Continued)

Table 4-12: Intersection Improvements by Stage (County and Caltrans Locations) (Cont'd)

Stage	Intersection	Improvements	Project Traffic Share %
4	25. The Old Road & Rye Canyon Road	Add 2nd & 3rd WBL. Restripe shared WBL/WBR to an exclusive WBR.	7.1%
	101. Long Canyon Road & Valencia Blvd	Add 1st NBT, 1st NBR, 1st SBT, and 1st WBL	2.1%
	102. Magic Mountain Pkwy & Valencia Blvd (Newhall Ranch)	Add 1st & 2nd NBL, 1st & 2nd NBT, 1st NBR, 1st & 2nd SBL, 1st & 2nd SBT, 1st & 2nd EBT, 1st EBR, 1st WBL, 1st & 2nd WBT, 1st WBR (part of the project to extend Valencia Boulevard west to Magic Mountain Parkway)	7.0%
5	12. I-5 SB Ramps & Valencia Blvd	Restripe 2nd WBR to a shared WBT/free-flow WBR	7.5%
	28. The Old Road & McBean Pkwy	Stripe 1st WBR	27.0%*
	96. San Martinez Grande Canyon Road & SR-126	Add 1st SBL, and 1st WBR	4.7%
	101. Long Canyon Road & Valencia Blvd	Add 1st NBL, 1st SBR, 1st & 2nd EBL, 1st, 2nd & 3rd EBT, and 1st & 2nd WBT (part of the project to extend Valencia Boulevard west of Long Canyon Road)	2.1%
	103. Pico Canyon Road & Valencia Blvd	Construct new intersection. Provide 2 NBL, 1 NBR, 2 EBT, 1 EBR, 1 WBL, and 2 WBT (part of the project to extend Pico Canyon Road to Valencia Boulevard)	0.6%
	110. Chiquito Canyon Road/Long Canyon Road & SR-126	Add 2nd NBL, 3rd SBT, 1st SBR, 2nd EBL, 3rd & 4th EBT, and 3rd WBT	3.7%
6a	14. I-5 SB Ramps & McBean Pkwy	Add 2nd SBL	12.6%
	17. I-5 NB Ramps & Lyons Ave	Add 1st free-flow WBR	7.2%
6b	10. I-5 SB Ramps & Magic Mountain Pkwy	Re-stripe the shared SBL/SBT to a SBL and the 1st SBR to a shared SBL/SBT.	19.7%
	16. I-5 SB Loop Ramp & Pico Canyon Road	Restripe eastbound approach to add a 3rd EBT. Add a left-turn phase for the WBL (can be protected/permissive configuration) and right-turn overlap phasing for the NBR.	4.7%
	18. I-5 SB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT	3.4%
	19. I-5 NB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT	3.2%
	26. The Old Road & Magic Mountain Pkwy	Add 5th EBT and right-turn overlap signal phasing for SBR	21.1%
	29. The Old Road & Pico Canyon Road	Convert SBR to 2nd SBT	7.8%
	80. Wolcott & SR-126	Add 4th EBT, 4th WBT, and right-turn overlap signal phasing for NBR	6.4%
	96. San Martinez Grande Canyon Road & SR-126	Add 1st NBL, 1st NBT, 2nd SBL, 1st SBR, 1st EBR, and 1st WBL	4.7%

Source: Westside Santa Clarita Valley Roadway Phasing Analysis

NB = Northbound	NBL = NB Left-turn Lane	NBT = NB Through Lane	NBR = NB Right-turn Lane
SB = Southbound	SBL = SB Left-turn Lane	SBT = SB Through Lane	SBR = SB Right-turn Lane
EB = Eastbound	EBL = EB Left-turn Lane	EBT = EB Through Lane	EBR = EB Right-turn Lane
WB = Westbound	WBL = WB Left-turn Lane	WBT = WB Through Lane	WBR = WB Right-turn Lane

See Appendix J for Fair-Share Calculations

*Due to the project-specific impact at these locations, the indicated mitigation will be implemented and participatory funding from other sources will be utilized as applicable. The fair-share percentage for these locations is provided for reference.

Table 4-13: Intersection Improvements by Stage (City Locations)

Stage	Intersection	Improvements	Project Traffic Share %
1	45. McBean Pkwy & Magic Mountain	Add 4th NBT, 3rd EBT and 3rd WBT	11.2%
	48. McBean Pkwy & Newhall Ranch	Add 4th EBT and 4th WBT	7.3%
	54. Orchard Village & Wiley Canyon	Add 1st NBR and 2nd SBL	2.2%
	55. Orchard Village & McBean Pkwy	Add 1st EBR	2.6%
	57. Valencia Blvd & Magic Mountain	Add 1st NBR, 3rd EBT, 2nd WBL and convert WBR to 3rd WBT	5.6%
	65. Bouquet Canyon Road & Soledad Canyon Road	Add 4th NBT	3.2%
	66. Bouquet Canyon Road & Newhall Ranch Road	Add 2nd SBL, 3rd & 4th EBT and 4th WBT	4.0%
4	55. Orchard Village & McBean	Add 1st SBL, shared SBL/SBT (part of the Henry Mayo Hospital Master Plan Phase 2 project)	2.6%
6a	30. Ave Stanford & Rye Canyon Rd	Add de-facto SBR	11.1%
	33. Rye Canyon Rd/Copper Hill Rd & Newhall Ranch Road	Add 4th EBT	6.0%
	44. McBean Pkwy & Valencia Blvd	Add 4th WBT	2.6%
	51. Wiley & Lyons	Convert EBR to 3rd EBT	4.9%
	54. Orchard Village & Wiley	Convert 2nd EBL to 3rd EBT	2.2%
6b	53. Valley & Lyons	Convert WBR to 3rd WBT	3.6%
	57. Valencia Blvd & Magic Mountain	Add 1st WBR	5.6%

Source: Westside Santa Clarita Valley Roadway Phasing Analysis

NB = Northbound	NBL = NB Left-turn Lane	NBT = NB Through Lane	NBR = NB Right-turn Lane
SB = Southbound	SBL = SB Left-turn Lane	SBT = SB Through Lane	SBR = SB Right-turn Lane
EB = Eastbound	EBL = EB Left-turn Lane	EBT = EB Through Lane	EBR = EB Right-turn Lane
WB = Westbound	WBL = WB Left-turn Lane	WBT = WB Through Lane	WBR = WB Right-turn Lane

See Appendix J for Fair-Share Calculations

Table 4-14: Intersection Capacity Utilization Summary - Cumulative (Phased) Conditions

	Exist.		Stage 1		Stage 2		Stage 3		Stage 4		Stage 5		Stage 6a		Stage 6b	
Intersection	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
7. I-5 SB Ramps & SR-126	.42	.31	.79	.59	.77	.65	.77	.67	.75	.64	.73	.66	.74	.70	.77	.75
8. I-5 NB Ramps & SR-126	.37	.29	.64	.60	.61	.62	.62	.64	.60	.61	.58	.64	.63	.69	.69	.77
9. Old Road & I-5 SB Ramps (at Rye Canyon)	.73	.92	.52	.62	.43	.53	.43	.54	.47	.65	.49	.68	.54	.74	.60	.82
10. I-5 SB Ramps & Magic Mountain	.58	.59	.55	.68	.58	.66	.59	.68	.60	.81	.63	.84	.68	.86	.64	.77
11. I-5 NB Ramps & Magic Mountain	.63	.70	.51	.66	.53	.66	.56	.69	.65	.79	.69	.82	.72	.84	.75	.87
12. I-5 SB Ramps & Valencia	.47	.42	.56	.66	.54	.65	.54	.72	.64	.86	.58	.78	.59	.83	.60	.86
13. I-5 NB Ramps & Valencia	.53	.51	.57	.65	.56	.64	.58	.66	.64	.67	.69	.69	.70	.71	.73	.73
14. I-5 SB Ramps & McBean	.56	.66	.55	.71	.52	.70	.53	.71	.57	.80	.60	.85	.52	.80	.52	.81
15. I-5 NB Ramps & McBean	.41	.66	.53	.71	.54	.69	.54	.70	.56	.72	.58	.76	.61	.81	.63	.85
16. I-5 SB On-Loop & Lyons	.55	.60	.56	.76	.57	.72	.57	.71	.57	.76	.58	.81	.60	.87	.58	.85
17. I-5 NB Ramps & Lyons	.53	.68	.50	.75	.45	.76	.44	.77	.48	.87	.49	.89	.51	.86	.53	.89
18. I-5 SB Ramps & Calgrove	.49	.64	.68	.66	.66	.70	.66	.70	.70	.74	.74	.82	.77	.89	.60	.68
19. I-5 NB Ramps & Calgrove	.64	.52	.79	.51	.78	.51	.78	.52	.82	.56	.85	.64	.88	.71	.67	.67
20. I-5 SB Ramp & Lyons	.44	.46	.41	.59	.40	.57	.40	.57	.46	.60	.50	.62	.51	.66	.53	.70
25. Old Road & Rye Canyon	.87	.84	.70	.80	.71	.72	.75	.74	.85	.66	.83	.73	.85	.78	.94	.85
26. Old Road & Magic Mountain	.49	.63	.55	.61	.51	.59	.58	.67	.68	.71	.73	.80	.78	.85	.85	.85
27. Old Road & Valencia	.54	.61	.52	.59	.58	.60	.60	.66	.66	.71	.75	.85	.76	.87	.79	.90
28. Old Road & McBean	.48	.72	.59	.89	.56	.84	.55	.86	.57	.77	.58	.77	.57	.77	.55	.82
29. Old Road & Pico	.55	.62	.83	.74	.84	.74	.87	.75	.79	.73	.80	.81	.82	.88	.84	.89
30. Stanford & Rye Cyn	.66	.72	.60	.78	.58	.71	.60	.73	.67	.79	.70	.85	.70	.80	.73	.88
32. Ave Scott & Rye	.70	.71	.67	.69	.65	.65	.68	.66	.70	.67	.72	.68	.73	.71	.73	.79
33. Copper Hill & Newhall Ranch	.59	.58	.69	.74	.77	.84	.82	.86	.79	.89	.81	.88	.82	.83	.81	.84
36. Tourney & Valencia	.40	.46	.57	.58	.56	.57	.56	.59	.56	.63	.58	.67	.60	.69	.64	.73
37. Tourney & Magic Mtn	.44	.51	.39	.63	.38	.63	.40	.65	.45	.67	.49	.71	.50	.73	.53	.77
44. McBean & Valencia	.62	.72	.86	.89	.86	.89	.85	.89	.85	.90	.88	.90	.84	.87	.85	.86
45. McBean & Magic Mtn	.58	.75	.78	.89	.76	.87	.75	.87	.80	.88	.81	.89	.79	.90	.77	.90
47. McBean & Scott	.67	.64	.87	.84	.86	.86	.86	.87	.85	.85	.84	.85	.85	.88	.89	.88
48. McBean & Newhall Ranch	.64	.71	.89	.87	.86	.88	.86	.90	.86	.84	.88	.84	.87	.89	.87	.90
51. Wiley & Lyons	.49	.74	.55	.78	.56	.78	.56	.80	.56	.83	.59	.87	.58	.81	.60	.87
53. Valley & Lyons	.49	.60	.51	.77	.51	.77	.51	.78	.52	.78	.56	.83	.58	.86	.58	.85
54. Orchard Village & Wiley	.46	.76	.60	.79	.60	.80	.60	.79	.58	.80	.61	.88	.64	.86	.68	.90
55. Orchard Village & McBean	.58	.79	.65	.84	.64	.84	.65	.85	.65	.80	.68	.83	.71	.86	.72	.90
57. Valencia & Magic Mtn	.52	.82	.80	.85	.82	.84	.81	.84	.83	.87	.85	.89	.88	.88	.90	.90

(Continued)

Table 4-14: Intersection Capacity Utilization Summary - Cumulative (Phased) Conditions (Continued)

	Exist.		Stage 1		Stage 2		Stage 3		Stage 4		Stage 5		Stage 6a		Stage 6b	
Intersection	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
65. Bouquet & Soledad	.78	.94	.78	.88	.79	.89	.79	.88	.74	.80	.78	.81	.79	.82	.81	.88
66. Bouquet & Newhall Ranch	.76	.76	.88	.86	.88	.86	.88	.85	.88	.79	.89	.83	.89	.84	.86	.88
80. Wolcott & SR-126	.34	.46	.54	.77	.54	.80	.55	.79	.56	.74	.66	.77	.77	.86	.76	.79
81. Commerce Center & Henry Mayo	--	--	.22	.37	.37	.36	.44	.42	.50	.47	.65	.54	.75	.61	.78	.72
82. Commerce Center & SR-126 EB Ramps	--	--	.13	.18	.32	.26	.38	.34	.37	.39	.42	.41	.45	.43	.47	.46
83. Commerce Center & SR-126 WB Ramps	--	--	.54	.41	.67	.55	.74	.62	.78	.69	.80	.72	.81	.78	.80	.87
96. Martinez/Potrero & SR-126	.33	.46	.37	.45	.38	.46	.38	.46	.41	.50	.44	.52	.56	.64	.70	.72
101. Long Canyon & Valencia	--	--	--	--	--	--	.10	.10	.12	.20	.31	.41	.47	.65	.50	.81
102. Newhall Ranch & Valencia	--	--	--	--	--	--	.10	.10	.24	.21	.36	.40	.43	.51	.68	.71
103. Pico Canyon & Valencia	--	--	--	--	--	--	--	--	.26	.29	.53	.59	.63	.74	.66	.80
104. Poe & Valencia	--	--	--	--	.23	.19	.24	.19	.38	.33	.57	.52	.64	.59	.68	.63
105. Westridge & Valencia	.48	.20	.31	.17	.40	.22	.45	.31	.46	.40	.54	.54	.56	.58	.56	.64
106. Commerce Center & Magic Mountain	--	--	.19	.24	.69	.33	.84	.47	.78	.56	.59	.67	.67	.72	.74	.74
107. Westridge & Magic Mountain	--	--	.21	.26	.40	.32	.48	.44	.56	.53	.63	.63	.66	.67	.67	.67
110. Chiquito Canyon & SR-126	.38	.44	.56	.58	.58	.58	.58	.58	.59	.59	.69	.63	.87	.90	n/a[1]	n/a[1]
118. Six Flags Entrance & Magic Mountain	--	--	.25	.47	.29	.46	.32	.50	.39	.59	.44	.65	.44	.67	.45	.74

Sources: Westside Santa Clarita Valley Roadway Phasing Analysis, Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita

[1]not applicable – This scenario has been evaluated using the Highway Capacity Manual Signalized Intersection methodology.

Table 4-15: Peak Hour Level of Service Summary – Cumulative (Phased) Conditions

Intersection	Exist.	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6a	Stage 6b
AM Peak Hour								
7. I-5 SB Ramps & SR-126	A	C	C	C	C	C	C	C
8. I-5 NB Ramps & SR-126	A	B	B	B	A	A	B	B
9. Old Road & I-5 SB Ramps (at Rye Canyon)	C	A	A	A	A	A	A	A
10. I-5 SB Ramps & Magic Mountain	A	A	A	A	A	B	B	B
11. I-5 NB Ramps & Magic Mountain	B	A	A	A	B	B	C	C
12. I-5 SB Ramps & Valencia	A	A	A	A	B	A	A	A
13. I-5 NB Ramps & Valencia	A	A	A	A	B	B	B	C
14. I-5 SB Ramps & McBean	A	A	A	A	A	A	A	A
15. I-5 NB Ramps & McBean	A	A	A	A	A	A	B	B
16. I-5 SB On-Loop & Lyons	A	A	A	A	A	A	A	A
17. I-5 NB Ramps & Lyons	A	A	A	A	A	A	A	A
18. I-5 SB Ramps & Calgrove	A	B	B	B	B	C	C	A
19. I-5 NB Ramps & Calgrove	B	C	C	C	D	D	D	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	A	A	A
25. Old Road & Rye Canyon	D	B	C	C	D	D	D	D
26. Old Road & Magic Mountain	A	A	A	A	B	C	C	D
27. Old Road & Valencia	A	A	A	A	B	C	C	C
28. Old Road & McBean	A	A	A	A	A	A	A	A
29. Old Road & Pico	A	D	D	D	C	C	D	D
30. Stanford & Rye Cyn	B	A	A	A	B	B	B	C
32. Ave Scott & Rye	B	B	B	B	B	C	C	C
33. Copper Hill & Newhall Ranch	A	B	C	D	C	D	D	D
36. Tourney & Valencia	A	A	A	A	A	A	A	B
37. Tourney & Magic Mtn	A	A	A	A	A	A	A	A
44. McBean & Valencia	B	D	D	D	D	D	D	D
45. McBean & Magic Mtn	A	C	C	C	C	D	C	C
47. McBean & Scott	B	D	D	D	D	D	D	D
48. McBean & Newhall Ranch	B	D	D	D	D	D	D	D
51. Wiley & Lyons	A	A	A	A	A	A	A	A
53. Valley & Lyons	A	A	A	A	A	A	A	A
54. Orchard Village & Wiley	A	A	A	A	A	B	B	B
55. Orchard Village & McBean	A	B	B	B	B	B	C	C
57. Valencia & Magic Mtn	A	C	D	D	D	D	D	D
65. Bouquet & Soledad	C	C	C	C	C	C	C	D
66. Bouquet & Newhall Ranch	C	D	D	D	D	D	D	D
80. Wolcott & SR-126	A	A	A	A	A	B	C	C
81. Commerce Center & Henry Mayo	--	A	A	A	A	B	C	C
82. Commerce Center & SR-126 EB Ramps	--	A	A	A	A	A	A	A
83. Commerce Center & SR-126 WB Ramps	--	A	B	C	C	C	D	C
96. Martinez/Potrero & SR-126	A	A	A	A	A	A	A	B
101. Long Canyon & Valencia	--	--	--	A	A	A	A	A
102. Newhall Ranch & Valencia	--	--	--	A	A	A	A	B

(Continued)

Table 4-15: Peak Hour Level of Service Summary – Cumulative (Phased) Conditions (Continued)

Intersection	Exist.	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6a	Stage 6b
103. Pico Canyon & Valencia	--	--	--	--	A	A	B	B
104. Poe & Valencia	--	--	A	A	A	A	B	B
105. Westridge & Valencia	A	A	A	A	A	A	A	A
106. Commerce Center & Magic Mountain	--	A	B	D	C	A	B	C
107. Westridge & Magic Mountain	--	A	A	A	A	B	B	B
110. Chiquito Canyon & SR-126	A	A	A	A	A	B	D	D
118. Six Flags Entrance & Magic Mountain	--	A	A	A	A	A	A	A
PM Peak Hour								
7. I-5 SB Ramps & SR-126	A	A	B	B	B	B	B	C
8. I-5 NB Ramps & SR-126	A	A	B	B	B	B	B	C
9. Old Road & I-5 SB Ramps (at Rye Canyon)	E	B	A	A	B	B	C	D
10. I-5 SB Ramps & Magic Mountain	A	B	B	B	D	D	D	C
11. I-5 NB Ramps & Magic Mountain	B	B	B	B	C	D	D	D
12. I-5 SB Ramps & Valencia	A	B	B	C	D	C	D	D
13. I-5 NB Ramps & Valencia	A	B	B	B	B	B	C	C
14. I-5 SB Ramps & McBean	B	C	B	C	C	D	C	D
15. I-5 NB Ramps & McBean	B	C	B	B	C	C	D	D
16. I-5 SB On-Loop & Lyons	A	C	C	C	C	D	D	D
17. I-5 NB Ramps & Lyons	B	C	C	C	D	D	D	D
18. I-5 SB Ramps & Calgrove	B	B	B	B	C	D	D	B
19. I-5 NB Ramps & Calgrove	A	A	A	A	A	B	C	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	B	B	B
25. Old Road & Rye Canyon	D	C	C	C	B	C	C	D
26. Old Road & Magic Mountain	B	B	A	B	C	C	D	D
27. Old Road & Valencia	B	A	A	B	C	D	D	D
28. Old Road & McBean	C	D	D	D	C	C	C	D
29. Old Road & Pico	B	C	C	C	C	D	D	D
30. Stanford & Rye Cyn	C	C	C	C	C	D	C	D
32. Ave Scott & Rye	C	B	B	B	B	B	C	C
33. Copper Hill & Newhall Ranch	A	C	D	D	D	D	D	D
36. Tourney & Valencia	A	A	A	A	B	B	B	C
37. Tourney & Magic Mtn	A	B	B	B	B	C	C	C
44. McBean & Valencia	C	D	D	D	D	D	D	D
45. McBean & Magic Mtn	C	D	D	D	D	D	D	D
47. McBean & Scott	B	D	D	D	D	D	D	D
48. McBean & Newhall Ranch	C	D	D	D	D	D	D	D
51. Wiley & Lyons	C	C	C	C	D	D	D	D
53. Valley & Lyons	A	C	C	C	C	D	D	D
54. Orchard Village & Wiley	C	C	C	C	C	D	D	D
55. Orchard Village & McBean	C	D	D	D	C	D	D	D
57. Valencia & Magic Mtn	D	D	D	D	D	D	D	D
65. Bouquet & Soledad	E	D	D	D	C	D	D	D
66. Bouquet & Newhall Ranch	C	D	D	D	C	D	D	D
80. Wolcott & SR-126	A	C	C	C	C	C	D	C
81. Commerce Center & Henry Mayo	--	A	A	A	A	A	B	C

(Continued)

Table 4-15: Peak Hour Level of Service Summary – Cumulative (Phased) Conditions (Continued)

Intersection	Exist.	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6a	Stage 6b
82. Commerce Center & SR-126 EB Ramps	--	A	A	A	A	A	A	A
83. Commerce Center & SR-126 WB Ramps	--	A	A	B	B	C	C	D
96. Martinez/Potrero & SR-126	A	A	A	A	A	A	B	C
101. Long Canyon & Valencia	--	--	--	A	A	A	B	D
102. Newhall Ranch & Valencia	--	--	--	A	A	A	A	C
103. Pico Canyon & Valencia	--	--	--	--	A	A	C	C
104. Poe & Valencia	--	--	A	A	A	A	A	B
105. Westridge & Valencia	A	A	A	A	A	A	A	B
106. Commerce Center & Magic Mountain	--	A	A	A	A	B	C	C
107. Westridge & Magic Mountain	--	A	A	A	A	B	B	B
110. Chiquito Canyon & SR-126	A	A	A	A	A	B	D	D
118. Six Flags Entrance & Magic Mountain	--	A	A	A	A	B	B	C

Sources: Westside Santa Clarita Valley Roadway Phasing Analysis, Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita

4.4 SPECIAL ISSUES

4.4.1 Interim Conditions without Commerce Center Drive Connection to SR-126

The purpose of this section is to identify the amount of project development that can occur prior to completing the connection of Commerce Center Drive between the project site and SR-126. This analysis supplements the cumulative conditions phasing analysis presented in the previous section by providing a threshold of development specific to the proposed project. While the cumulative conditions phasing analysis provides a threshold of development based on the entire Westside area, the threshold identified here is specific to Mission Village. It is intended that the connection of Commerce Center Drive between the project site and SR-126 be implemented by either threshold based on whichever occurs first.

The initial access to the project site will occur via the extensions of Magic Mountain Parkway and Westridge Parkway. As noted in the previous sections, a future extension of Magic Mountain Parkway to the west of the project site will provide access to the westerly areas of the Newhall Ranch Specific Plan area, and an extension of Commerce Center Drive between SR-126 and the project site will provide access to the north. Table 4-16 summarizes the amount of project traffic that is anticipated to utilize the Commerce Center Drive connection to the north.

As shown in the previously referenced Table 4-16, approximately 30 percent to 37 percent of the project's external traffic is anticipated to utilize the Commerce Center Drive connection to the north once the project is fully built out. However, since the initial occupancies within the project site are anticipated to occur prior to completion of that connection, an interim level of project development that can be accommodated without the connection has been derived. This interim level of development, referred to here as Project Stage 1, is based on the amount of traffic that can be accommodated by the remaining roadways (i.e., without the Commerce Center Drive connection), and is summarized in Table 4-17.

Project Stage 1 maintains the same ratio of residential to non-residential development as does the full project, and therefore is anticipated to achieve a rate of internal tripend capture that is comparable to the full project. It consists of 2,780 residential units and approximately 935,000 square feet of non-residential commercial development. As shown in the previously referenced Table 4-17, Project Stage 1 will generate approximately 25,000 external trips daily (2,251 in the AM peak hour and 2,615 in the PM peak Hour), which is roughly equivalent to the amount of project traffic that will be accommodated by each of the project access roadways other than the Commerce Center Drive connection.

Table 4-16: External Trip Totals With and Without Commerce Center Drive Extension

	AM Peak Hour			PM Peak Hour			
	IB	**OB**	**Total**	**IB**	**OB**	**Total**	**ADT**
Total External Project Trips	1,960	1,660	3,620	1,870	2,250	4,120	39,000
Commerce Center Drive Bridge Volumes	590	620	1,210	680	770	1,450	12,000
% of Total	30%	37%	33%	36%	34%	35%	31%
Volumes for Remainder of Access Roadway	1,370	1,040	2,410	1,190	1,480	2,670	27,000
% of Total	70%	63%	67%	64%	66%	65%	69%

Table 4-17: Land Use and Trip Generation without Commerce Center Drive Extension (Project Stage 1)

Land Use Type		AM Peak Hour			PM Peak Hour			
	Units	**IB**	**OB**	**Total**	**IB**	**OB**	**Total**	**ADT**
3. Single Family (6-10 du/ac)	250 DU	48	140	188	160	93	253	2,475
4. Condominium/Townhouse	1,500 DU	150	720	870	705	390	1,095	12,000
5. Apartment	500 DU	40	215	255	205	105	310	3,450
7. Senior (Active)	300 DU	24	36	60	48	30	78	1,113
8. CCRC	230 DU	28	14	41	32	35	67	646
Residential Total	*2,780 DU*	*289*	*1,125*	*1,414*	*1,150*	*652*	*1,802*	*19,684*
% of Total		*17%*	*76%*	*45%*	*65%*	*33%*	*48%*	*53%*
13. Commercial Shops	135 TSF	97	65	162	243	243	486	5,004
20. Elementary/Middle School	600 STU	156	120	276	48	54	102	870
24. Library	36 TSF	27	11	38	122	133	255	3,059
31. Business Park	420 TSF	504	97	601	126	416	542	4,284
40. Commercial Office	380 TSF	589	72	661	80	490	570	4,393
51. Developed Park[1]	40.9 AC	0	0	0	1	2	3	106
Non-Residential Total		*1,374*	*364*	*1,738*	*620*	*1,338*	*1,958*	*17,717*
% of Total		*83%*	*24%*	*55%*	*35%*	*67%*	*52%*	*47%*
TOTAL		**1,663**	**1,489**	**3,152**	**1,771**	**1,990**	**3,760**	**37,401**
% of Full Project		***62%***	***63%***	***62%***	***64%***	***63%***	***63%***	***64%***
External Trips		**1,210**	**1,041**	**2,251**	**1,196**	**1,418**	**2,615**	**25,002**
% External		***73%***	***70%***	***71%***	***68%***	***71%***	***70%***	***67%***

DU = Dwelling Units
TSF = Thousand Square Feet
STU = Students
AC = Acres

[1]Includes private recreation centers.

See Table 3-1 for trip rates.

The above table represents one potential amount of Project Stage 1 development that can be accommodated prior to the construction of the Commerce Center Drive extension. However, multiple combinations of residential and non-residential development can result in similar quantities of off-site project traffic volumes, all of which could be accommodated prior to the construction of the Commerce Center Drive extension. Flexibility in the makeup of Project Stage 1 development (e.g., more residential units with a lesser amount of commercial square footage) should be allowed provided that the net amount of off-site traffic generated by Project Stage 1 does not exceed the amounts indicated in the previously referenced Table 4-17.

4.4.2 Apartment to Condominium Scenario

As noted in Section 3.2, the proposed project trip generation is based on a housing mix that would include 905 apartments and 2,315 condominium/townhomes; the impacts analysis presented in prior Sections is based on that housing mix. However, the Specific Plan provides the applicant with certain flexibility relative to the specific type of housing to be built due, in part, to market considerations. For example, if at project buildout the rental market weakened while the for-sale market strengthened, the Specific Plan provides the applicant with the flexibility to adjust the housing mix such that the 905 apartments could be developed as condominiums. However, under that scenario, the project trip generation would increase because the trip generation rate for townhomes/condominiums is higher (8.0 tripends/day) than is the trip rate for apartments (6.9 tripends/day).

To address the potential traffic-related impacts associated with such shift in housing type, this section of the traffic study considers a scenario in which all 905 apartments are instead developed as condominiums. As shown in Table 4-18, under this scenario the proposed project would generate an additional 63 AM peak hour tripends, 100 more PM peak hour tripends, and 996 more daily tripends.

To determine the impact of the additional trips that would be generated under an all condominium scenario, the net volume of trips external to the project site (see the previously referenced Table 4-18 for amount) were distributed throughout the study area. A summary of the ICU calculations based on this scenario is provided in Table 4-19 for 2021 cumulative conditions, in Table 4-20 for existing plus ambient growth conditions, and in Table 4-21 for 2035 cumulative conditions (see Appendix G for ICU worksheets). These tables show that with the mitigation that has been identified for the project, no additional project impacts would occur under this scenario.

Table 4-18: Land Use and Trip Generation Summary – Condominium Scenario

		AM Peak Hour			PM Peak Hour			
Land Use Type	**Units**	**IB**	**OB**	**Total**	**IB**	**OB**	**Total**	**ADT**
Apartment Scenario								
5. Apartment	905 DU	73	388	461	370	190	560	6,244
Condominium Scenario								
4. Condominium/Townhouse	905 DU	91	434	525	425	235	660	7,240
Net Change								
Increase	*0 DU*	*18*	*46*	*64*	*55*	*45*	*100*	*996*
% Internal		30%	30%	/	25%	30%	/	30%
Tripends for Internal Trips		5	14	19	14	14	28	299
Tripends for External Trips		13	32	45	41	31	72	697
Trip Rates								
4. Condominium/Townhouse[1]	DU	.10	.48	.58	.47	.26	.73	8.00
5. Apartment[1]	DU	.08	.43	.51	.41	.21	.62	6.90

DU = Dwelling Units

Trip rate source:
[1]Santa Clarita Valley Consolidated Transportation Model (SCVCTM)

Table 4-19: ICU and LOS Summary – 2021 Cumulative Conditions (Condo Scenario)

	2021 Cumulative without Project				2021 Cumulative with Project (Condo Scenario) with Mitigation				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.83	D	.70	B	.73	C	.66	B	-.10	-.04
9. The Old Road & I-5 SB Ramps	.81	D	1.06	F	.82	D	1.06	F	.01	.00
10. I-5 SB Ramps & Magic Mountain Parkway	.58	A	.56	B	.64	B	.63	B	.06	.07
12. I-5 SB Ramps & Valencia Boulevard	.72	C	.81	D	.62	B	.67	B	-.10	-.14
14. I-5 SB Ramps & McBean Parkway	.52	A	.71	C	.54	A	.73	C	.02	.02
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.61	B	.69	B	.63	B	.71	C	.02	.02
Freeway Ramp Intersections (City)										
8. I-5 NB Ramps & Henry Mayo Drive (SR-126)	.59	A	.59	A	.61	B	.62	B	.02	.03
11. I-5 NB Ramps & Magic Mountain Parkway	.60	A	.61	B	.69	B	.70	B	.09	.09
13. I-5 NB Ramps & Valencia Boulevard	.67	B	.62	B	.68	B	.64	B	.01	.02
15. I-5 NB Ramps & McBean Parkway	.52	A	.57	A	.53	A	.59	A	.01	.02
17. I-5 NB On/Off & Lyons Avenue	.51	A	.75	C	.52	A	.77	C	.01	.02
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.03	F	1.21	F	.78	C	.91	E	-.25	-.30
26. The Old Road & Magic Mountain Parkway	.43	A	.51	A	.60	A	.59	A	.17	.08
27. The Old Road & Valencia Boulevard	.68	B	.60	A	.71	C	.73	C	.03	.13
28. The Old Road & McBean Parkway	.53	A	.85	D	.54	A	.86	D	.01	.01
29. The Old Road & Pico Canyon Road	.71	C	.80	C	.74	C	.82	D	.03	.02
94. Commerce Center Drive & SR-126	1.04	F	1.17	F	n/a (Grade Separated Intersection)					
105. Westridge Parkway & Valencia Boulevard	.53	A	.38	A	.58	A	.52	A	.05	.14
108. Stevenson Ranch Parkway & Pico Canyon Road	.60	A	.55	A	.60	A	.56	A	.00	.01
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.57	A	.46	A	.57	A	.46	A	.00	.00
City Arterial Intersections										
30. Avenue Stanford & Rye Canyon Road	.57	A	.66	B	.60	A	.68	B	.03	.02
33. Copper Hill Drive & Newhall Ranch Road	.72	C	.77	C	.75	C	.80	C	.03	.03

(Continued)

Table 4-19: ICU and LOS Summary – 2021 Cumulative Conditions (Condo Scenario) (Continued)

	2021 Cumulative without Project				2021 Cumulative with Project (Condo Scenario) with Mitigation				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
City Arterial Intersections										
35. Copper Hill Drive & Decoro Drive	.63	B	.63	B	.65	B	.64	B	.02	.01
36. Tourney Road & Valencia Boulevard	.51	A	.60	A	.52	A	.62	B	.01	.02
37. Tourney Road & Magic Mountain Parkway	.52	A	.56	A	.56	A	.62	B	.04	.06
44. McBean Parkway & Valencia Boulevard	.70	B	.83	D	.70	B	.84	D	.00	.01
45. McBean Parkway & Magic Mountain Parkway	.71	C	.92	E	.75	C	.92	E	.04	.00
48. McBean Parkway & Newhall Ranch Road	.78	C	1.01	F	.70	B	.81	D	-.08	-.20
49. McBean Parkway & Decoro Drive	.70	B	.60	A	.72	C	.61	B	.02	.01
51. Wiley Canyon Road & Lyons Avenue	.65	B	.83	D	.66	B	.84	D	.01	.01
54. Orchard Village Road & Wiley Canyon Road	.65	B	.75	C	.65	B	.75	C	.00	.00
55. Orchard Village Road & McBean Parkway	.65	B	.83	D	.64	B	.80	C	-.01	-.03
57. Valencia Boulevard & Magic Mountain Parkway	.79	C	.83	D	.80	C	.84	D	.01	.01
65. Bouquet Canyon Road & Soledad Canyon Road	.79	C	.91	E	.80	C	.91	E	.01	.00
66. Bouquet Canyon Road & Newhall Ranch Road	.89	D	1.01	F	.83	D	.88	D	-.06	-.13

Level of service ranges: .00 - .60 A; .61 - .70 B; .71 - .80 C; .81 - .90 D; .91 – 1.00 E; Above 1.00 F

Table 4-20: ICU and LOS Summary – Existing plus Ambient Conditions (Condo Scenario)

	Existing plus Ambient without Project				Existing plus Ambient plus Project (Condo Scenario) with Mitigation				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.86	D	.50	A	.84	D	.55	A	-.02	.05
9. The Old Road & I-5 SB Ramps	.88	D	1.11	F	.88	D	1.06	F	.00	-.05
10. I-5 SB Ramps & Magic Mountain Parkway	.43	A	.44	A	.52	A	.49	A	.09	.05
12. I-5 SB Ramps & Valencia Boulevard	.62	B	.55	A	.68	B	.59	A	.06	.04
14. I-5 SB Ramps & McBean Parkway	.45	A	.58	A	.46	A	.60	A	.01	.02
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.69	B	.73	C	.69	B	.74	C	.00	.01
County Arterial Intersections										
25. The Old Road & Rye Canyon	.74	C	.79	C	.66	B	.79	C	-.08	.00
26. The Old Road & Magic Mountain Parkway	.32	A	.38	A	.49	A	.43	A	.17	.05
27. The Old Road & Valencia Boulevard	.80	C	.53	A	.82	D	.59	A	.02	.06
28. The Old Road & McBean Parkway	.70	B	.92	E	.67	B	.91	E	-.03	-.01
29. The Old Road & Pico Canyon Road	.75	C	.84	D	.75	C	.84	D	.00	.00
94. Commerce Center Drive & SR-126	.65	B	.97	E	n/a (Grade Separated Intersection)					
105. Westridge Parkway & Valencia Boulevard	.66	B	.22	A	.71	C	.36	A	.05	.14
108. Stevenson Ranch Parkway & Pico Canyon Road	.57	A	.62	B	.58	A	.62	B	.01	.00
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.77	C	.47	A	.77	C	.48	A	.00	.01

Level of service ranges: .00 - .60 A; .61 - .70 B; .71 - .80 C; .81 - .90 D; .91 – 1.00 E; Above 1.00 F

Table 4-21: ICU and LOS Summary – 2035 Cumulative Conditions (Condo Scenario)

	2035 Cumulative without Project				2035 Cumulative with Project (Condo Scenario) with Mitigation				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
Freeway Ramp Intersections (County)										
7. I-5 SB Ramps & Henry Mayo Drive (SR-126)	.96	E	.96	E	.83	D	.90	D	-.13	-.06
9. The Old Road & I-5 SB Ramps	.84	D	1.34	F	.81	D	1.06	F	-.03	-.28
10. I-5 SB Ramps & Magic Mountain Parkway	.82	D	.88	D	.76	C	.82	D	-.06	-.06
12. I-5 SB Ramps & Valencia Boulevard	.77	C	1.19	F	.65	B	.96	E	-.12	-.23
14. I-5 SB Ramps & McBean Parkway	.72	C	.94	E	.62	B	.84	D	-.10	-.10
16. I-5 SB/Marriott & Pico Canyon Road/Lyons Avenue	.67	B	1.08	F	.69	B	1.08	F	.02	.00
Freeway Ramp Intersections (City)										
8. I-5 NB Ramps & SR-126	.59	A	.69	B	.60	A	.71	C	.01	.02
11. I-5 NB Ramps & Magic Mountain	.78	C	.86	D	.76	C	.84	D	-.02	-.02
13. I-5 NB Ramps & Valencia	.78	C	.83	D	.79	C	.84	D	.01	.01
15. I-5 NB Ramps & McBean	.60	A	.67	B	.62	B	.69	B	.02	.02
17. I-5 NB On/Off & Lyons Ave	.56	A	.89	D	.57	A	.79	C	.01	-.10
County Arterial Intersections										
25. The Old Road & Rye Canyon	1.73	F	2.04	F	.83	D[1]	.89	D[1]	-.90	-1.15
26. The Old Road & Magic Mountain Parkway	.66	B	.79	C	.78	C	.89	D	.12	.10
27. The Old Road & Valencia Boulevard	.72	C	.83	D	.79	C[1]	.89	D[1]	.07	.06
28. The Old Road & McBean Parkway	.63	B	.94	E	.70	B	.89	D	.07	-.05
29. The Old Road & Pico Canyon Road	.89	D	.96	E	.91	E[1]	.97	E[1]	.02	.01
94. Commerce Center Drive & SR-126	1.31	F	1.60	F	n/a (Grade Separated Intersection)					
105. Westridge Parkway & Valencia Boulevard	.58	A	.62	B	.59	A	.76	C	.01	.14
108. Stevenson Ranch Parkway & Pico Canyon Road	.61	B	.79	D	.61	B	.79	C	.00	.00
109. Stevenson Ranch Parkway & Poe Parkway/Chase	.48	A	.58	A	.48	A	.58	A	.00	.00
City Arterial Intersections										
30. Stanford & Rye Canyon	.55	A	.77	C	.57	A	.78	C	.02	.01
33. Copper Hill & Newhall Ranch	.78	C	.84	D	.81	D	.87	D	.03	.03
35. Copper Hill & Decoro	.70	B	.80	C	.72	C	.81	D	.02	.01
36. Tourney & Valencia	.67	B	.87	D	.68	B	.88	D	.01	.01
37. Tourney & Magic Mountain	.67	B	.86	D	.74	C	.82	D	.07	-.04
44. McBean & Valencia	.69	B	.94	E	.70	B	.94	E	.01	.00

(Continued)

Table 4-21: ICU and LOS Summary – 2035 Cumulative Conditions (Condo Scenario) (Continued)

	2035 Cumulative without Project				2035 Cumulative with Project (Condo Scenario) with Mitigation				Increase	
	AM		PM		AM		PM			
Intersection	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**ICU**	**LOS**	**AM**	**PM**
45. McBean & Magic Mountain	.92	E	1.19	F	.81	D[1]	1.06	F[1]	-.11	-.13
48. McBean & Newhall Ranch	.81	D	1.11	F	.83	D	.89	D	.02	-.22
49. McBean & Decoro	.65	B	.66	B	.65	B	.66	B	.00	.00
51. Wiley Canyon & Lyons Cyn	.70	B	1.07	F	.63	B	.96	E	-.07	-.11
54. Orchard Village & Wiley Cyn	1.06	F	1.42	F	.98	E[1]	1.27	F[1]	-.08	-.15
55. Orchard Village & McBean	.90	D	1.20	F	.91	E[1]	1.18	F[1]	.01	-.02
57. Valencia & Magic Mountain	1.10	F	1.24	F	.93	E	1.12	F	-.17	-.12
65. Bouquet & Soledad	.78	C	.99	E	.79	C	.99	E	.01	.00
66. Bouquet & Newhall Ranch	.99	E	1.14	F	.95	E	.97	E	-.04	-.17

Intersection Level of Service Performance Criteria is LOS D, unless noted otherwise.

[1]LOS E is the Level of Service Performance Criteria for this location (See Reference 6 in Section 1.6).

Level of service ranges:						
	.00 - .60	A	.71 - .80	C	.91 – 1.00	E
	.61 - .70	B	.81 - .90	D	Above 1.00	F

4.4.3 Congestion Management Program Analysis

The Los Angeles County Congestion Management Program (CMP) requires that a proposed development address two major subject areas with respect to traffic impacts. These are the project's impacts on the CMP highway system and the project's impacts on the local and regional transit systems.

According to the CMP guidelines, the geographical area examined in a CMP traffic impact analysis (TIA) consists of the CMP monitoring locations that meet the following criteria:

1. CMP intersections where the proposed project will add 50 or more trips during the AM or PM weekday peak hours (of adjacent street traffic).

2. Mainline freeway locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.

The CMP intersections nearest to the project site are the Chiquito Canyon Road/SR-126 intersection and the Valencia Boulevard/Magic Mountain Parkway intersection. The number of trips to and from the proposed project is forecast to include more than 50 peak hour trips at each of these intersections (201 peak hour trips and 174 peak hour trips, respectively). The next closest CMP intersection is the intersection of Railroad Avenue (formerly San Fernando Road) and Lyons Avenue and the maximum number of project trips at that location is less than 50 during the peak hour (approximately 6 peak hour trips).

The impact analyses of the previous sections show how the proposed project alone does not result in a significant impact at either CMP intersection location but that under cumulative conditions each intersection requires mitigation to operate at an acceptable CMP level of service. The mitigation identified for cumulative conditions as outlined in the phasing study results in LOS D at each location, which is better than the CMP LOS E threshold.

The nearest mainline freeway CMP monitoring locations are the following:

1. I-5 north of SR-126
2. I-5 north of SR-14

As shown in Section 3.5, the proposed project is forecast to add 150 or more peak hour trips to each of these locations and, as such, a CMP mainline freeway analysis is required. The next closest

mainline freeway CMP monitoring location is the segment of I-5 north of Osborne Street in the San Fernando Valley. The maximum number of project trips at that location is less than 150 during the peak hour since the amount of project trips entering and leaving the Santa Clarita Valley is under that threshold (see the previously referenced Table 3-5).

Section 4.1.3 includes an analysis of the mainline freeway segments that meet the CMP criteria for analysis and shows that the project does not result in a significant impact at either of those locations.

Another component of the CMP transportation impact analysis is a review of transit impacts. This review includes evidence that transit operators received the Notice of Preparation (included in the project's environmental documentation), identification of existing transit services near the project, estimation of the number of project trips assigned to transit, information on facilities and/or programs that will encourage public transit use, and an analysis of project impacts on transit service.

The project applicant is working with the City of Santa Clarita Transit to provide bus service to the project site. A bus transfer station is proposed for the project site, which would facilitate the use of transit for those who live or work at the project site.

The nearest existing bus routes to the project site are Santa Clarita Transit Routes 3 and 7, which currently serve the McBean Regional Transit Center, Valencia Town Center, Civic Center, College of the Canyons, Six Flags Magic Mountain, The Old Road/Westridge Center, Kaiser, Santa Clarita Park, and is near Arroyo Seco Jr. High School. Also near to the project site are Santa Clarita Transit Routes 1 and 2, which serve the McBean Regional Transit Center, Industrial Center, Commerce Center, Newhall Metrolink, City Hall, Valencia Town Center, River Oaks Shopping Center, Canyon High School, Sierra Vista Jr. High School, and Plum Canyon. The project is also located approximately five miles from the Soledad Metrolink Station.

Buildout of the Mission Village project is forecast to generate approximately 58,000 ADT. To estimate the number of project trips that would use public transit, the number of project vehicle trips is multiplied by an occupancy factor to determine total person trips, which is then multiplied by the applicable MTA factor provided in the CMP. The occupancy factor (1.4) is likewise provided in the CMP. When new bus routes are provided to the project site, the project is anticipated to generate the amount of transit trips shown in Table 4-22 based on the transit trip factors specified in the CMP impact analysis guidelines.

The County does not have LOS standards for transit service that are applicable to future development, such as the proposed project; however, the substantial demand for transit service that would result from the Mission Village project (approximately 300 to 500 peak hour trips), has the potential to result in a significant impact to transit services. The Mission Village project would facilitate the use of public transit by providing a bus transfer station and areas designated for bus stops along the Commerce Center Drive and Magic Mountain Parkway extensions. Additionally, transit service is evaluated and funded on an as-needed basis. Coordination with the transit provider to identify appropriate bus stops and the payment of transit mitigation fees (adopted by Santa Clarita Transit, MTA), as appropriate, would reduce the potential for transit-related impacts to a less than significant level. In this regard, to ensure that adequate transit capacity to serve the proposed project is available in the future, mitigation is proposed that requires the project applicant to pay applicable transit mitigation fees at the time of building permit issuance, unless the payment of such fees is modified by a transit mitigation agreement.

It is anticipated that, over time, the local bus service will expand as additional development occurs within the valley. Typically, bus route plans are evaluated on an annual basis, and routes are added and/or modified as appropriate and as funding permits; therefore, as the project site develops, service to the project area could be added as determined at the discretion of Santa Clarita Transit. Meanwhile, the current transit arrangement is anticipated to continue to serve local residents of the area, connecting residential areas with employment and commercial centers.

Metrolink, operated by the Southern California Regional Rail Authority (SCRAA), provides commuter rail service between the Antelope Valley and Downtown Los Angeles, and also links Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties with transfer service between the bus and rail systems. The closest Metrolink station to the project site is located along Soledad Canyon Road east of Bouquet Canyon Road. Long-range plans include an eventual Metrolink extension along the SR-126 corridor; land within Newhall Ranch is set aside for the Metrolink right-of-way, and a park-and-ride and/or train station.

In addition to the transit features of the proposed project noted above, the proposed project has been designed for pedestrian connectivity and includes facilities for bicycle use, including, for example, the installation of Class 2 bicycle lanes on portions of the Magic Mountain Parkway and Commerce Center Drive extensions. Additionally, the proposed project would not conflict with the Metro Bicycle Transportation Strategic Plan to make cycling a viable travel choice by promoting links between bicycle facilities and the transit network.

Table 4-22: Transit Trip Summary

	Standard Bus Route Scenario		CMP Transit Corridor Scenario[1]	
	AM Peak Hour	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
Residential Vehicle Trips	2,245	2,857	2,245	2,857
Residential Person Trips[2]	3,143	4,000	3,143	4,000
Factor to Transit Trips	3.5%	3.5%	5%	5%
Sub-Total - Residential Transit Trips	110	140	157	200
Commercial Vehicle Trips	2,406	2,916	2,406	2,916
Commercial Person Trips[2]	3,368	4,082	3,368	4,082
Factor to Person Trips	3.5%	3.5%	7%	7%
Sub-Total – Commercial Transit Trips	118	143	236	286
Total Transit Trips	**228**	**283**	**393**	**486**

[1]"Transit Corridor" consists of a series of transit nodes where frequent transit activity occurs. A transit node is defined as the intersection of two bus lines or fixed route shuttles, each with evening peak hour headways of ten minutes or less.

[2]Person Trips = Vehicle Trips x 1.4

Sources: Congestion Management Program for Los Angeles County, 2002 and 2004, Draft 2010 Congestion Management Program for Los Angeles County, August 2010.

4.4.4 Construction Trips

The construction of the project site will result in additional traffic added to the study area roadway system. This traffic will occur throughout the duration of construction. Construction activities are expected to occur over a period of approximately seven years (i.e., 2014 to 2021).

The amount of traffic generated by the ongoing construction activities has been estimated by Impact Sciences, Incorporated. Construction activities will vary throughout the duration of the project and average daily worker trips were estimated for each category of trip for each year of the construction period. The peak year for construction activity was determined to be in the 13th quarter of construction, in which approximately 640 ADT due to construction activity is anticipated (see Appendix H).

The construction trips are spread throughout the project site. As shown in previous sections, trips to and from the site will occur on roadways such as Magic Mountain Parkway and Commerce Center Drive. By the peak year for construction activity, the project will have constructed the following new roadways for project access:

- Magic Mountain Parkway (4-10 lanes, 6 lanes at easterly project limits)
- Westridge Parkway (4 lanes)

The two new roadways noted above will collectively provide capacity for approximately 90,000 ADT, of which construction traffic would utilize less than one percent. The dispersed nature of the construction traffic results in a negligible amount of traffic on any given roadway and, as such, the traffic due to construction activities will not result in a significant impact.

4.4.5 Commerce Center Drive at SR-126 Grade Separation

As shown in previous sections, the existing intersection of Commerce Center Drive at SR-126 is to be reconstructed as a grade-separated interchange. A project report for the construction of the interchange has been completed and final design plans are in preparation. As part of this study, verification of the future operations of the interchange has been prepared based on the current forecasts of long-range buildout conditions that include the proposed Mission Village project.

The following three intersections comprise the Commerce Center Drive at SR-126 grade-separated interchange:

81. Commerce Center Drive at Henry Mayo Drive (LOS C, AM & PM)
82. Commerce Center Drive at SR-126 Eastbound Ramps (LOS A, AM & PM)
83. Commerce Center Drive at SR-126 Westbound Ramps (LOS D, AM & PM)

ICU calculation worksheets for the three intersections listed above are provided in Appendix A. As shown, each intersection is forecast to operate at LOS D or better for long-range buildout conditions, in accordance with the intersection performance standards established for this area.

4.4.6 The Old Road – Feedmill Road to Rye Canyon Road

The segment of The Old Road between Feedmill Road and Rye Canyon Road is currently a four-lane roadway that includes a bridge over the Santa Clara River and a second bridge over railroad right-of-way. The County Highway Plan designates this section of The Old Road as a Major Highway.

Major Highways are generally six-lane divided roadways with right-of ways between 100 and 140 feet. The long-range plans for this segment of The Old Road include widening the roadway to Major Highway standards, including the widening or replacement of the two existing bridges.

Peak hour traffic forecasts presented in the previous sections indicate that under existing plus ambient growth plus project conditions, this section of The Old Road is forecast to experience a peak directional volume of approximately 1,540 vehicles per hour. The corresponding daily volume estimate is approximately 25,000 ADT. For the year 2021 cumulative conditions, this section of The Old Road is forecast to experience a peak directional volume of approximately 2,100 vehicles per hour. The corresponding daily volume estimate is approximately 37,000 ADT. For the year 2035 cumulative conditions, this section of The Old Road is forecast to experience a peak directional volume of approximately 2,600 vehicles per hour. The corresponding daily volume estimate is approximately 56,000 ADT.

The traffic volumes forecasts summarized above indicate that this section of The Old Road can remain as a four-lane roadway through the project buildout year of 2021, based on both existing plus ambient growth plus project conditions as well as 2021 cumulative conditions. The year 2035 cumulative conditions forecasts indicate that expansion to a six-lane roadway will be required prior to buildout of this area.

4.4.7 Westridge Parkway at Old Rock Road/Boulder Crest Drive

The intersection of Westridge Parkway at Old Rock Road/Boulder Crest Drive is located just north of the Westridge Parkway/Valencia Boulevard intersection. Westridge Parkway at Old Rock Road/Boulder Crest Drive is currently a four-way stop sign controlled intersection that is utilized for access to an elementary school and to a home owner's association (HOA) recreation facility. Each of these facilities is located on Old Rock Road just southwest of Westridge Parkway.

Westridge Parkway currently ends approximately 1,200 feet northwest of the Old Rock Road/Boulder Crest Drive intersection and traffic through the intersection consists primarily of local residents and those accessing the elementary school and recreation facility. As part of the proposed project, Westridge Parkway will be extended north to intersect with Magic Mountain Parkway and will serve as an access roadway for the proposed project. With the additional traffic that will pass through the Westridge Parkway at Old Rock Road/Boulder Crest Drive intersection due to the extension of Westridge Parkway into the project site, County Department of Public Works Traffic and Lighting Division staff has determined that a traffic signal will be warranted at this intersection. The proposed project will be required to install a traffic signal at the intersection of Westridge Parkway at Old Rock Road/Boulder Crest Drive after detailed signing and striping plans and traffic signal plans have been reviewed and approved by the Department of Public Works, and prior to the recordation of the first tract map in Mission Village.

4.5 MITIGATION SUMMARY

The proposed Mission Village project will mitigate impacts as follows:

1. The project will construct the on-site roadways as outlined in Chapter 3.0.
2. The project will mitigate its impacts through the construction of the off-site improvements outlined in Table 4-6: Off-Site Mitigation Measures for Project Impacts – Existing plus Ambient Conditions (Year 2021), and in Section 4.4.7 – Westridge Parkway at Old Rock Road/Boulder Crest Drive.
3. The project's impacts under cumulative conditions for the project buildout year (2021) will be mitigated by the construction of the off-site improvements outlined in Table 4-5: Off-Site Mitigation Measures for Project Impacts – 2021 Cumulative Conditions. As discussed in Section 4.2, the mitigation measures will be funded either through the project's payment of a fair-share contribution towards the improvement, by an established B&T District, or by a combination of both.
4. The project's impacts under long-range cumulative conditions (2035) will be mitigated by the construction of the off-site improvements outlined in Table 4-9: Off-Site Mitigation Measures for Project Impacts – Buildout 2035 Cumulative Conditions. As discussed in Section 4.2, the mitigation measures will be funded either through the project's payment of a fair-share contribution towards the improvement, by an established B&T District, or by a combination of both.
5. The timing of the improvements listed in the tables referenced above will be as outlined in the Westside Phasing Analysis discussed in Section 4.3.2, the current version of which is summarized in Table 4-11: Roadway Construction Stages, Table 4-12: Intersection Improvements by Stage (County and Caltrans Locations), and Table 4-13: Intersection Improvements by Stage (City Locations).

With the mitigation referenced above, the impacts of the project will be fully mitigated and no additional mitigation is required of the project.

Appendix A
INTERSECTION CAPACITY UTILIZATION WORKSHEETS – OFF SITE

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure A-1.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

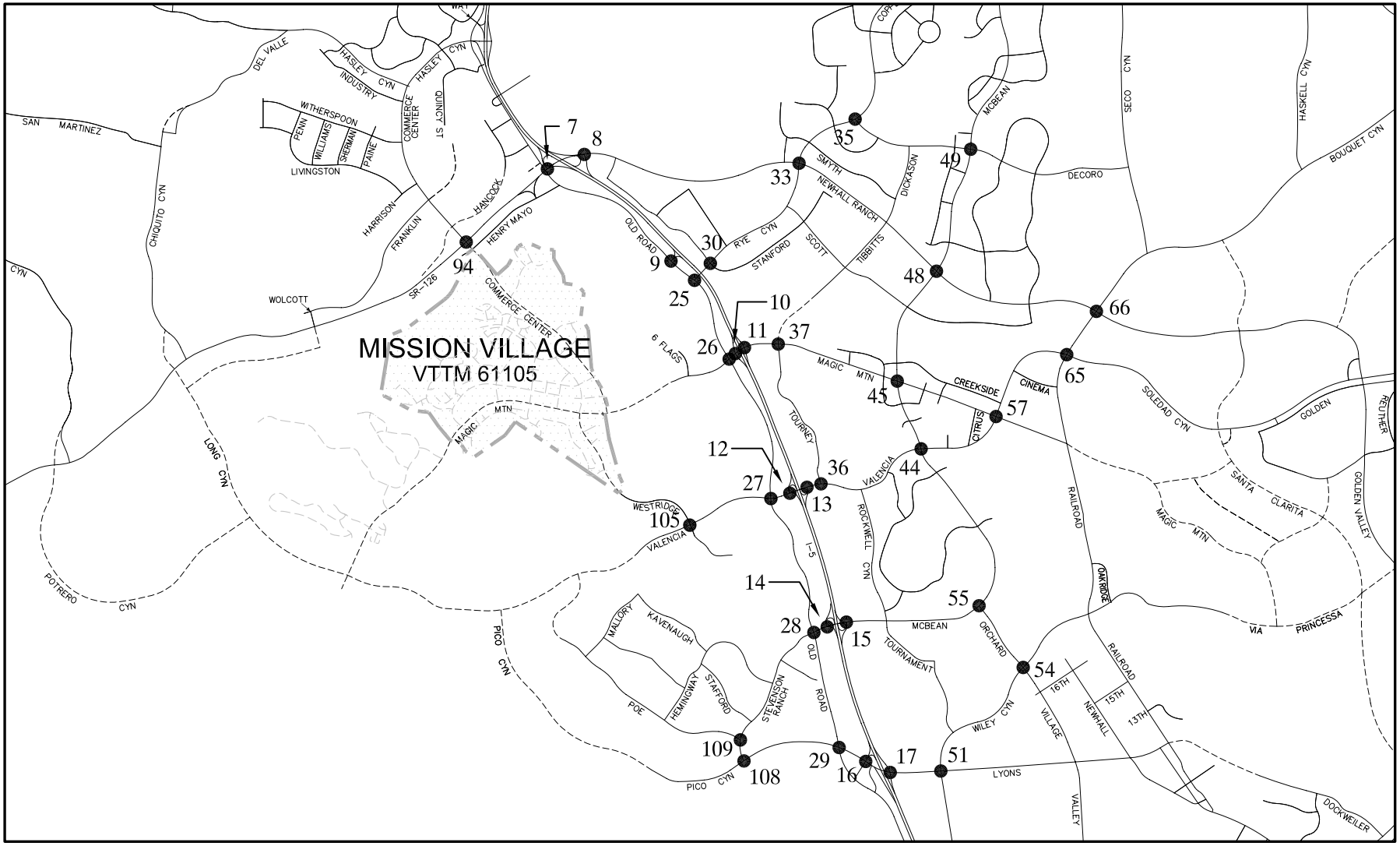
Example of Right-turn Capacity Utilization For Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)



Legend

- Project Boundary
- Future Roadway
- XX Intersection Study Number
- Intersection Study Location

Figure A-1

INTERSECTION LOCATIONS - OFF-SITE

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (typically 75%)

5. Right-turn Adjustment for ICU Calculation

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example of Shared Lane Utilization for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}.$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}.$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}.$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}.$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}.$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}.$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

$$\text{V/C (Left)} = \text{V/C (Through)}$$

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}.$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

7. I-5 SB Ramps & Henry Mayo (SR-126)

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	574	.20*	378	.13*
SBT	0	0	0		0	
SBR	2	3200	134	.04	114	.04
EBL	0	0	0		0	
EBT	4	6400	441	.07	901	.14
EBR	f		606		1197	
WBL	0	0	0		0	
WBT	3	4800	1973	.41*	941	.20*
WBR	f		483		663	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.43**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	712	.25*	469	.16*
SBT	0	0	0		0	
SBR	2	3200	166	.05	141	.04
EBL	0	0	0		0	
EBT	4	6400	547	.09	1117	.17
EBR	f		751		1484	
WBL	0	0	0		0	
WBT	3	4800	2447	.51*	1167	.24*
WBR	f		599		822	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.50**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	712	.25*	469	.16*
SBT	0	0	0		0	
SBR	2	3200	325	.10	197	.06
EBL	0	0	0		0	
EBT	4	6400	720	.11	1516	.24
EBR	f		766		1384	
WBL	0	0	0		0	
WBT	3	4800	2368	.49*	1381	.29*
WBR	f		599		822	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.55**

7. I-5 SB Ramps & SR-126

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	574	.20*	378	.13*
SBT	0	0	0		0	
SBR	2	3200	134	.04	114	.04
EBL	0	0	0		0	
EBT	4	6400	441	.07	901	.14
EBR	f		606		1197	
WBL	0	0	0		0	
WBT	3	4800	1973	.41*	941	.20*
WBR	f		483		663	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.43**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	739	.26*	757	.26*
SBT	0	0	0		0	
SBR	2	3200	405	.13	255	.08
EBL	0	0	0		0	
EBT	4	6400	873	.14	1579	.25
EBR	f		910		1095	
WBL	0	0	0		0	
WBT	3	4800	2253	.47*	1645	.34*
WBR	f		310		499	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.83**		**.70**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	739	.26*	757	.26*
SBT	0	0	0		0	
SBR	2	3200	564	.18	311	.10
EBL	0	0	0		0	
EBT	4	6400	1040	.16	1906	.30
EBR	f		933		1129	
WBL	0	0	0		0	
WBT	3	4800	2353	.49*	1873	.39*
WBR	f		310		499	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.75**

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	739	.26*	757	.26*
SBT	0	0	0		0	
SBR	2	3200	564	.18	311	.10
EBL	0	0	0		0	
EBT	4	6400	1040	.16	1906	.30*
EBR	f		933		1129	
WBL	0	0	0		0	
WBT	4	6400	2353	.37*	1873	.29
WBR	f		310		499	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.66**

7. I-5 SB Ramps & SR-126

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	960	.33*	1150	.40*
SBT	0	0	0		0	
SBR	2	3200	640	.20	426	.13
EBL	0	0	0		0	
EBT	4	6400	1078	.17	2276	.36
EBR	f		1227		943	
WBL	0	0	0		0	
WBT	3	4800	2535	.53*	2204	.46*
WBR	f		30		220	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.96**		**.96**

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	960	.33*	1150	.40*
SBT	0	0	0		0	
SBR	2	3200	790	.25	480	.15
EBL	0	0	0		0	
EBT	4	6400	1230	.19	2560	.40
EBR	f		1250		990	
WBL	0	0	0		0	
WBT	3	4800	2590	.54*	2320	.48*
WBR	f		30		220	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.97**		**.98**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	960	.33*	1150	.40*
SBT	0	0	0		0	
SBR	2	3200	790	.25	480	.15
EBL	0	0	0		0	
EBT	4	6400	1230	.19	2560	.40*
EBR	f		1250		990	
WBL	0	0	0		0	
WBT	4	6400	2590	.40*	2320	.36
WBR	f		30		220	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.83**		**.90**

8. I-5 NB Ramps & SR-126

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1248	.24*	597	.11*
NBT	0	0	0		0	
NBR	1	1750	709	.41	729	.42
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	881	.13	1056	.15
EBR	f		127		185	
WBL	0	0	0		0	
WBT	3	5250	1208	.23*	919	.18*
WBR	f		331		597	
Right Turn Adjustment			NBR	.09*	NBR	.29*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.68**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1020	.19*	938	.18*
NBT	0	0	0		0	
NBR	1	1750	485	.28	421	.24
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1217	.17	1751	.25*
EBR	f		255		446	
WBL	0	0	0		0	
WBT	3	5250	1556	.30*	1144	.22
WBR	f		493		748	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.59**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1020	.19*	966	.18*
NBT	0	0	0		0	
NBR	1	1750	485	.28	421	.24
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1332	.19	1926	.28*
EBR	f		308		598	
WBL	0	0	0		0	
WBT	3	5250	1656	.32*	1343	.26
WBR	f		493		748	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	790	.15*	1247	.24*
NBT	0	0	0		0	
NBR	1	1750	130	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1451	.21	2458	.35*
EBR	f		327		678	
WBL	0	0	0		0	
WBT	3	5250	1795	.34*	1146	.22
WBR	f		540		870	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.69**

8. I-5 NB Ramps & SR-126

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	790	.15*	1270	.24*
NBT	0	0	0		0	
NBR	1	1750	130	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1550	.22	2590	.37*
EBR	f		380		830	
WBL	0	0	0		0	
WBT	3	5250	1850	.35*	1240	.24
WBR	f		540		870	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.71**

9. The Old Rd & I-5 SB Ramps

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	44	.03	16	.01
NBT	2	3200	407	.13*	329	.10*
NBR	1	1600	887	.55	1177	.74
SBL	1	1600	103	.06*	111	.07*
SBT	2	3200	372	.12	439	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		107		64	
WBT	0	3200	0	.04*	0	.02*
WBR	0.5		7		1	
Right Turn Adjustment			NBR	.39*	NBR	.62*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.91**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	55	.03	20	.01
NBT	2	3200	505	.16*	408	.13*
NBR	1	1600	1100	.69	1459	.91
SBL	1	1600	128	.08*	138	.09*
SBT	2	3200	461	.14	544	.17
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		133		79	
WBT	0	3200	0	.04*	0	.03*
WBR	0.5		9		1	
Right Turn Adjustment			NBR	.50*	NBR	.76*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**1.11**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	55	.03	20	.01
NBT	2	3200	312	.10*	381	.12*
NBR	1	1600	1096	.69	1379	.86
SBL	1	1600	132	.08*	138	.09*
SBT	2	3200	373	.12	440	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		154		93	
WBT	0	3200	0	.05*	0	.03*
WBR	0.5		9		1	
Right Turn Adjustment			NBR	.55*	NBR	.72*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**1.06**

9. The Old Rd & I-5 SB Ramps

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	44	.03	16	.01
NBT	2	3200	407	.13*	329	.10*
NBR	1	1600	887	.55	1177	.74
SBL	1	1600	103	.06*	111	.07*
SBT	2	3200	372	.12	439	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		107		64	
WBT	0	3200	0	.04*	0	.02*
WBR	0.5		7		1	
Right Turn Adjustment			NBR	.39*	NBR	.62*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.91**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	38	.02	22	.01
NBT	2	3200	676	.21*	919	.29*
NBR	1	1600	915	.57	1143	.71
SBL	1	1600	166	.10*	379	.24*
SBT	2	3200	354	.11	827	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		513		110	
WBT	0	3200	0	.17*	0	.04*
WBR	0.5		17		5	
Right Turn Adjustment			NBR	.23*	NBR	.39*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**1.06**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	38	.02	22	.01
NBT	2	3200	718	.22*	919	.29*
NBR	1	1600	915	.57	1143	.71
SBL	1	1600	170	.11*	379	.24*
SBT	2	3200	354	.11	827	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		524		112	
WBT	0	3200	0	.17*	0	.04*
WBR	0.5		17		5	
Right Turn Adjustment			NBR	.22*	NBR	.39*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**1.06**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02	30	.02
NBT	2	3200	931	.29*	1677	.52*
NBR	1	1600	490	.31	730	.46
SBL	1	1600	236	.15*	1006	.63*
SBT	2	3200	320	.10	1090	.34
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		929		258	
WBT	0	3200	0	.30*	0	.09*
WBR	0.5		30		20	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**1.34**

9. The Old Rd & I-5 SB Ramps

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02	30	.02
NBT	2	3200	950	.30*	1680	.52*
NBR	1	1600	490	.31	730	.46
SBL	1	1600	240	.15*	1020	.64*
SBT	2	3200	320	.10	1090	.34
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		940		260	
WBT	0	3200	0	.30*	0	.09*
WBR	0.5		30		20	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .85 1.35

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02	30	.02
NBT	2	3200	950	.30*	1680	.52*
NBR	2	3200	490	.15	730	.23
SBL	2	2880	240	.08*	1020	.35*
SBT	3	4800	320	.07	1090	.23
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	940	.33*	260	.09*
WBT	0	0	0		0	
WBR	1	1600	30	.02	20	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .81 1.06

10. I-5 SB Ramps & Magic Mtn

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		294		253	
SBT	0.5	3200	0	.09*	6	.08*
SBR	2	3200	28	.01	39	.01
EBL	0	0	0		0	
EBT	3	4800	154	.03	356	.07*
EBR	2	3200	45	.01	119	.04
WBL	2	2880	414	.14	350	.12*
WBT	4	6400	1076	.17*	823	.13
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .36 .37

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		365		314	
SBT	0.5	3200	0	.11*	7	.10*
SBR	2	3200	35	.01	48	.02
EBL	0	0	0		0	
EBT	3	4800	191	.04*	441	.09*
EBR	2	3200	56	.02	148	.05
WBL	2	2880	513	.18*	434	.15*
WBT	4	6400	1334	.21	1021	.16
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .43 .44

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		369		319	
SBT	0.5	3200	0	.12*	7	.10*
SBR	2	3200	35	.01	48	.02
EBL	0	0	0		0	
EBT	3	4800	419	.09	704	.15*
EBR	2	3200	303	.09	259	.08
WBL	2	2880	448	.16	414	.14*
WBT	4	6400	1913	.30*	1308	.20
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .49

10. I-5 SB Ramps & Magic Mtn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		294		253	
SBT	0.5	3200	0	.09*	6	.08*
SBR	2	3200	28	.01	39	.01
EBL	0	0	0		0	
EBT	3	4800	154	.03	356	.07*
EBR	2	3200	45	.01	119	.04
WBL	2	2880	414	.14	350	.12*
WBT	4	6400	1076	.17*	823	.13
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.36**		**.37**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		735		650	
SBT	0.5	3200	0	.23*	3	.20*
SBR	2	3200	64	.02	97	.03
EBL	0	0	0		0	
EBT	3	4800	444	.09	927	.19*
EBR	2	3200	365	.11	434	.14
WBL	2	2880	245	.09	214	.07*
WBT	4	6400	1592	.25*	1621	.25
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.56**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		739		655	
SBT	0.5	3200	0	.23*	3	.21*
SBR	2	3200	64	.02	97	.03
EBL	0	0	0		0	
EBT	3	4800	670	.14	1173	.24*
EBR	2	3200	612	.19	578	.18
WBL	2	2880	245	.09	214	.07*
WBT	4	6400	2003	.31*	1935	.30
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		1266		1233	
SBT	0.5	3200	0	.40*	0	.39*
SBR	2	3200	140	.04	138	.04
EBL	0	0	0		0	
EBT	3	4800	805	.17	1551	.32*
EBR	2	3200	845	.26	691	.22
WBL	2	2880	100	.03	210	.07*
WBT	4	6400	2051	.32*	2260	.35
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.88**

10. I-5 SB Ramps & Magic Mtn

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		1270		1240	
SBT	0.5	3200	0	.40*	0	.39*
SBR	2	3200	140	.04	140	.04
EBL	0	0	0		0	
EBT	3	4800	1060	.22	1860	.39*
EBR	2	3200	1090	.34	820	.26
WBL	2	2880	100	.03	210	.07*
WBT	4	6400	2520	.39*	2640	.41
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.89**		**.95**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		1270		1240	
SBT	0.5	4800	0	.26*	0	.26*
SBR	1	1600	140	.09	140	.09
EBL	0	0	0		0	
EBT	3	4800	1060	.22	1860	.39*
EBR	2	3200	1090	.34	820	.26
WBL	2	2880	100	.03	210	.07*
WBT	4	6400	2520	.39*	2640	.41
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.82**

11. I-5 NB Ramps & Magic Mtn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	786	.22*	603	.17
NBT	0.5	3500	0	.11	1	{.18}*
NBR	1.5		399		664	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	17	.00	46	.01*
EBT	3	5250	396	.08	544	.10
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	698	.10*	599	.11*
WBR	1.5		206	{.04}	444	.13
Right Turn Adjustment					WBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.42**		**.42**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	999	.29*	888	.25*
NBT	0.5	3500	0	.09	1	.12
NBR	1.5		325		420	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	54	.02	180	.05
EBT	3	5250	1107	.21*	1383	.26*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	835	{.12}	967	{.17}
WBR	1.5		269		677	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.61**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1169	.33*	998	.29*
NBT	0.5	3500	0	.09	1	.12
NBR	1.5		325		420	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	54	.02	180	.05
EBT	3	5250	1335	.25*	1633	.31*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1076	.15	1172	{.19}
WBR	1.5		269		684	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.70**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1068	.31*	1026	.29*
NBT	0.5	3500	0	.13	0	.09
NBR	1.5		460		330	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	120	.03	300	.09
EBT	3	5250	1952	.37*	2475	.47*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1082	{.18}	1454	{.26}
WBR	1.5		690		1117	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.86**

11. I-5 NB Ramps & Magic Mtn

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1210	.35*	1120	.32*
NBT	0.5	3500	0	.13	0	.09
NBR	1.5		460		330	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	120	.03	300	.09
EBT	3	5250	2210	.42*	2790	.53*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1410	{.21}	1740	{.29}
WBR	1.5		690		1120	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.87**		**.95**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1210	{.24}*	1120	.21*
NBT	0	7000	0	.24	0	
NBR	1.5		460		330	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	120	.03	300	.09
EBT	3	5250	2210	.42*	2790	.53*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1410	{.20}	1740	{.30}
WBR	1.5		690		1120	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.76**		**.84**

12. I-5 SB Ramps & Valencia

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	237	.08*	136	.05*
SBT	0	0	0		0	
SBR	1	1600	258	.16	71	.04
EBL	0	0	0		0	
EBT	3	4800	789	.16	515	.11
EBR	f		447		118	
WBL	0	0	0		0	
WBT	2	3200	819	.26*	997	.31*
WBR	f		877		945	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .46

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	294	.10*	169	.06*
SBT	0	0	0		0	
SBR	1	1600	320	.20	88	.06
EBL	0	0	0		0	
EBT	3	4800	978	.20	639	.13
EBR	f		554		146	
WBL	0	0	0		0	
WBT	2	3200	1016	.32*	1236	.39*
WBR	f		1087		1172	
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .62 .55

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	327	.11*	202	.07*
SBT	0	0	0		0	
SBR	1	1600	315	.20	17	.01
EBL	0	0	0		0	
EBT	3	4800	986	.21	687	.14
EBR	f		579		198	
WBL	0	0	0		0	
WBT	2	3200	1219	.38*	1355	.42*
WBR	f		1152		1154	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .68 .59

12. I-5 SB Ramps & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	237	.08*	136	.05*
SBT	0	0	0		0	
SBR	1	1600	258	.16	71	.04
EBL	0	0	0		0	
EBT	3	4800	789	.16	515	.11
EBR	f		447		118	
WBL	0	0	0		0	
WBT	2	3200	819	.26*	997	.31*
WBR	f		877		945	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.46**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	274	.10*	206	.07*
SBT	0	0	0		0	
SBR	1	1600	364	.23	313	.20
EBL	0	0	0		0	
EBT	3	4800	1056	.22	953	.20
EBR	f		653		415	
WBL	0	0	0		0	
WBT	2	3200	1252	.39*	1633	.51*
WBR	f		931		890	
Right Turn Adjustment			SBR	.13*	SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.81**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	323	.11*	220	.08*
SBT	0	0	0		0	
SBR	1	1600	364	.23	313	.20
EBL	0	0	0		0	
EBT	3	4800	1070	.22	1013	.21
EBR	f		678		473	
WBL	0	0	0		0	
WBT	2	3200	1390	.43*	1760	.55*
WBR	f		931		890	
Right Turn Adjustment			SBR	.12*	SBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.76**		**.85**

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	323	.11*	220	.08*
SBT	0	0	0		0	
SBR	1	1600	364	.23	313	.20
EBL	0	0	0		0	
EBT	3	4800	1070	.22	1013	.21
EBR	f		678		473	
WBL	0	0	0		0	
WBT	3	4800	1390	.29*	1760	.37*
WBR	f		931		890	
Right Turn Adjustment			SBR	.12*	SBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.67**

12. I-5 SB Ramps & Valencia

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	291	.10*	266	.09*
SBT	0	0	0		0	
SBR	1	1600	370	.23	520	.33
EBL	0	0	0		0	
EBT	3	4800	1316	.27	1542	.32
EBR	f		974		681	
WBL	0	0	0		0	
WBT	2	3200	1408	.44*	2418	.76*
WBR	f		1160		830	
Right Turn Adjustment			SBR	.13*	SBR	.24*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .77 1.19

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	340	.12*	280	.10*
SBT	0	0	0		0	
SBR	1	1600	370	.23	520	.33
EBL	0	0	0		0	
EBT	3	4800	1330	.28	1610	.34
EBR	f		1000		740	
WBL	0	0	0		0	
WBT	2	3200	1520	.48*	2530	.79*
WBR	f		1160		830	
Right Turn Adjustment			SBR	.11*	SBR	.23*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .81 1.22

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	340	.12*	280	.10*
SBT	0	0	0		0	
SBR	1	1600	370	.23	520	.33
EBL	0	0	0		0	
EBT	3	4800	1330	.28	1610	.34
EBR	f		1000		740	
WBL	0	0	0		0	
WBT	3	4800	1520	.32*	2530	.53*
WBR	f		1160		830	
Right Turn Adjustment			SBR	.11*	SBR	.23*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .65 .96

13. I-5 NB Ramps & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	368	.11*	226	.06*
NBT	0	0	0		0	
NBR	2	3500	1011	.29	794	.23
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	833	.19*	733	.15
EBR	0	0	183		77	
WBL	2	3500	111	.03*	119	.03
WBT	4	7000	1357	.19	1490	.21*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.16*	NBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.49**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	550	.16*	328	.09*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	955	.27
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1191	.26*	1144	.24
EBR	0	0	164		127	
WBL	2	3500	142	.04*	180	.05
WBT	4	7000	1702	.24	2087	.30*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.11*	NBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.62**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	638	.18*	371	.11*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	955	.27
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1254	.27*	1218	.26
EBR	0	0	164		127	
WBL	2	3500	151	.04*	183	.05
WBT	4	7000	1752	.25	2170	.31*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.09*	NBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.64**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	572	.16*	458	.13*
NBT	0	0	0		0	
NBR	2	3500	1230	.35	1240	.35
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1527	.32*	1668	.36*
EBR	0	0	140		200	
WBL	2	3500	171	.05*	288	.08*
WBT	4	7000	2096	.30	2830	.40
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.15*	NBR	.16*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.83**

13. I-5 NB Ramps & Valencia

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	640	.18*	490	.14*
NBT	0	0	0		0	
NBR	2	3500	1230	.35	1240	.35
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1590	.33*	1750	.37*
EBR	0	0	140		200	
WBL	2	3500	180	.05*	290	.08*
WBT	4	7000	2140	.31	2910	.42
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.13*	NBR	.15*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .79 .84

14. I-5 SB Ramps & McBean

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	163	.10*	155	.10*
SBT	0	0	0		0	
SBR	1	1600	151	.09	169	.11
EBL	0	0	0		0	
EBT	2	3200	569	.18*	861	.27
EBR	1	1600	347	.22	142	.09
WBL	0	0	0		0	
WBT	2	3200	464	.15	915	.29*
WBR	1	1600	451	.28	490	.31
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .38 .50

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	202	.13*	192	.12*
SBT	0	0	0		0	
SBR	1	1600	187	.12	210	.13
EBL	0	0	0		0	
EBT	2	3200	706	.22*	1068	.33
EBR	1	1600	430	.27	176	.11
WBL	0	0	0		0	
WBT	2	3200	575	.18	1135	.35*
WBR	1	1600	559	.35	608	.38
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .45 .58

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	238	.15*	220	.14*
SBT	0	0	0		0	
SBR	1	1600	193	.12	219	.14
EBL	0	0	0		0	
EBT	2	3200	610	.19	1136	.36
EBR	1	1600	432	.27	238	.15
WBL	0	0	0		0	
WBT	2	3200	668	.21*	1153	.36*
WBR	1	1600	559	.35	525	.33
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .46 .60

14. I-5 SB Ramps & McBean

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	163	.10*	155	.10*
SBT	0	0	0		0	
SBR	1	1600	151	.09	169	.11
EBL	0	0	0		0	
EBT	2	3200	569	.18*	861	.27
EBR	1	1600	347	.22	142	.09
WBL	0	0	0		0	
WBT	2	3200	464	.15	915	.29*
WBR	1	1600	451	.28	490	.31
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .38 .50

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	251	.16*	329	.21*
SBT	0	0	0		0	
SBR	1	1600	205	.13	206	.13
EBL	0	0	0		0	
EBT	2	3200	824	.26*	1053	.33
EBR	1	1600	340	.21	169	.11
WBL	0	0	0		0	
WBT	2	3200	566	.18	1286	.40*
WBR	1	1600	429	.27	464	.29
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .71

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	287	.18*	349	.22*
SBT	0	0	0		0	
SBR	1	1600	211	.13	214	.13
EBL	0	0	0		0	
EBT	2	3200	826	.26*	1105	.35
EBR	1	1600	340	.21	235	.15
WBL	0	0	0		0	
WBT	2	3200	651	.20	1317	.41*
WBR	1	1600	429	.27	464	.29
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .54 .73

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	412	.26*	467	.29*
SBT	0	0	0		0	
SBR	1	1600	274	.17	252	.16
EBL	0	0	0		0	
EBT	2	3200	1156	.36*	1274	.40
EBR	1	1600	320	.20	44	.03
WBL	0	0	0		0	
WBT	2	3200	811	.25	1774	.55*
WBR	1	1600	390	.24	310	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .72 .94

14. I-5 SB Ramps & McBean

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	450	.28*	490	.31*
SBT	0	0	0		0	
SBR	1	1600	280	.18	260	.16
EBL	0	0	0		0	
EBT	2	3200	1160	.36*	1330	.42
EBR	1	1600	320	.20	110	.07
WBL	0	0	0		0	
WBT	2	3200	930	.29	1830	.57*
WBR	1	1600	390	.24	310	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .74 .98

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	450	.16*	490	.17*
SBT	0	0	0		0	
SBR	1	1600	280	.18	260	.16
EBL	0	0	0		0	
EBT	2	3200	1160	.36*	1330	.42
EBR	1	1600	320	.20	110	.07
WBL	0	0	0		0	
WBT	2	3200	930	.29	1830	.57*
WBR	1	1600	390	.24	310	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .62 .84

15. I-5 NB Ramps & McBean

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	85	.02*	205	.06*
NBT	0	0	0		0	
NBR	2	3500	536	.15	456	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	619	.18	858	.25
EBR	1	1750	203	.12	207	.12
WBL	0	0	0		0	
WBT	3	5250	870	.20*	1124	.25*
WBR	0	0	185		165	
Right Turn Adjustment			NBR	.11*	NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.43**		**.48**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	160	.05*	341	.10*
NBT	0	0	0		0	
NBR	2	3500	595	.17	541	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	863	.25*	1109	.32*
EBR	1	1750	268	.15	295	.17
WBL	0	0	0		0	
WBT	3	5250	866	.19	1361	.30
WBR	0	0	147		209	
Right Turn Adjustment			NBR	.12*	NBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.57**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	204	.06*	346	.10*
NBT	0	0	0		0	
NBR	2	3500	595	.17	541	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	900	.26*	1180	.34*
EBR	1	1750	268	.15	297	.17
WBL	0	0	0		0	
WBT	3	5250	906	.20	1388	.31
WBR	0	0	158		223	
Right Turn Adjustment			NBR	.11*	NBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.59**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	279	.08*	502	.14*
NBT	0	0	0		0	
NBR	2	3500	540	.15	630	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1238	.35*	1351	.39*
EBR	1	1750	370	.21	370	.21
WBL	0	0	0		0	
WBT	3	5250	951	.20	1571	.35
WBR	0	0	110		283	
Right Turn Adjustment			NBR	.07*	NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.67**

15. I-5 NB Ramps & McBean

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	350	.10*	530	.15*
NBT	0	0	0		0	
NBR	2	3500	540	.15	630	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1280	.37*	1430	.41*
EBR	1	1750	370	.21	370	.21
WBL	0	0	0		0	
WBT	3	5250	1000	.21	1600	.36
WBR	0	0	120		300	
Right Turn Adjustment			NBR	.05*	NBR	.03*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .62 .69

16. I-5 SB/Marriott & Pico/Lyons

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	73	.05	87	.05
SBL	1.5		369		397	
SBT	0.5	3200	82	.14*	95	.15*
SBR	1	1600	33	.02	113	.07
EBL	0	0	0		0	
EBT	2	3200	843	.28*	872	.28
EBR	0	0	54		39	
WBL	1	1600	51	.03*	57	.04
WBT	2	3200	517	.16	1075	.34*
WBR	1	1600	359	.22	276	.17
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .58 .59

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	91	.06	108	.07
SBL	1.5		458		492	
SBT	0.5	3200	102	.18*	118	.19*
SBR	1	1600	41	.03	140	.09
EBL	0	0	0		0	
EBT	2	3200	1045	.35*	1081	.35
EBR	0	0	67		48	
WBL	1	1600	63	.04*	71	.04
WBT	2	3200	641	.20	1333	.42*
WBR	1	1600	445	.28	342	.21
Right Turn Adjustment			NBR	.02*	NBR	.02*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .69 .73

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	91	.06	108	.07
SBL	1.5		494		511	
SBT	0.5	3200	102	.19*	129	.20*
SBR	1	1600	58	.04	145	.09
EBL	0	0	0		0	
EBT	2	3200	986	.33*	1092	.36
EBR	0	0	67		48	
WBL	1	1600	63	.04*	71	.04
WBT	2	3200	648	.20	1338	.42*
WBR	1	1600	417	.26	321	.20
Right Turn Adjustment			NBR	.03*	NBR	.02*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .69 .74

16. I-5 SB/Marriott & Pico/Lyons

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	73	.05	87	.05
SBL	1.5		369		397	
SBT	0.5	3200	82	.14*	95	.15*
SBR	1	1600	33	.02	113	.07
EBL	0	0	0		0	
EBT	2	3200	843	.28*	872	.28
EBR	0	0	54		39	
WBL	1	1600	51	.03*	57	.04
WBT	2	3200	517	.16	1075	.34*
WBR	1	1600	359	.22	276	.17
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.59**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	72	.05	80	.05
SBL	1.5		538		354	
SBT	0.5	3200	50	.18*	71	.13*
SBR	1	1600	161	.10	87	.05
EBL	0	0	0		0	
EBT	2	3200	833	.27*	1245	.40*
EBR	0	0	43		44	
WBL	1	1600	42	.03*	58	.04*
WBT	2	3200	810	.25	1414	.44
WBR	1	1600	329	.21	278	.17
Right Turn Adjustment			NBR	.03*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.69**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	72	.05	80	.05
SBL	1.5		574		365	
SBT	0.5	3200	50	.20*	71	.14*
SBR	1	1600	178	.11	94	.06
EBL	0	0	0		0	
EBT	2	3200	833	.27*	1266	.41*
EBR	0	0	43		44	
WBL	1	1600	42	.03*	58	.04*
WBT	2	3200	826	.26	1419	.44
WBR	1	1600	329	.21	278	.17
Right Turn Adjustment			NBR	.02*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.71**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	70	.04	410	.26
SBL	1.5		754		314	
SBT	0.5	3200	10	.24*	110	.13*
SBR	1	1600	324	.20	13	.01
EBL	0	0	0		0	
EBT	2	3200	650	.21	1580	.51*
EBR	0	0	30		40	
WBL	1	1600	30	.02	530	.33*
WBT	2	3200	1061	.33*	1326	.41
WBR	1	1600	280	.18	250	.16
Right Turn Adjustment					NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**1.08**

16. I-5 SB/Marriott & Pico/Lyons

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	70	.04	410	.26
SBL	1.5		790		330	
SBT	0.5	3200	10	.25*	110	.14*
SBR	1	1600	340	.21	20	.01
EBL	0	0	0		0	
EBT	2	3200	650	.21	1600	.51*
EBR	0	0	30		40	
WBL	1	1600	30	.02	530	.33*
WBT	2	3200	1080	.34*	1330	.42
WBR	1	1600	280	.18	250	.16
Right Turn Adjustment					NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**1.09**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	70	.04	410	.26
SBL	1.5		790		330	
SBT	0.5	3200	10	.25*	110	.14*
SBR	1	1600	340	.21	20	.01
EBL	0	0	0		0	
EBT	2	3200	650	.21	1600	.51*
EBR	0	0	30		40	
WBL	1	1600	30	.02	530	.33*
WBT	2	3200	1080	.34*	1330	.42
WBR	1	1600	280	.18	250	.16
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.69**		**1.08**

17. I-5 NB On/Off & Lyons Ave

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		240	{.07}*	567	{.16}*
NBT	0.5	3500	0	.07	2	.16
NBR	f		302		546	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	158	.09*	244	.14*
EBT	2	3500	682	.19	1192	.34
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	730	.21*	1023	.26*
WBR	0	0	471	.27	366	
Right Turn Adjustment			WBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.66**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		302	{.09}*	713	{.20}*
NBT	0.5	3500	4	.09	1	.20
NBR	f		292		477	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	109	.06*	167	.10*
EBT	2	3500	995	.28	1260	.36
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	917	.26*	1114	.32*
WBR	0	0	449		612	.35
Right Turn Adjustment					WBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.75**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		302	{.09}*	715	{.20}*
NBT	0.5	3500	4	.09	1	.20
NBR	f		292		477	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	113	.06*	168	.10*
EBT	2	3500	1031	.29	1293	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	933	.27*	1115	.32*
WBR	0	0	478	.27	648	.37
Right Turn Adjustment					WBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.77**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		230	{.07}*	738	{.21}*
NBT	0.5	3500	10	.07	0	.21
NBR	f		280		400	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04	89	.05
EBT	2	3500	1354	.39*	1524	.44*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1161	.31	1308	.37
WBR	0	0	473		933	.53
Right Turn Adjustment					WBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.89**

17. I-5 NB On/Off & Lyons Ave

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		230	{.07}*	740	{.21}*
NBT	0.5	3500	10	.07	0	.21
NBR	f		280		400	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04	90	.05
EBT	2	3500	1390	.40*	1560	.45*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1180	.32	1310	.37
WBR	0	0	500		970	.55
Right Turn Adjustment					WBR	.15*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .57 .91

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		230	{.07}*	740	{.21}*
NBT	0.5	3500	10	.07	0	.21
NBR	f		280		400	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04	90	.05*
EBT	2	3500	1390	.40*	1560	.45
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1.5	5250	1180	.34	1310	.43*
WBR	1.5		500	.29	970	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .57 .79

25. The Old Rd & Rye Canyon

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	311	.19*	268	.17*
NBR	f		1026		818	
SBL	1	1600	261	.16*	243	.15*
SBT	2	3200	189	.06	267	.08
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	252	.16*	378	.24*
WBT	0	0	0		0	
WBR	f		990		1231	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .66

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	386	.24*	332	.21*
NBR	f		1272		1014	
SBL	1	1600	324	.20*	301	.19*
SBT	2	3200	234	.07	331	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	312	.20*	469	.29*
WBT	0	0	0		0	
WBR	f		1228		1526	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .79

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	150	.09*	273	.17*
NBR	f		1379		1106	
SBL	1	1600	335	.21*	320	.20*
SBT	2	3200	160	.05	235	.07
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	407	.25*	509	.32*
WBT	0	0	0		0	
WBR	f		1271		1486	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .65 .79

25. The Old Rd & Rye Canyon

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	311	.19*	268	.17*
NBR	f		1026		818	
SBL	1	1600	261	.16*	243	.15*
SBT	2	3200	189	.06	267	.08
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	252	.16*	378	.24*
WBT	0	0	0		0	
WBR	f		990		1231	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .66

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	595	.37*	702	.44*
NBR	f		1384		1230	
SBL	1	1600	459	.29*	431	.27*
SBT	2	3200	346	.11	697	.22
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	439	.27*	636	.40*
WBT	0	0	0		0	
WBR	f		1165		1420	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.03 1.21

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	599	.37*	708	.44*
NBR	f		1494		1335	
SBL	1	1600	459	.29*	431	.27*
SBT	2	3200	360	.11	713	.22
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	532	.33*	702	.44*
WBT	0	0	0		0	
WBR	f		1207		1420	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.09 1.25

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3200	599	.19*	708	.22*
NBR	2	3200	1494	.47	1335	.42
SBL	2	2880	459	.16*	431	.15*
SBT	2	3200	360	.11	713	.22
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	532	.33*	702	.44*
WBT	0	0	0		0	
WBR	2	3200	1207	.38	1420	.44
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .78 .91

25. The Old Rd & Rye Canyon

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	995	.62*	1304	.82*
NBR	f		1466		1207	
SBL	1	1600	680	.43*	760	.48*
SBT	2	3200	466	.15	994	.31
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	922	.58*	1022	.64*
WBT	0	0	0		0	
WBR	f		751		1237	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.73 2.04

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	1000	.63*	1310	.82*
NBR	f		1560		1290	
SBL	1	1600	680	.43*	760	.48*
SBT	2	3200	480	.15	1010	.32
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	1010	.63*	1120	.70*
WBT	0	0	0		0	
WBR	f		770		1240	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.79 2.10

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1000	.21*	1310	.27*
NBR	2	3200	1560	.49	1290	.40
SBL	2	2880	680	.24*	760	.26*
SBT	3	4800	480	.10	1010	.21
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	1010	.23*	1120	.26*
WBT	0	0	0		0	
WBR	2	3200	770	.24	1240	.39
Right Turn Adjustment			NBR	.05*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .83 .89

26. The Old Rd & Magic Mountain

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	17	.01	16	.01
NBT	3	4800	411	.09*	451	.09*
NBR	1	1600	70	.04	184	.12
SBL	2	2880	143	.05*	215	.07*
SBT	3	4800	287	.06	414	.09
SBR	1	1600	2	.00	1	.00
EBL	2	2880	26	.01	20	.01
EBT	4	6400	21	.00*	51	.01*
EBR	1	1600	4	.00	9	.01
WBL	2	2880	123	.04*	151	.05*
WBT	4	6400	17	.00	9	.00
WBR	f		976		797	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.28**		**.32**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	21	.01	20	.01
NBT	3	4800	510	.11*	559	.12*
NBR	1	1600	87	.05	228	.14
SBL	2	2880	177	.06*	267	.09*
SBT	3	4800	356	.07	513	.11
SBR	1	1600	2	.00	1	.00
EBL	2	2880	32	.01	25	.01
EBT	4	6400	26	.00*	63	.01*
EBR	1	1600	5	.00	11	.01
WBL	2	2880	153	.05*	187	.06*
WBT	4	6400	21	.00	11	.00
WBR	f		1210		988	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.32**		**.38**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	457	.16*	63	.02
NBT	3	4800	409	.09	543	.11*
NBR	1	1600	87	.05	237	.15
SBL	2	2880	113	.04	188	.07*
SBT	3	4800	342	.07*	475	.10
SBR	1	1600	107	.07	67	.04
EBL	2	2880	139	.05*	124	.04
EBT	4	6400	564	.09	506	.08*
EBR	1	1600	40	.03	113	.07
WBL	2	2880	156	.05	196	.07*
WBT	4	6400	726	.11*	335	.05
WBR	f		1078		945	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.43**

26. The Old Rd & Magic Mountain

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	17	.01	16	.01
NBT	3	4800	411	.09*	451	.09*
NBR	1	1600	70	.04	184	.12
SBL	2	2880	143	.05*	215	.07*
SBT	3	4800	287	.06	414	.09
SBR	1	1600	2	.00	1	.00
EBL	2	2880	26	.01	20	.01
EBT	4	6400	21	.00*	51	.01*
EBR	1	1600	4	.00	9	.01
WBL	2	2880	123	.04*	151	.05*
WBT	4	6400	17	.00	9	.00
WBR	f		976		797	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.28**		**.32**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	270	.09	156	.05
NBT	3	4800	512	.11*	446	.09*
NBR	1	1600	101	.06	156	.10
SBL	2	2880	269	.09*	398	.14*
SBT	3	4800	183	.04	557	.12
SBR	1	1600	203	.13	280	.18
EBL	2	2880	219	.08*	295	.10
EBT	4	6400	460	.07	790	.12*
EBR	1	1600	51	.03	256	.16
WBL	2	2880	152	.05	173	.06*
WBT	4	6400	330	.05*	439	.07
WBR	f		1180		1159	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.43**		**.51**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	438	.15	182	.06
NBT	3	4800	512	.11*	446	.09*
NBR	1	1600	101	.06	156	.10
SBL	2	2880	269	.09*	398	.14*
SBT	3	4800	183	.04	557	.12
SBR	1	1600	314	.20	364	.23
EBL	2	2880	334	.12*	410	.14*
EBT	4	6400	932	.15	1179	.18
EBR	1	1600	71	.04	276	.17
WBL	2	2880	152	.05	173	.06
WBT	4	6400	741	.12*	753	.12*
WBR	f		1180		1159	
Right Turn Adjustment			SBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.59**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	390	.14	320	.11*
NBT	3	4800	530	.11*	370	.08
NBR	1	1600	150	.09	140	.09
SBL	2	2880	700	.24*	490	.17
SBT	3	4800	110	.02	660	.14*
SBR	1	1600	294	.18	643	.40
EBL	2	2880	319	.11*	398	.14
EBT	4	6400	801	.13	1613	.25*
EBR	1	1600	87	.05	540	.34
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	661	.10*	768	.12
WBR	f		1340		1450	
Right Turn Adjustment					Multi	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.79**

26. The Old Rd & Magic Mountain

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	440	.15	350	.12*
NBT	3	4800	530	.11*	370	.08
NBR	1	1600	150	.09	140	.09
SBL	2	2880	700	.24*	490	.17
SBT	3	4800	110	.02	660	.14*
SBR	1	1600	400	.25	760	.48
EBL	2	2880	420	.15*	490	.17
EBT	4	6400	1300	.20	2050	.32*
EBR	1	1600	110	.07	560	.35
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	1130	.18*	1150	.18
WBR	f		1340		1450	
Right Turn Adjustment					SBR	.19*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.93**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	440	.15	350	.12*
NBT	3	4800	530	.11*	370	.08
NBR	1	1600	150	.09	140	.09
SBL	2	2880	700	.24*	490	.17
SBT	3	4800	110	.02	660	.14*
SBR	1	1600	400	.25	760	.48
EBL	2	2880	420	.15*	490	.17
EBT	4	6400	1300	.20	2050	.32*
EBR	1	1600	110	.07	560	.35
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	1130	.18*	1150	.18
WBR	f		1340		1450	
Right Turn Adjustment					SBR	.15*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for SBR						
TOTAL CAPACITY UTILIZATION				**.78**		**.89**

27. The Old Rd & Valencia

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	668	.23*	96	.03
NBT	3	4800	257	.05	497	.10*
NBR	1	1600	107	.07	247	.15
SBL	2	2880	121	.04	201	.07*
SBT	3	4800	157	.03*	422	.09
SBR	1	1600	233	.15	93	.06
EBL	2	2880	312	.11*	77	.03
EBT	4	6400	886	.14	209	.03*
EBR	1	1600	542	.34	61	.04
WBL	2	2880	107	.04	395	.14*
WBT	3	4800	756	.16*	248	.05
WBR	f		137		330	
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.44**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	828	.29*	119	.04
NBT	3	4800	319	.07	616	.13*
NBR	1	1600	133	.08	306	.19
SBL	2	2880	150	.05	249	.09*
SBT	3	4800	195	.04*	523	.11
SBR	1	1600	289	.18	115	.07
EBL	2	2880	387	.13*	95	.03
EBT	4	6400	1099	.17	259	.04*
EBR	1	1600	672	.42	76	.05
WBL	2	2880	133	.05	490	.17*
WBT	3	4800	937	.20*	308	.06
WBR	f		170		409	
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.53**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	841	.29*	202	.07
NBT	3	4800	606	.13	620	.13*
NBR	1	1600	133	.08	293	.18
SBL	2	2880	150	.05	247	.09*
SBT	3	4800	195	.04*	565	.12
SBR	1	1600	292	.18	111	.07
EBL	2	2880	357	.12*	96	.03
EBT	4	6400	1132	.18	373	.06*
EBR	1	1600	685	.43	308	.19
WBL	2	2880	136	.05	440	.15*
WBT	3	4800	1073	.22*	401	.08
WBR	f		228		412	
Right Turn Adjustment			SBR	.05*	EBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.58**

27. The Old Rd & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	668	.23*	96	.03
NBT	3	4800	257	.05	497	.10*
NBR	1	1600	107	.07	247	.15
SBL	2	2880	121	.04	201	.07*
SBT	3	4800	157	.03*	422	.09
SBR	1	1600	233	.15	93	.06
EBL	2	2880	312	.11*	77	.03
EBT	4	6400	886	.14	209	.03*
EBR	1	1600	542	.34	61	.04
WBL	2	2880	107	.04	395	.14*
WBT	3	4800	756	.16*	248	.05
WBR	f		137		330	
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.44**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	461	.16*	176	.06
NBT	3	4800	410	.09	564	.12*
NBR	1	1600	117	.07	314	.20
SBL	2	2880	125	.04	284	.10*
SBT	3	4800	166	.03*	628	.13
SBR	1	1600	186	.12	144	.09
EBL	2	2880	320	.11*	157	.05
EBT	4	6400	1474	.23	814	.13*
EBR	1	1600	447	.28	288	.18
WBL	2	2880	95	.03	428	.15*
WBT	3	4800	1282	.27*	1039	.22
WBR	f		218		404	
Right Turn Adjustment			SBR	.01*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.60**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	474	.16*	259	.09*
NBT	3	4800	565	.12	564	.12
NBR	1	1600	117	.07	314	.20
SBL	2	2880	125	.04	284	.10
SBT	3	4800	168	.04*	628	.13*
SBR	1	1600	189	.12	145	.09
EBL	2	2880	320	.11*	158	.05
EBT	4	6400	1511	.24	930	.15*
EBR	1	1600	460	.29	522	.33
WBL	2	2880	95	.03	428	.15*
WBT	3	4800	1420	.30*	1154	.24
WBR	f		218		415	
Right Turn Adjustment					EBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.73**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	585	.20*	287	.10*
NBT	3	4800	306	.06	590	.12
NBR	1	1600	130	.08	430	.27
SBL	2	2880	130	.05	380	.13
SBT	3	4800	185	.04*	740	.15*
SBR	1	1600	177	.11	219	.14
EBL	2	2880	260	.09	239	.08*
EBT	4	6400	2201	.34*	1494	.23
EBR	1	1600	315	.20	433	.27
WBL	2	2880	120	.04*	520	.18
WBT	3	4800	1321	.28	1924	.40*
WBR	f		378		455	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.83**

27. The Old Rd & Valencia

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	760	.26*	400	.14*
NBT	3	4800	340	.07	590	.12
NBR	1	1600	130	.08	430	.27
SBL	2	2880	130	.05	380	.13
SBT	3	4800	190	.04*	740	.15*
SBR	1	1600	180	.11	220	.14
EBL	2	2880	260	.09*	240	.08*
EBT	4	6400	2240	.35	1620	.25
EBR	1	1600	330	.21	650	.41
WBL	2	2880	120	.04	520	.18
WBT	3	4800	1430	.30*	2020	.42*
WBR	f		380		470	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.89**

28. The Old Rd & McBean

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	63	.04*	232	.15*
NBT	3	4800	326	.07	546	.11
NBR	1	1600	103	.06	632	.40
SBL	1	1600	67	.04	79	.05
SBT	2	3200	458	.14*	589	.18*
SBR	1	1600	369	.23	278	.17
EBL	2	2880	614	.21*	197	.07
EBT	3	4800	616	.13	369	.08*
EBR	1	1600	184	.12	136	.09
WBL	2	2880	337	.12	720	.25*
WBT	2	3200	216	.09*	568	.20
WBR	0	0	73		68	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.76**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	78	.05*	288	.18*
NBT	3	4800	404	.08	677	.14
NBR	1	1600	128	.08	784	.49
SBL	1	1600	83	.05	98	.06
SBT	2	3200	568	.18*	730	.23*
SBR	1	1600	458	.29	345	.22
EBL	2	2880	761	.26*	244	.08
EBT	3	4800	764	.16	458	.10*
EBR	1	1600	228	.14	169	.11
WBL	2	2880	418	.15	893	.31*
WBT	2	3200	268	.11*	704	.25
WBR	0	0	91		84	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.92**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	78	.05*	288	.18*
NBT	3	4800	489	.10	709	.15
NBR	1	1600	128	.08	802	.50
SBL	1	1600	85	.05	209	.13
SBT	2	3200	575	.18*	804	.25*
SBR	1	1600	465	.29	389	.24
EBL	2	2880	891	.31*	253	.09
EBT	3	4800	668	.14	459	.10*
EBR	1	1600	228	.14	169	.11
WBL	2	2880	425	.15	911	.32*
WBT	2	3200	273	.14*	686	.25
WBR	0	0	176		115	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.95**

Existing + Ambient + Project + Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	78	.05*	288	.18*
NBT	3	4800	489	.10	709	.15
NBR	1	1600	128	.08	802	.50
SBL	1	1600	85	.05	209	.13
SBT	3	4800	575	.12*	804	.17*
SBR	1	1600	465	.29	389	.24
EBL	2	2880	891	.31*	253	.09
EBT	3	4800	668	.14	459	.10*
EBR	1	1600	228	.14	169	.11
WBL	2	2880	425	.15	911	.32*
WBT	2	3200	273	.09*	686	.21
WBR	1	1600	176	.11	115	.07
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.91**

28. The Old Rd & McBean

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	63	.04*	232	.15*
NBT	3	4800	326	.07	546	.11
NBR	1	1600	103	.06	632	.40
SBL	1	1600	67	.04	79	.05
SBT	2	3200	458	.14*	589	.18*
SBR	1	1600	369	.23	278	.17
EBL	2	2880	614	.21*	197	.07
EBT	3	4800	616	.13	369	.08*
EBR	1	1600	184	.12	136	.09
WBL	2	2880	337	.12	720	.25*
WBT	2	3200	216	.09*	568	.20
WBR	0	0	73		68	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.76**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	66	.04*	192	.12*
NBT	3	4800	371	.08	662	.14
NBR	1	1600	190	.12	631	.39
SBL	1	1600	98	.06	204	.13
SBT	2	3200	355	.11*	825	.26*
SBR	1	1600	209	.13	260	.16
EBL	2	2880	396	.14*	199	.07
EBT	3	4800	816	.17	422	.09*
EBR	1	1600	156	.10	111	.07
WBL	2	2880	319	.11	793	.28*
WBT	2	3200	225	.14*	739	.27
WBR	0	0	219		117	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.85**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	66	.04	192	.12*
NBT	3	4800	422	.09*	703	.15
NBR	1	1600	190	.12	632	.40
SBL	1	1600	100	.06*	320	.20
SBT	2	3200	362	.11	920	.29*
SBR	1	1600	213	.13	282	.18
EBL	2	2880	428	.15*	208	.07
EBT	3	4800	816	.17	423	.09*
EBR	1	1600	156	.10	111	.07
WBL	2	2880	322	.11	798	.28*
WBT	2	3200	229	.14*	742	.28
WBR	0	0	304	.19	148	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.88**

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	66	.04	192	.12
NBT	3	4800	422	.09*	703	.15*
NBR	1	1600	190	.12	632	.40
SBL	1	1600	100	.06*	320	.20*
SBT	3	4800	362	.08	920	.19
SBR	1	1600	213	.13	282	.18
EBL	2	2880	428	.15	208	.07
EBT	3	4800	816	.17*	423	.09*
EBR	1	1600	156	.10	111	.07
WBL	2	2880	322	.11*	798	.28*
WBT	2	3200	229	.07	742	.23
WBR	1	1600	304	.19	148	.09
Right Turn Adjustment			WBR	.01*	NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.86**

28. The Old Rd & McBean

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05	140	.09*
NBT	3	4800	383	.08*	769	.16
NBR	1	1600	280	.18	630	.39
SBL	1	1600	156	.10*	208	.13
SBT	2	3200	242	.08	1040	.33*
SBR	1	1600	16	.01	258	.16
EBL	2	2880	107	.04	200	.07*
EBT	3	4800	1090	.23*	470	.10
EBR	1	1600	120	.08	90	.06
WBL	2	2880	247	.09*	895	.31
WBT	2	3200	256	.16	927	.35*
WBR	0	0	551	.34	204	
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.94**

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05	140	.09*
NBT	3	4800	440	.09*	810	.17
NBR	1	1600	280	.18	630	.39
SBL	1	1600	160	.10*	330	.21
SBT	2	3200	250	.08	1110	.35*
SBR	1	1600	20	.01	280	.18
EBL	2	2880	140	.05	210	.07*
EBT	3	4800	1090	.23*	470	.10
EBR	1	1600	120	.08	90	.06
WBL	2	2880	250	.09*	900	.31
WBT	2	3200	260	.16	930	.37*
WBR	0	0	670	.42	260	
Right Turn Adjustment			Multi	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.98**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05	140	.09
NBT	3	4800	440	.09*	810	.17*
NBR	1	1600	280	.18	630	.39
SBL	1	1600	160	.10*	330	.21*
SBT	3	4800	250	.05	1110	.23
SBR	1	1600	20	.01	280	.18
EBL	2	2880	140	.05	210	.07
EBT	3	4800	1090	.23*	470	.10*
EBR	1	1600	120	.08	90	.06
WBL	2	2880	250	.09*	900	.31*
WBT	2	3200	260	.08	930	.29
WBR	1	1600	670	.42	260	.16
Right Turn Adjustment			Multi	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.89**

29. The Old Rd & Pico Canyon

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	86	.05	170	.11
NBT	2	3200	338	.13*	411	.15*
NBR	0	0	80		64	
SBL	2	2880	341	.12*	543	.19*
SBT	2	3200	520	.17	304	.11
SBR	0	0	28		54	
EBL	1	1600	69	.04	48	.03*
EBT	2	3200	760	.24*	431	.13
EBR	1	1600	86	.05	30	.02
WBL	1	1600	67	.04*	49	.03
WBT	2	3200	349	.11	753	.24*
WBR	f		391		778	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.71**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	107	.07	211	.13
NBT	2	3200	419	.16*	510	.18*
NBR	0	0	99		79	
SBL	2	2880	423	.15*	673	.23*
SBT	2	3200	645	.21	377	.14
SBR	0	0	35		67	
EBL	1	1600	86	.05	60	.04*
EBT	2	3200	942	.29*	534	.17
EBR	1	1600	107	.07	37	.02
WBL	1	1600	83	.05*	61	.04
WBT	2	3200	433	.14	934	.29*
WBR	f		485		965	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.84**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	107	.07	211	.13
NBT	2	3200	438	.17*	527	.19*
NBR	0	0	99		79	
SBL	2	2880	423	.15*	622	.22*
SBT	2	3200	645	.21	405	.15
SBR	0	0	35		78	
EBL	1	1600	121	.08	60	.04*
EBT	2	3200	882	.28*	596	.19
EBR	1	1600	105	.07	37	.02
WBL	1	1600	84	.05*	61	.04
WBT	2	3200	444	.14	942	.29*
WBR	f		500		965	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.84**

29. The Old Rd & Pico Canyon

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	86	.05	170	.11
NBT	2	3200	338	.13*	411	.15*
NBR	0	0	80		64	
SBL	2	2880	341	.12*	543	.19*
SBT	2	3200	520	.17	304	.11
SBR	0	0	28		54	
EBL	1	1600	69	.04	48	.03*
EBT	2	3200	760	.24*	431	.13
EBR	1	1600	86	.05	30	.02
WBL	1	1600	67	.04*	49	.03
WBT	2	3200	349	.11	753	.24*
WBR	f		391		778	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.71**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	101	.06	179	.11
NBT	2	3200	294	.11*	508	.18*
NBR	0	0	67		80	
SBL	2	2880	332	.12*	519	.18*
SBT	2	3200	366	.14	412	.21
SBR	0	0	73		245	
EBL	1	1600	223	.14*	71	.04*
EBT	2	3200	659	.21	673	.21
EBR	1	1600	88	.06	131	.08
WBL	1	1600	42	.03	32	.02
WBT	2	3200	774	.24*	964	.30*
WBR	f		334		676	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.80**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	101	.06	179	.11
NBT	2	3200	305	.12*	527	.19*
NBR	0	0	67		80	
SBL	2	2880	332	.12*	540	.19*
SBT	2	3200	366	.14	452	.22
SBR	0	0	73		256	
EBL	1	1600	235	.15*	71	.04*
EBT	2	3200	659	.21	673	.21
EBR	1	1600	88	.06	131	.08
WBL	1	1600	42	.03	32	.02
WBT	2	3200	789	.25*	972	.30*
WBR	f		353		679	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.82**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	100	.06	559	.35*
NBT	2	3200	228	.09*	531	.23
NBR	0	0	50		200	
SBL	2	2880	320	.11*	710	.25
SBT	2	3200	160	.09	434	.23*
SBR	0	0	130		299	
EBL	1	1600	364	.23*	50	.03
EBT	2	3200	350	.11	480	.15*
EBR	1	1600	80	.05	690	.43
WBL	1	1600	10	.01	180	.11*
WBT	2	3200	1165	.36*	362	.11
WBR	f		271		677	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.89**		**.96**

29. The Old Rd & Pico Canyon

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	100	.06	560	.35*
NBT	2	3200	240	.09*	550	.23
NBR	0	0	50		200	
SBL	2	2880	320	.11*	730	.25
SBT	2	3200	160	.09	450	.24*
SBR	0	0	130		310	
EBL	1	1600	380	.24*	50	.03
EBT	2	3200	350	.11	480	.15*
EBR	1	1600	80	.05	690	.43
WBL	1	1600	10	.01	180	.11*
WBT	2	3200	1180	.37*	370	.12
WBR	f		290		680	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.91**		**.97**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	100	.03	560	.19
NBT	2	3200	240	.09*	550	.23*
NBR	0	0	50		200	
SBL	2	2880	320	.11*	730	.25*
SBT	2	3200	160	.09	450	.24
SBR	0	0	130		310	
EBL	1	1600	380	.24*	50	.03
EBT	2	3200	350	.11	480	.15*
EBR	1	1600	80	.05	690	.43
WBL	1	1600	10	.01	180	.11*
WBT	3	4800	1180	.31*	370	.12
WBR	0	0	290		680	.43
Right Turn Adjustment					Multi	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.95**

30. Ave Stanford & Rye Canyon

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	89	.03*	383	.11*
NBT	1	1750	39	.03	40	.03
NBR	0	0	12		16	
SBL	1	1750	15	.01	92	.05
SBT	1	1750	27	.02*	83	.05*
SBR	1	1750	31	.02	262	.15
EBL	1	1750	214	.12*	39	.02
EBT	3	5250	625	.18	925	.20*
EBR	0	0	453	.26	129	
WBL	1	1750	22	.01	18	.01*
WBT	3	5250	1151	.24*	888	.17
WBR	0	0	99		24	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .51 .54

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	308	.09*	405	.12*
NBT	1	1750	31	.03	127	.09
NBR	0	0	29		31	
SBL	1	1750	26	.01	104	.06
SBT	1	1750	49	.03*	211	.12*
SBR	1	1750	57	.03	296	.17
EBL	1	1750	195	.11*	79	.05
EBT	3	5250	1189	.30	1310	.31*
EBR	0	0	388		329	
WBL	1	1750	21	.01	19	.01*
WBT	3	5250	1221	.24*	1264	.25
WBR	0	0	60		47	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .57 .66

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	342	.10*	433	.12*
NBT	1	1750	31	.03	129	.09
NBR	0	0	29		31	
SBL	1	1750	26	.01	105	.06
SBT	1	1750	51	.03*	216	.12*
SBR	1	1750	57	.03	296	.17
EBL	1	1750	195	.11*	79	.05
EBT	3	5250	1273	.32	1400	.33*
EBR	0	0	413		346	
WBL	1	1750	21	.01	19	.01*
WBT	3	5250	1321	.26*	1302	.26
WBR	0	0	60		50	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .68

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	201	.06*	129	.04*
NBT	1	1750	10	.03	210	.15
NBR	0	0	50		50	
SBL	1	1750	30	.02	119	.07
SBT	1	1750	58	.03*	388	.22*
SBR	1	1750	100	.06	340	.19
EBL	1	1750	150	.09	130	.07*
EBT	3	5250	1684	.35*	1671	.36
EBR	0	0	162		237	
WBL	1	1750	10	.01*	20	.01
WBT	3	5250	1290	.25	1689	.34*
WBR	0	0	10		80	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .77

30. Ave Stanford & Rye Canyon

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	210	.06*	150	.04*
NBT	1	1750	10	.03	210	.15
NBR	0	0	50		50	
SBL	1	1750	30	.02	120	.07
SBT	1	1750	60	.03*	390	.22*
SBR	1	1750	100	.06	340	.19
EBL	1	1750	150	.09	130	.07*
EBT	3	5250	1760	.37*	1750	.38
EBR	0	0	180		240	
WBL	1	1750	10	.01*	20	.01
WBT	3	5250	1390	.27	1770	.35*
WBR	0	0	10		80	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.78**

33. Rye/Copper Hill & NRR

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	41	.01*	115	.03
NBT	3	5250	381	.07	1070	.20*
NBR	f		32		219	
SBL	2	3500	133	.04	220	.06*
SBT	3	5250	1240	.24*	516	.10
SBR	f		358		192	
EBL	2	3500	441	.13*	922	.26*
EBT	4	7000	510	.07	983	.14
EBR	1	1750	76	.04	43	.02
WBL	2	3500	366	.10	168	.05
WBT	4	7000	1038	.15*	553	.08*
WBR	f		217		148	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.70**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	113	.03*	206	.06
NBT	3	5250	764	.15	1171	.22*
NBR	f		109		181	
SBL	2	3500	114	.03	216	.06*
SBT	3	5250	1439	.27*	716	.14
SBR	f		686		480	
EBL	2	3500	386	.11*	949	.27*
EBT	4	7000	563	.08	1440	.21
EBR	1	1750	163	.09	246	.14
WBL	2	3500	209	.06	156	.04
WBT	4	7000	1488	.21*	867	.12*
WBR	f		271		206	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.77**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	118	.03*	214	.06
NBT	3	5250	792	.15	1229	.23*
NBR	f		123		181	
SBL	2	3500	114	.03	216	.06*
SBT	3	5250	1527	.29*	726	.14
SBR	f		723		524	
EBL	2	3500	400	.11*	993	.28*
EBT	4	7000	582	.08	1530	.22
EBR	1	1750	170	.10	251	.14
WBL	2	3500	209	.06	156	.04
WBT	4	7000	1537	.22*	939	.13*
WBR	f		271		206	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.80**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	433	.12*	373	.11
NBT	3	5250	1124	.21	1267	.24*
NBR	f		190		98	
SBL	2	3500	130	.04	250	.07*
SBT	3	5250	1535	.29*	883	.17
SBR	f		1170		789	
EBL	2	3500	323	.09*	1018	.29*
EBT	4	7000	497	.07	1938	.28
EBR	1	1750	273	.16	472	.27
WBL	2	3500	330	.09	460	.13
WBT	4	7000	1257	.18*	1007	.14*
WBR	f		680		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.84**

33. Rye/Copper Hill & NRR

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	440	.13*	380	.11
NBT	3	5250	1160	.22	1320	.25*
NBR	f		190		100	
SBL	2	3500	130	.04	250	.07*
SBT	3	5250	1620	.31*	930	.18
SBR	f		1210		800	
EBL	2	3500	330	.09*	1040	.30*
EBT	4	7000	510	.07	2010	.29
EBR	1	1750	280	.16	480	.27
WBL	2	3500	330	.09	460	.13
WBT	4	7000	1260	.18*	1020	.15*
WBR	f		680		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**.87**

35. Copper Hill & Decoro

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	591	.11	1769	.34*
NBR	1	1750	173	.10	421	.24
SBL	1	1750	325	.19	44	.03*
SBT	3	5250	1920	.37*	625	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	343	.10*	151	.04*
WBT	0	0	0		0	
WBR	1	1750	264	.15	60	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.51**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	706	.13	2297	.44*
NBR	1	1750	175	.10	270	.15
SBL	1	1750	336	.19	82	.05*
SBT	3	5250	2404	.46*	625	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	240	.07*	132	.04*
WBT	0	0	0		0	
WBR	1	1750	205	.12	122	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.63**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	734	.14	2379	.45*
NBR	1	1750	178	.10	272	.16
SBL	1	1750	336	.19	82	.05*
SBT	3	5250	2515	.48*	661	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	242	.07*	135	.04*
WBT	0	0	0		0	
WBR	1	1750	205	.12	122	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.64**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	862	.16	2873	.55*
NBR	1	1750	177	.10	69	.04
SBL	1	1750	340	.19	140	.08*
SBT	3	5250	2947	.56*	632	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	143	.04*	88	.03*
WBT	0	0	0		0	
WBR	1	1750	130	.07	230	.13
Right Turn Adjustment					WBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.80**

35. Copper Hill & Decoro

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	890	.17	2940	.56*
NBR	1	1750	180	.10	70	.04
SBL	1	1750	340	.19	140	.08*
SBT	3	5250	3050	.58*	670	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	150	.04*	90	.03*
WBT	0	0	0		0	
WBR	1	1750	130	.07	230	.13
Right Turn Adjustment					WBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.81**

36. Tourney & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	37	.01*	254	.07*
SBT	0	0	0		0	
SBR	1	1750	48	.03	338	.19
EBL	2	3500	361	.10*	63	.02*
EBT	4	7000	1272	.18	1404	.20
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1377	.24*	1226	.19*
WBR	0	0	290		82	
Right Turn Adjustment					SBR	.10*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.45**		**.48**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	60	.02*	257	.07*
SBT	0	0	0		0	
SBR	1	1750	96	.05	377	.22
EBL	2	3500	372	.11*	96	.03*
EBT	4	7000	1746	.25	1973	.28
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1683	.28*	1830	.27*
WBR	0	0	272		90	
Right Turn Adjustment					SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.60**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	60	.02*	257	.07*
SBT	0	0	0		0	
SBR	1	1750	98	.06	381	.22
EBL	2	3500	376	.11*	97	.03*
EBT	4	7000	1806	.26	2046	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1740	.29*	1912	.29*
WBR	0	0	272		90	
Right Turn Adjustment					SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	170	.05*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	228	.13	666	.38
EBL	2	3500	696	.20*	329	.09*
EBT	4	7000	2040	.29	2579	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1961	.32*	2374	.37*
WBR	0	0	270		190	
Right Turn Adjustment					SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.87**

36. Tourney & Valencia

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	170	.05*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	230	.13	670	.38
EBL	2	3500	700	.20*	330	.09*
EBT	4	7000	2100	.30	2660	.38
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2010	.33*	2450	.38*
WBR	0	0	270		190	
Right Turn Adjustment					SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.88**

37. Tourney & Magic Mountain

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	134	.04*	221	.06*
NBT	0	0	0		0	
NBR	1	1750	70	.04	253	.14
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	666	.13*	1074	.20*
EBR	1	1750	233	.13	70	.04
WBL	1	1750	387	.22*	109	.06*
WBT	3	5250	713	.14	764	.15
WBR	0	0	0		0	
Right Turn Adjustment					NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.45**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	105	.03*	289	.08*
NBT	0	0	0		0	
NBR	1	1750	74	.04	234	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1165	.22*	1639	.31*
EBR	1	1750	265	.15	73	.04
WBL	1	1750	296	.17*	131	.07*
WBT	3	5250	951	.18	1179	.22
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.56**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	108	.03*	314	.09*
NBT	0	0	0		0	
NBR	1	1750	74	.04	234	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1354	.26*	1872	.36*
EBR	1	1750	300	.17	87	.05
WBL	1	1750	296	.17*	131	.07*
WBT	3	5250	1187	.23	1362	.26
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	37	.02	265	.15*
NBT	2	3500	440	.13*	470	.17
NBR	0	0	30		140	
SBL	1	1750	30	.02*	100	.06
SBT	2	3500	230	.07	500	.14*
SBR	2	3500	190	.05	579	.17
EBL	2	3500	455	.13*	329	.09
EBT	3	5250	1596	.30	2262	.43*
EBR	1	1750	225	.13	36	.02
WBL	1	1750	160	.09	70	.04*
WBT	3	5250	1486	.29*	1401	.27
WBR	0	0	50		10	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.86**

37. Tourney & Magic Mountain

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	290	.17*
NBT	2	3500	440	.13*	470	.17
NBR	0	0	30		140	
SBL	1	1750	30	.02*	100	.06
SBT	2	3500	230	.07	500	.14*
SBR	2	3500	220	.06	670	.19
EBL	2	3500	490	.14*	370	.11
EBT	3	5250	1780	.34	2520	.48*
EBR	1	1750	260	.15	50	.03
WBL	1	1750	160	.09	70	.04*
WBT	3	5250	1780	.35*	1570	.30
WBR	0	0	50		10	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.93**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	290	.17*
NBT	2	3500	440	.13*	470	.17
NBR	0	0	30		140	
SBL	1	1750	30	.02*	100	.06
SBT	2	3500	230	.07	500	.14*
SBR	2	3500	220	.06	670	.19
EBL	2	3500	490	.14*	370	.11*
EBT	4	7000	1780	.25	2520	.36
EBR	1	1750	260	.15	50	.03
WBL	1	1750	160	.09	70	.04
WBT	3	5250	1780	.35*	1570	.30*
WBR	0	0	50		10	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.82**

44. McBean & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	218	.06*	193	.06
NBT	3	5250	772	.15	1105	.21*
NBR	2	3500	182	.05	342	.10
SBL	2	3500	97	.03	195	.06*
SBT	3	5250	672	.13*	931	.18
SBR	2	3500	584	.17	296	.08
EBL	2	3500	360	.10*	535	.15
EBT	3	5250	722	.14	1213	.23*
EBR	1	1750	78	.04	57	.03
WBL	2	3500	314	.09	505	.14*
WBT	3	5250	1149	.22*	890	.17
WBR	1	1750	31	.02	116	.07
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .61 .74

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	238	.07*	178	.05
NBT	3	5250	971	.18	1223	.23*
NBR	2	3500	274	.08	548	.16
SBL	2	3500	71	.02	205	.06*
SBT	3	5250	801	.15*	1186	.23
SBR	2	3500	701	.20	732	.21
EBL	2	3500	518	.15*	822	.23*
EBT	3	5250	956	.18	1227	.23
EBR	1	1750	52	.03	140	.08
WBL	2	3500	431	.12	635	.18
WBT	3	5250	1187	.23*	1084	.21*
WBR	1	1750	119	.07	195	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .83

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	254	.07*	188	.05
NBT	3	5250	977	.19	1229	.23*
NBR	2	3500	274	.08	548	.16
SBL	2	3500	72	.02	207	.06*
SBT	3	5250	805	.15*	1195	.23
SBR	2	3500	701	.20	735	.21
EBL	2	3500	518	.15*	824	.24*
EBT	3	5250	962	.18	1242	.24
EBR	1	1750	53	.03	155	.09
WBL	2	3500	431	.12	635	.18
WBT	3	5250	1202	.23*	1093	.21*
WBR	1	1750	119	.07	200	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .84

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	257	.07*	161	.05
NBT	3	5250	1042	.20	1355	.26*
NBR	2	3500	330	.09	700	.20
SBL	2	3500	58	.02	229	.07*
SBT	3	5250	896	.17*	1385	.26
SBR	2	3500	880	.25	1027	.29
EBL	2	3500	510	.15*	998	.29*
EBT	3	5250	1104	.21	1233	.23
EBR	1	1750	19	.01	279	.16
WBL	2	3500	430	.12	700	.20
WBT	3	5250	1045	.20*	1141	.22*
WBR	1	1750	230	.13	391	.22
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .69 .94

44. McBean & Valencia

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	270	.08*	170	.05
NBT	3	5250	1050	.20	1360	.26*
NBR	2	3500	330	.09	700	.20
SBL	2	3500	60	.02	230	.07*
SBT	3	5250	900	.17*	1390	.26
SBR	2	3500	880	.25	1030	.29
EBL	2	3500	510	.15*	1000	.29*
EBT	3	5250	1110	.21	1250	.24
EBR	1	1750	20	.01	300	.17
WBL	2	3500	430	.12	700	.20
WBT	3	5250	1060	.20*	1150	.22*
WBR	1	1750	230	.13	400	.23
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .94

45. McBean & Magic Mtn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	50	.01*	94	.03
NBT	3	5250	900	.17	1384	.26*
NBR	f		21		98	
SBL	2	3500	387	.11	250	.07*
SBT	4	7000	1871	.27*	1296	.19
SBR	f		534		203	
EBL	2	3500	592	.17*	570	.16*
EBT	2	3500	475	.14	548	.16
EBR	1	1750	107	.06	126	.07
WBL	2	3500	58	.02	172	.05
WBT	3	5250	330	.06*	369	.07*
WBR	1	1750	113	.06	387	.22
Right Turn Adjustment					WBR	.10*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .76

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	120	.03	218	.06
NBT	3	5250	1212	.23*	1915	.36*
NBR	f		34		160	
SBL	2	3500	393	.11*	268	.08*
SBT	4	7000	1879	.27	1826	.26
SBR	f		530		287	
EBL	2	3500	673	.19*	648	.19*
EBT	2	3500	828	.24	864	.25
EBR	1	1750	123	.07	273	.16
WBL	2	3500	63	.02	180	.05
WBT	3	5250	416	.08*	727	.14*
WBR	1	1750	98	.06	437	.25
Right Turn Adjustment					WBR	.05*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .71 .92

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	140	.04	253	.07
NBT	3	5250	1212	.23*	1915	.36*
NBR	f		34		160	
SBL	2	3500	393	.11*	268	.08*
SBT	4	7000	1879	.27	1826	.26
SBR	f		616		332	
EBL	2	3500	748	.21*	720	.21*
EBT	2	3500	920	.26	967	.28
EBR	1	1750	139	.08	304	.17
WBL	2	3500	63	.02	180	.05
WBT	3	5250	530	.10*	815	.16*
WBR	1	1750	98	.06	437	.25
Right Turn Adjustment					WBR	.03*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .75 .94

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	140	.04	253	.07
NBT	3	5250	1212	.23*	1915	.36*
NBR	f		34		160	
SBL	2	3500	393	.11*	268	.08*
SBT	4	7000	1879	.27	1826	.26
SBR	f		616		332	
EBL	2	3500	748	.21*	720	.21*
EBT	3	5250	920	.18	967	.18
EBR	1	1750	139	.08	304	.17
WBL	2	3500	63	.02	180	.05
WBT	3	5250	530	.10*	815	.16*
WBR	1	1750	98	.06	437	.25
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .75 .92

45. McBean & Magic Mtn

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	178	.05	315	.09
NBT	3	5250	1280	.24*	2450	.47*
NBR	f		40		270	
SBL	2	3500	590	.17*	330	.09*
SBT	4	7000	1880	.27	2100	.30
SBR	f		582		97	
EBL	2	3500	430	.12	370	.11
EBT	2	3500	1379	.39*	1633	.47*
EBR	1	1750	114	.07	425	.24
WBL	2	3500	70	.02*	210	.06*
WBT	3	5250	724	.14	1183	.23
WBR	1	1750	370	.21	560	.32
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .92 1.19

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	200	.06	350	.10
NBT	3	5250	1280	.24*	2450	.47*
NBR	f		40		270	
SBL	2	3500	590	.17*	330	.09*
SBT	4	7000	1880	.27	2100	.30
SBR	f		730		110	
EBL	2	3500	480	.14	450	.13
EBT	2	3500	1490	.43*	1760	.50*
EBR	1	1750	130	.07	450	.26
WBL	2	3500	70	.02*	210	.06*
WBT	3	5250	830	.16	1290	.25
WBR	1	1750	370	.21	560	.32
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .96 1.22

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	200	.06	350	.10
NBT	3	5250	1280	.24*	2450	.47*
NBR	f		40		270	
SBL	2	3500	590	.17*	330	.09*
SBT	4	7000	1880	.27	2100	.30
SBR	f		730		110	
EBL	2	3500	480	.14	450	.13
EBT	3	5250	1490	.28*	1760	.34*
EBR	1	1750	130	.07	450	.26
WBL	2	3500	70	.02*	210	.06*
WBT	3	5250	830	.16	1290	.25
WBR	1	1750	370	.21	560	.32
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .81 1.06

48. McBean & Newhall Ranch

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	394	.11*	353	.10
NBT	3	5250	431	.08	1499	.29*
NBR	1	1750	212	.12	690	.39
SBL	2	3500	275	.08	206	.06*
SBT	4	7000	1542	.22*	706	.10
SBR	f		187		48	
EBL	2	3500	103	.03*	198	.06
EBT	4	7000	566	.08	1402	.20*
EBR	1	1750	193	.11	323	.18
WBL	2	3500	639	.18	440	.13*
WBT	3	5250	1397	.27*	727	.14
WBR	1	1750	111	.06	270	.15
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.78**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	225	.06*	334	.10
NBT	3	5250	657	.13	1660	.32*
NBR	1	1750	238	.14	1070	.61
SBL	2	3500	414	.12	181	.05*
SBT	4	7000	1579	.23*	1047	.15
SBR	f		270		44	
EBL	2	3500	97	.03*	401	.11
EBT	4	7000	753	.11	1511	.22*
EBR	1	1750	302	.17	520	.30
WBL	2	3500	466	.13	425	.12*
WBT	3	5250	1893	.36*	1154	.22
WBR	1	1750	93	.05	349	.20
Right Turn Adjustment					NBR	.20*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**1.01**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	225	.06*	334	.10
NBT	3	5250	672	.13	1664	.32*
NBR	1	1750	286	.16	1137	.65
SBL	2	3500	414	.12	181	.05*
SBT	4	7000	1633	.23*	1075	.15
SBR	f		284		46	
EBL	2	3500	97	.03*	432	.12*
EBT	4	7000	763	.11	1541	.22
EBR	1	1750	302	.17	520	.30
WBL	2	3500	481	.14	428	.12
WBT	3	5250	1929	.37*	1216	.23*
WBR	1	1750	93	.05	349	.20
Right Turn Adjustment					NBR	.23*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**1.05**

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	225	.06*	334	.10
NBT	3	5250	672	.13	1664	.32*
NBR	2	3500	286	.08	1137	.32
SBL	2	3500	414	.12	181	.05*
SBT	4	7000	1633	.23*	1075	.15
SBR	f		284		46	
EBL	2	3500	97	.03*	432	.12
EBT	4	7000	763	.11	1541	.22*
EBR	1	1750	302	.17	520	.30
WBL	2	3500	481	.14	428	.12*
WBT	4	7000	1929	.28*	1216	.17
WBR	1	1750	93	.05	349	.20
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.70**		**.81**

48. McBean & Newhall Ranch

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07	290	.08
NBT	3	5250	895	.17*	1986	.38*
NBR	1	1750	124	.07	1156	.66
SBL	2	3500	530	.15*	180	.05*
SBT	4	7000	1720	.25	1304	.19
SBR	f		187		58	
EBL	2	3500	90	.03*	237	.07*
EBT	4	7000	831	.12	1967	.28
EBR	1	1750	320	.18	620	.35
WBL	2	3500	908	.26	260	.07
WBT	3	5250	1819	.35*	1576	.30*
WBR	1	1750	60	.03	520	.30
Right Turn Adjustment			EBR	.01*	NBR	.21*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .81 1.11

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07	290	.08
NBT	3	5250	910	.17*	2010	.38*
NBR	1	1750	150	.09	1210	.69
SBL	2	3500	530	.15*	180	.05*
SBT	4	7000	1750	.25	1330	.19
SBR	f		190		60	
EBL	2	3500	90	.03	250	.07*
EBT	4	7000	840	.12*	2000	.29
EBR	1	1750	320	.18	620	.35
WBL	2	3500	990	.28*	260	.07
WBT	3	5250	1840	.35	1630	.31*
WBR	1	1750	60	.03	520	.30
Right Turn Adjustment			EBR	.01*	NBR	.24*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .83 1.15

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07	290	.08
NBT	3	5250	910	.17*	2010	.38*
NBR	2	3500	150	.04	1210	.35
SBL	2	3500	530	.15*	180	.05*
SBT	4	7000	1750	.25	1330	.19
SBR	f		190		60	
EBL	2	3500	90	.03	250	.07
EBT	4	7000	840	.12*	2000	.29*
EBR	1	1750	320	.18	620	.35
WBL	2	3500	990	.28*	260	.07*
WBT	4	7000	1840	.26	1630	.23
WBR	1	1750	60	.03	520	.30
Right Turn Adjustment			EBR	.01*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .83 .89

49. McBean & Decoro

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	183	.10*	121	.07
NBT	3	5250	434	.08	1072	.20*
NBR	1	1750	168	.10	403	.23
SBL	1	1750	120	.07	75	.04*
SBT	3	5250	856	.16*	486	.09
SBR	1	1750	382	.22	79	.05
EBL	2	3500	241	.07*	398	.11*
EBT	2	3500	189	.05	456	.13
EBR	1	1750	103	.06	53	.03
WBL	2	3500	615	.18	233	.07
WBT	2	3500	997	.33*	251	.09*
WBR	0	0	144		77	
Right Turn Adjustment			SBR	.01*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.54**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	177	.10*	90	.05
NBT	3	5250	431	.08	1266	.24*
NBR	1	1750	166	.09	511	.29
SBL	1	1750	155	.09	99	.06*
SBT	3	5250	1059	.20*	607	.12
SBR	1	1750	309	.18	62	.04
EBL	2	3500	161	.05*	346	.10
EBT	2	3500	141	.04	443	.13*
EBR	1	1750	93	.05	69	.04
WBL	2	3500	622	.18	244	.07*
WBT	2	3500	782	.25*	202	.09
WBR	0	0	107		127	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.60**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	177	.10*	90	.05
NBT	3	5250	433	.08	1273	.24*
NBR	1	1750	173	.10	523	.30
SBL	1	1750	155	.09	99	.06*
SBT	3	5250	1082	.21*	615	.12
SBR	1	1750	314	.18	62	.04
EBL	2	3500	162	.05*	366	.10
EBT	2	3500	141	.04	456	.13*
EBR	1	1750	93	.05	69	.04
WBL	2	3500	642	.18	255	.07*
WBT	2	3500	794	.26*	203	.09
WBR	0	0	107		127	
Right Turn Adjustment					NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.61**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	170	.10*	50	.03
NBT	3	5250	398	.08	1511	.29*
NBR	1	1750	153	.09	544	.31
SBL	1	1750	120	.07	150	.09*
SBT	3	5250	1398	.27*	683	.13
SBR	1	1750	173	.10	40	.02
EBL	2	3500	49	.01*	261	.07
EBT	2	3500	90	.03	370	.11*
EBR	1	1750	100	.06	100	.06
WBL	2	3500	443	.13	239	.07*
WBT	2	3500	510	.17*	139	.08
WBR	0	0	70		130	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.66**

49. McBean & Decoro

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	170	.10*	50	.03
NBT	3	5250	400	.08	1520	.29*
NBR	1	1750	160	.09	560	.32
SBL	1	1750	120	.07	150	.09*
SBT	3	5250	1420	.27*	690	.13
SBR	1	1750	180	.10	40	.02
EBL	2	3500	50	.01*	280	.08
EBT	2	3500	90	.03	380	.11*
EBR	1	1750	100	.06	100	.06
WBL	2	3500	450	.13	250	.07*
WBT	2	3500	530	.17*	140	.08
WBR	0	0	70		130	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.66**

51. Wiley Cyn & Lyons

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	179	.10*	190	.11
NBT	2	3500	200	.06	399	.11*
NBR	1	1750	124	.07	237	.14
SBL	1	1750	125	.07	160	.09*
SBT	2	3500	382	.11*	261	.07
SBR	1	1750	371	.21	256	.15
EBL	2	3500	134	.04	288	.08
EBT	2	3500	647	.18*	983	.28*
EBR	1	1750	115	.07	118	.07
WBL	1	1750	164	.09*	199	.11*
WBT	3	5250	775	.17	769	.18
WBR	0	0	94		157	
Right Turn Adjustment			SBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.69**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	172	.10*	245	.14*
NBT	2	3500	200	.06	483	.14
NBR	1	1750	144	.08	274	.16
SBL	1	1750	145	.08	147	.08
SBT	2	3500	408	.12*	533	.15*
SBR	1	1750	365	.21	354	.20
EBL	2	3500	171	.05	342	.10
EBT	2	3500	803	.23*	1085	.31*
EBR	1	1750	115	.07	83	.05
WBL	1	1750	171	.10*	235	.13*
WBT	3	5250	705	.15	986	.22
WBR	0	0	61		163	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.83**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	178	.10*	251	.14*
NBT	2	3500	200	.06	483	.14
NBR	1	1750	144	.08	274	.16
SBL	1	1750	145	.08	147	.08
SBT	2	3500	408	.12*	533	.15*
SBR	1	1750	367	.21	356	.20
EBL	2	3500	172	.05	342	.10
EBT	2	3500	831	.24*	1111	.32*
EBR	1	1750	119	.07	85	.05
WBL	1	1750	171	.10*	235	.13*
WBT	3	5250	739	.15	1014	.22
WBR	0	0	61		163	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.84**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	154	.09*	314	.18*
NBT	2	3500	190	.05	640	.18
NBR	1	1750	180	.10	330	.19
SBL	1	1750	180	.10	110	.06
SBT	2	3500	500	.14*	870	.25*
SBR	1	1750	468	.27	578	.33
EBL	2	3500	249	.07	540	.15
EBT	2	3500	942	.27*	1301	.37*
EBR	1	1750	96	.05	19	.01
WBL	1	1750	170	.10*	290	.17*
WBT	3	5250	585	.11	1222	.26
WBR	0	0	10		160	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**1.07**

51. Wiley Cyn & Lyons

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	160	.09*	320	.18*
NBT	2	3500	190	.05	640	.18
NBR	1	1750	180	.10	330	.19
SBL	1	1750	180	.10	110	.06
SBT	2	3500	500	.14*	870	.25*
SBR	1	1750	470	.27	580	.33
EBL	2	3500	250	.07	540	.15
EBT	2	3500	970	.28*	1330	.38*
EBR	1	1750	100	.06	20	.01
WBL	1	1750	170	.10*	290	.17*
WBT	3	5250	620	.12	1250	.27
WBR	0	0	10		160	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**1.08**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	160	.09*	320	.18*
NBT	2	3500	190	.05	640	.18
NBR	1	1750	180	.10	330	.19
SBL	1	1750	180	.10	110	.06
SBT	2	3500	500	.14*	870	.25*
SBR	1	1750	470	.27	580	.33
EBL	2	3500	250	.07	540	.15
EBT	3	5250	970	.20*	1330	.26*
EBR	0	0	100		20	
WBL	1	1750	170	.10*	290	.17*
WBT	3	5250	620	.12	1250	.27
WBR	0	0	10		160	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.96**

54. Orchard Village & Wiley Cyn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	218	.12*	132	.08
NBT	2	3500	754	.25	807	.27*
NBR	0	0	113		153	
SBL	1	1750	117	.07	124	.07*
SBT	2	3500	777	.22*	731	.21
SBR	1	1750	283	.16	215	.12
EBL	2	3500	172	.05	282	.08
EBT	2	3500	125	.07*	254	.12*
EBR	0	0	272	.16	179	
WBL	1	1750	152	.09*	98	.06*
WBT	2	3500	268	.08	240	.07
WBR	1	1750	96	.05	101	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.62**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	157	.09	122	.07
NBT	2	3500	797	.28*	935	.35*
NBR	0	0	173		275	
SBL	1	1750	114	.07*	121	.07*
SBT	2	3500	733	.21	1032	.29
SBR	1	1750	312	.18	239	.14
EBL	2	3500	206	.06	294	.08
EBT	2	3500	193	.11*	336	.14*
EBR	0	0	201	.11	171	
WBL	1	1750	164	.09*	156	.09*
WBT	2	3500	313	.09	346	.10
WBR	1	1750	74	.04	96	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.75**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	157	.09	122	.07
NBT	2	3500	816	.28*	947	.35*
NBR	0	0	173		275	
SBL	1	1750	114	.07*	123	.07*
SBT	2	3500	745	.21	1068	.31
SBR	1	1750	312	.18	239	.14
EBL	2	3500	206	.06	294	.08
EBT	2	3500	193	.11*	336	.14*
EBR	0	0	201	.11	171	
WBL	1	1750	164	.09*	156	.09*
WBT	2	3500	313	.09	346	.10
WBR	1	1750	78	.04	97	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.75**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	690	.29*	990	.45*
NBR	0	0	340		600	
SBL	1	1750	565	.32*	669	.38*
SBT	2	3500	538	.15	1059	.30
SBR	1	1750	340	.19	190	.11
EBL	2	3500	240	.07	310	.09
EBT	2	3500	360	.13*	757	.26*
EBR	0	0	110		148	
WBL	1	1750	390	.22*	400	.23*
WBT	2	3500	670	.19	690	.20
WBR	1	1750	495	.28	556	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**1.06**		**1.42**

54. Orchard Village & Wiley Cyn

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	710	.30*	1000	.46*
NBR	0	0	340		600	
SBL	1	1750	570	.33*	680	.39*
SBT	2	3500	550	.16	1090	.31
SBR	1	1750	340	.19	190	.11
EBL	2	3500	240	.07	310	.09
EBT	2	3500	360	.13*	760	.26*
EBR	0	0	110		150	
WBL	1	1750	390	.22*	400	.23*
WBT	2	3500	670	.19	690	.20
WBR	1	1750	500	.29	560	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**1.08**		**1.44**

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	710	.20*	1000	.29*
NBR	1	1750	340	.19	600	.34
SBL	1	1750	570	.33*	680	.39*
SBT	2	3500	550	.16	1090	.31
SBR	1	1750	340	.19	190	.11
EBL	2	3500	240	.07	310	.09
EBT	2	3500	360	.13*	760	.26*
EBR	0	0	110		150	
WBL	1	1750	390	.22*	400	.23*
WBT	2	3500	670	.19	690	.20
WBR	1	1750	500	.29	560	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.98**		**1.27**

55. Orchard Village & McBean

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		327		215	
NBT	0.5	3500	39	.10*	17	.07*
NBR	2	3500	592	.17	757	.22
SBL	0	0	25		64	
SBT	1	1750	32	.03*	40	.06*
SBR	d	1750	19	.01	31	.02
EBL	1	1750	38	.02	28	.02
EBT	3	5250	436	.12*	860	.22*
EBR	0	0	253	.14	319	
WBL	2	3500	778	.22*	799	.23*
WBT	3	5250	507	.11	566	.11
WBR	0	0	48		19	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .57 .68

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		443		341	
NBT	0.5	3500	48	.14*	36	.11*
NBR	2	3500	736	.21	899	.26
SBL	0	0	18		62	
SBT	1	1750	27	.03*	53	.07*
SBR	d	1750	15	.01	31	.02
EBL	1	1750	43	.02	33	.02
EBT	3	5250	521	.15*	926	.26*
EBR	0	0	378	.22	592	.34
WBL	2	3500	801	.23*	1015	.29*
WBT	3	5250	623	.13	753	.15
WBR	0	0	44		19	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .65 .83

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		472		357	
NBT	0.5	3500	48	.15*	36	.11*
NBR	2	3500	736	.21	899	.26
SBL	0	0	18		62	
SBT	1	1750	27	.03*	53	.07*
SBR	d	1750	15	.01	31	.02
EBL	1	1750	43	.02	33	.02
EBT	3	5250	521	.15*	927	.26*
EBR	0	0	392	.22	632	.36
WBL	2	3500	801	.23*	1015	.29*
WBT	3	5250	623	.13	754	.15
WBR	0	0	44		19	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .66 .85

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		472		357	
NBT	0.5	3500	48	.15*	36	.11*
NBR	2	3500	736	.21	899	.26
SBL	1.5		18		62	
SBT	1.5	5250	27	.01*	53	.02*
SBR	1	1750	15	.01	31	.02
EBL	1	1750	43	.02	33	.02
EBT	3	5250	521	.15*	927	.26*
EBR	0	0	392	.22	632	.36
WBL	2	3500	801	.23*	1015	.29*
WBT	3	5250	623	.13	754	.15
WBR	0	0	44		19	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .64 .80

55. Orchard Village & McBean

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		958		843	
NBT	0.5	3500	60	.29*	60	.26*
NBR	2	3500	850	.24	1100	.31
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	470	.13*	909	.26*
EBR	0	0	831	.47	1106	.63
WBL	2	3500	840	.24*	1190	.34*
WBT	3	5250	620	.12	899	.18
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.12*	EBR	.17*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .90 1.20

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		990		860	
NBT	0.5	3500	60	.30*	60	.26*
NBR	2	3500	850	.24	1100	.31
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	470	.13*	910	.26*
EBR	0	0	850	.49	1150	.66
WBL	2	3500	840	.24*	1190	.34*
WBT	3	5250	620	.12	900	.18
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.13*	EBR	.20*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .92 1.23

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		990		860	
NBT	0.5	3500	60	.30*	60	.26*
NBR	2	3500	850	.24	1100	.31
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	470	.13*	910	.26*
EBR	0	0	850	.49	1150	.66
WBL	2	3500	840	.24*	1190	.34*
WBT	3	5250	620	.12	900	.18
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.13*	EBR	.20*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .91 1.18

57. Valencia & Magic Mtn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	32	.02*	56	.03
NBT	3	5250	682	.14	1406	.30*
NBR	0	0	71		154	
SBL	1	1750	25	.01	56	.03*
SBT	3	5250	1632	.31*	1115	.21
SBR	2	3500	429	.12	371	.11
EBL	2	3500	145	.04	500	.14*
EBT	2	3500	153	.05*	420	.13
EBR	0	0	29		29	
WBL	1	1750	176	.10*	148	.08
WBT	2	3500	351	.10	303	.09*
WBR	1	1750	26	.01	61	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.66**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	49	.03*	80	.05
NBT	3	5250	878	.19	1700	.39*
NBR	0	0	97		336	
SBL	1	1750	23	.01	45	.03*
SBT	3	5250	1786	.34*	1326	.25
SBR	2	3500	565	.16	532	.15
EBL	2	3500	323	.09	445	.13
EBT	2	3500	303	.10*	590	.18*
EBR	0	0	48		34	
WBL	1	1750	378	.22*	219	.13*
WBT	2	3500	390	.11	445	.13
WBR	1	1750	32	.02	47	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.83**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	49	.03*	80	.05
NBT	3	5250	881	.19	1706	.39*
NBR	0	0	97		338	
SBL	1	1750	23	.01	45	.03*
SBT	3	5250	1795	.34*	1331	.25
SBR	2	3500	636	.18	555	.16
EBL	2	3500	353	.10	471	.13
EBT	2	3500	328	.11*	614	.19*
EBR	0	0	55		34	
WBL	1	1750	383	.22*	219	.13*
WBT	2	3500	431	.12	470	.13
WBR	1	1750	32	.02	47	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.84**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	130	.07
NBT	3	5250	816	.20	1803	.48*
NBR	0	0	260		696	
SBL	1	1750	20	.01	50	.03*
SBT	3	5250	1628	.31*	1216	.23
SBR	2	3500	744	.21	578	.17
EBL	2	3500	482	.14	582	.17
EBT	2	3500	855	.26*	1260	.37*
EBR	0	0	63		40	
WBL	1	1750	657	.38*	448	.26*
WBT	2	3500	994	.28	917	.26
WBR	1	1750	70	.04	40	.02
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**1.10**		**1.24**

57. Valencia & Magic Mtn

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	130	.07
NBT	3	5250	820	.21	1810	.48*
NBR	0	0	260		700	
SBL	1	1750	20	.01	50	.03*
SBT	3	5250	1640	.31*	1220	.23
SBR	2	3500	790	.23	600	.17
EBL	2	3500	510	.15	620	.18
EBT	2	3500	900	.28*	1300	.38*
EBR	0	0	70		40	
WBL	1	1750	660	.38*	450	.26*
WBT	2	3500	1050	.30	960	.27
WBR	1	1750	70	.04	40	.02
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.12 1.25

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	130	.07
NBT	3	5250	820	.21	1810	.48*
NBR	0	0	260		700	
SBL	1	1750	20	.01	50	.03*
SBT	3	5250	1640	.31*	1220	.23
SBR	2	3500	790	.23	600	.17
EBL	2	3500	510	.15	620	.18
EBT	2	3500	900	.28*	1300	.38*
EBR	0	0	70		40	
WBL	2	3500	660	.19*	450	.13*
WBT	2	3500	1050	.30	960	.27
WBR	1	1750	70	.04	40	.02
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .93 1.12

65. Bouquet & Soledad

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	21	.01*	24	.01
NBT	3	5250	399	.08	1109	.21*
NBR	1	1750	182	.10	286	.16
SBL	3	5250	331	.06	461	.09*
SBT	2.5	7000	1218	{.30}*	832	{.18}
SBR	1.5		917		669	
EBL	3	5250	240	.05*	986	.19*
EBT	3	5250	499	.10	1366	.26
EBR	0	0	9		4	
WBL	3	5250	307	.06	315	.06
WBT	2.5	7000	1139	.22*	947	{.18}*
WBR	1.5		230		391	{.16}
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.77**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	21	.01*	67	.04
NBT	3	5250	536	.10	1602	.31*
NBR	1	1750	362	.21	538	.31
SBL	3	5250	343	.07	371	.07*
SBT	2.5	7000	1774	{.40}*	1077	{.24}
SBR	1.5		1116		866	
EBL	3	5250	288	.05*	1099	.21*
EBT	3	5250	842	.17	1485	.29
EBR	0	0	58		24	
WBL	3	5250	405	.08	589	.11
WBT	2.5	7000	1189	.23*	1122	{.22}*
WBR	1.5		246		522	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.91**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	21	.01*	67	.04
NBT	3	5250	536	.10	1603	.31*
NBR	1	1750	362	.21	539	.31
SBL	3	5250	344	.07	375	.07*
SBT	2.5	7000	1792	{.41}*	1079	{.24}
SBR	1.5		1156		869	
EBL	3	5250	288	.05*	1106	.21*
EBT	3	5250	864	.18	1509	.29
EBR	0	0	58		25	
WBL	3	5250	415	.08	592	.11
WBT	2.5	7000	1224	.23*	1134	{.22}*
WBR	1.5		252		524	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.91**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	3	5250	710	.14	1820	.35*
NBR	1	1750	220	.13	510	.29
SBL	3	5250	379	.07	402	.08*
SBT	2.5	7000	1920	{.44}*	1430	{.28}
SBR	1.5		1262		828	
EBL	3	5250	330	.06*	1308	.25*
EBT	3	5250	867	.19	1126	.24
EBR	0	0	120		147	
WBL	3	5250	160	.03	380	.07
WBT	2.5	7000	876	.17*	941	{.21}*
WBR	1.5		290		635	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.99**

65. Bouquet & Soledad

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	3	5250	710	.14	1820	.35*
NBR	1	1750	220	.13	510	.29
SBL	3	5250	380	.07	410	.08*
SBT	2.5	7000	1920	{.44}*	1430	{.28}
SBR	1.5		1270		830	
EBL	3	5250	330	.06*	1310	.25*
EBT	3	5250	890	.19	1150	.25
EBR	0	0	120		150	
WBL	3	5250	160	.03	380	.07
WBT	2.5	7000	920	.18*	950	{.21}*
WBR	1.5		290		640	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.99**

66. Bouquet & Newhall Ranch

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	291	.08*	445	.13
NBT	4	7000	561	.08	2044	.29*
NBR	1	1750	33	.02	44	.03
SBL	1	1750	324	.19	210	.12*
SBT	4	7000	2079	.30*	1328	.19
SBR	1	1750	584	.33	356	.20
EBL	3	5250	260	.05*	1020	.19*
EBT	2	3500	369	.11	786	.22
EBR	2	3500	261	.07	454	.13
WBL	2	3500	120	.03	209	.06
WBT	4	7000	890	.13*	634	.09*
WBR	1	1750	89	.05	359	.21
Right Turn Adjustment					WBR	.03*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .66 .82

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	407	.12*	585	.17
NBT	4	7000	569	.08	2396	.34*
NBR	1	1750	159	.09	377	.22
SBL	1	1750	230	.13	153	.09*
SBT	4	7000	2351	.34*	1443	.21
SBR	1	1750	521	.30	443	.25
EBL	3	5250	308	.06	895	.17
EBT	2	3500	761	.22*	1437	.41*
EBR	2	3500	496	.14	651	.19
WBL	2	3500	393	.11*	257	.07*
WBT	4	7000	1358	.19	846	.12
WBR	1	1750	85	.05	271	.15
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .89 1.01

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	413	.12*	592	.17
NBT	4	7000	569	.08	2401	.34*
NBR	1	1750	159	.09	377	.22
SBL	1	1750	230	.13	153	.09*
SBT	4	7000	2394	.34*	1443	.21
SBR	1	1750	530	.30	460	.26
EBL	3	5250	318	.06	918	.17
EBT	2	3500	801	.23*	1491	.43*
EBR	2	3500	500	.14	660	.19
WBL	2	3500	403	.12*	258	.07*
WBT	4	7000	1385	.20	881	.13
WBR	1	1750	85	.05	271	.15
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .91 1.03

2021 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	413	.12*	592	.17
NBT	4	7000	569	.08	2401	.34*
NBR	1	1750	159	.09	377	.22
SBL	1	1750	230	.13	153	.09*
SBT	4	7000	2394	.34*	1443	.21
SBR	1	1750	530	.30	460	.26
EBL	3	5250	318	.06	918	.17
EBT	3	5250	801	.15*	1491	.28*
EBR	2	3500	500	.14	660	.19
WBL	2	3500	403	.12*	258	.07*
WBT	4	7000	1385	.20	881	.13
WBR	1	1750	85	.05	271	.15
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .83 .88

66. Bouquet & Newhall Ranch

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	559	.16*	781	.22*
NBT	4	7000	570	.08	2529	.36
NBR	1	1750	310	.18	590	.34
SBL	1	1750	100	.06	70	.04
SBT	4	7000	2195	.31*	1470	.21*
SBR	1	1750	763	.44	417	.24
EBL	3	5250	230	.04	662	.13
EBT	2	3500	873	.25*	2005	.57*
EBR	2	3500	836	.24	1029	.29
WBL	2	3500	587	.17*	140	.04*
WBT	4	7000	1446	.21	986	.14
WBR	1	1750	70	.04	100	.06
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .99 1.14

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	560	.16*	790	.23*
NBT	4	7000	570	.08	2530	.36
NBR	1	1750	310	.18	590	.34
SBL	1	1750	100	.06	70	.04
SBT	4	7000	2200	.31*	1470	.21*
SBR	1	1750	810	.46	430	.25
EBL	3	5250	240	.05	680	.13
EBT	2	3500	890	.25*	2050	.59*
EBR	2	3500	840	.24	1040	.30
WBL	2	3500	590	.17*	140	.04*
WBT	4	7000	1470	.21	1010	.14
WBR	1	1750	70	.04	100	.06
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .99 1.17

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	560	.16*	790	.23*
NBT	4	7000	570	.08	2530	.36
NBR	1	1750	310	.18	590	.34
SBL	1	1750	100	.06	70	.04
SBT	4	7000	2200	.31*	1470	.21*
SBR	1	1750	810	.46	430	.25
EBL	3	5250	240	.05	680	.13
EBT	3	5250	890	.17*	2050	.39*
EBR	2	3500	840	.24	1040	.30
WBL	2	3500	590	.17*	140	.04*
WBT	4	7000	1470	.21	1010	.14
WBR	1	1750	70	.04	100	.06
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .95 .97

81. Commerce Ctr & Henry Mayo

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01*
NBT	3	4800	1160	.26*	850	.21
NBR	0	0	90		160	
SBL	2	2880	30	.01*	150	.05
SBT	2	3200	360	.11	870	.27*
SBR	1	1600	20	.01	50	.03
EBL	1	1600	460	.29*	250	.16*
EBT	2	3200	150	.05	220	.07
EBR	1	1600	230	.14	280	.18
WBL	1.5		40		240	
WBT	0.5	3200	10	.02*	10	.08*
WBR	1	1600	100	.06	340	.21
Right Turn Adjustment			WBR	.03*	Multi	.09*
Clearance Interval				.10*		.10*
Note: Assumes E/W Split Phasing						

TOTAL CAPACITY UTILIZATION .71 .71

82. Commerce Ctr & SR-126 EB

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1550	.32*	1020	.21
NBR	f		170		420	
SBL	0	0	0		0	
SBT	2	3200	420	.13	1060	.33*
SBR	f		340		1450	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .42 .43

83. Commerce Ctr & SR-126 WB

2035 Cumulative With Project With Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	230	.08	510	.18*
NBT	3	4800	1320	.28*	510	.11
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	580	.12	2340	.49*
SBR	1	1600	140	.09	530	.33
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	180	.06*	170	.06*
WBT	0	0	0		0	
WBR	2	3200	1490	.47	550	.17
Right Turn Adjustment			WBR	.41*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .85 .83

94. Commerce Center & SR-126

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	47	.03	65	.04*
NBT	1	1600	84	.05*	55	.03
NBR	1	1600	20	.01	13	.01
SBL	2	2880	435	.15*	1047	.36*
SBT	1	1600	50	.03	214	.13
SBR	1	1600	39	.02	38	.02
EBL	1	1600	81	.05*	38	.02
EBT	2	3200	554	.17	876	.27*
EBR	d	1600	28	.02	35	.02
WBL	1	1600	73	.05	20	.01*
WBT	2	3200	604	.19*	662	.21
WBR	f		1799		439	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .54 .78

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	58	.04	81	.05*
NBT	1	1600	91	.06*	68	.04
NBR	1	1600	25	.02	16	.01
SBL	2	2880	539	.19*	1103	.38*
SBT	1	1600	62	.04	221	.14
SBR	1	1600	48	.03	45	.03
EBL	1	1600	88	.06*	47	.03
EBT	2	3200	687	.21	1086	.34*
EBR	d	1600	35	.02	43	.03
WBL	1	1600	91	.06	25	.02*
WBT	2	3200	749	.23*	821	.26
WBR	f		1858		544	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .64 .89

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	243	.15	215	.13
NBT	1	1600	652	.41*	252	.16*
NBR	1	1600	215	.13	377	.24
SBL	2	2880	541	.19*	1060	.37*
SBT	1	1600	234	.15	510	.32
SBR	1	1600	48	.03	45	.03
EBL	1	1600	88	.06	47	.03
EBT	2	3200	681	.21*	1059	.33*
EBR	d	1600	202	.13	194	.12
WBL	1	1600	350	.22*	309	.19*
WBT	2	3200	649	.20	813	.25
WBR	f		1781		538	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.13 1.15

94. Commerce Center & SR-126

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	47	.03	65	.04*
NBT	1	1600	84	.05*	55	.03
NBR	1	1600	20	.01	13	.01
SBL	2	2880	435	.15*	1047	.36*
SBT	1	1600	50	.03	214	.13
SBR	1	1600	39	.02	38	.02
EBL	1	1600	81	.05*	38	.02
EBT	2	3200	554	.17	876	.27*
EBR	d	1600	28	.02	35	.02
WBL	1	1600	73	.05	20	.01*
WBT	2	3200	604	.19*	662	.21
WBR	f		1799		439	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .54 .78

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	89	.06	196	.12*
NBT	1	1600	507	.32*	183	.11
NBR	1	1600	68	.04	95	.06
SBL	2	2880	402	.14*	1233	.43*
SBT	1	1600	146	.09	526	.33
SBR	1	1600	92	.06	250	.16
EBL	1	1600	235	.15*	78	.05
EBT	2	3200	1137	.39	1335	.48*
EBR	0	0	117		187	
WBL	1	1600	68	.04	71	.04*
WBT	2	3200	1060	.33*	1282	.40
WBR	f		1623		501	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.04 1.17

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	167	.10	323	.20
NBT	1	1600	801	.50*	357	.22*
NBR	1	1600	258	.16	456	.29
SBL	2	2880	402	.14	1233	.43
SBT	1	1600	317	.20*	764	.48*
SBR	1	1600	92	.06	250	.16
EBL	1	1600	235	.15	78	.05
EBT	2	3200	1137	.44*	1335	.51*
EBR	0	0	276		307	
WBL	1	1600	327	.20*	355	.22*
WBT	2	3200	1060	.33	1282	.40
WBR	f		1623		501	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.44 1.53

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	152	.10	381	.24*
NBT	1	1600	566	.35*	206	.13
NBR	1	1600	26	.02	89	.06
SBL	2	2880	340	.12*	1450	.50*
SBT	1	1600	63	.04	652	.41
SBR	1	1600	140	.09	530	.33
EBL	1	1600	440	.28*	130	.08
EBT	2	3200	1650	.58	2000	.74*
EBR	0	0	221		380	
WBL	1	1600	74	.05	30	.02*
WBT	2	3200	1480	.46*	2180	.68
WBR	f		1490		550	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.31 1.60

94. Commerce Center & SR-126

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	230	.14	510	.32*
NBT	1	1600	860	.54*	380	.24
NBR	1	1600	200	.13	420	.26
SBL	2	2880	340	.12	1450	.50
SBT	1	1600	240	.15*	890	.56*
SBR	1	1600	140	.09	530	.33
EBL	1	1600	440	.28	130	.08
EBT	2	3200	1650	.63*	2000	.78*
EBR	0	0	380		500	
WBL	1	1600	280	.18*	200	.13*
WBT	2	3200	1480	.46	2180	.68
WBR	f		1490		550	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.60 1.89

105. Westridge & Valencia

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	65	.04	4	.00
NBT	1	1600	9	.01*	0	.00*
NBR	1	1600	62	.04	26	.02
SBL	2	2880	287	.10*	91	.03*
SBT	1	1600	20	.01	0	.00
SBR	1	1600	53	.03	2	.00
EBL	1	1600	7	.00	1	.00
EBT	3	4800	1255	.26	219	.05*
EBR	0	0	7		4	
WBL	1	1600	12	.01	30	.02*
WBT	3	4800	1615	.34*	191	.04
WBR	1	1600	100	.06	99	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.20**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	81	.05	5	.00
NBT	1	1600	11	.01*	0	.00*
NBR	1	1600	77	.05	32	.02
SBL	2	2880	356	.12*	113	.04*
SBT	1	1600	25	.02	0	.00
SBR	1	1600	66	.04	2	.00
EBL	1	1600	9	.01*	1	.00
EBT	3	4800	1556	.33	272	.06*
EBR	0	0	9		5	
WBL	1	1600	15	.01	37	.02*
WBT	3	4800	2003	.42*	237	.05
WBR	1	1600	124	.08	123	.08
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.22**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	81	.05	5	.00
NBT	1	1600	11	.01*	0	.00*
NBR	1	1600	77	.05	32	.02
SBL	2	2880	408	.14*	471	.16*
SBT	1	1600	25	.02	0	.00
SBR	1	1600	105	.07	31	.02
EBL	1	1600	57	.04*	23	.01
EBT	3	4800	1556	.33	272	.06*
EBR	0	0	9		5	
WBL	1	1600	15	.01	37	.02*
WBT	3	4800	2003	.42*	237	.05
WBR	1	1600	283	.18	327	.20
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.35**

105. Westridge & Valencia

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	65	.04	4	.00
NBT	1	1600	9	.01*	0	.00*
NBR	1	1600	62	.04	26	.02
SBL	2	2880	287	.10*	91	.03*
SBT	1	1600	20	.01	0	.00
SBR	1	1600	53	.03	2	.00
EBL	1	1600	7	.00	1	.00
EBT	3	4800	1255	.26	219	.05*
EBR	0	0	7		4	
WBL	1	1600	12	.01	30	.02*
WBT	3	4800	1615	.34*	191	.04
WBR	1	1600	100	.06	99	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.20**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	36	.02	2	.00
NBT	1	1600	5	.00*	0	.00*
NBR	1	1600	35	.02	15	.01
SBL	2	2880	164	.06*	171	.06*
SBT	1	1600	11	.01	0	.00
SBR	1	1600	48	.03	32	.02
EBL	1	1600	44	.03*	17	.01*
EBT	3	4800	1662	.35	888	.19
EBR	0	0	4		2	
WBL	1	1600	7	.00	17	.01
WBT	3	4800	1648	.34*	1000	.21*
WBR	1	1600	83	.05	89	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.38**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	36	.02	2	.00
NBT	1	1600	5	.00*	0	.00*
NBR	1	1600	35	.02	15	.01
SBL	2	2880	216	.08*	529	.18*
SBT	1	1600	11	.01	0	.00
SBR	1	1600	87	.05	61	.04
EBL	1	1600	92	.06*	39	.02*
EBT	3	4800	1662	.35	888	.19
EBR	0	0	4		2	
WBL	1	1600	7	.00	17	.01
WBT	3	4800	1648	.34*	1000	.21*
WBR	1	1600	242	.15	293	.18
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.51**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	10	.01
NBT	1	1600	10	.01	10	.01*
NBR	1	1600	60	.04	30	.02
SBL	2	2880	36	.01	200	.07*
SBT	1	1600	20	.01*	10	.01
SBR	1	1600	41	.03	71	.04
EBL	1	1600	72	.05	38	.02*
EBT	3	4800	2000	.42*	1560	.33
EBR	0	0	10		10	
WBL	1	1600	10	.01*	30	.02
WBT	3	4800	1400	.29	2000	.42*
WBR	1	1600	109	.07	98	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.62**

105. Westridge & Valencia

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	10	.01
NBT	1	1600	10	.01	10	.01*
NBR	1	1600	60	.04	30	.02
SBL	2	2880	90	.03	550	.19*
SBT	1	1600	20	.01*	10	.01
SBR	1	1600	80	.05	100	.06
EBL	1	1600	120	.08	60	.04*
EBT	3	4800	2000	.42*	1560	.33
EBR	0	0	10		10	
WBL	1	1600	10	.01*	30	.02
WBT	3	4800	1400	.29	2000	.42*
WBR	1	1600	400	.25	310	.19
Right Turn Adjustment			NBR	.01*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .59 .76

108. Stevenson Rnch & Pico Cyn

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	749	.26*	295	.10*
SBT	0	0	0		0	
SBR	1	1600	51	.03	68	.04
EBL	1	1600	108	.07*	49	.03*
EBT	2	3200	138	.04	134	.04
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	88	.06*	103	.06*
WBR	1	1600	337	.21	582	.36
Right Turn Adjustment					WBR	.22*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.51**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	929	.32*	366	.13*
SBT	0	0	0		0	
SBR	1	1600	63	.04	84	.05
EBL	1	1600	134	.08*	61	.04*
EBT	2	3200	171	.05	166	.05
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	109	.07*	128	.08*
WBR	1	1600	418	.26	722	.45
Right Turn Adjustment					WBR	.27*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.62**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	929	.32*	366	.13*
SBT	0	0	0		0	
SBR	1	1600	63	.04	90	.06
EBL	1	1600	137	.09*	61	.04*
EBT	2	3200	171	.05	166	.05
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	110	.07*	134	.08*
WBR	1	1600	418	.26	722	.45
Right Turn Adjustment					WBR	.27*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.62**

108. McBean & Pico Cyn

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	749	.26*	295	.10*
SBT	0	0	0		0	
SBR	1	1600	51	.03	68	.04
EBL	1	1600	108	.07*	49	.03*
EBT	2	3200	138	.04	134	.04
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	88	.06*	103	.06*
WBR	1	1600	337	.21	582	.36
Right Turn Adjustment					WBR	.22*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .49 .51

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	538	.19*	306	.11*
SBT	0	0	0		0	
SBR	1	1600	68	.04	150	.09
EBL	1	1600	174	.11*	102	.06*
EBT	2	3200	306	.10	577	.18
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	322	.20*	451	.28*
WBR	1	1600	272	.17	480	.30
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .55

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	538	.19*	306	.11*
SBT	0	0	0		0	
SBR	1	1600	68	.04	156	.10
EBL	1	1600	177	.11*	102	.06*
EBT	2	3200	306	.10	577	.18
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	323	.20*	457	.29*
WBR	1	1600	272	.17	480	.30
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .56

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	260	.09*	300	.10*
SBT	0	0	0		0	
SBR	1	1600	100	.06	254	.16
EBL	1	1600	257	.16*	150	.09*
EBT	2	3200	280	.09	1070	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	419	.26*	794	.50*
WBR	1	1600	170	.11	320	.20
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .79

108. McBean & Pico Cyn

2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	260	.09*	300	.10*
SBT	0	0	0		0	
SBR	1	1600	100	.06	260	.16
EBL	1	1600	260	.16*	150	.09*
EBT	2	3200	280	.09	1070	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	420	.26*	800	.50*
WBR	1	1600	170	.11	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.79**

109. Stevenson Rnch & Poe/Chase

Existing (2009) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	175	.11*	278	.17*
NBT	2	3200	435	.14	255	.09
NBR	0	0	10		23	
SBL	1	1600	72	.05	3	.00
SBT	2	3200	714	.22*	167	.05*
SBR	d	1600	88	.06	112	.07
EBL	1	1600	266	.17*	100	.06*
EBT	1	1600	34	.02	4	.00
EBR	1	1600	365	.23	168	.11
WBL	1	1600	41	.03	12	.01
WBT	1	1600	10	.03*	1	.01*
WBR	0	0	43		11	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.39**

Existing + Ambient (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	217	.14*	345	.22*
NBT	2	3200	539	.17	316	.11
NBR	0	0	12		29	
SBL	1	1600	89	.06	4	.00
SBT	2	3200	885	.28*	207	.06*
SBR	d	1600	109	.07	139	.09
EBL	1	1600	330	.21*	124	.08*
EBT	1	1600	42	.03	5	.00
EBR	1	1600	453	.28	208	.13
WBL	1	1600	51	.03	15	.01
WBT	1	1600	12	.04*	1	.01*
WBR	0	0	53		14	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.47**

Existing + Ambient + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	217	.14*	345	.22*
NBT	2	3200	542	.17	316	.11
NBR	0	0	12		29	
SBL	1	1600	89	.06	4	.00
SBT	2	3200	885	.28*	213	.07*
SBR	d	1600	109	.07	140	.09
EBL	1	1600	331	.21*	124	.08*
EBT	1	1600	42	.03	5	.00
EBR	1	1600	453	.28	208	.13
WBL	1	1600	51	.03	15	.01
WBT	1	1600	12	.04*	1	.01*
WBR	0	0	53		14	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.48**

109. McBean & Poe

Existing (2009/2010) Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	175	.11*	278	.17*
NBT	2	3200	435	.14	255	.09
NBR	0	0	10		23	
SBL	1	1600	72	.05	3	.00
SBT	2	3200	714	.22*	167	.05*
SBR	d	1600	88	.06	112	.07
EBL	1	1600	266	.17*	100	.06*
EBT	1	1600	34	.02	4	.00
EBR	1	1600	365	.23	168	.11
WBL	1	1600	41	.03	12	.01
WBT	1	1600	10	.03*	1	.01*
WBR	0	0	43		11	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.39**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	182	.11*	305	.19*
NBT	2	3200	357	.11	222	.07
NBR	0	0	6		13	
SBL	1	1600	40	.03	2	.00
SBT	2	3200	444	.14*	210	.07*
SBR	d	1600	102	.06	243	.15
EBL	1	1600	316	.20*	148	.09*
EBT	1	1600	19	.01	2	.00
EBR	1	1600	319	.20	230	.14
WBL	1	1600	23	.01	7	.00
WBT	1	1600	6	.02*	1	.00*
WBR	0	0	24		6	
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.46**

2021 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	182	.11*	305	.19*
NBT	2	3200	360	.11	222	.07
NBR	0	0	6		13	
SBL	1	1600	40	.03	2	.00
SBT	2	3200	444	.14*	216	.07*
SBR	d	1600	102	.06	244	.15
EBL	1	1600	317	.20*	148	.09*
EBT	1	1600	19	.01	2	.00
EBR	1	1600	319	.20	230	.14
WBL	1	1600	23	.01	7	.00
WBT	1	1600	6	.02*	1	.00*
WBR	0	0	24		6	
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.46**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	170	.11*	310	.19*
NBT	2	3200	257	.08	160	.05
NBR	0	0	0		0	
SBL	1	1600	0	.00	0	.00
SBT	2	3200	110	.03*	264	.08*
SBR	d	1600	160	.10	409	.26
EBL	1	1600	389	.24*	220	.14*
EBT	1	1600	0	.00	0	.00
EBR	1	1600	250	.16	290	.18
WBL	1	1600	0	.00	0	.00
WBT	1	1600	0	.00*	0	.00*
WBR	0	0	0		0	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.58**

109. McBean & Poe

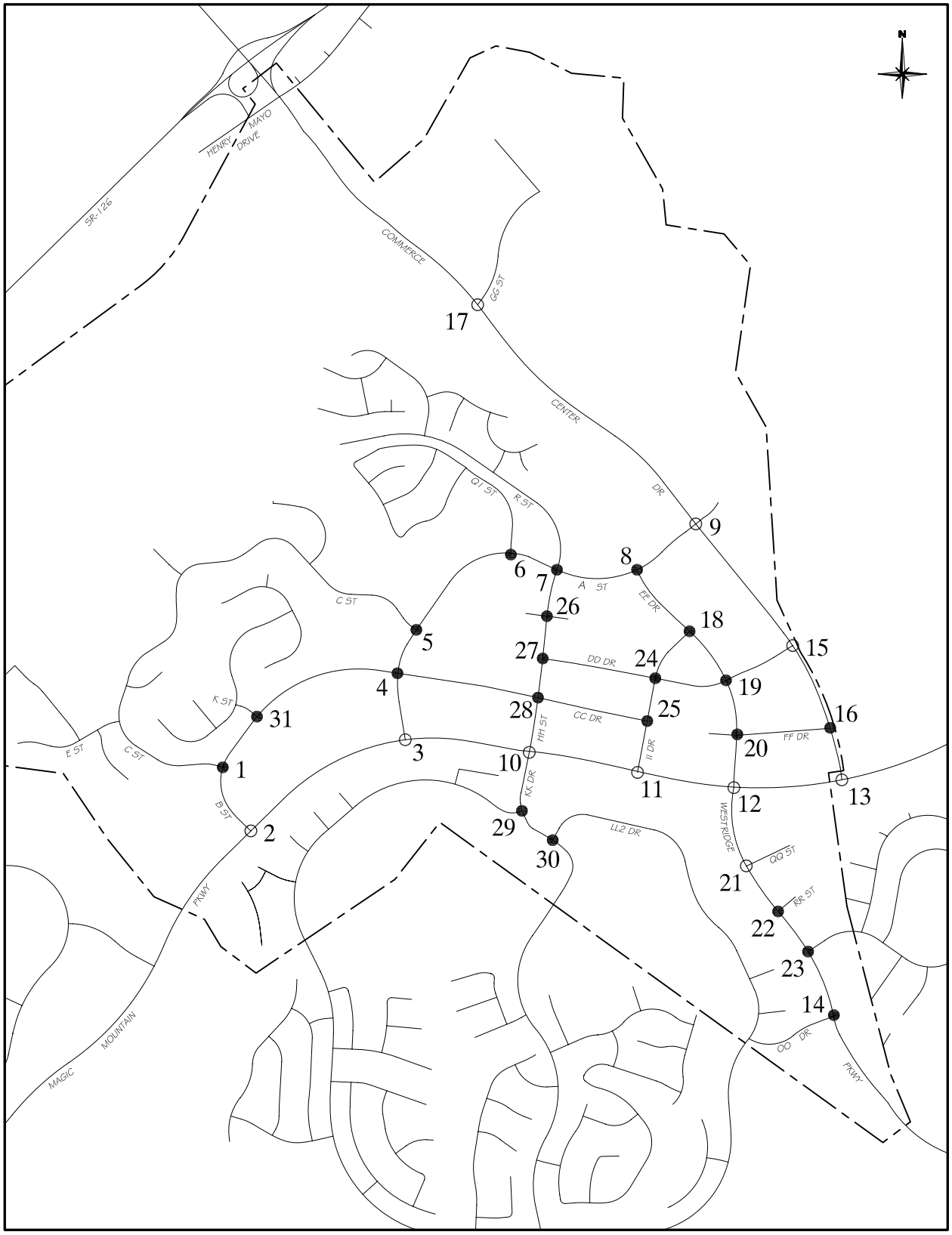
2035 Cumulative With Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	170	.11*	310	.19*
NBT	2	3200	260	.08	160	.05
NBR	0	0	0		0	
SBL	1	1600	0	.00	0	.00
SBT	2	3200	110	.03*	270	.08*
SBR	d	1600	160	.10	410	.26
EBL	1	1600	390	.24*	220	.14*
EBT	1	1600	0	.00	0	.00
EBR	1	1600	250	.16	290	.18
WBL	1	1600	0	.00	0	.00
WBT	1	1600	0	.00*	0	.00*
WBR	0	0	0		0	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .48 .58

Appendix B
INTERSECTION CAPACITY UTILIZATION WORKSHEETS – ON SITE

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure B-1.



Legend

- ● Intersection Location (Stop Sign Control)
- ○ Intersection Location (Signal Control)
- —·— Project Boundary

Figure B-1

INTERSECTION LOCATIONS
- ON-SITE

1. B St & C St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	7		48	
NBT	1	1600	16	.01	52	.06*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	40	.03*	27	.02
SBR	0	0	0		1	
EBL	0	0	0		0	
EBT	1	1600	0	.03*	0	.02*
EBR	0	0	44		28	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.16**		**.18**

2. B St & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	55		29	
SBT	1	1600	0	.05*	0	.03*
SBR	0	0	29		26	
EBL	1	1600	13	.01	48	.03*
EBT	2	3200	1316	.41*	755	.24
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	530	.17	1385	.45*
WBR	0	0	10		52	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.61**

3. A St & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	181	.11*	107	.07*
SBT	0	0	0		0	
SBR	1	1600	55	.03	52	.03
EBL	1	1600	53	.03	37	.02*
EBT	2	3200	1318	.41*	747	.23
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	485	.17	1385	.47*
WBR	0	0	63		123	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.66**

4. A St & B St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	28	.02*	98	.06*
NBT	1	1600	76	.05	21	.02
NBR	0	0	4		8	
SBL	1	1600	0	.00	0	.00
SBT	1	1600	102	.07*	71	.08*
SBR	0	0	6		52	
EBL	0	0	53		14	
EBT	1	1600	1	.10*	0	.05*
EBR	0	0	106		69	
WBL	0	0	4		4	
WBT	1	1600	0	.00	0	.00
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.29**		**.29**

5. A St & C St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	7	.00
NBT	1	1600	129	.08*	28	.02
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	102	.06	115	.08*
SBR	0	0	0		8	
EBL	0	0	10	{.01}*	1	
EBT	1	1600	0	.01	0	.01*
EBR	0	0	6		8	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.19**		**.19**

6. Q1 St & A St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	83	.05*	43	.03*
SBT	0	0	0		0	
SBR	1	1600	6	.00	7	.00
EBL	1	1600	3	.00	4	.00
EBT	1	1600	99	.06	24	.02
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	40	.10*	84	.11*
WBR	0	0	122		85	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.25**		**.24**

7. R St & A St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	18	.01	8	.01
NBT	1	1600	20	.19*	48	.12*
NBR	0	0	288		150	
SBL	1	1600	150	.09*	89	.06*
SBT	1	1600	75	.05	30	.02
SBR	0	0	11		9	
EBL	1	1600	1	.00	0	.00
EBT	1	1600	165	.11*	64	.04
EBR	0	0	16		4	
WBL	1	1600	18	.01*	115	.07
WBT	1	1600	133	.11	151	.21*
WBR	0	0	38		188	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.49**

8. EE Dr & A St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		7	
NBT	1	1600	0	.03*	0	.06*
NBR	0	0	49		85	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	585	.38*	298	.19
EBR	0	0	17		4	
WBL	1	1600	2	.00	17	.01
WBT	1	1600	189	.12	447	.28*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.44**

9. Commerce Ctr Dr & A St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	95	.06	144	.09*
NBT	3	4800	1194	.25*	586	.13
NBR	0	0	14		51	
SBL	1	1600	11	.01*	78	.05
SBT	3	4800	415	.09	1412	.29*
SBR	1	1600	93	.06	318	.20
EBL	2	2880	549	.19*	294	.10*
EBT	1	1600	4	.05	4	.06
EBR	0	0	81		86	
WBL	1	1600	56	.04	38	.02
WBT	1	1600	3	.05*	2	.02*
WBR	0	0	77		33	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .60

10. KK Dr/HH St & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	3	.00
NBT	1	1600	12	.03*	10	.02*
NBR	0	0	37		25	
SBL	1	1600	277	.17*	140	.09*
SBT	1	1600	0	.02	0	.03
SBR	0	0	35		49	
EBL	1	1600	160	.10	135	.08*
EBT	2	3200	1332	.42*	705	.23
EBR	0	0	7		15	
WBL	1	1600	6	.00	22	.01
WBT	2	3200	503	.18	1456	.53*
WBR	0	0	66		237	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .72 .82

11. II Dr & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	42		58	
SBT	1	1600	0	.04*	0	.07*
SBR	0	0	22		53	
EBL	1	1600	17	.01	23	.01*
EBT	2	3200	1629	.51*	848	.26
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	553	.18	1662	.54*
WBR	0	0	17		77	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .65 .72

12. Westridge Pkwy & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	109	.07	184	.12*
NBT	1	1600	137	.09*	82	.05
NBR	1	1600	409	.26	172	.11
SBL	1	1600	42	.03*	32	.02
SBT	1	1600	30	.03	189	.18*
SBR	0	0	20		93	
EBL	1	1600	113	.07	46	.03*
EBT	3	4800	1460	.32*	712	.18
EBR	0	0	98		148	
WBL	2	2880	120	.04*	529	.18
WBT	2	3200	441	.14	1462	.46*
WBR	1	1600	228	.14	165	.10
Right Turn Adjustment			NBR	.13*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .71 .89

13. Commerce Ctr Dr & Magic Mountain Pkwy

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	380	.13*	765	.27*
SBT	0	0	0		0	
SBR	2	3200	106	.03	860	.27
EBL	2	2880	608	.21*	158	.05*
EBT	3	4800	1304	.27	758	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	683	.14*	1296	.27*
WBR	1	1600	665	.42	525	.33
Right Turn Adjustment			WBR	.15*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .73 .69

14. Westridge Pkwy & OO Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	14	.01	20	.01*
NBT	2	3200	677	.21*	358	.11
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3200	189	.07	824	.28*
SBR	0	0	36		84	
EBL	0	0	35		29	
EBT	1	1600	0	.03*	0	.03*
EBR	0	0	20		15	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .34 .42

15. Commerce Ctr Dr & DD Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	123	.08	132	.08*
NBT	3	4800	1150	.24*	551	.11
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	430	.09	1293	.27*
SBR	1	1600	122	.08	242	.15
EBL	1	1600	153	.10*	230	.14*
EBT	0	0	0		0	
EBR	1	1600	101	.06	133	.08
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .44 .59

16. Commerce Ctr & FF Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1273	.27*	683	.14
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	420	.11	1387	.30*
SBR	0	0	111		39	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	1	1600	66	.04	238	.15
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.15*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .37 .55

17. Commerce Ctr Dr & GG St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1414	.29*	863	.18
NBR	1	1600	406	.25	50	.03
SBL	1	1600	318	.20*	126	.08
SBT	3	4800	491	.10	1578	.33*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		28	.01*	230	
WBT	0	4800	0		0	{.09}*
WBR	1.5		102		366	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .52

18. EE Dr & II Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	6	.00	33	.02
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	29	.02*	5	.02*
SBR	0	0	5		25	
EBL	0	0	21	{.01}*	14	{.01}*
EBT	1	1600	0	.01	0	.01
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .13 .13

19. EE Dr & DD Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	4		17	
NBT	1	1600	1	.07*	10	.11*
NBR	0	0	110		151	
SBL	0	0	19	{.01}*	1	
SBT	1	1600	10	.02	4	.00
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	131	.09*	92	.07
EBR	0	0	6		13	
WBL	0	0	12	{.01}*	87	
WBT	1	1600	32	.03	146	.16*
WBR	0	0	5		23	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .28 .37

20. EE Dr & FF Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	41		130	
NBT	1	1600	48	.30*	35	.18*
NBR	0	0	390		127	
SBL	0	0	10	{.01}*	2	
SBT	1	1600	9	.02	51	.06
SBR	0	0	9		50	
EBL	0	0	46		23	{.01}*
EBT	1	1600	19	.08*	5	.06
EBR	0	0	62		72	
WBL	0	0	20	{.01}*	190	
WBT	1	1600	0	.03	4	.20*
WBR	0	0	21		119	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .50 .49

21. Westridge & QQ St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3200	573	.18*	312	.10
NBR	0	0	0		0	
SBL	1	1600	110	.07*	80	.05
SBT	2	3200	138	.04	786	.25*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	0	.05*	0	.08*
WBR	0	0	82		126	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .40 .43

22. Westridge & RR St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3200	573	.22*	312	.12
NBR	0	0	120		58	
SBL	1	1600	0	.00	0	.00
SBT	2	3200	138	.04	786	.25*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	56		108	
WBT	1	1600	0	.04*	0	.07*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .36 .42

23. Westridge & Entrada

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3200	686	.22*	369	.12
NBR	0	0	26		18	
SBL	1	1600	2	.00	3	.00
SBT	2	3200	192	.06	891	.28*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	33		17	
WBT	1	1600	0	.03*	0	.01*
WBR	0	0	7		1	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .35 .39

24. II Dr & DD Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	15	.03*	4	.02
NBR	0	0	30		23	
SBL	0	0	0		0	
SBT	1	1600	5	.00	25	.02*
SBR	0	0	0		0	
EBL	0	0	6		10	{.01}*
EBT	1	1600	1	.00	1	.01
EBR	0	0	0		0	
WBL	0	0	14		41	
WBT	1	1600	3	.01*	29	.04*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .14 .17

25. II Dr & CC Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	8		30	{.02}*
NBT	1	1600	28	.02	42	.05
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	38	.02*	60	.04*
SBR	0	0	1		7	
EBL	0	0	8		3	
EBT	1	1600	0	.01*	0	.02*
EBR	0	0	2		36	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .13 .18

26. HH St & Driveway

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	16		65	
NBT	1	1600	277	.19*	191	.17*
NBR	0	0	5		23	
SBL	0	0	2		13	{.01}*
SBT	1	1600	107	.07	105	.10
SBR	0	0	4		34	
EBL	0	0	38		15	
EBT	1	1600	0	.06*	0	.04*
EBR	0	0	64		41	
WBL	0	0	23	{.01}*	15	{.01}*
WBT	1	1600	0	.02	0	.01
WBR	0	0	14		5	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .36 .33

27. HH St & DD Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	297	.19*	267	.17*
NBR	0	0	5		2	
SBL	0	0	0		0	
SBT	1	1600	194	.12	161	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		1	
WBT	1	1600	0	.00*	0	.01*
WBR	0	0	1		12	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .29 .28

28. HH St & CC Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	17		79	
NBT	1	1600	225	.15*	262	.22*
NBR	0	0	3		9	
SBL	0	0	0		0	
SBT	1	1600	207	.14	112	.10
SBR	0	0	9		55	
EBL	0	0	67		27	
EBT	1	1600	1	.09*	0	.05*
EBR	0	0	81		52	
WBL	0	0	0		10	{.01}*
WBT	1	1600	0	.00	0	.01
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .34 .38

29. KK Dr & LL St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	5		8	
NBT	1	1600	53	.04*	34	.03*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	10	.01	24	.02
SBR	0	0	3		13	
EBL	0	0	6		5	
EBT	1	1600	0	.01*	0	.01*
EBR	0	0	11		6	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .15 .14

30. KK Dr & LL2 Dr

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	0	.01*	0	.01*
SBR	0	0	9		10	
EBL	0	0	14	{.01}*	11	{.01}*
EBT	1	1600	7	.01	19	.02
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	49	.03*	32	.02*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .15 .14

31. K St & B St

Mission Village Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	38		21	
SBT	1	1600	0	.03*	0	.02*
SBR	0	0	10		9	
EBL	0	0	5		12	{.01}*
EBT	1	1600	13	.01	15	.02
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	1	.01*	10	.03*
WBR	0	0	12		43	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .14 .16

Appendix C
MISSION VILLAGE TRAFFIC MODEL DATA

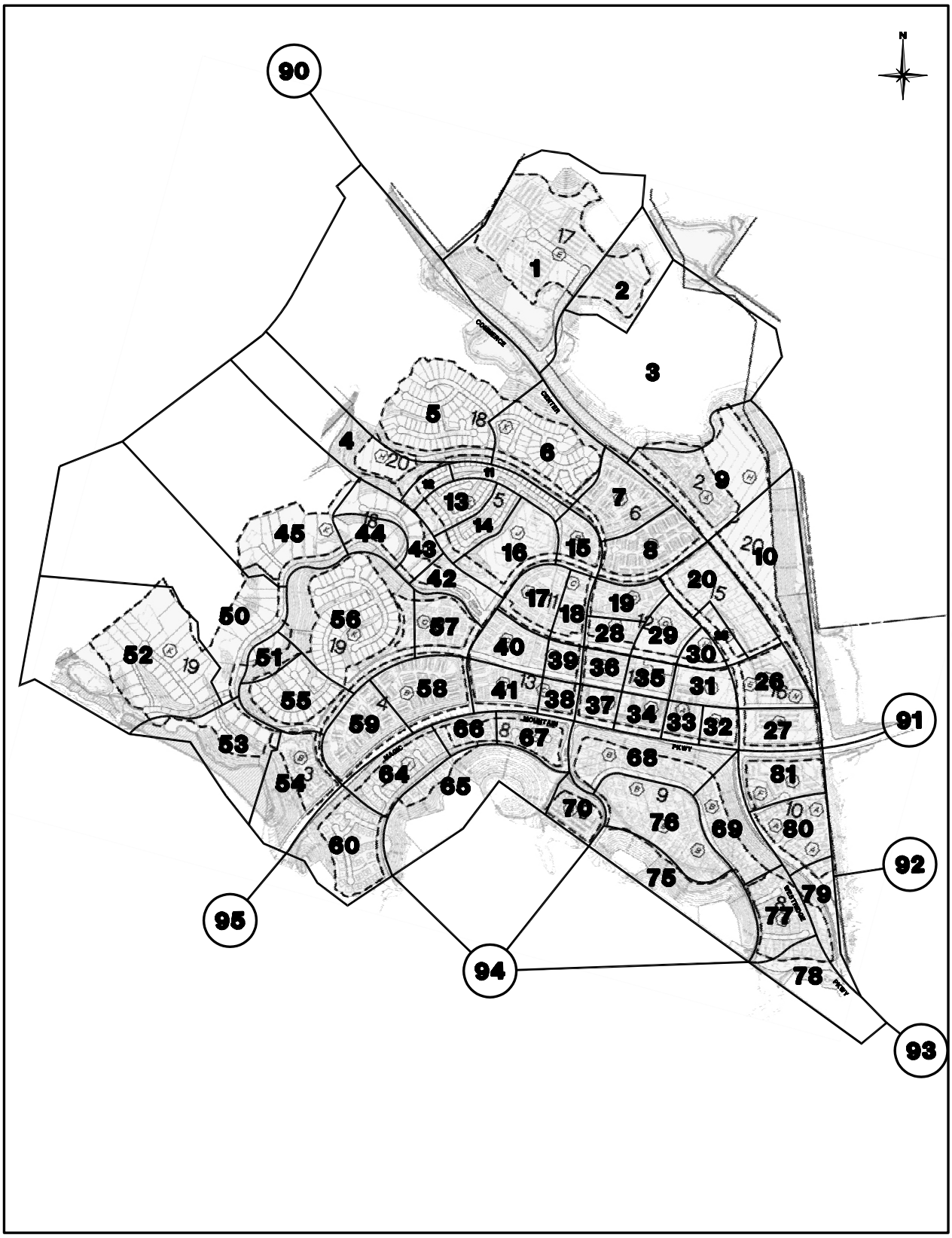


Figure C-1

MISSION VILLAGE TRAFFIC MODEL
TRAFFIC ANALYSIS ZONES

Mission Village Traffic Model - ADT and Peak Hour Trip Rate Summary								
		AM Peak Hour			PM Peak Hour			
Land Use Type	**Units**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**ADT**
1. Single Family (<1du/ac)	DU	0.29	0.67	0.96	0.84	0.36	1.20	9.90
2. Single Family (1-5du/ac)	DU	0.19	0.56	0.75	0.64	0.37	1.01	9.90
3. Single Family (6-10du/ac)	DU	0.19	0.56	0.75	0.64	0.37	1.01	9.90
4. Condominium/Townhouse	DU	0.10	0.48	0.58	0.47	0.26	0.73	8.00
5. Apartment	DU	0.08	0.43	0.51	0.41	0.21	0.62	6.90
6. Mobile Home	DU	0.08	0.32	0.40	0.35	0.21	0.56	6.90
7. Senior (Active)	DU	0.08	0.12	0.20	0.16	0.10	0.26	3.71
8. Senior Assisted Living	BEDS	0.09	0.05	0.14	0.10	0.12	0.22	2.66
10. Commercial Center (>30ac)	TSF	0.47	0.30	0.77	1.64	1.78	3.42	40.06
11. Commercial Center(10-30a)	TSF	0.73	0.47	1.20	2.38	2.58	4.96	54.06
12. Commercial Center (<10ac)	TSF	1.09	0.69	1.78	3.32	3.60	6.92	85.06
13. Commercial Shops	TSF	0.72	0.48	1.20	1.80	1.80	3.60	37.06
14. Hotel	ROOM	0.34	0.22	0.56	0.32	0.29	0.61	8.23
15. Sit-Down Restaurant	TSF	4.82	4.45	9.27	6.52	4.34	10.86	130.34
16. Fast Food Restaurant	TSF	25.43	24.43	49.86	17.41	16.07	33.48	496.12
17. Movie Theater	SEAT	0.00	0.00	0.00	0.05	0.02	0.07	1.76
18. Health Club	TSF	0.96	0.64	1.60	2.16	1.44	3.60	40.00
19. Car Dealership	TSF	1.61	0.60	2.21	1.12	1.68	2.80	37.50
20. Elementary/Middle School	STU	0.26	0.20	0.46	0.08	0.09	0.17	1.45
21. High School	STU	0.32	0.14	0.46	0.06	0.09	0.15	1.79
22. College	STU	0.13	0.01	0.14	0.07	0.14	0.21	1.54
23. Hospital	TSF	0.71	0.26	0.97	0.22	0.70	0.92	16.80
24. Library	TSF	0.76	0.30	1.06	3.40	3.69	7.09	84.98
25. Church	TSF	0.39	0.33	0.72	0.36	0.30	0.66	9.30
26. Day Care	STU	0.43	0.38	0.81	0.40	0.46	0.86	4.52
30. Industrial Park	TSF	0.55	0.10	0.65	0.13	0.52	0.65	6.00
31. Business Park	TSF	1.20	0.23	1.43	0.30	0.99	1.29	10.20
32. Manufacturing/Warehouse	TSF	0.56	0.17	0.73	0.27	0.47	0.74	5.10
33. Science/Research	TSF	1.03	0.21	1.24	0.16	0.92	1.08	10.20
34. Utilities	TSF	0.00	0.00	0.00	0.00	0.00	0.00	2.38
35. Regional Post Office	TSF	0.20	0.15	0.35	0.15	0.15	0.30	5.00
40. Commercial Office	TSF	1.55	0.19	1.74	0.21	1.29	1.50	11.56
41. High-Rise Office	TSF	1.37	0.19	1.56	0.25	1.24	1.49	10.88
42. Medical Office	TSF	1.94	0.49	2.43	0.99	2.67	3.66	34.20
43. Post Office	TSF	4.17	3.85	8.02	5.50	5.29	10.79	108.19
50. Golf Course	AC	0.15	0.06	0.21	0.10	0.20	0.30	7.96
51. Developed Park	AC	0.00	0.00	0.00	0.03	0.04	0.07	2.60
52. Undeveloped Park	AC	0.00	0.00	0.00	0.00	0.00	0.00	0.50
53. Wayside Honor Ranch	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
54. Six Flags Magic Mtn	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
55. Travel Village	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
56. CHP Office	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
57. Agua Dulce Airport	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
58. Landfill	SG	3.00	2.00	5.00	4.00	6.00	10.00	100.00
59. Cemex	SG	3.60	3.75	7.35	2.00	2.25	4.25	100.00

Mission Village Traffic Model - Zonal Land Use and Trip Generation									
			AM Peak Hour			PM Peak Hour			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
1	31 Business Park	349 TSF	418	80	498	105	345	450	3,555
	SUB-TOTAL		418	80	498	105	345	450	3,555
2	31 Business Park	349 TSF	418	80	498	105	345	450	3,555
	SUB-TOTAL		418	80	498	105	345	450	3,555
4	51 Developed Park	5 AC	0	0	0	0	0	0	14
	SUB-TOTAL		0	0	0	0	0	0	14
5	2 Single Family (1-5du/ac)	62 DU	12	35	47	40	23	63	614
	SUB-TOTAL		12	35	47	40	23	63	614
6	2 Single Family (1-5du/ac)	61 DU	12	34	46	39	23	62	604
	SUB-TOTAL		12	34	46	39	23	62	604
7	4 Condominium/Townhouse	153 DU	15	73	88	72	40	112	1,224
	SUB-TOTAL		15	73	88	72	40	112	1,224
8	4 Condominium/Townhouse	201 DU	20	96	116	94	52	146	1,608
	SUB-TOTAL		20	96	116	94	52	146	1,608
9	4 Condominium/Townhouse	326 DU	33	156	189	153	85	238	2,608
	SUB-TOTAL		33	156	189	153	85	238	2,608
10	51 Developed Park	21 AC	0	0	0	1	1	2	55
	SUB-TOTAL		0	0	0	1	1	2	55
11	2 Single Family (1-5du/ac)	21 DU	4	12	16	13	8	21	208
	SUB-TOTAL		4	12	16	13	8	21	208
12	2 Single Family (1-5du/ac)	7 DU	1	4	5	4	3	7	69
	SUB-TOTAL		1	4	5	4	3	7	69
13	2 Single Family (1-5du/ac)	18 DU	3	10	13	12	7	19	178
	SUB-TOTAL		3	10	13	12	7	19	178
14	2 Single Family (1-5du/ac)	45 DU	9	25	34	29	17	46	445
	SUB-TOTAL		9	25	34	29	17	46	445
15	4 Condominium/Townhouse	60 DU	6	29	35	28	16	44	480
	SUB-TOTAL		6	29	35	28	16	44	480
16	20 Elementary/Middle School	900 STU	234	180	414	72	81	153	1,305
	SUB-TOTAL		234	180	414	72	81	153	1,305
17	4 Condominium/Townhouse	126 DU	13	60	73	59	33	92	1,008
	SUB-TOTAL		13	60	73	59	33	92	1,008
18	4 Condominium/Townhouse	114 DU	11	55	66	54	30	84	912
	SUB-TOTAL		11	55	66	54	30	84	912
19	4 Condominium/Townhouse	120 DU	12	58	70	56	31	87	960
	SUB-TOTAL		12	58	70	56	31	87	960
20	8 CCRC	351 DU	42	21	63	49	53	102	986
	SUB-TOTAL		42	21	63	49	53	102	986
25	13 Commercial Shops	38 TSF	28	18	46	69	69	138	1,424
	40 Commercial Office	88 TSF	136	17	153	18	114	132	1,017
	SUB-TOTAL		164	35	199	87	183	270	2,441
26	13 Commercial Shops	82 TSF	59	39	98	148	148	296	3,043
	40 Commercial Office	92 TSF	143	17	160	19	119	138	1,064
	SUB-TOTAL		202	56	258	167	267	434	4,107
27	13 Commercial Shops	37 TSF	27	18	45	67	67	134	1,378
	40 Commercial Office	300 TSF	465	57	522	63	387	450	3,468
	SUB-TOTAL		492	75	567	130	454	584	4,846
28	4 Condominium/Townhouse	87 DU	9	42	51	41	23	64	696
	SUB-TOTAL		9	42	51	41	23	64	696
29	51 Developed Park	7 AC	0	0	0	0	0	0	18
	SUB-TOTAL		0	0	0	0	0	0	18
30	51 Developed Park	3 AC	0	0	0	0	0	0	8

Mission Village Traffic Model - Zonal Land Use and Trip Generation									
			AM Peak Hour			PM Peak Hour			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
	SUB-TOTAL		0	0	0	0	0	0	8
31	13 Commercial Shops	48.10 TSF	35	23	58	87	87	174	1,783
	4 Condominium/Townhouse	264 DU	26	127	153	124	69	193	2,112
	SUB-TOTAL		61	150	211	211	156	367	3,895
32	4 Condominium/Townhouse	272 DU	27	131	158	128	71	199	2,176
	13 Commercial Shops	18 TSF	13	9	22	33	33	66	678
	SUB-TOTAL		40	140	180	161	104	265	2,854
33	5 Apartment	96 DU	8	41	49	39	20	59	662
	SUB-TOTAL		8	41	49	39	20	59	662
34	5 Apartment	108 DU	9	46	55	44	23	67	745
	SUB-TOTAL		9	46	55	44	23	67	745
35	24 Library	20 TSF	15	6	21	68	74	142	1,700
	SUB-TOTAL		15	6	21	68	74	142	1,700
36	4 Condominium/Townhouse	99 DU	10	48	58	47	26	73	792
	SUB-TOTAL		10	48	58	47	26	73	792
37	5 Apartment	108 DU	9	46	55	44	23	67	745
	SUB-TOTAL		9	46	55	44	23	67	745
38	4 Condominium/Townhouse	128 DU	13	61	74	60	33	93	1,024
	SUB-TOTAL		13	61	74	60	33	93	1,024
39	4 Condominium/Townhouse	96 DU	10	46	56	45	25	70	768
	SUB-TOTAL		10	46	56	45	25	70	768
40	4 Condominium/Townhouse	105 DU	11	50	61	49	27	76	840
	SUB-TOTAL		11	50	61	49	27	76	840
41	4 Condominium/Townhouse	96 DU	10	46	56	45	25	70	768
	SUB-TOTAL		10	46	56	45	25	70	768
42	2 Single Family (1-5du/ac)	2 DU	0	1	1	1	1	2	20
	SUB-TOTAL		0	1	1	1	1	2	20
43	2 Single Family (1-5du/ac)	7 DU	1	4	5	4	3	7	69
	SUB-TOTAL		1	4	5	4	3	7	69
44	2 Single Family (1-5du/ac)	5 DU	1	3	4	3	2	5	50
	SUB-TOTAL		1	3	4	3	2	5	50
45	2 Single Family (1-5du/ac)	11 DU	2	6	8	7	4	11	109
	SUB-TOTAL		2	6	8	7	4	11	109
50	2 Single Family (1-5du/ac)	9 DU	2	5	7	6	3	9	89
	SUB-TOTAL		2	5	7	6	3	9	89
51	2 Single Family (1-5du/ac)	4 DU	1	2	3	3	1	4	40
	SUB-TOTAL		1	2	3	3	1	4	40
52	2 Single Family (1-5du/ac)	24 DU	5	13	18	15	9	24	238
	SUB-TOTAL		5	13	18	15	9	24	238
53	2 Single Family (1-5du/ac)	11 DU	2	6	8	7	4	11	109
	SUB-TOTAL		2	6	8	7	4	11	109
54	4 Condominium/Townhouse	60 DU	6	29	35	28	16	44	480
	SUB-TOTAL		6	29	35	28	16	44	480
55	2 Single Family (1-5du/ac)	30 DU	6	17	23	19	11	30	297
	SUB-TOTAL		6	17	23	19	11	30	297
56	2 Single Family (1-5du/ac)	65 DU	12	36	48	42	24	66	644
	51 Developed Park	0 AC	0	0	0	0	0	0	1
	SUB-TOTAL		12	36	48	42	24	66	645
57	4 Condominium/Townhouse	80 DU	8	38	46	38	21	59	640

Mission Village Traffic Model - Zonal Land Use and Trip Generation									
			AM Peak Hour			PM Peak Hour			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
	SUB-TOTAL		8	38	46	38	21	59	640
58	4 Condominium/Townhouse	186 DU	19	89	108	87	48	135	1,488
	SUB-TOTAL		19	89	108	87	48	135	1,488
59	4 Condominium/Townhouse	92 DU	9	44	53	43	24	67	736
	SUB-TOTAL		9	44	53	43	24	67	736
60	7 Senior (Active)	63 DU	5	8	13	10	6	16	234
	SUB-TOTAL		5	8	13	10	6	16	234
64	7 Senior (Active)	40 DU	3	5	8	6	4	10	148
	SUB-TOTAL		3	5	8	6	4	10	148
65	7 Senior (Active)	18 DU	1	2	3	3	2	5	67
	SUB-TOTAL		1	2	3	3	2	5	67
66	7 Senior (Active)	24 DU	2	3	5	4	2	6	89
	SUB-TOTAL		2	3	5	4	2	6	89
67	7 Senior (Active)	31 DU	2	4	6	5	3	8	115
	SUB-TOTAL		2	4	6	5	3	8	115
68	7 Senior (Active)	44 DU	4	5	9	7	4	11	163
	SUB-TOTAL		4	5	9	7	4	11	163
69	7 Senior (Active)	44 DU	4	5	9	7	4	11	163
	SUB-TOTAL		4	5	9	7	4	11	163
70	51 Developed Park	5 AC	0	0	0	0	0	0	12
	SUB-TOTAL		0	0	0	0	0	0	12
76	7 Senior (Active)	129 DU	10	15	25	21	13	34	479
	SUB-TOTAL		10	15	25	21	13	34	479
77	7 Senior (Active)	34 DU	3	4	7	5	3	8	126
	SUB-TOTAL		3	4	7	5	3	8	126
80	4 Condominium/Townhouse	275 DU	28	132	160	129	72	201	2,200
	SUB-TOTAL		28	132	160	129	72	201	2,200
81	40 Commercial Office	154 TSF	239	29	268	32	199	231	1,780
	SUB-TOTAL		239	29	268	32	199	231	1,780

Mission Village Traffic Model - Land Use and Trip Generation Summary								
		AM Peak Hour			PM Peak Hour			
Land Use Type	**Units**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**ADT**
2. Single Family (1-5du/ac)	382 DU	73	213	286	244	143	387	3,783
4. Condominium/Townhouse	2940 DU	296	1,410	1,706	1,380	767	2,147	23,520
5. Apartment	312 DU	26	133	159	127	66	193	2,152
7. Senior (Active)	427 DU	34	51	85	68	41	109	1,584
8. CCRC	351 DU	42	21	63	49	53	102	986
13. Commercial Shops	224.1 TSF	162	107	269	404	404	808	8,306
20. Elementary/Middle School	900 STU	234	180	414	72	81	153	1,305
24. Library	20 TSF	15	6	21	68	74	142	1,700
31. Business Park	697.00 TSF	836	160	996	210	690	900	7,110
40. Commercial Office	634.00 TSF	983	120	1,103	132	819	951	7,329
51. Developed Park	40.90 AC	0	0	0	1	1	2	108
TOTAL		**2,701**	**2,401**	**5,102**	**2,755**	**3,139**	**5,894**	**57,883**

Peak Hour Cordon Volume Balancing Summary						
	AM Peak Hour			PM Peak Hour		
	From Cordon/Zone		To Cordon/Zone	From Cordon/Zone		To Cordon/Zone
Internal Zone Tripends	2,110		2,383	2,735		2,395
Unbalanced Cordon Tripends	4,300		4,050	4,780		5,110
Total	**6,410**		**6,433**	**7,515**		**7,505**
Difference		**< 23>**			**< -10>**	
Balancing Factors Applied to Non-Fixed Cordon Locations	1.003		.997	.999		1.001
Internal Zone Tripends	2,110		2,383	2,735		2,395
Balanced Cordon Tripends	4,300		4,050	4,780		5,110
Total	**6,410**		**6,433**	**7,515**		**7,505**
Difference		**< 23>**			**< -10>**	

Balanced Peak Hour Cordon Volume Summary													
	AM Peak Hour						PM Peak Hour						
Cordon Location	**From**	**%/ ADT**	**To**	**%/ADT**	**Total**	**%/ADT**	**From**	**%/ADT**	**To**	**%/ADT**	**Total**	**%/ADT**	**ADT**
90 Commerce Ctr s/o Henry Mayo	810	2.8	1,520	5.2	2,330	7.9	1,700	5.8	1,230	4.2	2,930	10.0	29,311
91 Magic Mtn e/o Commerce Ctr	1,350	3.1	1,690	3.9	3,040	6.9	1,820	4.1	1,520	3.5	3,340	7.6	43,876
92 Entrada Pvt Dr e/o Westridge	40	7.9	30	5.9	70	13.8	20	4.0	20	4.0	40	7.9	506
93 Westridge s/o "OO" Dr	690	6.8	210	2.1	900	8.9	380	3.7	840	8.3	1,220	12.0	10,149
94 Legacy Pvt Drives (3 total)	80	3.4	40	1.7	120	5.1	60	2.5	90	3.8	150	6.4	2,357
95 Magic Mtn w/o "B" St	1,330	4.7	560	2.0	1,890	6.7	800	2.8	1,410	5.0	2,210	7.9	28,118
TOTAL	**4,300**	**3.8**	**4,050**	**3.5**	**8,350**	**7.3**	**4,780**	**4.2**	**5,110**	**4.5**	**9,890**	**8.7**	**114,317**

Appendix D
TRAFFIC COUNT DATA SHEETS

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 SB ON/OFF RAMPS
E/W ST: SR-126 (HENRY MAYO DR)
CITY: SANTA CLARITA

FILENAME: 1290302A
DATE: 12/15/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	2	X	2	X	4	2	X	3	1	
7:00 AM				89		47		89	120		370	117	832
15 AM				100		36		97	137		436	98	904
30 AM				191		32		121	181		437	131	1093
45 AM				189		27		111	148		583	124	1182
8:00 AM				94		39		112	140		517	130	1032
15 AM				79		26		109	134		405	97	850
30 AM				75		46		109	138		372	102	842
45 AM				95		44		93	132		319	87	770
PEAK HOUR BEGINS AT: 715 AM													PHF: 0.89
VOLUMES =				574		134		441	606		1973	483	4211

FILENAME: 1290302Q
DATE: 12/15/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				97		35		182	316		224	110	964
15 PM				71		30		170	264		218	95	848
30 PM				94		40		246	356		257	207	1200
45 PM				88		31		216	316		244	132	1027
5:00 PM				111		22		218	283		265	188	1087
15 PM				85		21		221	242		175	136	880
30 PM				76		32		192	259		215	158	932
45 PM				71		24		188	223		252	129	887
PEAK HOUR BEGINS AT: 1630 PM													PHF: 0.87
VOLUMES =				378		114		901	1197		941	663	4194

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 NB ON/OFF RAMPS
E/W ST: NEWHALL RANCH RD
CITY: SANTA CLARITA

FILENAME: 1290303A
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	3	X	1	X	X	X	X	4	1	X	3	2	
7:00 AM	269		91					142	20		272		794
15 AM	271		135					169	21		318		914
30 AM	309		161					286	34		303		1093
45 AM	347		175					270	28		462		1282
8:00 AM	319		202					197	30		324		1072
15 AM	273		171					128	35		311		918
30 AM	220		152					173	33		299		877
45 AM	196		119					184	33		190		722
PEAK HOUR BEGINS AT: 730 AM													PHF: 0.85
VOLUMES =	1248		709					881	127		1400	0	4365

Call 1208* 331**

FILENAME: 1290303Q
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	207		179					206	42		188	130	952
15 PM	156		156					274	50		154	136	926
30 PM	149		183					246	52		303	156	1089
45 PM	167		184					253	44		183	144	975
5:00 PM	145		174					263	43		223	171	1019
15 PM	136		188					294	46		210	126	1000
30 PM	112		173					265	41		180	145	916
45 PM	81		177					237	39		156	151	841
PEAK HOUR BEGINS AT: 1630 PM													PHF: 0.94
VOLUMES =	597		729					1056	185		919	597	4083

COMMENTS: NORTHBOUND ON RAMP CLOSED DURING AM

*Call WBT = 1208 (Balanced with Tuesday count @ SB Ramps

**Call WBR = 331 (2008 count)

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: I-5 SB ON/OFF RAMPS
CITY: SANTA CLARITA

FILENAME: 1290304
DATE: 12/03/09
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	1	1	2	X	X	X	X	1.5	X	0.5	
7:00 AM	9	78	285	11	58					18		2	461
15 AM	4	101	199	17	54					18		1	394
30 AM	7	86	216	27	91					33		1	461
45 AM	16	107	219	37	117					34		4	534
8:00 AM	12	111	245	21	96					22		1	508
15 AM	9	103	207	18	68					18		1	424
30 AM	17	89	211	16	77					32		1	443
45 AM	12	58	182	8	70					20		1	351

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.9

VOLUMES =	44	407	887	103	372					107		7	1927

FILENAME: 1290304P
DATE: 12/03/09
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	8	77	275	32	116					13		0	521
15 PM	2	87	189	41	83					17		2	421
30 PM	2	74	365	27	115					18		0	601
45 PM	1	90	284	27	91					17		0	510
5:00 PM	4	88	270	32	141					13		0	548
15 PM	9	77	258	25	92					16		1	478
30 PM	10	78	255	22	86					25		1	477
45 PM	9	66	192	14	69					12		0	362

PEAK HOUR BEGINS AT: 1630 PM — PHF: 0.89

VOLUMES =	16	329	1177	111	439					64		1	2137

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 SB ON/OFF RAMPS
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 1290307
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	1.5	0.5	2	X	3	2	2	4	X	
7:00 AM				70	0	6		26	12	127	237		478
15 AM				60	0	5		20	9	99	235		428
30 AM				49	0	4		21	10	97	245		426
45 AM				129	0	10		56	14	118	321		648
8:00 AM				63	0	6		47	10	96	271		493
15 AM				53	0	8		30	11	103	239		444
30 AM				32	0	7		35	10	55	155		294
45 AM				63	0	4		36	11	105	188		407
PEAK HOUR BEGINS AT: 730 AM													PHF: 0.78
VOLUMES =				294	0	28		154	45	414	1076		2011

FILENAME: 1290307P
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				62	0	7		87	17	65	183		421
15 PM				70	0	3		72	19	73	154		391
30 PM				78	0	4		81	26	79	181		449
45 PM				78	2	6		86	38	77	192		479
5:00 PM				65	0	11		96	33	95	196		496
15 PM				69	3	13		88	28	89	208		498
30 PM				41	1	9		86	20	89	227		473
45 PM				79	0	6		68	17	87	186		443
PEAK HOUR BEGINS AT: 1645 PM													PHF: 0.98
VOLUMES =				253	6	39		356	119	350	823		1946

COMMENTS:

11

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 NB ON/OFF RAMPS
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 1290308
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	0.5	1.5	X	X	X	2	3	X	X	3.5	1.5	
7:00 AM	187	0	43				7	81			185	41	544
15 AM	213	0	66				2	67			131	49	528
30 AM	195	0	82				5	85			178	49	594
45 AM	197	0	94				2	115			153	57	618
8:00 AM	229	0	126				3	116			175	52	701
15 AM	165	0	97				7	80			192	48	589
30 AM	151	1	99				5	75			118	33	482
45 AM	152	0	98				5	86			145	39	525

PEAK HOUR BEGINS AT: PHF: 0.89
730 AM

VOLUMES =	786	0	399				17	396			698	206	2502

FILENAME: 129031708P
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	130	0	161				23	149			127	93	683
15 PM	136	0	168				29	138			133	101	705
30 PM	135	0	170				11	147			137	107	707
45 PM	132	1	165				13	152			146	101	710
5:00 PM	118	1	177				8	142			157	110	713
15 PM	159	0	156				11	144			141	122	733
30 PM	172	0	169				11	112			143	103	710
45 PM	154	0	162				16	146			158	109	745

PEAK HOUR BEGINS AT: PHF: 0.97
1700 PM

VOLUMES =	603	1	664				46	544			599	444	2901

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 SB ON/OFF RAMPS
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 1290311
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	2	X	1	X	3	1	X	2	2	
7:00 AM				46		103		110	91		167	349	866
15 AM				32		23		76	45		124	227	527
30 AM				72		48		78	70		156	259	683
45 AM				95		88		151	92		259	175	860
8:00 AM				44		94		193	110		276	263	980
15 AM				47		61		228	129		155	213	833
30 AM				51		15		217	116		129	226	754
45 AM				46		16		90	57		126	200	535
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.87
VOLUMES =				237		258		789	447		819	877	3427

FILENAME: 1290311Q
DATE: 12/15/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				28		18		133	27		208	182	596
15 PM				31		18		127	31		187	202	596
30 PM				32		17		93	35		188	263	628
45 PM				34		19		155	30		242	214	694
5:00 PM				42		17		103	22		248	239	671
15 PM				27		16		117	30		241	244	675
30 PM				33		19		140	36		266	248	742
45 PM				31		26		108	38		215	221	639
PEAK HOUR BEGINS AT: 1645 PM													PHF: 0.94
VOLUMES =				136		71		515	118		997	945	2782

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 NB ON/OFF RAMPS
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 1290312
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	2	X	2	X	X	X	X	3	0	2	4	X	
7:00 AM	59		122					114	21	17	431		764
15 AM	64		130					119	26	20	458		817
30 AM	61		204					122	18	23	335		763
45 AM	111		269					221	25	25	326		977
8:00 AM	107		238					196	24	30	332		927
15 AM	77		268					214	70	27	348		1004
30 AM	73		236					202	64	29	351		955
45 AM	46		215					150	10	22	306		749
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.96
VOLUMES =	368		1011					833	183	111	1357		3863

FILENAME: 1290312P
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	51		219					187	37	33	350		877
15 PM	58		204					137	15	28	263		705
30 PM	61		203					165	15	35	351		830
45 PM	53		186					200	26	34	353		852
5:00 PM	46		199					179	27	19	383		853
15 PM	66		206					189	9	31	403		904
30 PM	47		191					173	16	51	306		784
45 PM	54		224					128	10	42	291		749
PEAK HOUR BEGINS AT: 1630 PM													PHF: 0.95
VOLUMES =	226		794					733	77	119	1490		3439

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 SB ON/OFF RAMPS
E/W ST: MCBEAN PKWY
CITY: SANTA CLARITA

FILENAME: 1290316A
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	1	X	1	X	2	1	X	2	1	
7:00 AM				19		23		68	58		83	125	376
15 AM				18		77		88	83		104	129	499
30 AM				35		39		108	93		102	120	497
45 AM				55		53		162	89		121	91	571
8:00 AM				37		30		161	86		129	124	567
15 AM				36		29		138	79		112	116	510
30 AM				19		20		143	75		100	112	469
45 AM				26		28		150	61		115	87	467

PEAK HOUR BEGINS AT: PHF: 0.94
730 AM
VOLUMES = 163 151 569 347 464 451 2145

FILENAME: 1290316P
DATE: 12/01/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				37		33		203	30		179	108	590
15 PM				41		42		207	25		211	130	656
30 PM				29		29		214	38		218	122	650
45 PM				42		52		200	31		172	73	570
5:00 PM				43		46		240	48		314	165	856
15 PM				42		36		182	38		204	118	620
30 PM				44		44		218	41		210	124	681
45 PM				29		40		200	30		182	85	566

PEAK HOUR BEGINS AT: PHF: 0.8
1615 PM
VOLUMES = 155 169 861 142 915 490 2732

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 NB ON/OFF RAMPS
E/W ST: MCBEAN PKWY
CITY: SANTA CLARITA

FILENAME: 1290317
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	X	2	X	X	X	X	2	1	X	2.5	0.5	
7:00 AM	15		66					86	19		194	42	422
15 AM	19		78					93	41		196	28	455
30 AM	18		121					122	40		209	39	549
45 AM	29		160					195	52		221	57	714
8:00 AM	19		139					157	73		237	51	676
15 AM	19		116					145	38		203	38	559
30 AM	29		112					121	38		182	28	510
45 AM	20		127					159	39		179	21	545

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.87

VOLUMES =	85		536				619	203		870	185	2498

FILENAME: 1290317P
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	54		120					206	45		289	44	758
15 PM	58		106					198	49		268	43	722
30 PM	43		111					237	54		302	43	790
45 PM	50		119					217	59		265	35	745
5:00 PM	40		79					194	42		246	39	640
15 PM	55		90					190	48		253	40	676
30 PM	54		99					205	49		260	22	689
45 PM	62		91					195	51		235	36	670

PEAK HOUR BEGINS AT: 1600 PM — PHF: 0.95

VOLUMES =	205		456				858	207		1124	165	3015

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 SB ON/OFF RAMPS/MARRIOTT WY
E/W ST: PICO CANYON RD
CITY: SANTA CLARITA

FILENAME: 1290319
DATE: 12/09/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	1	1.5	0.5	1	X	2	0	1	2	1	
7:00 AM			19	51	26	15		183	12	7	69	87	469
15 AM			26	52	38	10		142	12	9	70	88	447
30 AM			20	67	22	12		182	13	5	109	89	519
45 AM			19	101	20	7		227	12	9	138	79	612
8:00 AM			19	113	23	9		234	14	13	146	99	670
15 AM			19	77	16	7		209	16	15	128	85	572
30 AM			16	78	23	10		173	12	14	105	96	527
45 AM			25	72	10	5		190	6	11	139	78	536
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.89
VOLUMES =			73	369	82	33		843	54	51	517	359	2381

FILENAME: 1290319P
DATE: 12/09/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM			21	46	7	6		168	7	7	238	49	549
15 PM			20	120	18	33		197	16	6	276	53	739
30 PM			11	99	14	25		211	12	9	296	60	737
45 PM			19	111	27	37		210	13	19	265	73	774
5:00 PM			20	85	18	21		212	7	11	285	79	738
15 PM			20	105	31	38		240	14	12	245	54	759
30 PM			28	96	19	17		210	5	15	280	70	740
45 PM			19	121	15	34		198	13	11	272	50	733
PEAK HOUR BEGINS AT: 1645 PM													PHF: 0.97
VOLUMES =			87	397	95	113		872	39	57	1075	276	3011

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : I-5 NB ON/OFF RAMPS
E/W ST: LYONS AVE
CITY: SANTA CLARITA

FILENAME: 1290320A
DATE: 12/15/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	1.5	0.5	1	X	X	X	1	2	X	X	3	0	
7:00 AM	37	0	47				15	78			152	59	388
15 AM	49	0	60				30	100			164	75	478
30 AM	44	0	72				37	114			155	98	520
45 AM	64	0	93				42	196			189	162	746
8:00 AM	61	0	87				49	175			175	158	705
15 AM	55	0	63				34	156			190	90	588
30 AM	60	0	59				33	155			176	61	544
45 AM	57	0	91				31	180			199	84	642
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.87
VOLUMES =	240	0	302				158	682			730	471	2583

FILENAME: 129031720P
DATE: 12/01/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	116	1	128				40	229			211	96	821
15 PM	120	0	119				41	260			217	81	838
30 PM	123	1	112				37	228			224	88	813
45 PM	123	0	131				42	268			204	111	879
5:00 PM	126	0	131				87	303			271	84	1002
15 PM	120	0	122				36	268			287	91	924
30 PM	161	1	134				66	334			210	87	993
45 PM	160	1	159				55	287			255	104	1021
PEAK HOUR BEGINS AT: 1700 PM													PHF: 0.96
VOLUMES =	567	2	546				244	1192			1023	366	3940

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: RYE CANYON RD
CITY: SANTA CLARITA

FILENAME: 1290305
DATE: 12/03/09
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	1	2	1	2	X	X	X	X	1	X	2	
7:00 AM		59	204	34	32					46		281	656
15 AM		77	288	40	25					37		239	706
30 AM		66	218	63	34					47		227	655
45 AM		68	285	77	63					74		274	841
8:00 AM		76	266	72	54					71		256	795
15 AM		101	257	49	38					60		233	738
30 AM		70	186	51	49					41		226	623
45 AM		53	200	60	37					46		184	580
PEAK HOUR BEGINS AT: 730 AM													PHF: 0.9
VOLUMES =		311	1026	261	189					252		990	3029

FILENAME: 1290305P
DATE: 12/03/09
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM		57	156	63	60					71		306	713
15 PM		65	180	49	51					74		226	645
30 PM		69	185	60	70					108		403	895
45 PM		68	200	55	68					75		252	718
5:00 PM		69	217	72	76					107		340	881
15 PM		62	216	56	53					88		236	711
30 PM		61	220	53	56					72		220	682
45 PM		56	257	46	34					79		170	642
PEAK HOUR BEGINS AT: 1630 PM													PHF: 0.9
VOLUMES =		268	818	243	267					378		1231	3205

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 1290306
DATE: 12/09/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	2	3	1	2	3	1	2	4	1	2	4	1	
7:00 AM	7	57	14	41	51	0	7	4	0	13	1	217	412
15 AM	7	72	11	24	39	0	10	7	1	16	0	273	460
30 AM	4	76	11	31	62	1	6	10	0	23	1	228	453
45 AM	3	119	10	38	77	0	7	3	1	32	5	284	579
8:00 AM	5	110	22	47	94	1	8	4	2	38	10	255	596
15 AM	5	106	27	27	54	0	5	4	1	30	1	209	469
30 AM	6	97	20	40	53	1	1	4	0	25	0	191	438
45 AM	8	85	18	32	47	1	8	5	0	24	1	166	395

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.88

VOLUMES =	17	411	70	143	287	2	26	21	4	123	17	976	2097

FILENAME: 1290306P
DATE: 12/09/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	2	93	35	57	87	1	0	6	2	33	4	166	486
15 PM	3	90	39	59	91	0	4	11	1	40	2	173	513
30 PM	0	100	51	84	129	1	4	9	1	33	0	175	587
45 PM	3	92	33	65	83	0	1	8	0	34	1	180	500
5:00 PM	4	103	49	71	145	0	4	9	3	38	1	194	621
15 PM	5	99	43	67	113	0	9	21	5	33	4	179	578
30 PM	5	132	45	47	76	0	4	8	0	49	1	245	612
45 PM	2	117	47	30	80	1	3	13	1	31	3	179	507

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.93

VOLUMES =	16	451	184	215	414	1	20	51	9	151	9	797	2318

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 1290310A
DATE: 12/15/09
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	3	1	2	3	1	2	4	1	2	3	1	
7:00 AM	114	40	9	28	29	32	41	135	104	30	207	34	803
15 AM	17	42	25	35	42	15	20	72	29	33	75	35	440
30 AM	86	62	17	24	33	40	29	97	34	19	116	41	598
45 AM	168	55	22	20	28	63	59	172	98	16	211	32	944
8:00 AM	256	102	29	42	41	72	80	194	108	32	272	34	1262
15 AM	184	55	25	24	38	80	99	273	181	24	196	36	1215
30 AM	60	45	31	35	50	18	74	247	155	35	77	35	862
45 AM	18	47	46	39	49	20	25	75	32	50	28	42	471
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.85
VOLUMES =	668	257	107	121	157	233	312	886	542	107	756	137	4283

FILENAME: 1290310Q
DATE: 12/15/09
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	28	98	63	49	55	19	18	53	21	87	59	72	622
15 PM	15	101	58	42	59	14	16	54	22	66	53	66	566
30 PM	28	110	60	41	90	23	15	47	18	67	49	70	618
45 PM	31	117	69	56	114	24	16	58	16	108	62	78	749
5:00 PM	22	131	65	50	118	21	16	46	19	99	65	73	725
15 PM	21	109	53	52	91	19	24	43	13	90	49	89	653
30 PM	22	140	60	43	99	29	21	62	13	98	72	90	749
45 PM	11	124	46	44	79	19	23	53	15	61	70	88	633
PEAK HOUR BEGINS AT: 1645 PM													PHF: 0.96
VOLUMES =	96	497	247	201	422	93	77	209	61	395	248	330	2876

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: STEVENSON RANCH PKWY
CITY: SANTA CLARITA

FILENAME: 1290315A
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	1	3	1	1	2	1	2	3	1	2	2	0	
7:00 AM	5	34	24	9	92	79	71	104	24	90	31	15	578
15 AM	9	45	21	7	64	26	36	118	32	160	29	7	554
30 AM	6	54	24	16	68	16	93	125	45	106	39	17	609
45 AM	8	101	36	12	73	44	197	201	63	96	59	23	913
8:00 AM	18	99	28	19	133	84	240	187	63	88	68	24	1051
15 AM	27	78	12	17	112	115	117	107	27	80	47	12	751
30 AM	10	48	27	19	140	126	60	121	31	73	42	14	711
45 AM	23	58	29	16	65	36	50	153	24	79	55	9	597
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.81
VOLUMES =	63	326	103	67	458	369	614	616	184	337	216	73	3426

FILENAME: 1290315Q
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	59	110	123	14	118	57	52	88	39	155	126	12	953
15 PM	39	122	143	17	99	65	50	83	21	159	89	11	898
30 PM	53	139	164	23	119	58	38	70	36	162	145	23	1030
45 PM	62	122	148	24	143	62	43	85	31	151	111	23	1005
5:00 PM	49	152	154	22	175	68	53	98	35	162	139	9	1116
15 PM	51	128	151	23	168	64	55	101	29	169	166	24	1129
30 PM	62	134	174	13	124	60	44	76	27	214	129	23	1080
45 PM	70	132	153	21	122	86	45	94	45	175	134	12	1089
PEAK HOUR BEGINS AT: 1700 PM													PHF: 0.98
VOLUMES =	232	546	632	79	589	278	197	369	136	720	568	68	4414

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : THE OLD RD
E/W ST: PICO CANYON RD
CITY: SANTA CLARITA

FILENAME: 1290318A
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	0	2	2	0	1	2	1	1	2	1	
7:00 AM	13	35	17	63	120	5	6	181	28	18	43	28	557
15 AM	11	27	8	43	124	4	6	116	21	10	35	42	447
30 AM	21	80	11	64	75	8	13	150	17	21	93	72	625
45 AM	22	72	21	78	111	5	15	186	23	17	80	98	728
8:00 AM	24	83	20	91	130	7	18	194	23	16	88	107	801
15 AM	21	91	19	89	141	9	17	187	20	16	92	99	801
30 AM	19	92	20	83	138	7	19	193	20	18	89	87	785
45 AM	14	58	15	66	64	6	11	114	8	7	87	97	547

PEAK HOUR BEGINS AT: 745 AM — PHF: 0.97

VOLUMES =	86	338	80	341	520	28	69	760	86	67	349	391	3115

FILENAME: 1290318Q
DATE: 12/15/09
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	46	73	15	179	73	17	14	100	12	6	200	249	984
15 PM	30	47	5	121	52	17	9	56	8	6	104	167	622
30 PM	28	73	14	115	58	8	13	99	16	10	158	190	782
45 PM	33	66	12	109	62	15	11	102	12	7	160	194	783
5:00 PM	39	106	13	147	72	16	16	102	7	11	169	227	925
15 PM	43	89	19	131	85	13	9	97	8	14	181	163	852
30 PM	46	94	14	128	80	15	10	91	10	13	186	174	861
45 PM	42	122	18	137	67	10	13	141	5	11	217	214	997

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.91

VOLUMES =	170	411	64	543	304	54	48	431	30	49	753	778	3635

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : COMMERCE CENTER DR
E/W ST: SR-126 (HENRY MAYO DR)
CITY: SANTA CLARITA

FILENAME: 1290301A
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	1	1	2	1	1	1	2	0	1	2	2	
7:00 AM	9	30	2	74	31	15	19	136	8	15	184	352	875
15 AM	13	14	6	75	9	7	11	107	13	9	148	358	770
30 AM	10	11	3	71	7	10	12	115	9	10	151	331	740
45 AM	12	26	4	110	10	7	37	150	5	23	148	561	1093
8:00 AM	12	21	6	97	15	8	28	147	6	20	153	537	1050
15 AM	9	24	8	86	9	15	8	128	9	13	170	416	895
30 AM	14	13	2	142	16	9	8	129	8	17	133	285	776
45 AM	9	10	7	85	10	8	6	143	10	18	128	206	640

PEAK HOUR BEGINS AT: 745 AM — PHF: 0.87

VOLUMES =	47	84	20	435	50	39	81	554	28	73	604	1799	3814

FILENAME: 1290301Q
DATE: 12/16/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	14	14	3	249	69	9	11	221	8	2	197	123	920
15 PM	19	15	2	261	34	6	7	201	8	3	149	94	799
30 PM	14	11	3	279	65	10	12	237	11	7	163	108	920
45 PM	18	15	5	258	46	13	8	217	8	8	153	114	863
5:00 PM	15	9	4	283	54	20	10	223	6	4	139	75	842
15 PM	18	6	3	262	58	18	7	176	6	3	180	86	823
30 PM	19	4	6	212	80	28	12	200	9	7	132	73	782
45 PM	10	3	3	203	21	10	12	232	4	4	125	58	685

PEAK HOUR BEGINS AT: 1600 PM — PHF: 0.95

VOLUMES =	65	55	13	1047	214	38	38	876	35	20	662	439	3502

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : WESTRIDGE PKWY/VALLEY OAK LN
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 1290309A
DATE: 01/27/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	1	1	2	1	1	1	3	0	1	3	1	
7:00 AM	9	0	5	17	1	1	2	245	3	2	410	9	704
15 AM	1	1	9	16	0	0	0	75	4	1	93	8	208
30 AM	16	0	3	51	3	7	0	54	0	5	212	15	366
45 AM	19	8	17	92	9	33	2	195	0	1	426	53	855
8:00 AM	25	1	17	129	8	16	2	317	1	4	574	20	1114
15 AM	16	0	18	35	2	4	0	425	1	4	479	11	995
30 AM	5	0	10	31	1	0	3	318	5	3	136	16	528
45 AM	0	0	8	23	0	0	0	18	0	2	24	13	88

PEAK HOUR BEGINS AT: 745 AM — PHF: 0.78

VOLUMES =	65	9	62	287	20	53	7	1255	7	12	1615	100	3492

FILENAME: 1290309P
DATE: 12/02/09
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	0	0	5	24	0	0	0	105	0	6	45	25	210
15 PM	1	0	3	24	0	1	0	38	0	3	15	26	111
30 PM	1	0	6	24	3	0	0	24	0	5	22	25	110
45 PM	2	0	9	13	0	0	0	75	1	9	38	19	166
5:00 PM	0	0	9	28	0	1	1	62	0	5	47	31	184
15 PM	1	0	2	26	0	1	0	21	0	7	42	27	127
30 PM	1	0	6	24	0	0	0	61	3	9	64	22	190
45 PM	0	0	4	21	0	0	0	34	0	7	51	23	140

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.88

VOLUMES =	4	0	26	91	0	2	1	219	4	30	191	99	667

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : STEVENSON RANCH PKWY
E/W ST: PICO CANYON RD
CITY: SANTA CLARITA

FILENAME: 1290313
DATE: 12/01/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	2	X	1	1	2	X	X	1	1	
7:00 AM				133		16	8	14			3	27	201
15 AM				153		8	11	17			10	27	226
30 AM				144		6	20	31			12	61	274
45 AM				240		4	33	68			32	130	507
8:00 AM				189		18	35	21			33	89	385
15 AM				176		23	20	18			11	57	305
30 AM				135		18	13	13			13	44	236
45 AM				146		27	13	24			24	40	274

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.73

VOLUMES =				749		51	108	138			88	337	1471

FILENAME: 1290313P
DATE: 12/01/09
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				68		18	21	17			29	122	275
15 PM				63		14	16	24			21	93	231
30 PM				70		11	9	19			24	123	256
45 PM				72		14	17	39			18	94	254
5:00 PM				79		24	19	40			23	125	310
15 PM				80		16	9	28			22	147	302
30 PM				66		14	14	35			31	170	330
45 PM				70		14	7	31			27	140	289

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.93

VOLUMES =				295		68	49	134			103	582	1231

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : STEVENSON RANCH PKWY
E/W ST: POE PKWY/CHASE AVE
CITY: SANTA CLARITA

FILENAME: 1290314
DATE: 12/01/09
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	0	1	2	0	1	1	1	1	1	0	
7:00 AM	13	19	1	0	68	10	25	0	59	8	0	1	204
15 AM	20	25	0	1	89	13	38	0	86	6	1	1	280
30 AM	32	56	2	9	112	12	67	7	80	9	1	4	391
45 AM	70	199	4	45	243	9	81	25	137	17	5	20	855
8:00 AM	46	132	2	17	210	32	83	1	83	12	3	11	632
15 AM	27	48	2	1	149	35	35	1	65	3	1	8	375
30 AM	26	36	3	4	123	33	22	1	52	6	1	2	309
45 AM	27	29	4	1	124	23	38	0	74	4	0	2	326

PEAK HOUR BEGINS AT: PHF: 0.66
730 AM

VOLUMES =	175	435	10	72	714	88	266	34	365	41	10	43	2253

FILENAME: 1290314P
DATE: 12/01/09
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	59	65	9	4	44	40	26	0	35	2	1	2	287
15 PM	53	58	5	1	39	23	22	1	36	1	0	1	240
30 PM	58	58	3	1	41	20	19	1	37	0	0	0	238
45 PM	46	61	3	3	37	24	32	1	43	2	1	5	258
5:00 PM	71	65	6	0	59	34	30	0	45	4	0	1	315
15 PM	70	55	6	0	28	25	12	2	48	2	0	4	252
30 PM	91	74	8	0	43	29	26	1	32	4	0	1	309
45 PM	64	63	4	0	33	21	19	0	44	0	0	1	249

PEAK HOUR BEGINS AT: PHF: 0.9
1645 PM

VOLUMES =	278	255	23	3	167	112	100	4	168	12	1	11	1134

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : AVENUE STANFORD
E/W ST: RYE CANYON RD
CITY: SANTA CLARITA

FILENAME: 04100201
DATE: 4/29/10
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	2	1	0	1	1	1	1	3	0	1	3	0	
7:00 AM	16	7	1	6	6	5	66	123	114	6	274	19	643
15 AM	19	2	3	3	6	8	62	143	116	4	291	19	676
30 AM	27	13	3	2	6	7	42	128	111	7	267	20	633
45 AM	25	13	5	4	8	7	54	192	138	7	319	32	804
8:00 AM	18	11	1	6	7	9	56	162	88	4	274	28	664
15 AM	16	3	1	7	5	11	34	139	91	4	241	24	576
30 AM	27	9	5	4	6	10	39	134	64	5	217	29	549
45 AM	18	4	7	6	10	20	42	126	60	4	206	21	524

PEAK HOUR BEGINS AT: 715 AM — PHF: 0.86

VOLUMES =	89	39	12	15	27	31	214	625	453	22	1151	99	2777

FILENAME: 04100201P
DATE: 4/29/10
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	59	12	2	7	13	16	17	171	37	6	148	4	492
15 PM	113	16	11	17	21	68	19	176	32	2	228	9	712
30 PM	64	6	2	13	14	35	11	188	37	2	169	8	549
45 PM	145	12	6	32	36	92	20	168	23	8	276	10	828
5:00 PM	47	6	3	15	8	48	8	187	39	1	204	5	571
15 PM	108	13	3	24	22	58	7	302	38	4	232	5	816
30 PM	83	9	4	21	17	64	4	268	29	5	176	4	684
45 PM	61	7	3	23	14	46	4	251	27	3	166	4	609

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.88

VOLUMES =	383	40	16	92	83	262	39	925	129	18	888	24	2899

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : COPPER HILL DR/RYE CANYON RD
E/W ST: NEWHALL RANCH RD
CITY: SANTA CLARITA

FILENAME: 04100202
DATE: 4/22/10
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	2	3	1(f)	2	3	1(f)	2	4	1	2	4	1(f)	
7:00 AM	6	46	7	15	246	47	62	71	12	61	146	17	736
15 AM	10	68	7	16	311	78	85	83	19	88	210	29	1004
30 AM	11	89	6	28	289	71	96	136	15	70	286	68	1165
45 AM	6	123	11	52	351	89	158	168	19	77	302	72	1428
8:00 AM	13	78	7	30	339	97	102	104	17	93	219	30	1129
15 AM	11	91	8	23	261	101	85	102	25	126	231	47	1111
30 AM	18	94	15	14	223	82	74	112	15	89	185	25	946
45 AM	7	61	16	17	217	90	80	114	12	68	150	34	866

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.85

VOLUMES =	41	381	32	133	1240	358	441	510	76	366	1038	217	4833

FILENAME: 04100202P
DATE: 4/22/10
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	22	205	30	40	120	51	195	175	8	37	109	22	1014
15 PM	20	156	35	48	107	54	207	215	6	38	115	27	1028
30 PM	48	287	50	64	116	28	209	207	8	32	131	33	1213
45 PM	26	258	39	46	110	47	224	245	12	50	143	41	1241
5:00 PM	34	292	79	61	124	60	227	237	15	39	157	34	1359
15 PM	35	265	56	46	109	41	253	271	9	37	130	36	1288
30 PM	20	255	45	67	173	44	218	230	7	42	123	37	1261
45 PM	12	218	42	56	169	55	215	189	10	44	126	33	1169

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.95

VOLUMES =	115	1070	219	220	516	192	922	983	43	168	553	148	5149

COMMENTS:

35

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : COPPER HILL DR
E/W ST: DECORO DR
CITY: SANTA CLARITA

FILENAME: 04100203
DATE: 4/27/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	3	1(f)	1	3	X	X	X	X	2	X	1	
7:00 AM		88	26	25	372					78		21	610
15 AM		115	29	48	418					68		76	754
30 AM		184	42	136	506					81		163	1112
45 AM		162	65	127	575					91		14	1034
8:00 AM		130	37	14	421					103		11	716
15 AM		116	31	12	382					86		9	636
30 AM		105	21	12	288					91		7	524
45 AM		88	19	13	284					50		5	459

PEAK HOUR BEGINS AT: 715 AM — PHF: 0.81

VOLUMES =		591	173	325	1920					343		264	3616

FILENAME: 04100203P
DATE: 4/27/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM		343	79	12	169					50		5	658
15 PM		302	88	15	154					32		6	597
30 PM		423	98	13	133					31		16	714
45 PM		408	96	3	136					30		9	682
5:00 PM		474	113	7	151					40		13	798
15 PM		419	131	8	169					41		12	780
30 PM		437	85	18	143					37		10	730
45 PM		439	92	11	162					33		25	762

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.96

VOLUMES =		1769	421	44	625					151		60	3070

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : TOURNEY RD
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 04100204
DATE: 4/20/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	X	X	X	2	X	1	2	4	X	X	4	0	
7:00 AM				2		8	41	151			343	18	563
15 AM				6		9	50	198			381	31	675
30 AM				5		7	61	304			342	44	763
45 AM				10		8	99	353			305	77	852
8:00 AM				8		18	86	291			428	79	910
15 AM				14		15	115	324			302	90	860
30 AM				11		20	70	283			249	57	690
45 AM				25		19	77	279			252	66	718
PEAK HOUR BEGINS AT: 730 AM													PHF: 0.93
VOLUMES =				37		48	361	1272			1377	290	3385

FILENAME: 04100204P
DATE: 4/20/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM				35		74	38	296			264	18	725
15 PM				45		46	21	312			266	29	719
30 PM				42		74	27	298			265	25	731
45 PM				38		66	22	291			276	19	712
5:00 PM				74		101	20	359			288	26	868
15 PM				71		83	19	364			311	28	876
30 PM				70		91	13	310			337	16	837
45 PM				39		63	11	371			290	12	786
PEAK HOUR BEGINS AT: 1700 PM													PHF: 0.96
VOLUMES =				254		338	63	1404			1226	82	3367

COMMENTS:

37

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : TOURNEY RD
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 04100205
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	X	1	X	X	X	X	3	1	1	3	X	
7:00 AM	8		5					106	12	32	175		338
15 AM	16		9					98	29	55	184		391
30 AM	24		5					151	32	79	169		460
45 AM	39		14					194	69	100	162		578
8:00 AM	30		20					164	63	98	197		572
15 AM	40		18					181	46	111	181		577
30 AM	25		18					127	55	78	173		476
45 AM	25		28					152	23	73	170		471

PEAK HOUR BEGINS AT: PHF: 0.95
745 AM

VOLUMES =	134		70				666	233	387	713		2203

FILENAME: 04100205P
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	34		39					226	21	29	158		507
15 PM	44		57					271	22	37	137		568
30 PM	35		53					249	24	31	174		566
45 PM	49		62					275	33	33	145		597
5:00 PM	58		77					246	14	32	204		631
15 PM	54		58					252	15	26	193		598
30 PM	46		70					278	21	24	179		618
45 PM	63		48					298	20	27	188		644

PEAK HOUR BEGINS AT: PHF: 0.97
1700 PM

VOLUMES =	221		253				1074	70	109	764		2491

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : MCBEAN PKWY
E/W ST: VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 04100206
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	3	2	2	3	2	2	3	1	2	3	1	
7:00 AM	55	110	52	12	104	138	49	95	18	43	205	6	887
15 AM	50	142	43	20	101	139	89	125	14	73	273	4	1073
30 AM	41	195	67	23	137	173	66	129	12	62	321	1	1227
45 AM	58	211	32	30	186	142	104	214	22	81	326	9	1415
8:00 AM	72	202	36	26	166	148	84	202	26	78	256	15	1311
15 AM	47	164	47	18	183	121	106	177	18	93	246	6	1226
30 AM	46	129	66	26	152	115	114	227	21	75	179	7	1157
45 AM	49	156	48	28	171	135	77	158	23	82	249	11	1187

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.92

VOLUMES =	218	772	182	97	672	584	360	722	78	314	1149	31	5179

FILENAME: 04100206P
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	36	283	105	29	207	69	137	309	2	135	166	43	1521
15 PM	32	277	108	25	215	74	141	316	3	115	201	33	1540
30 PM	53	209	88	53	240	71	132	309	5	90	162	41	1453
45 PM	44	274	83	51	231	77	136	304	16	148	206	42	1612
5:00 PM	36	290	95	50	217	68	127	296	12	123	211	26	1551
15 PM	58	262	88	47	241	70	139	325	12	139	246	33	1660
30 PM	55	279	76	47	242	81	133	288	17	95	227	15	1555
45 PM	56	268	81	44	238	79	131	292	15	101	238	17	1560

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.96

VOLUMES =	193	1105	342	195	931	296	535	1213	57	505	890	116	6378

COMMENTS:

95

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : MCBEAN PKWY
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 04100207
DATE: 4/22/10
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	3	1 (f)	2	4	1 (f)	2	2	1	2	3	1	
7:00 AM	3	132	6	31	253	122	47	63	12	12	55	20	756
15 AM	5	151	3	14	377	148	85	62	15	14	62	23	959
30 AM	11	205	7	45	447	140	100	92	20	9	72	32	1180
45 AM	9	211	10	68	505	203	104	97	18	12	70	24	1331
8:00 AM	17	219	4	71	570	169	134	113	32	7	83	27	1446
15 AM	15	223	4	102	417	94	149	137	27	10	79	25	1282
30 AM	7	181	7	103	461	138	176	111	24	26	89	29	1352
45 AM	11	277	6	111	423	133	133	114	24	15	79	32	1358

PEAK HOUR BEGINS AT: 800 AM — PHF: 0.94

VOLUMES =	50	900	21	387	1871	534	592	475	107	58	330	113	5438

FILENAME: 04100207P
DATE: 4/22/10
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	50	386	35	51	316	59	121	113	22	39	79	73	1344
15 PM	36	341	31	54	287	38	157	126	25	43	82	75	1295
30 PM	37	298	29	48	317	57	130	115	27	44	92	67	1261
45 PM	26	307	18	75	342	53	184	140	28	40	94	80	1387
5:00 PM	16	329	29	55	328	49	125	124	35	45	90	81	1306
15 PM	22	368	24	74	306	52	148	141	36	48	99	110	1428
30 PM	30	380	27	46	320	49	113	143	27	39	86	116	1376
45 PM	26	331	28	63	351	30	172	137	37	33	79	76	1363

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.96

VOLUMES =	94	1384	98	250	1296	203	570	548	126	172	369	387	5497

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : MCBEAN PKWY
E/W ST: NEWHALL RANCH RD
CITY: SANTA CLARITA

FILENAME: 04100208
DATE: 4/27/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	2	3	1 (new - was 2)	2	4	1 (f)	2	4	1	2	3	1	
7:00 AM	33	79	16	47	246	17	11	98	31	160	311	12	1061
15 AM	48	107	56	37	289	26	17	107	20	148	365	22	1242
30 AM	71	91	36	70	369	64	28	136	26	133	366	15	1405
45 AM	99	119	58	78	451	68	34	200	58	146	377	18	1706
8:00 AM	113	106	69	80	392	29	26	126	51	200	326	48	1566
15 AM	111	115	49	47	330	26	15	104	58	160	328	30	1373
30 AM	56	97	41	31	270	26	25	85	34	97	210	18	990
45 AM	108	125	47	39	322	26	12	94	35	132	264	15	1219

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.89

VOLUMES =	394	431	212	275	1542	187	103	566	193	639	1397	111	6050

FILENAME: 04100208P
DATE: 4/27/10
DAY: TUESDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	70	293	159	35	143	12	28	301	83	95	181	43	1443
15 PM	72	289	163	41	186	14	19	202	50	89	174	51	1350
30 PM	85	324	178	52	149	10	42	338	75	95	167	43	1558
45 PM	90	316	184	40	193	14	53	405	77	93	161	47	1673
5:00 PM	104	394	200	35	170	10	49	372	101	106	188	71	1800
15 PM	108	387	189	50	141	12	58	374	81	103	174	86	1763
30 PM	68	367	149	45	189	14	45	324	59	117	186	52	1615
45 PM	73	351	152	76	206	12	46	332	82	114	179	61	1684

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.95

VOLUMES =	353	1499	690	206	706	48	198	1402	323	440	727	270	6862

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : MCBEAN PKWY
E/W ST: DECORO DR
CITY: SANTA CLARITA

FILENAME: 04100209
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	3	1	1	3	1	2	2	1	2	2	0	
7:00 AM	13	48	14	15	176	38	14	24	10	99	69	3	523
15 AM	42	88	34	22	180	78	23	29	18	144	256	11	925
30 AM	51	117	35	39	241	166	62	57	22	181	426	26	1423
45 AM	31	127	52	35	210	93	110	63	28	157	196	55	1157
8:00 AM	59	102	47	24	225	45	46	40	35	133	119	52	927
15 AM	34	75	26	15	192	29	35	38	19	86	52	19	620
30 AM	22	71	24	14	214	46	24	20	9	103	61	20	628
45 AM	16	85	26	9	152	38	30	21	10	99	64	23	573

PEAK HOUR BEGINS AT: 715 AM — PHF: 0.78

VOLUMES =	183	434	168	120	856	382	241	189	103	615	997	144	4432

FILENAME: 04100209P
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	17	230	82	16	111	20	55	87	11	68	53	11	761
15 PM	21	108	71	14	134	21	70	93	5	40	40	17	634
30 PM	19	203	82	18	127	18	83	106	11	57	42	20	786
45 PM	18	195	73	9	142	20	82	104	14	48	44	16	765
5:00 PM	29	259	99	35	144	14	128	126	12	57	70	13	986
15 PM	31	266	103	12	97	24	84	114	5	52	68	14	870
30 PM	26	295	105	18	129	18	105	109	15	68	57	26	971
45 PM	35	252	96	10	116	23	81	107	21	56	56	24	877

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.94

VOLUMES =	121	1072	403	75	486	79	398	456	53	233	251	77	3704

COMMENTS:

51

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : WILEY CANYON RD
E/W ST: LYONS AVE
CITY: SANTA CLARITA

FILENAME: 04100210
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	1	1	2	1	2	2	1	1	3	0	
7:00 AM	17	25	24	5	111	80	23	76	9	27	103	13	513
15 AM	22	26	17	21	106	76	24	82	19	30	117	15	555
30 AM	35	47	35	23	94	67	23	152	18	41	168	15	718
45 AM	69	71	36	32	112	110	41	186	36	42	203	27	965
8:00 AM	43	50	31	40	80	94	44	168	33	52	216	37	888
15 AM	32	32	22	30	96	100	26	141	28	29	188	15	739
30 AM	20	36	37	27	65	73	27	184	23	28	163	23	706
45 AM	24	50	32	38	56	65	39	179	19	37	161	17	717

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.86

VOLUMES =	179	200	124	125	382	371	134	647	115	164	775	94	3310

FILENAME: 04100210P
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	60	111	50	32	58	51	78	239	21	34	187	38	959
15 PM	33	89	57	24	52	50	53	234	19	43	172	42	868
30 PM	54	119	47	37	57	74	74	199	24	49	209	38	981
45 PM	40	68	44	30	61	59	51	263	23	49	184	34	906
5:00 PM	42	97	59	53	66	71	71	230	44	54	195	44	1026
15 PM	47	112	66	38	68	66	82	252	26	50	186	42	1035
30 PM	61	122	68	39	66	60	84	238	25	46	204	37	1050
45 PM	40	88	45	41	63	57	89	213	23	32	131	26	848

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.96

VOLUMES =	190	399	237	160	261	256	288	983	118	199	769	157	4017

COMMENTS:

54

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : ORCHARD VILLAGE RD
E/W ST: WILEY CANYON RD
CITY: SANTA CLARITA

FILENAME: 04100211
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	0	1	2	1	2	~~1~~2	~~0~~0	1	2	1	
7:00 AM	26	59	15	6	74	55	27	22	13	18	74	10	399
15 AM	22	98	19	8	88	42	23	21	9	19	55	14	418
30 AM	23	106	23	12	189	63	31	41	34	22	70	16	630
45 AM	84	247	27	13	257	46	34	35	109	51	75	31	1009
8:00 AM	77	232	29	34	195	86	67	34	78	48	81	36	997
15 AM	30	159	29	39	119	80	35	20	36	22	65	15	649
30 AM	27	116	28	31	206	71	36	36	49	31	47	14	692
45 AM	40	189	28	17	215	42	35	39	50	35	45	17	752

PEAK HOUR BEGINS AT: 745 AM — PHF: 0.83

VOLUMES =	218	754	113	117	777	283	172	125	272	152	268	96	3347

FILENAME: 04100211P
DATE: 4/21/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	30	175	41	43	215	61	57	71	41	26	53	16	829
15 PM	31	145	33	46	111	46	42	54	28	28	42	12	618
30 PM	29	149	32	36	198	54	57	67	32	37	35	16	742
45 PM	36	196	33	37	183	48	73	75	58	25	45	21	830
5:00 PM	38	202	38	23	212	53	74	53	56	19	76	33	877
15 PM	26	186	36	37	161	56	65	54	34	25	61	24	765
30 PM	32	223	46	27	175	58	70	72	31	29	58	23	844
45 PM	31	181	29	32	191	40	58	45	39	36	46	22	750

PEAK HOUR BEGINS AT: 1645 PM — PHF: 0.95

VOLUMES =	132	807	153	124	731	215	282	254	179	98	240	101	3316

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : ORCHARD VILLAGE RD/HOSPITAL ENTRANCE
E/W ST: MCBEAN PKWY
CITY: SANTA CLARITA

FILENAME: 04100212
DATE: 4/20/10
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1.5	0.5	2	0	1	0(d)	1	3	0	2	3	0	
7:00 AM	32	9	60	4	3	4	3	74	36	72	147	2	446
15 AM	47	3	89	5	6	3	1	62	40	94	123	7	480
30 AM	79	7	101	7	13	10	7	89	63	166	108	6	656
45 AM	92	11	180	7	7	5	10	103	88	242	125	15	885
8:00 AM	97	8	163	7	10	2	14	146	56	226	131	9	869
15 AM	59	13	148	4	2	2	7	98	46	144	143	18	684
30 AM	38	10	106	6	7	8	10	81	51	104	135	14	570
45 AM	44	13	124	11	6	3	2	115	66	131	126	8	649
PEAK HOUR BEGINS AT: 730 AM													PHF: 0.87
VOLUMES =	327	39	592	25	32	19	38	436	253	778	507	48	3094

FILENAME: 04100212P
DATE: 4/20/10
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	45	11	156	16	11	10	14	142	75	136	101	8	725
15 PM	43	15	153	19	7	8	5	188	70	131	114	5	758
30 PM	44	10	175	20	11	6	3	196	63	179	136	9	852
45 PM	46	4	179	14	4	2	3	183	64	155	131	5	790
5:00 PM	61	7	197	22	14	8	5	188	76	198	176	6	958
15 PM	50	1	187	16	14	15	8	221	93	208	145	2	960
30 PM	45	4	196	14	9	5	7	210	66	217	113	6	892
45 PM	59	5	177	12	3	3	8	241	84	176	132	5	905
PEAK HOUR BEGINS AT: 1700 PM													PHF: 0.97
VOLUMES =	215	17	757	64	40	31	28	860	319	799	566	19	3715

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : VALENCIA BLVD
E/W ST: MAGIC MOUNTAIN PKWY
CITY: SANTA CLARITA

FILENAME: 04100213
DATE: 4/22/10
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	3	0	1	3	2	2	2	0	1	2	1	
7:00 AM	4	103	12	6	250	68	31	27	3	16	47	3	570
15 AM	1	139	20	1	350	114	16	23	5	21	60	4	754
30 AM	6	177	10	5	376	96	34	42	3	30	70	2	851
45 AM	8	174	22	6	470	101	43	35	8	37	91	8	1003
8:00 AM	10	193	25	5	409	130	32	33	7	59	103	8	1014
15 AM	8	138	14	9	377	102	36	43	11	50	87	8	883
30 AM	14	181	17	4	322	104	32	34	10	47	68	7	840
45 AM	21	186	15	4	296	85	34	47	5	32	70	7	802

PEAK HOUR BEGINS AT: PHF: 0.92
730 AM

VOLUMES =	32	682	71	25	1632	429	145	153	29	176	351	26	3751

FILENAME: 04100213P
DATE: 4/22/10
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	24	349	36	17	253	91	122	75	12	26	74	15	1094
15 PM	24	360	30	19	239	68	119	97	14	40	89	8	1107
30 PM	16	315	32	17	277	80	110	86	11	46	80	19	1089
45 PM	9	385	47	13	247	101	143	108	7	31	82	18	1191
5:00 PM	12	371	39	17	311	102	104	107	5	33	78	14	1193
15 PM	19	335	36	9	280	88	143	119	6	38	63	10	1146
30 PM	16	340	32	11	261	82	119	83	6	37	61	11	1059
45 PM	13	369	44	6	269	77	121	88	3	48	85	10	1133

PEAK HOUR BEGINS AT: PHF: 0.97
1630 PM

VOLUMES =	56	1406	154	56	1115	371	500	420	29	148	303	61	4619

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : BOUQUET CANYON RD
E/W ST: SOLEDAD CANYON RD/VALENCIA BLVD
CITY: SANTA CLARITA

FILENAME: 04100214
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	3	1	3	2.5	1.5	3	3	0	3	2.5	1.5	
7:00 AM	6	77	35	83	252	192	35	86	0	73	185	34	1058
15 AM	2	97	46	43	255	223	55	96	0	67	251	59	1194
30 AM	5	95	40	84	271	214	53	109	1	80	305	54	1311
45 AM	3	98	44	101	364	298	54	138	4	76	287	57	1524
8:00 AM	6	102	50	86	287	222	70	137	3	79	256	61	1359
15 AM	7	104	48	60	296	183	63	115	1	72	291	58	1298
30 AM	10	105	42	65	251	166	65	110	2	87	229	66	1198
45 AM	5	98	39	69	236	162	70	126	0	78	237	61	1181

PEAK HOUR BEGINS AT: 730 AM — PHF: 0.9

VOLUMES =	21	399	182	331	1218	917	240	499	9	307	1139	230	5492

FILENAME: 04100214P
DATE: 4/28/10
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	9	288	110	151	214	179	259	297	3	92	183	81	1866
15 PM	6	268	90	121	201	160	247	292	3	100	194	79	1761
30 PM	7	266	79	160	219	161	239	274	4	58	153	80	1700
45 PM	10	343	77	100	174	153	254	338	1	80	223	98	1851
5:00 PM	4	242	56	97	206	127	276	364	0	76	225	142	1815
15 PM	5	262	93	112	210	142	234	345	2	80	196	84	1765
30 PM	7	334	84	100	191	189	228	310	0	89	295	103	1930
45 PM	8	271	53	152	225	211	248	347	2	70	231	62	1880

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.96

VOLUMES =	24	1109	286	461	832	669	986	1366	4	315	947	391	7390

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : BOUQUET CANYON RD
E/W ST: NEWHALL RANCH RD
CITY: SANTA CLARITA

FILENAME: 04100215
DATE: 4/27/10
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	2	4	1	1	4	1	3	3	2	2	4	1	
7:00 AM	90	124	4	46	433	128	26	70	49	19	186	18	1193
15 AM	83	132	4	72	527	161	56	76	35	23	231	26	1426
30 AM	81	156	8	69	480	141	68	101	63	36	246	26	1475
45 AM	68	134	9	89	578	149	69	96	92	34	257	16	1591
8:00 AM	59	139	12	94	494	133	67	96	71	27	156	21	1369
15 AM	80	170	4	70	493	155	86	92	65	21	142	37	1415
30 AM	75	147	7	60	372	94	66	91	61	30	162	28	1193
45 AM	94	158	8	54	457	112	57	62	67	27	140	25	1261

PEAK HOUR BEGINS AT: 715 AM — PHF: 0.92

VOLUMES =	291	561	33	324	2079	584	260	369	261	120	890	89	5861

FILENAME: 04100215P
DATE: 4/27/10
DAY: TUESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	115	421	18	49	252	65	221	229	80	33	127	48	1658
15 PM	122	464	8	62	317	129	261	177	96	51	128	92	1907
30 PM	110	401	7	59	321	74	304	230	109	46	162	88	1911
45 PM	123	448	15	49	280	69	189	169	106	51	160	86	1745
5:00 PM	117	565	12	61	344	88	262	191	110	54	147	96	2047
15 PM	102	509	7	58	280	72	255	226	125	69	188	87	1978
30 PM	105	522	12	62	365	102	259	189	129	44	176	97	2062
45 PM	121	448	13	29	339	94	244	180	90	42	123	79	1802

PEAK HOUR BEGINS AT: 1700 PM — PHF: 0.96

VOLUMES =	445	2044	44	210	1328	356	1020	786	454	209	634	359	7889

COMMENTS:

Appendix E
TECHNICAL MEMORANDUM

Newhall Ranch Mission Village Mixed-Use Trip Generation Estimate

DRAFT

FEHR & PEERS
TRANSPORTATION CONSULTANTS

TECHNICAL MEMORANDUM

Date: December 30, 2009

To: Corey Harpole – Newhall Land

From: Ronald T. Milam and Steve Crosley - Fehr & Peers

Subject: ***Newhall Ranch Mission Village Mixed-Use Trip Generation Estimate***

SM09-2373

Fehr & Peers has completed the mixed-use development (MXD) trip generation estimate for Mission Village. This estimate is based on a quantitative model that attempts to capture the vehicle traffic reduction effects of mixed-use developments and improve on current trip generation methods that rely on conventional travel demand models or rates and adjustments from the Institute of Transportation Engineers (ITE). These current methods are believed to understate the vehicle traffic reduction of mixed-use developments, leading to excessive traffic impacts and related mitigation that can discourage development of otherwise desirable projects.

The model developed used data from 239 MXDs in six metropolitan regions (Boston, Atlanta, Houston, San Diego, Seattle, and Sacramento). Hierarchical Linear Modeling (HLM) techniques were used to quantify relationships between characteristics of the MXDs and the likelihood that trips generated by those MXDs will stay internal and/or use modes of transportation other than the private vehicle.

Variables that proved successful in the latest version of the model are listed below.

- Employment
- (Population + Employment) per square mile
- Land Area
- Total Jobs / Population Diversity
- Retail Jobs / Population Diversity
- Number of intersections per square mile
- Employment within a mile
- Employment within a 30 minute trip by transit
- Average Household Size
- Vehicles Owned Per Capita

Many of these variables are examples of the "Ds", which are built environment variables that are known to influence travel behavior - density, diversity, development scale, design, and distance to transit.

A set of 16 independent mixed use sites that were not included in the initial model were tested to help validate the model. Among the validation sites, use of the MXD model produced superior statistical performance when comparing the model results to observed data. Specifically, the MXD model had a significantly lower root mean squared error (RMSE) and higher pseudo-R squared than traditional methods when comparing estimated to observed external vehicle trips. Estimates from the ITE Trip Generation Manual had an RMSE of 40% and pseudo-R squared of 0.58 (i.e., the ITE method only explains about 58 percent of the variability in external vehicle trips), modified estimates using ITE's traditional trip internalization techniques had an RMSE of 32% and pseudo-R squared of 0.73, whereas modified estimates using the MXD model had an RMSE of only 26% and pseudo-R squared of 0.82.

The MXD model has been developed in cooperation with the US Environmental Protection Agency (EPA) and ITE. ITE is currently reviewing the model for potential inclusion in their updated recommended practice for evaluating MXD projects.

FEHR & PEERS
TRANSPORTATION CONSULTANTS

MISSION VILLAGE ESTIMATES

The Mission Village MXD trip generation estimate was based on the input values listed in Table 1.

TABLE 1 MXD MODEL INPUTS FOR MISSION VILLAGE		
Input Variable	**Input Value**	**Source**
Project Area (Acres)	1,252	Mission Village Site Plan/Project Description
Number of Project Intersections	291	Mission Village Site Plan/Project Description
Transit Available within Site	Yes	Mission Village Site Plan/Project Description
Average Household (HH) Size for Single Family Dwelling Units	2.84	2000 Census - Tract 9203.29, 9203.30, and 9203.31 average (for HH owners)
Average HH Size for Multi-Family Dwelling Units	1.76	2000 Census - Tract 9203.29, 9203.30, and 9203.31 average (for HH renters)
Average Vehicles Owned per Dwelling Unit	1.60	2000 Census – Los Angeles County
Employment within 1 Mile of the Project Site	19,743	Santa Clarita Valley Consolidated Traffic Model/Austin-Foust
Employment within a 30 minute trip by transit	33,636	
Trip Purpose Splits	Varies	
Residential Dwelling Units	4,412	*Mission Village Newhall Ranch, Traffic Data*, Austin-Foust Associates, Inc., December 2009
Commercial Shops (1,000 sq. ft.)	224.1	
Business Park (1,000 sq. ft.)	697	
Commercial Office (1,000 sq. ft.)	634	
Elementary/Middle School (Students)	900	
Other Trip Generating Land Uses - Library and Park (Daily Trips)	1,808	

Based on the inputs in Table 1, the MXD model results are shown in Table 2.

TABLE 2 MISSION VILLAGE MXD TRIP GENERATION AND INTERNALIZATION ESTIMATE			
Time Period	**Gross Trips**	**Net External Trips**	**Vehicle Trip Internalization**
Daily	57,878	38,922	33%
AM Peak Hour	5,101	3,615	29%
PM Peak Hour	5,889	4,123	30%

The estimate in Table 2 was reasonableness checked against the most similar validation sites from the MXD model development. This comparison is shown in Table 3 and reveals that the Mission Village estimate is closer to the Moraga site in terms of internalization, which is expected due to a similar physical size and balance between residential dwelling units and employment.

TABLE 3 MISSION VILLAGE MXD TRIP GENERATION REASONABLENESS CHECK				
Location	**Acres**	**Residential Dwelling Units**	**Employment**	**Daily Vehicle Trip Internalization**
Moraga, CA	2,400	5,948	3,870	37%
South Davis, CA	791	4,454	2,791	17%
Mission Village	*1252*	*4,412*	*4,571*	*33%*

A comparison was also made to the trip generation estimate generated by the SCVCTM model. While the model does have some sensitivity to the mixed-use nature of the Mission Village project, the model is not fully sensitive to the built environment variables captured by the MXD

model. As such, the comparison revealed a higher level of internalization using the MXD model as shown in Table 4.

TABLE 4 COMPARION OF THE MISSION VILLAGE NET EXTERNAL TRIP GENERATION ESTIMATES FROM THE MXD AND SCVCTM MODELS			
Trip Estimate	**MXD Model**	**SCVCTM Model**	**Difference**
Gross Daily Trips	57,878	57,883	-5
Gross AM Peak Hour Trips	5,101	5,102	-1
Gross PM Peak Hour Trips	5,889	5,894	-5
Internal Daily Trips	18,956	12,739	6,217
Internal AM Peak Hour Trips	1,486	1,100	386
Internal PM Peak Hour Trips	1,766	1,296	470
Net External Daily Trips	38,922	45,144	-6,222
Net External AM Peak Hour Trips	3,615	4,002	-387
Net External PM Peak Hour Trips	4,123	4,598	-475

These results are similar to our findings on other MXD projects where conventional travel demand models do not fully account for the unique built environment features associated with mixed-use developments around principles of compact urban design and creating environments conducive of having multiple travel choices including walking, bicycling, and transit.

FURTHER DISCUSSION AND FOLLOW-UP

We are prepared to discuss these findings are your earliest convenience and have provided additional background material on the MXD model development in Attachment A.

ATTACHMENT A

Traffic Generated by Mixed-Use Developments – A Six-Region Study Using Consistent Built Environmental Measures

Reid Ewing
Michael Greenwald
Ming Zhang
Jerry Walters
Mark Feldman
Robert Cervero
Lawrence Frank
Senait Kassa
John Thomas

Abstract

Current methods of traffic impact analysis, which rely on rates and adjustments from the Institute of Transportation Engineers, are believed to understate the traffic benefits of mixed-use developments (MXDs), leading to higher impact fees, exactions, and negotiated payments than should be the case and discouraging development of otherwise desirable projects. The purpose of this study was to develop new methodology for more accurately predicting the traffic impacts of MXDs. Standard protocols were used to identify and generate datasets for MXDs in six large and diverse metropolitan regions. Data from household travel surveys and GIS databases were pooled for these MXDs, and travel and built environmental variables were consistently defined across regions. Hierarchical modeling was used to estimate models for internal capture of trips within MXDs, walking and transit use on external trips, and trip length for external automobile trips. MXDs with diverse activities on-site are shown to capture a large share of trips internally, reducing their traffic impacts relative to conventional suburban developments. Smaller MXDs in walkable areas with good transit access generate significant shares of walk and transit trips, thus also mitigating traffic impacts. Centrally located MXDs, small and large, generate shorter vehicle trips, which reduces their impacts relative to outlying developments.

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Introduction

A diverse group of stakeholders is interested in the traffic impacts of mixed-use developments (MXDs). Internal capture rates for trips between land uses are constantly debated by developers who want to minimize traffic mitigation and communities that want to hold existing residents harmless from traffic impacts, and by planners who tend to favor mixed-use developments for a host of reasons and traffic engineers who are skeptical about their traffic benefits. Absent reliable trip generation methodology, communities face a dilemma: Do they err on the conservative side and potentially discourage worthwhile projects, or err on the liberal side and risk unmitigated traffic impacts.

Being able to more accurately estimate the proportion of trips captured internally by MXDs is critical if communities are to make the most effective use of available land and realize master and comprehensive plan objectives without triggering debilitating traffic congestion. As important as the ability to estimate internal capture rates is the ability to estimate the proportion of external trips captured by alternative modes, and the length of private vehicle trips bound for destinations outside the development.

This study innovates in the following respects: (1) pooling travel and land use data for six diverse regions; (2) testing many consistently defined built environmental variables from the six regions; (3) analyzing travel as a multi-level phenomenon, with trips nested within developments and developments nested within regions; (4) focusing on MXDs as geographic units of analysis; (5) including internal capture of trips within developments as a travel outcome measure (along with conventional measures, mode choice and trip distance); (6) measuring effects of MXD on vehicle trip generation rates as opposed to modal splits and incidence of walking, as has been the case in most prior work (see Ewing and Cervero, 2001); and (7) feeding directly into traffic engineering practice through a project sponsor, the Institute of Transportation Engineers.

Current ITE Method

Virtually all traffic impact analyses rely on trip generation rates compiled in the ITE *Trip Generation* manual (7th Edition, 2003). The ITE rates are largely representative of individual, single-use suburban developments whose trips are by private vehicle and whose origins or destinations lie outside the development.

For mixed-use development projects, an ITE member survey found that nearly two-thirds of practitioners estimate internal capture rates using a procedure outlined in Chapter 7 of the ITE *Trip Generation Handbook*. The procedure works this way:

- The analyst determines the amounts of different land use types (residential, retail, and office) contained within the development.
- These amounts are multiplied by ITE's per-unit trip generation rates to obtain a preliminary estimate of the number of vehicle trips generated by the site. This preliminary estimate is what the site would be expected to generate if there were no interactions among the on-site uses.

- The generated trips are then reduced by a certain percentage to account for internal capture of trips within MXDs. The reductions are based on the following two look-up tables:

Strengths of the Current ITE Method

From the viewpoint of the practicing engineer, the ITE internal capture methodology has some important advantages:

- It seems objective. Two analysts given the same data will arrive at exactly the same result. There is no room for negotiation or interpretation (and so no reason to pressure the analyst to skew the results in a pre-determined direction).
- It seems logical. Most engineers readily accept the idea that the degree of internalization will be determined by how well the productions and attractions match for each trip purpose.
- It is fast. With a spreadsheet template an analyst can input the data and have an answer in a matter of minutes.

Looked at another way, any new methodology that lacks these qualities may not find wide acceptance within the engineering community.

Weaknesses of the Current Method

The ITE methodology also has significant weaknesses.

- The two look-up tables are based on data for a "limited number of multi-use sites in Florida" (specifically six sites analyzed by the Florida Department of Transportation, ITE 2001, p. 123). The accuracy of forecasts is thus dependent on how closely the site being analyzed matches the sites used in the tables' creation. The handbook acknowledges this problem and instructs the analyst to find analogous sites locally and collect their own data to produce locally-valid look-up tables.
- The land use types that can be analyzed are limited to the three present in the original sites and embodied in the look-up tables. Uses other than residential, retail, and office defy analysis.
- The scale of development is disregarded. Clearly, a large site with many productions and attractions is more likely to produce "matches" between them than is a small site, and the look-up tables for large sites should have higher cell percentages than the tables for small sites. Development scale was the most significant influence on internal capture rates in a study of South Florida MXDs, and more than half of all trips were found to be internalized by community-scale MXDs, far in excess of any rate obtainable with the handbook method (Ewing et al., 2001).
- The land use context of development projects is ignored. Common sense and the literature tell us that projects in remote locations are more likely to capture trips on-site than are those surrounded by competing trip attractions. For MXDs in South Florida, the

second most important determinant of internal capture rates was accessibility to the rest of the region (second after the scale of development). Conversely, projects in areas of high accessibility are more likely to generate walk trips to external destinations.

- The possibility of mode shifts for well-integrated and transit served sites is not explicitly considered. This may not bias results for free-standing sites, but infill projects within an urban context may capture few trips internally but still have significant vehicle trip reductions relative to the ITE rates.

Conceptual Framework

In this study, travel to/from MXDs is conceived as a series of choices (see conceptual framework in Figure 1). The choices relate directly to the methodology we are proposing to adjust ITE trip generation rates downward.

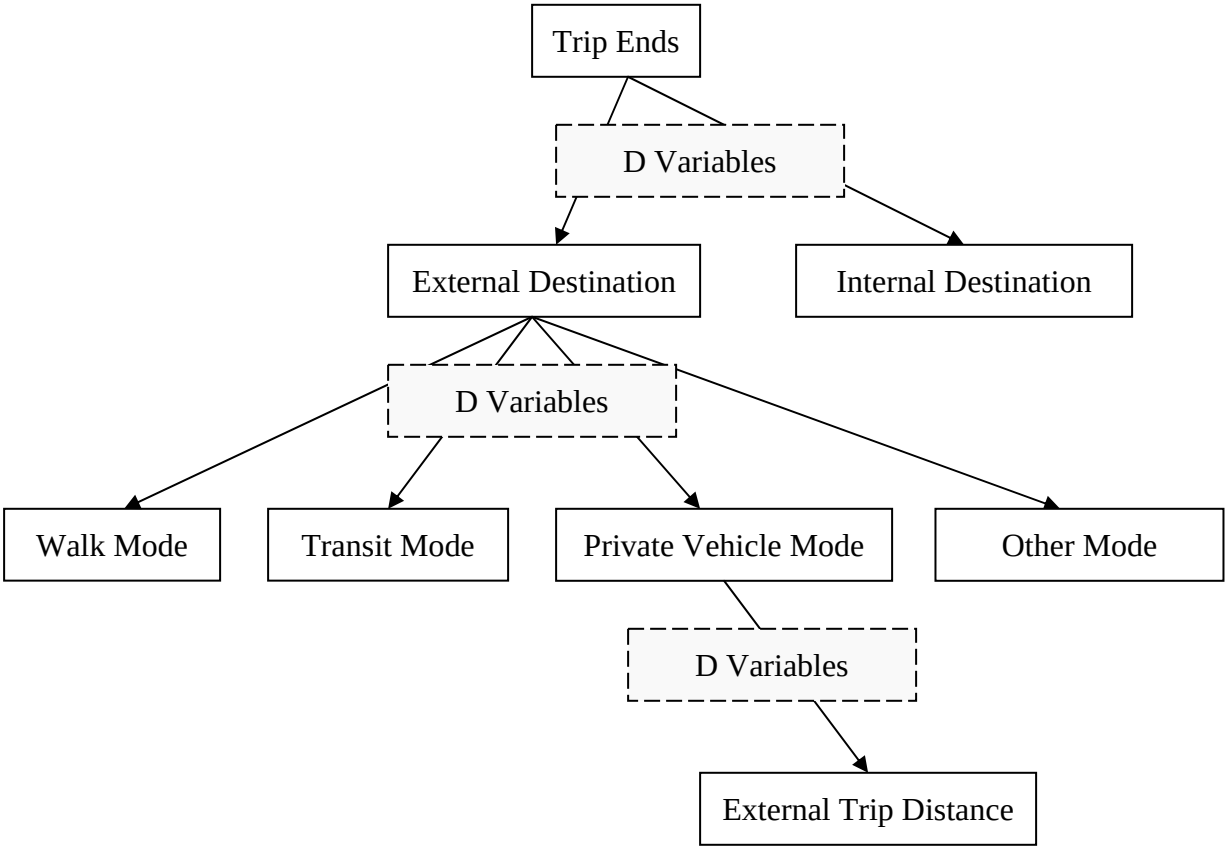
The first adjustment to ITE rates is for trips that remain within the development. Destination choice is conceived as dichotomous. A traveler may choose a destination within the development, or a destination outside the development. Internal trips are treated as 100 percent deducts from ITE trip generation rates.

Then, for trips that leave the development, adjustments are made for walking and transit use. Mode choices are conceived as dichotomous. A traveler may choose to walk or not. The traveler may choose to use transit or not. Walking and transit use may be treated as 100 percent deducts from ITE trip generation rates, or may be treated as partial offsets. It is reasonable to assume that transit trips substitute for personal vehicle trips, but walk trips may supplement as well as substitute for personal vehicle trips. The study team plans to propose substitution rates based on a review of literature.

Finally, for external personal vehicle trips, the traveler chooses a destination. This destination may be near or far. This outcome variable is continuous rather than dichotomous.

The D variables in Figure 1 are characteristics of travelers, MXDs, and regions, as defined below. The D variables determine, moderate, mediate, and confound travel decisions.

Figure 1. Traffic Impact Adjustments



Sample Selection

The main criterion for inclusion of regions in this study was data availability. Regions had to offer:

- regional household travel surveys with XY coordinates for trip ends, so we could distinguish trips to, from, and within small MXDs; and
- land use databases at the parcel level with detailed land use classifications, so we could study land-use intensity and mix down to the parcel level.

Most U.S. regions fall short on one or both counts. While nearly all metropolitan planning organizations (MPOs) have conducted regional household travel surveys as the basis for the calibration of regional travel demand models, most have geocoded trip ends only at the relatively coarse geography of traffic analysis zones. Likewise, while most MPOs have historical land use databases that are used in model calibration, these too provide data only for the relatively coarse

geography of traffic analysis zones. Traffic analysis zones vary in size from region to region, but as a general rule, are equivalent to census block groups. They are large relative to many MXDs, and in any event, will ordinarily not coincide with MXD boundaries.

Thirteen regional household travel databases were identified that met the first criterion. This was narrowed down to six regions based on the availability of parcel-level land use data and the interest of planning researchers who had worked with these datasets.

All six travel databases were derived from large-scale regional travel diary surveys. All allowed us to classify trips by purpose and mode of travel. All allowed us to control for socioeconomic characteristics of travelers that may confound interactions between the built environment and travel. All had already been linked to built environmental databases. While the specific variables differed somewhat from database to database, there was the potential to reconcile differences and specify equivalent models.

Identifying MXDs

The ITE definition of multi-use development was modified to create a generic definition of MXD that would encompass many existing areas with interconnected, mixed land use patterns:

> "A mixed-use development or district consists of two or more land uses between which trips can be made using local streets, without having to use major streets. The uses may include residential, retail, office, and/or entertainment. There may be walk trips between the uses."

To identify MXDs in the six study regions at the dates of the most recent regional household travel surveys, the team used a bottom-up, expert-based process in which planners for the different jurisdictions were queried about MXDs within their boundaries. Using this approach, a definition of an MXD would be read to local planners over the phone, and they would be asked to name, identify the boundaries, and list the uses contained within such areas.

The application of this method, in some cases, proved challenging when local planners lacked historical knowledge of their jurisdictions back to time of the applicable travel surveys, had trouble identifying MXD boundaries due to the continuous nature of urban grids, or simply were unresponsive to repeated requests for interviews. When the first two problems arose, additional experts were consulted and/or planners were asked to make educated guesses. In the most unresponsive cases, we simply gave up and lost potential additions to our sample. Three smaller jurisdictions in the Portland region, for example, never returned phone calls or emails. Given our hit rate, we may have missed an MXD or two in the Portland region.

Final Samples

Sample statistics are shown in Table 1. The regions that contribute modest numbers of trip ends to the sample still add statistical power. The importance of Boston, Houston, and Sacramento

lies in the number of MXDs each contributes, not in the number of trip ends. Also, the inclusion of the three regions doubles the number of regions in the sample. In a hierarchical analysis, statistical power is limited by the number of degrees of freedom at each level of analysis. There are ample cases at Level 1, the trip end level, but a shortage of cases at Level 2, the MXD level, and a severe shortage at Level 3, the regional level.

Table 1. Sample Statistics

	Survey Year	MXDs	Mean Acreage per MXD	Total Trip Ends	Mean Trip Ends per MXD
Atlanta	2001	24	290	6,167	257
Boston	1991	59	175	3,578	60.6
Houston	1995	34	401	1,584	46.6
Portland	1994	53	116	6,146	116
Sacramento	2000	25	179	2,487	99.4
Seattle	1999	44	207	15,915	361.7

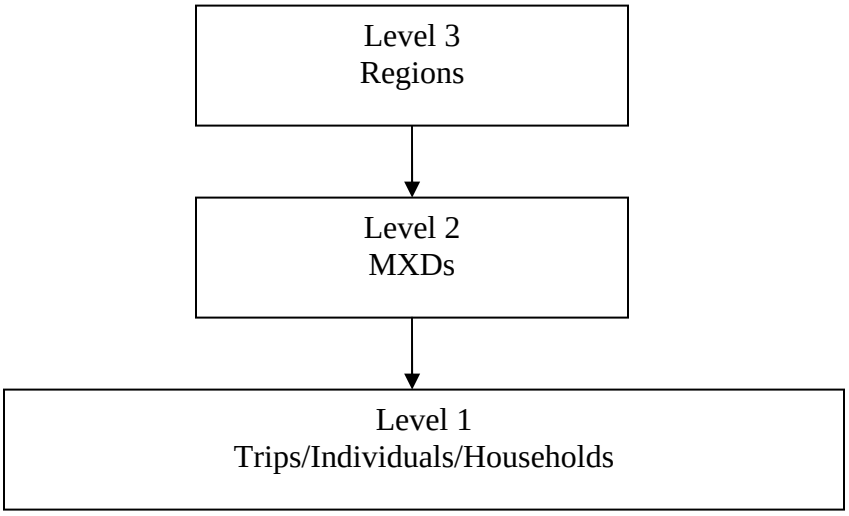
Data and Model Structure

Our data and model structure are hierarchical. Hierarchical modeling is required to account for dependence among observations, in this case the dependence of trips to and from a given MXD. All the trips to/from a given MXD share the characteristics of the MXD, that is, are dependent on these characteristics. This dependence violates the independence assumption of ordinary least squares ("OLS") regression. Standard errors of regression coefficients based on OLS will consequently be underestimated. Moreover, OLS coefficient estimates will be inefficient. Hierarchical (multi-level) modeling overcomes these limitations, accounting for the dependence among observations and producing more accurate coefficient and standard error estimates.

We initially conceived the data structure as a five-level hierarchy, with trips nested within individuals, individuals nested within households, households nested within MXDs, and MXDs nested within metropolitan regions. Upon review of the dataset, we found that the data are not so neatly hierarchical. Many of the individuals in the sample make trips to or from more than one MXD.

This has implications for modeling methodology. Rather than a five-level hierarchy, the choices facing travelers have to be modeled in a three-level framework. Individual trip ends are uniquely identified with MXDs. So trips (their characteristics and the associated characteristics of travelers and their households) form Level 1 in the hierarchy, MXDs form Level 2, and regions form Level 3 (see Figure 2).

Figure 2. Data and Model Structure



Models were estimated with HLM 6 (Hierarchical Linear and Nonlinear Modeling) software. Hierarchical linear models were estimated for the continuous outcome (trip distance), while hierarchical nonlinear models were estimated for the dichotomous outcomes (internal vs. external, walk vs. other, and transit vs. other). Within a hierarchical model, each level in the data structure is formally represented by its own sub-model. The sub-models are statistically linked.

In our initial model estimations, only the intercepts were allowed to randomly vary across higher level units. All of the regression coefficients at higher levels were treated as fixed. These are referred to as "random intercept" models (Ewing et al. 2003; Ewing et al. 2006). As the sample of MXDs was expanded, we also tested for cross-level variable interactions with “random coefficient” models. It is certainly possible that the relationship between, say, walking and vehicle availability varies with size of the MXD, or the relationship between internal capture and MXD density varies from region to region.

Outcome Variables

The variables modeled were:

INTERNAL – Dummy variable indicating that a trip remains internal to the MXD (1=internal, 0=external)

WALK – Dummy variable indicating that the travel mode on an external trip is walking (1=walk mode, 0=other)

TRANSIT - Dummy variable indicating that the travel mode on an external trip is public bus or

rail (1=transit, 0=other)

TDIST - Network trip distance between origin and destination locations for an external private vehicle trip, in miles

(Bike trips were not modeled because our samples contain relatively few of them.)

There is much variation in internal capture rates from MXD to MXD, and from region to region. Across regions, average internal capture rates vary from a low of 8 percent for Atlanta to a high of 28 percent for Houston (see Table 2). The high rate for Houston may reflect the fact that Houston's MXDs are, in general, larger and more remotely located than those in other regions.

Table 2. Internal Capture Rates for MXDs in the Six Study Regions

	Internal Capture
Atlanta	8.0%
Boston	9.4%
Houston	28.3%
Portland	13.0%
Sacramento	15.1%
Seattle	11.2%

In all household travel surveys, automobile, walk, and transit (bus or rail, where available) are identified as separate modes of travel. Bicycle is as well, but samples are too small to be reliably analyzed. Again, there is great variation in mode shares from MXD to MXD, and region to region. In all regions, the dominant mode for external trips to/from MXDs is the automobile ("private motor vehicle"). The essential choices facing travelers are to walk or use a private vehicle, or to take transit or use a private vehicle. For external trips, average mode shares by walking and transit combined vary from a low of 2 percent for Sacramento to a high of 18.9 percent for Boston (see Table 3).

Of the 35,877 trip ends generated by these MXDs, 6,378 (17.8%) involved trips within the mixed-use site, another 2,099 (5.8%) involved trips entering or leaving the site via walking, and another 1,995 (5.6%) involved trips entering or leaving via transit. Thus, on average, a total of 29% of the total trip ends generated by mixed-use developments put no strain on the external street network, generate very few vehicle miles traveled, and should be deducted from ITE trip rates for stand-alone developments. This 29% figure, we note, is a bit less than the 36% internal capture rate measured for the six MXD sites by the Florida DOT, as reported in the 2001 ITE *Trip Generation Handbook*.

Table 3. Average Walk and Transit Mode Shares for External Trips to/from MXDs

	Walk Share	Transit Share
Atlanta	3.2%	2.1%
Boston	13.2%	3.7%
Houston	2.7%	5.2%
Portland	7.1%	3.3%
Sacramento	1.8%	0.2%
Seattle	4.7%	8.7%

Trip distances are just as variable across regions. Average distances of external auto trips to/from MXDs range from 4.8 miles for MXDs in Boston to 13.6 miles for MXDs in Houston (see Table 4).

Table 4. Average Trip Distances for External Auto Trips to/from MXDs in the Six Study Regions (in miles)

	Distance (miles)
Atlanta	9.1
Boston	4.8
Houston	13.6
Portland	5.4
Sacramento	8.1
Seattle	7.9
Combined	7.5

Explanatory Variables

In travel research, urban development patterns have come to be characterized by "D" variables. The original "three Ds," coined by Cervero and Kockelman (1997), are *density*, *diversity*, and *design*. Three additional Ds have been labeled since then, *destination accessibility*, *distance to transit*, and *demographics*. An additional D variable is relevant to this analysis: *development scale*.

In this study, all seven types of D variables were measured and used to predict the travel characteristics of MXDs. The richness of the datasets varies from region to region. Portland and Atlanta have the most complete datasets. Houston and Sacramento have the least complete datasets. Variables available for all regions are shown in normal type. Those available for a subset of regions are shown in italics.

Trip-Level Explanatory Variables (Level 1)

HBO – Dummy variable indicating that the trip is home-based for purposes other than work (1=home-based other, 0=otherwise)

NHB – Dummy variable indicating that the trip is non-home-based (1=non-home-based, 0=otherwise)

(The reference category for trip purpose variables is home-based work.)

Traveler-Level Explanatory Variables (Level 1)

CHILD – Dummy variable indicating that the traveler is under 16 years of age (1=child, 0=adult)

WHITE – Dummy variable indicating that a traveler is a white caucasian (1=white, 0=other)

Race and ethnicity are available for all but Boston and Sacramento.

(The travel diary databases have more detailed ethnic classes, and actual age data.)

Household-Level Explanatory Variables (Level 1)

HHSIZE – Number of members of the household

VEHCAP – Number of motorized vehicles per person in the household

BUSSTOP – Dummy variable indicating that the household lives within ¼ mile of a bus stop (1=yes, 0=no)

MXD-Level Explanatory Variables (Level 2)

Development Scale Variables

POP – Resident population within the MXD

Prorated sum of the population for the census block groups which intersect the MXD. Prorating was done by calculating density of population per residential acre (tax lots designated single-family or multifamily) for the entire census block group, then multiplying the density by the amount of residential acreage within the block group contributing to the MXD, and finally, summing over all block groups intersecting the MXD area. For Houston, data at the TAZ level were prorated.

EMP – Employment within the MXD

Weighted sum of the employment within the MXD for all SIC industries. For Portland,

employment estimates were based on the average number of employees in each size category, summed across employer size categories. For other regions, data at the TAZ level were prorated.

ACTIVITY – Resident population plus employment within the MXD

Density Variables

POPDEN – Population density per net square mile within the MXD

Population within the MXD, divided by land designated for single-family or multifamily housing in tax lot records. Net population density is available for all but Houston.

EMPDEN - Employment density per net square mile within the MXD

Employment within the MXD, divided by land designated for employment uses in tax lot records. Net employment density is available for all but Houston.

ACTDEN - Activity density per square mile within the MXD

Sum of population and employment within the MXD, divided by gross land area.

FAR – Floor area ratio of all land uses within the MXD

Total square footage of all buildings divided by total square footage of all tax lots within the MXD. FAR is available for Portland, Seattle, and Atlanta.

DEVLAND – Proportion of developed land within the MXD

Diversity Variables

JOBPOP – Index that measures the balance between employment and resident population within the MXD

Index ranges from 0, where only jobs or residents are present in an MXD, not both, to 1 where the ratio of jobs to residents is the same as the region as a whole. Values are intermediate when MXDs have both jobs and residents, but one predominates. [1]

JOBMIX – Diversity index that captures the variety of employment within the MXD

Entropy calculation based on employment in SIC categories likely to exchange trips. For Portland, the four categories of employment factored into the index were: retail; services;

[1] JOBPOP = 1 – [ABS (employment - a*population)/(employment + a*population)]
ABS is the absolute value of the expression in parentheses. a is the regional ratio of employment to residents.

finance/insurance/real estate; and transportation/communications/public utilities.[2] *For other regions, the categories were slightly different.*[3] *The index varies in value from 0, where all employment is in one of these categories, to 1, where employment is evenly divided among these categories. JOBMIX is available for Atlanta, Boston, Portland, and Seattle.*

BUILDMIX - Diversity index that captures the variety of land uses within the MXD

Entropy calculation based on building floor area in land use categories likely to exchange trips. In both regions, land uses were aggregated into three roughly equivalent categories: commercial, office, and public/institutional. The entropy index varies in value from 0, where all building area is in one of these categories, to 1, where building area is evenly divided among these categories BUILDMIX is available for Atlanta and Seattle.

LANDMIX – Another diversity index that captures the variety of land uses within the MXD

Entropy calculation based on net acreage in land use categories likely to exchange trips. For Portland, the land uses were: residential, commercial, industrial, and public or semi-public.[4] For other regions, the categories were slightly different.[5] The entropy index varies in value from 0, where all developed land is in one of these categories, to 1, where developed land is evenly divided among these categories.

Design Variables

STRDEN - Centerline miles of all streets per square mile of gross land area within the MXD

INTDEN - Number of intersections per square mile of gross land area within the MXD

SIDEWALK – Mileage of sidewalks per centerline mile of streets within the MXD

Sidewalk mileage is available for Portland and Atlanta.

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[2] JOBMIX = -[retail share*LN (retail share) + service share*LN (service share) + FIRE share*LN (FIRE share) + TCPU share*LN (TCPU share)]/ LN (4), where LN is the natural logarithm of the value in parentheses

[3] The employment categories were as follows: for Atlanta, retail, service, FIRE, transportation/communication/utilities, and government; for Boston, retail, service, finance, transportation, and government; and for Seattle, retail, FIRE, wholesale/transportation/communications/utilities, and civic.

[4] The entropy calculation is: LANDMIX = -[single-family share*LN (single-family share) + multifamily share*LN (multifamily share) + commercial share*LN (commercial share) + industrial share*LN (industrial share) + public share*LN (public share)]/ LN (5) --- where LN is the natural logarithm of the value in parentheses.

[5] For Houston, the land uses were: residential, commercial, industrial, and institutional; a "mixed residential and commercial" class of land uses was included with commercial. For Boston, the land uses were: residential, commercial, industrial, and recreational. For Seattle, detailed land uses were aggregated into four categories: residential, commercial, industrial, and institutional. For Atlanta, detailed land uses were aggregated into four categories: residential, commercial, industrial, and institutional. For Sacramento, detailed land uses were aggregated into four categories: residential, commercial, industrial, and institutional; a mixed class of land uses was included with commercial.

Destination Accessibility Variables

EMPMILE – Total employment within one mile of the MXD

Weighted average for all TAZs intersecting the MXD. Weighting was done by proportion of each TAZ within the MXD boundary relative to an entire TAZ area (i.e., "clipping" the block group with the MXD polygon).

EMP10A – Total employment accessible within 10-minutes travel time of the MXD using an automobile at midday

Computed in same manner as EMPMILE.

EMP20A – Total employment accessible within 20-minutes travel time of the MXD using an automobile at midday

Computed in same manner as EMPMILE.

EMP30A – Total employment accessible within 30-minutes travel time of the MXD using an automobile at midday

Computed in same manner as EMPMILE.

EMP30T– Total employment accessible within 30-minute travel time of the MXD using transit

Computed in the same manner as EMPMILE.

Distance to Transit Variables

STOPDEN – Number of transit stops within the MXD per square mile of land area

Uses 25 ft. buffer to catch bus stops on periphery.

RAILSTOP – Rail station located within the MXD (1=yes, 0=no).

Commuter, metro, and light rail systems are all considered.

The number of MXDs for which we have values of different explanatory values varies greatly from variable to variable, as shown in Table 5.

Table 5. Sample Sizes and Descriptive Statistics for Level 2 Variables

	N	Mean	S.D.
POP	239	2271.0	3261.4
EMP	239	2696.3	5572.2
ACTIVITY	239	4967.2	6945.6
POPDEN	205	21600.3	35147.5
EMPDEN	204	30269.4	51360.9
ACTDEN	239	19780.9	30669.4
FAR	121	0.400	0.538
DEVLAND	239	0.825	0.218
JOBPOP	239	0.558	0.297
JOBMIX	180	0.702	0.166
BUILDMIX	64	0.554	0.325
LANDMIX	239	0.518	0.199
STRDEN	239	25.4	10.5
INTDEN	239	257.5	203.0
SIDEWALK	74	0.915	0.673
EMPMILE	239	30.5	50.9
EMP10A	239	69.8	111.2
EMP20A	239	276.1	377.1
EMP30A	239	505.0	630.6
EMP30T	239	86.1	147.9
STOPDEN	239	70.5	83.9
RAILSTOP	239	0.084	0.277

Modeled Results

Internal Capture

For internal capture, the dependent variable is the natural log of the odds of an individual making a trip with both ends within an MXD. Explanatory variables, their coefficients, and their significance levels (p-values) are shown in Table 6.

Models were estimated sequentially, starting with the full set of MXDs and the limited set of Level 2 variables for which all MXDs have values. The resulting base model includes only those explanatory variables with values for all 239 MXDs. Level 2 variables were sequentially added to the base model, resulting in a loss of cases and degrees of freedom. The last variable to be added was the building mix variable, available for only two regions.

In the base model, two Level 1 variables have the expected signs and are significant. Home-based other and non-home based trips are more likely to be internal trips than are home-based work trips. While characterized as controls, these trip purpose variables are a function of the

employment mix within the MXD. Office-oriented developments generate a disproportionate number of home-based work trips, while retail-oriented developments generate a disproportionate number of home-based non-work trips. These variables could be treated as inputs to traffic impact analyses.

In the base model, internalization of trips is significantly related to four Level 2 variables, resident population, employment, job-population balance, and intersection density within the MXD. The first two are measures of *development scale*, the third a measure of *diversity*, and the fourth a measure of *design*. All four are positively related to the likelihood of internal trips. Larger MXDs are more likely to capture trips internally, as are MXDs with a balance of employment and resident population and MXDs with short blocks and highly connected streets. A high job-housing balance index suggests relatively high trip internalization for not only work trips but also retail shopping since employment counts include individuals working in the retail and service sectors.

An additional Level 2 variable proved significant in subsequent model estimations; land use mix (BUILDMIX) in the model with 64 MXDs from two regions. BUILDMIX is a measure of *diversity*. It has the expected sign, being positively related to internal capture. The inclusion of land use mix, and the smaller sample it begets, causes job-population balance to fall below the conventional 0.05 level of statistical significance. Yet, for theoretical reasons, we prefer the fully specified model, with variables representing balance as well as mix, and propose to use it in the internal capture methodology.

None of the Level 3 variables proved significant. While there is significant variance of internal capture from region to region, it is not explained by the variables in our data set. It is, however, captured in the random effects term of the Level 3 equation.

Added to Table 6 are the elasticities of internal capture with respect to the significant explanatory variables. These are percentage changes in the probability of internal capture with respect to a one percent change in each explanatory variable. They are computed with the formula:

> *elasticity = coefficient of explanatory variable * mean value of explanatory variable * (1 - mean probability of internal capture)*

Among built environmental variables, the elasticity of internal capture is highest for land use mix. The elasticity value, 0.48, suggests that the probability of internal capture increases by 0.48 percent for every one percent increase in the value of this variable. Other elasticity values can be interpreted in the same way. Internal capture is relatively inelastic with respect to all explanatory variables.

These elasticity values will be used to develop adjustment factors for ITE trip generation rates. Probabilities are just expected internal capture rates, so it will be easy to adjust ITE's vehicle trip rates downward by expected internal capture rates, pivoting off ITE values.

Table 6. Log Odds of Internal Capture

	239 MXDs				64 MXDs			
	coeff	t-ratio	p-value	elast	coeff	t-ratio	p-value	elast
Constant	-3.378				-4.110			
POP	9.3E-05	4.645	< 0.001	0.18	1.1E-04	2.69	0.01	0.22
EMP	3.3E-05	2.522	0.013	0.08	8.2E-05	3.63	0.001	0.19
JOBPOP	0.761	2.815	0.006	0.37	0.580	1.14	0.26	0.28
BUILDMIX					1.003	2.07	0.04	0.48
INTDEN	8.2E-04	1.947	0.052	0.18	0.00203	1.96	0.05	0.45
HBO	1.051	14.02	< 0.001	N/A	1.091	10.36	< 0.001	N/A
NHB	1.876	25.39	< 0.001	N/A	2.043	19.79	< 0.001	N/A
Pseudo-R^2	0.11				0.50			

Walk and Transit Use for External Trips

For external trips, walking and transit use have been modeled independently because they depend on different environmental factors (as described below). For walk mode choice, the dependent variable is the natural log of the odds of an external trip being made by walking. For transit mode choice, the dependent variable is the natural log of the odds of an external trip being made by transit. The significant independent variables, their coefficients, and their significance levels (p-values) are shown in Tables 7 and 8.

Among Level 2 environmental variables, the strongest influences on walking are intersection density and jobs within one mile of the MXD boundary. The former is a measure of *design*, and the latter is a measure of *destination accessibility*. High intersection density within the MXD makes walking to/from activities outside the MXD that much faster and easier. High employment totals within a mile of the MXD affords trip attractions within walking distance. Activity *density* within the MXD is also positively related to walking on external trips. Perhaps this is due to better walking conditions or trip chaining opportunities.

The significant environmental influences on transit use are the density of bus stops within the MXD, the presence of a rail station within the MXD, and the regional transit accessibility of the MXD, measured in terms of jobs reachable within 30 minutes by transit. These variables measure *distance to transit* and *destination accessibility*. They suggest, consistent with other literature, that mixed-use transit oriented developments (TODs) that concentrate residents, workers, and retail shops in close proximity to major transit stops can “de-generate” trips (Cervero and Arrington, 2008).

The results in Tables 7 and 8 are shown for control variables as well as environmental variables. Walking is more likely on home-based other trips than on home-based work trips. Transit use is less likely on trips for purposes other than work. For the walk model, we prefer the version which includes only the explanatory variables with values for all 239 MXDs, because it is often difficult to obtain precise measures of sidewalk coverage, and design is already represented by

intersection density in the model.

Table 7. Log Odds of Walking on External Trips

	239 MXDs				75 MXDs			
	coeff	t-ratio	p-value	elast	coeff	t-ratio	p-value	elast
constant	-3.943				-3.451			
EMPMILE	0.00877	6.446	< 0.001	0.25	0.00554	1.348	0.182	0.16
ACTDEN	6E-06	2.797	0.006	0.11	1.0E-05	2.080	0.041	0.18
INTDEN	0.00227	5.266	< 0.001	0.54	0.00202	2.862	0.006	0.49
SIDEWALK					0.703	3.648	0.001	0.60
HBO	0.856	9.571	< 0.001	N/A	0.381	4.274	< 0.001	N/A
NHB	0.700	7.705	< 0.001	N/A	0.508	4.186	< 0.001	N/A
pseudo-R^2	0.51				0.61			

Table 8. Likelihood of Using Transit on External Trips

	239 MXDs			
	coeff	t-ratio	p-value	elast
constant	-3.361			
EMP30T	0.00199	4.580	< 0.001	0.16
STOPDEN	0.00332	3.802	< 0.001	0.22
RAILSTOP	0.554	2.293	0.023	N/A
HBO	-0.412	-5.823	< 0.001	N/A
NHB	-0.438	-6.110	< 0.001	N/A
pseudo-R^2	0.31			

Trip Distance for External Automobile Trips

The length of external automobile (private vehicle) trips is related to the regional accessibility of the MXD, measured in terms of employment that can be reached within 20 minutes by automobile (see Table 9). The better the regional accessibility to employment (and hence to shopping, services, etc.), the shorter the length of vehicle trips. Job-population balance is also significant and negatively related to external automobile trip length. This may be due to trip chaining behavior.

Home-based other and non-home based trips are shorter than home-based work trips (the reference case), on average about 2.5 miles shorter. The length of external trips increases to a significant extent with household size, perhaps due to multi-purpose trip making. The length of

external trips also increases with vehicle availability, which may due to higher income or less competition for the family car.

Table 9. Trip Distance for External Automobile Trips

	239 MXDs			
	coeff	t-ratio	p-value	elast
constant	10.17			
EMP20A	-0.0016	-2.35	0.02	-0.07
JOBPOP	-3.036	-3.38	0.001	-0.26
HBO	-2.581	-17.7	< 0.001	NA
NHB	-2.391	-16.1	< 0.001	NA
CHILD	-0.896	-5.67	< 0.001	NA
HHSIZE	0.305	7.23	< 0.001	0.13
VEHCAP	1.27	10.5	< 0.001	0.17
pseudo-R^2	0.12			

Model Validation

The preceding models were applied to 15 MXDs for which daily counts of external vehicle trips were available. Six of those 15 sites are in South Florida. Their traffic counts are presented in Appendix C of the *Trip Generation Handbook.* The remaining sites are located in California, Texas, and Georgia. Traffic counts are from a variety of sources. The sites represent a wide range of densities, land use mixes, and development scales. Populations of the validation MXDs range from zero (Crocker Center in Boca Raton, FL, containing commercial and office uses only) to nearly 17,000 (the entire town of Moraga, CA). Employment levels range from near-zero (The Villages in Irvine, CA) to more than 5,500 (Park Place, also in Irvine, CA). Some sites are well served by transit, including one built around a rail station, while others are suburban and poorly served by transit. With such a diverse validation sample, one can begin to build confidence that our MXD models have external validity.

Data were collected for all model variables for each of the 15 sites. The variables EMPMILE and EMP30T and the regional total needed for the calculation of JOBPOP were estimated from regional travel model, ground-truthed from aerials, and in some cases, from websites of the MXDs. Since travel survey data were not available for these sites, the trip purpose variables were estimated at values between 0 and 1, based on the land uses contained within the MXDs.

The models used in the validation were the fully-specified internal capture model (with BUILDMIX), the base walking model (without SIDEWALK), and the only transit model estimated. The probabilities estimated with these models are shown in Table 10:

Table 10: Predicted Probabilities from Application of the Model on Validation Sites

Site	Internal Capture Rate	Walk Mode Share	Transit Mode Share	Predicted Trip Reduction	Actual Trip Reduction
1	11%	4%	3%	17%	12%
2	58%	4%	3%	60%	49%
3	47%	6%	3%	51%	45%
4	11%	5%	4%	20%	1%
5	8%	6%	4%	17%	13%
6	7%	7%	3%	17%	20%
7	13%	6%	3%	20%	18%
8	20%	5%	3%	27%	23%
9	14%	4%	2%	19%	29%
10	18%	5%	2%	24%	28%
11	17%	5%	2%	23%	31%
12	24%	4%	3%	29%	30%
13	14%	7%	7%	26%	15%
14	22%	6%	3%	29%	45%
15	36%	11%	3%	45%	54%

These models are capable of predicting a wide range of internal capture rates and mode shares for external trips, taking into account, development scale, site design, and regional context. The models predict total trip reduction within 10% of the actual reduction observed for 11 of the 15 validation sites, and within 15% for two of the other four sites.

Table 11 compares model performance to current ITE methods, specifically:

1. *ITE Trip Generation* without any adjustments ("ITE Raw")
2. Internalization spreadsheet method from the ITE *Trip Generation Handbook* ("ITE Net")

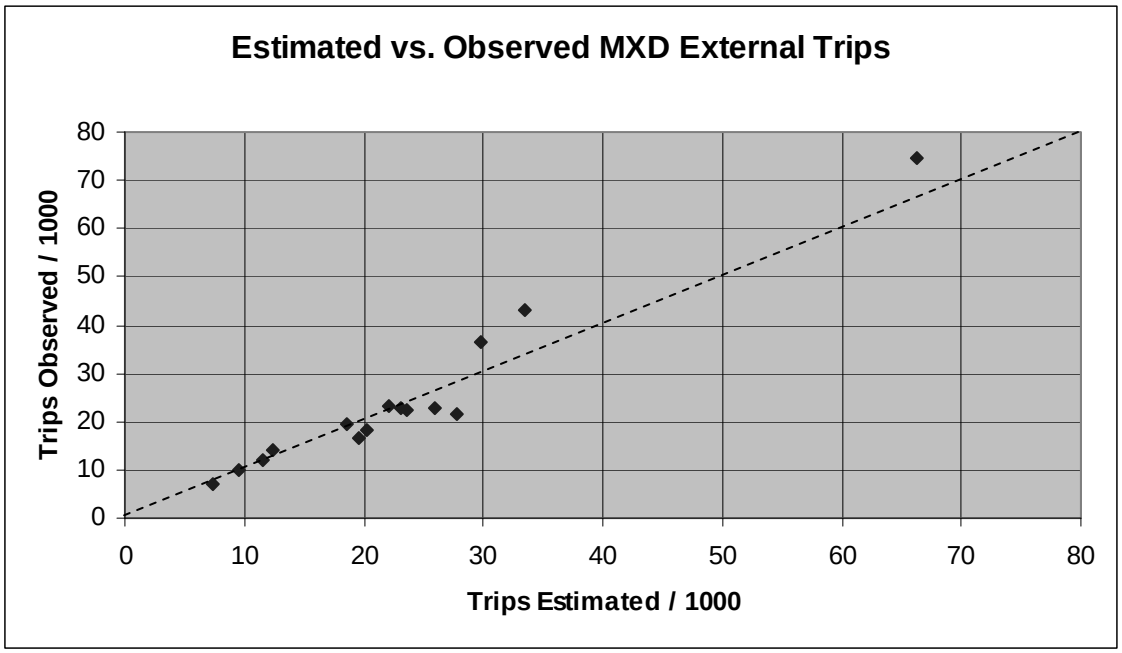
The Root Mean Squared Error (RMSE), used in the transportation field to evaluate model accuracy, penalizes proportionally more for large errors and normalizes the error across different values of the quantity one is trying predict. An RMSE of less than 40% is generally considered good. Table 11 shows that the proposed models improve the RMSE significantly compared to the ITE Raw and ITE Net methods.

Table 11: Comparison of Percent Differences between Predicted and Actual External Vehicle Counts

Site	ITE Raw	ITE Net	MXD Models
1	14%	11%	-5%
2	96%	88%	-22%
3	82%	57%	-11%
4	1%	-8%	-19%
5	15%	8%	-5%
6	24%	19%	3%
7	22%	16%	-3%
8	30%	19%	-5%
9	40%	24%	13%
10	39%	18%	5%
11	45%	30%	12%
12	43%	29%	1%
13	17%	8%	-13%
14	81%	60%	29%
15	116%	84%	19%
RMSE	86%	65%	18%

Finally, Figure 3 shows the strong association between predicted and observed external vehicle trips using the models developed herein.

Figure 3. Scatterplot of Predicted vs. Observed External Vehicle Trips



Conclusion

The "bibles" of traffic impact analysis, the Institute of Transportation Engineers' *Trip Generation* manual and *Trip Generation Handbook*, are woefully lacking when it comes to MXDs, an increasingly common development form. Except for a handful of master-planned projects in Florida, actual numbers on internal capture rates are few and far between. Traffic engineers are thus largely left to their own devices to quantify the trip reductions that might accrue from this often varied and complex development type. Often times, no adjustment is made. This ends up over-stating the traffic impacts of MXD proposals, leading to high impact fees, exactions, and negotiated payments than should be the case and adding fodder to those who oppose any and all land-use changes. Unavoidably, then, failure to account for internal capture ends up penalizing MXDs by forcing developers of these projects to, in effect, cross-subsidize single-use projects through their bloated impact-fee payments. Besides adjustments in impact fee schedules, the trip-reducing benefits of MXDs call for other actions that reward this inherently efficient form of development, like flexible parking codes, market-responsive zoning, streamlining the project review and permitting process, and investments in supportive public infrastructure.

This research sought to advance the state of knowledge on the relationships that govern travel to and within mixed used development projects and to enumerate tangible and verifiable traffic reductions relative to the rates in the ITE *Trip Generation* manual. Travel research published over the last few years convincingly shows that changes by several percentage points in any or several of the 7D variables used in this study slightly reduces the number of vehicle trips and vehicle miles traveled. Our study extends and focuses that research on the particular characteristics of MXDs. It represents the first national study of the travel generation by mixed-use development, making use of household travel survey data from six metropolitan areas. We found an average of three out of 10 trips produced by and attracted to MXDs put no strain on the external street network and generated very few vehicle miles traveled. Statistical equations derived from the data reveal that the primary factors affecting this reduction in automobile travel are:

- The total and the relative amounts of population and employment on the site
- The site density (floor area ratio)
- The size of households and their auto ownership
- The amount of employment within walking distance of the site
- The pedestrian-friendliness (small blocks and sidewalks) of the site
- The density of bus stops, presence or absence a rail station, and the access to employment within a 30 minute transit ride of the site

For traffic impact, greenhouse gas, and energy analyses, the number of vehicle miles of travel (VMT) generated by a mixed-use site depends, in addition to the factors above, upon the site's placement within the region, specifically, the number of jobs located within a 20-minute drive of the site. Greater destination accessibility translates into shorter auto trips external to the site. This effect is as significant as the effects associated with internal capture of trips with mixed-use developments, and conversion of some external trips from auto to alternate modes.

The findings on mixed-use trip generation reported here will be refined and validated through field surveys at representative sites in locations such as Southern California, Salt Lake City, Denver, Dallas, Florida, Atlanta and Washington D.C. When the study is completed, it will help guide planners and developers of mixed-use projects on design features likely to minimize traffic generation and greenhouse gas and energy impacts, and it will produce new analysis techniques for traffic engineers to more realistically quantify impacts and size infrastructure for mixed-use development proposals. Only through smart calculations informed by studies like ours can planners and engineers begin to put in place strategies that reward smart growth.

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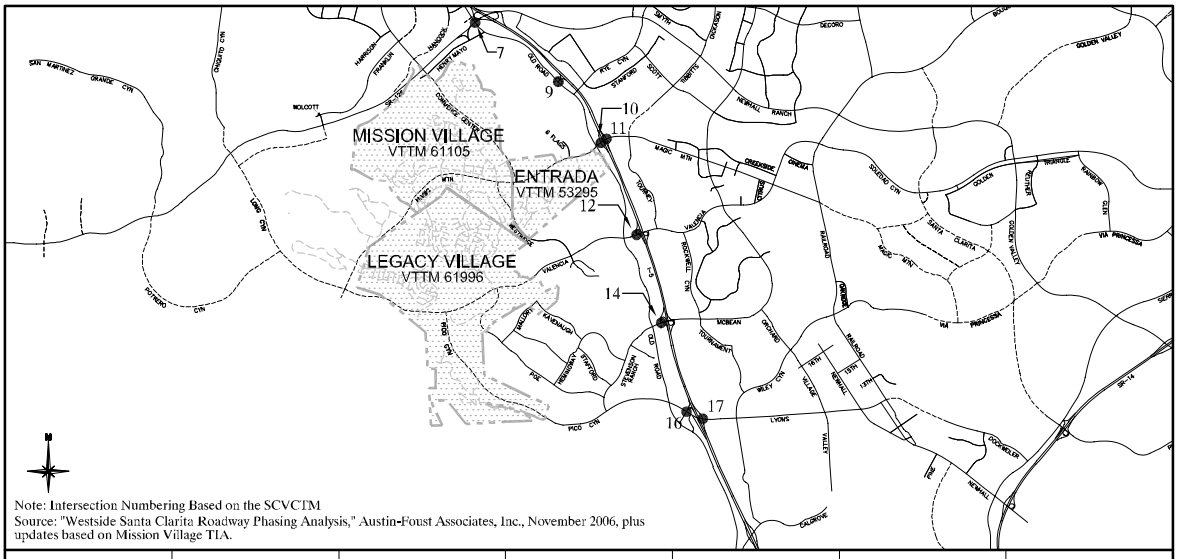
Appendix F
WESTSIDE PHASING IMPROVEMENTS

Intersection Lane Diagrams



Note: Intersection Numbering Based on the SCVCTM
Source: "Westside Santa Clarita Roadway Phasing Analysis," Austin-Foust Associates, Inc., November 2006, plus updates based on Mission Village TIA.

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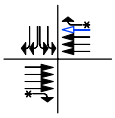
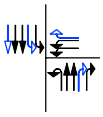
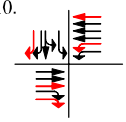
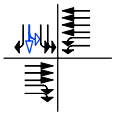
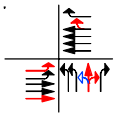
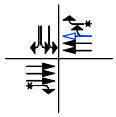
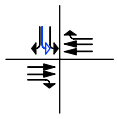
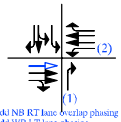
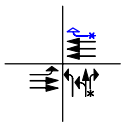
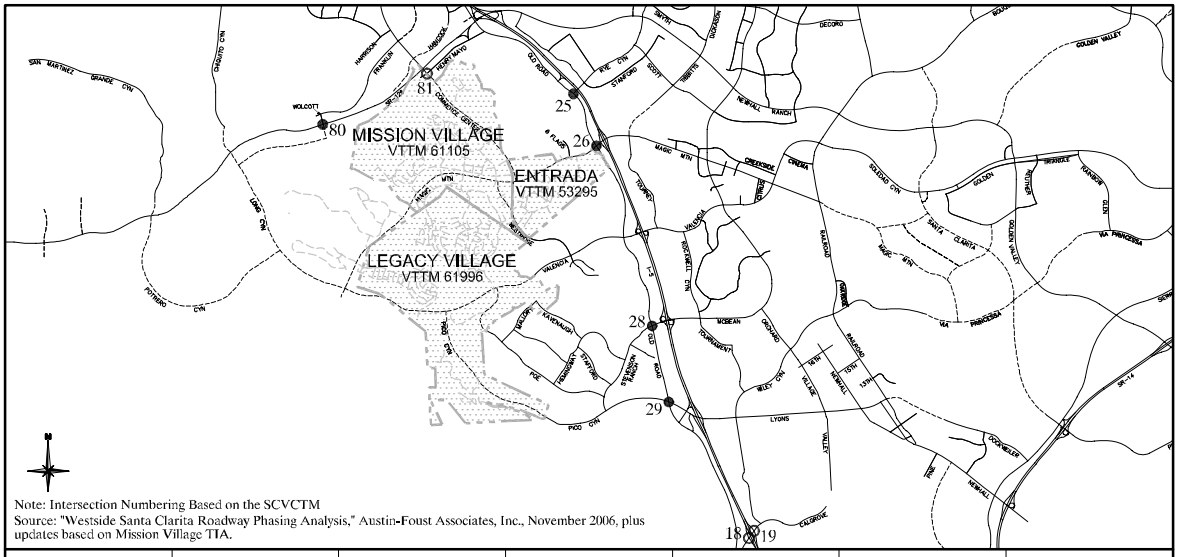
7. 	No Change	No Change	No Change	No Change	No Change	No Change
9. 	No Change	No Change	No Change	No Change	No Change	No Change
10. 	No Change	No Change	No Change	No Change	No Change	
11. 	No Change	No Change	No Change	No Change	No Change	No Change
12. No Change	No Change	No Change	No Change		No Change	No Change
14. No Change	No Change	No Change	No Change	No Change		No Change
16. No Change	No Change	No Change	No Change	No Change	No Change	 (2) (1) (1) add NB RT lane overlap phasing (2) add WB LT lane phasing
17. No Change	No Change	No Change	No Change	No Change		No Change

Legend

- Unsignalized Intersection
- Signalized Intersection
- Future Intersection
- Intersection Lane - Existing or Previous Stage
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane
- Staged Improvement - Future
- Staged Improvement - Implemented (Existing)

Figure F-1

WESTSIDE PHASING INTERSECTION IMPROVEMENTS - COUNTY AND CALTRANS LOCATIONS



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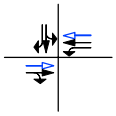
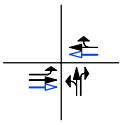
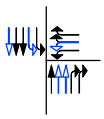
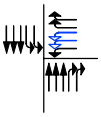
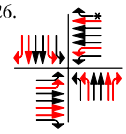
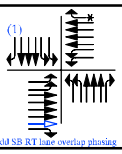
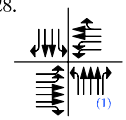
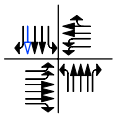
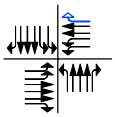
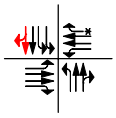
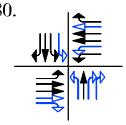
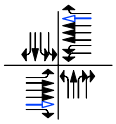
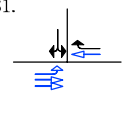
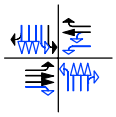
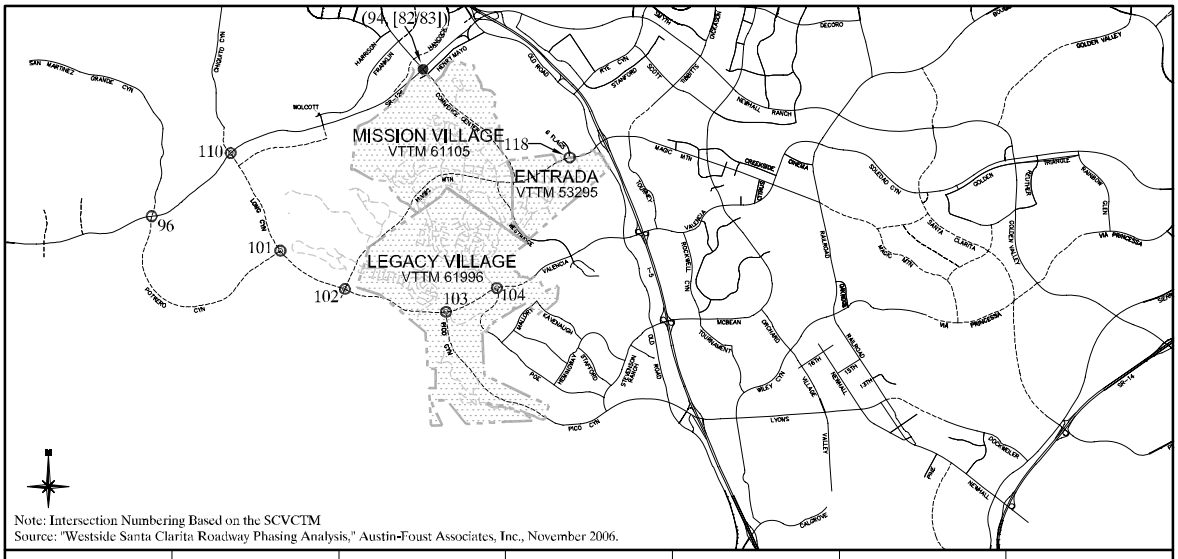
18. No Change	No Change	No Change	No Change	No Change	No Change	
19. No Change	No Change	No Change	No Change	No Change	No Change	
25. 	No Change	No Change		No Change	No Change	No Change
26. 	No Change	No Change	No Change	No Change	No Change	 (1) add SB RT lane overlap phasing
28.  (1) add NB RT lane overlap phasing		No Change	No Change		No Change	No Change
29. No Change	No Change	No Change	No Change	No Change	No Change	
80. 	No Change	No Change	No Change	No Change	No Change	
81. 		No Change	No Change	No Change	No Change	No Change

Legend

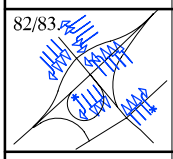
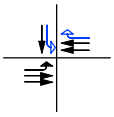
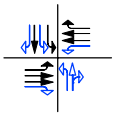
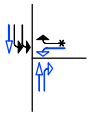
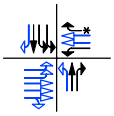
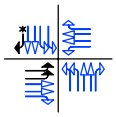
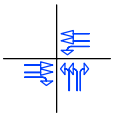
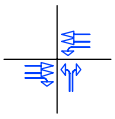
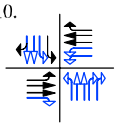
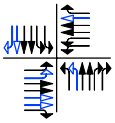
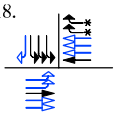
- Unsignalized Intersection
- Signalized Intersection
- Future Intersection
- Intersection Lane - Existing or Previous Stage
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane
- Staged Improvement - Future
- Staged Improvement - Implemented (Existing)

Figure F-2

WESTSIDE PHASING INTERSECTION IMPROVEMENTS - COUNTY AND CALTRANS LOCATIONS



Note: Intersection Numbering Based on the SCVCTM
Source: "Westside Santa Clarita Roadway Phasing Analysis," Austin-Foust Associates, Inc., November 2006.

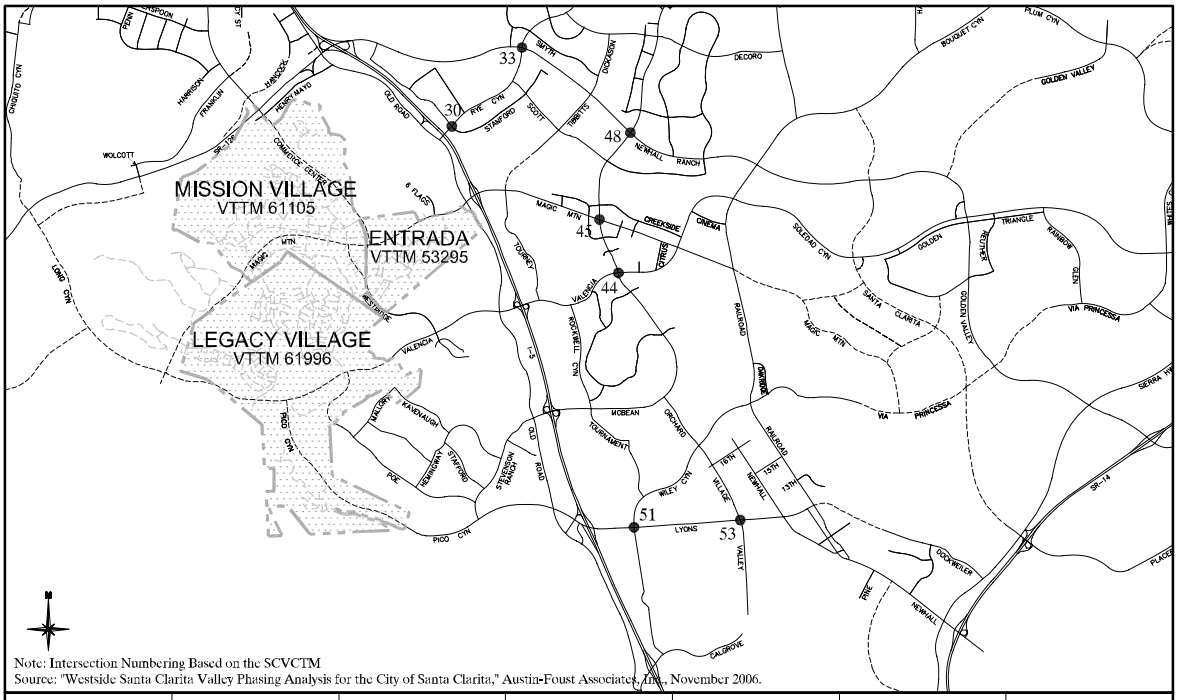
STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6A	STAGE 6B
82/83. 	No Change	No Change	No Change	No Change	No Change	No Change
96. Not Applicable	Not Applicable	Not Applicable	Not Applicable		No Change	
101. Not Applicable	Not Applicable				No Change	No Change
102. Not Applicable	Not Applicable			No Change	No Change	No Change
103. Not Applicable	Not Applicable	Not Applicable	Not Applicable		No Change	No Change
104. Not Applicable		No Change	No Change	No Change	No Change	No Change
110. 	No Change	No Change	No Change		No Change	No Change
118. 	No Change	No Change	No Change	No Change	No Change	No Change

Legend

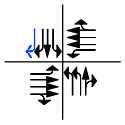
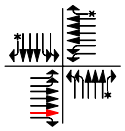
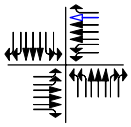
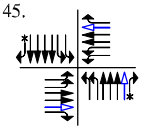
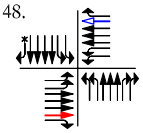
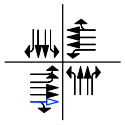
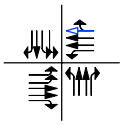
- Unsignalized Intersection
- Signalized Intersection
- Future Intersection
- Intersection Lane - Existing or Previous Stage
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane
- Staged Improvement - Future
- Staged Improvement - Implemented (Existing)

Figure F-3

WESTSIDE PHASING INTERSECTION IMPROVEMENTS - COUNTY AND CALTRANS LOCATIONS



Note: Intersection Numbering Based on the SCVCTM
Source: "Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita," Austin-Foust Associates, Inc., November 2006.

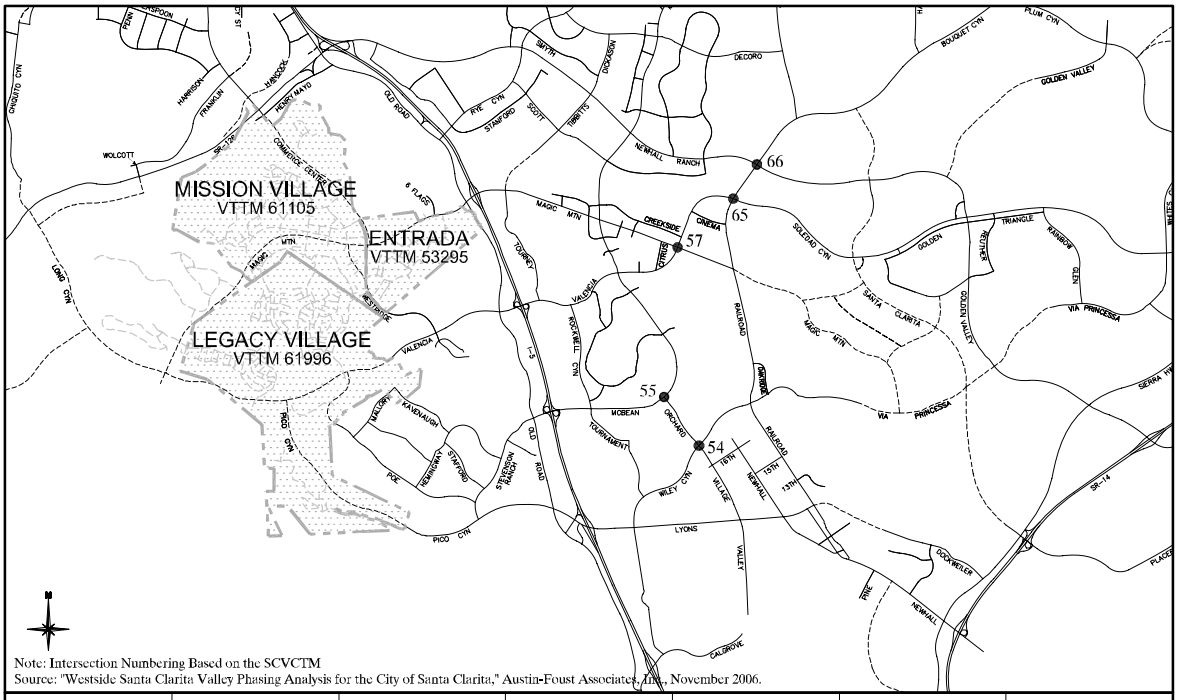
STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6A	STAGE 6B
30. No Change	No Change	No Change	No Change	No Change		No Change
33. No Change	No Change	No Change	No Change	No Change		No Change
44. No Change	No Change	No Change	No Change	No Change		No Change
45. 	No Change	No Change	No Change	No Change	No Change	No Change
48. 	No Change	No Change	No Change	No Change	No Change	No Change
51. No Change	No Change	No Change	No Change	No Change		No Change
53. No Change	No Change	No Change	No Change	No Change	No Change	

Legend

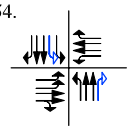
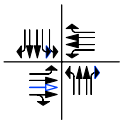
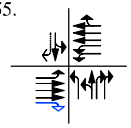
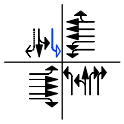
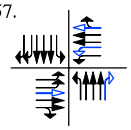
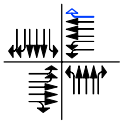
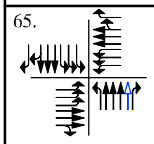
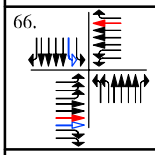
- Unsignalized Intersection
- Signalized Intersection
- Future Intersection
- Intersection Lane - Existing or Previous Stage
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane
- Staged Improvement - Future
- Staged Improvement - Implemented (Existing)

Figure F-4

WESTSIDE PHASING INTERSECTION IMPROVEMENTS - CITY LOCATIONS



Note: Intersection Numbering Based on the SCVCTM
Source: "Westside Santa Clarita Valley Phasing Analysis for the City of Santa Clarita," Austin-Foust Associates, Inc., November 2006.

STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6A	STAGE 6B
54. 	No Change	No Change	No Change	No Change		No Change
55. 	No Change	No Change		No Change	No Change	No Change
57. 	No Change	No Change	No Change	No Change	No Change	
65. 	No Change	No Change	No Change	No Change	No Change	No Change
66. 	No Change	No Change	No Change	No Change	No Change	No Change

Legend

- Unsignalized Intersection
- Signalized Intersection
- Future Intersection
- Intersection Lane - Existing or Previous Stage
- Free-Flow Right-Turn Lane
- De-Facto Right-Turn Lane
- Staged Improvement - Future
- Staged Improvement - Implemented (Existing)

Figure F-5

WESTSIDE PHASING INTERSECTION IMPROVEMENTS - CITY LOCATIONS

Appendix G
INTERSECTION CAPACITY UTILIZATIONS WORKSHEETS

Apartment to Condominium Scenario

7. I-5 SB Ramps & SR-126

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	712	.25*	469	.16*
SBT	0	0	0		0	
SBR	2	3200	166	.05	141	.04
EBL	0	0	0		0	
EBT	4	6400	547	.09	1117	.17
EBR	f		751		1484	
WBL	0	0	0		0	
WBT	3	4800	2447	.51*	1167	.24*
WBR	f		599		822	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.50**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	712	.25*	469	.16*
SBT	0	0	0		0	
SBR	2	3200	328	.10	198	.06
EBL	0	0	0		0	
EBT	4	6400	723	.11	1523	.24
EBR	f		766		1385	
WBL	0	0	0		0	
WBT	3	4800	2370	.49*	1386	.29*
WBR	f		599		822	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.55**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	739	.26*	757	.26*
SBT	0	0	0		0	
SBR	2	3200	405	.13	255	.08
EBL	0	0	0		0	
EBT	4	6400	873	.14	1579	.25
EBR	f		910		1095	
WBL	0	0	0		0	
WBT	3	4800	2253	.47*	1645	.34*
WBR	f		310		499	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.83**		**.70**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	739	.26*	757	.26*
SBT	0	0	0		0	
SBR	2	3200	567	.18	312	.10
EBL	0	0	0		0	
EBT	4	6400	1043	.16	1913	.30*
EBR	f		933		1130	
WBL	0	0	0		0	
WBT	4	6400	2355	.37*	1878	.29
WBR	f		310		499	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.66**

7. I-5 SB Ramps & SR-126

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	960	.33*	1150	.40*
SBT	0	0	0		0	
SBR	2	3200	640	.20	426	.13
EBL	0	0	0		0	
EBT	4	6400	1078	.17	2276	.36
EBR	f		1227		943	
WBL	0	0	0		0	
WBT	3	4800	2535	.53*	2204	.46*
WBR	f		30		220	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.96**		**.96**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	960	.33*	1150	.40*
SBT	0	0	0		0	
SBR	2	3200	793	.25	481	.15
EBL	0	0	0		0	
EBT	4	6400	1233	.19	2566	.40*
EBR	f		1250		991	
WBL	0	0	0		0	
WBT	4	6400	2591	.40*	2323	.36
WBR	f		30		220	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.83**		**.90**

8. I-5 NB Ramps & SR-126

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1020	.19*	938	.18*
NBT	0	0	0		0	
NBR	1	1750	485	.28	421	.24
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1217	.17	1751	.25*
EBR	f		255		446	
WBL	0	0	0		0	
WBT	3	5250	1556	.30*	1144	.22
WBR	f		493		748	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.59**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1020	.19*	967	.18*
NBT	0	0	0		0	
NBR	1	1750	485	.28	421	.24
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1334	.19	1930	.28*
EBR	f		309		601	
WBL	0	0	0		0	
WBT	3	5250	1658	.32*	1347	.26
WBR	f		493		748	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	790	.15*	1247	.24*
NBT	0	0	0		0	
NBR	1	1750	130	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1451	.21	2458	.35*
EBR	f		327		678	
WBL	0	0	0		0	
WBT	3	5250	1795	.34*	1146	.22
WBR	f		540		870	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.69**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	790	.15*	1271	.24*
NBT	0	0	0		0	
NBR	1	1750	130	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1552	.22	2593	.37*
EBR	f		381		833	
WBL	0	0	0		0	
WBT	3	5250	1851	.35*	1242	.24
WBR	f		540		870	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.71**

9. The Old Rd & I-5 SB Ramps

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	55	.03	20	.01
NBT	2	3200	505	.16*	408	.13*
NBR	1	1600	1100	.69	1459	.91
SBL	1	1600	128	.08*	138	.09*
SBT	2	3200	461	.14	544	.17
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		133		79	
WBT	0	3200	0	.04*	0	.03*
WBR	0.5		9		1	
Right Turn Adjustment			NBR	.50*	NBR	.76*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**1.11**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	55	.03	20	.01
NBT	2	3200	313	.10*	381	.12*
NBR	1	1600	1096	.69	1379	.86
SBL	1	1600	132	.08*	138	.09*
SBT	2	3200	373	.12	440	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		154		93	
WBT	0	3200	0	.05*	0	.03*
WBR	0.5		9		1	
Right Turn Adjustment			NBR	.55*	NBR	.72*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**1.06**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	38	.02	22	.01
NBT	2	3200	676	.21*	919	.29*
NBR	1	1600	915	.57	1143	.71
SBL	1	1600	166	.10*	379	.24*
SBT	2	3200	354	.11	827	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		513		110	
WBT	0	3200	0	.17*	0	.04*
WBR	0.5		17		5	
Right Turn Adjustment			NBR	.23*	NBR	.39*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**1.06**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	38	.02	22	.01
NBT	2	3200	719	.22*	919	.29*
NBR	1	1600	915	.57	1143	.71
SBL	1	1600	170	.11*	379	.24*
SBT	2	3200	354	.11	827	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		524		112	
WBT	0	3200	0	.17*	0	.04*
WBR	0.5		17		5	
Right Turn Adjustment			NBR	.22*	NBR	.39*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**1.06**

9. The Old Rd & I-5 SB Ramps

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02	30	.02
NBT	2	3200	931	.29*	1677	.52*
NBR	1	1600	490	.31	730	.46
SBL	1	1600	236	.15*	1006	.63*
SBT	2	3200	320	.10	1090	.34
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		929		258	
WBT	0	3200	0	.30*	0	.09*
WBR	0.5		30		20	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .84 1.34

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02	30	.02
NBT	2	3200	950	.30*	1680	.52*
NBR	2	3200	490	.15	730	.23
SBL	2	2880	240	.08*	1020	.35*
SBT	3	4800	320	.07	1090	.23
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	940	.33*	260	.09*
WBT	0	0	0		0	
WBR	1	1600	30	.02	20	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .81 1.06

10. I-5 SB Ramps & Magic Mtn

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		365		314	
SBT	0.5	3200	0	.11*	7	.10*
SBR	2	3200	35	.01	48	.02
EBL	0	0	0		0	
EBT	3	4800	191	.04*	441	.09*
EBR	2	3200	56	.02	148	.05
WBL	2	2880	513	.18*	434	.15*
WBT	4	6400	1334	.21	1021	.16
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .43 .44

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		369		319	
SBT	0.5	3200	0	.12*	7	.10*
SBR	2	3200	35	.01	48	.02
EBL	0	0	0		0	
EBT	3	4800	423	.09	709	.15*
EBR	2	3200	308	.10	262	.08
WBL	2	2880	448	.16	414	.14*
WBT	4	6400	1921	.30*	1315	.21
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .49

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		735		650	
SBT	0.5	3200	0	.23*	3	.20*
SBR	2	3200	64	.02	97	.03
EBL	0	0	0		0	
EBT	3	4800	444	.09	927	.19*
EBR	2	3200	365	.11	434	.14
WBL	2	2880	245	.09	214	.07*
WBT	4	6400	1592	.25*	1621	.25
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .58 .56

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		739		655	
SBT	0.5	3200	0	.23*	3	.21*
SBR	2	3200	64	.02	97	.03
EBL	0	0	0		0	
EBT	3	4800	674	.14	1178	.25*
EBR	2	3200	617	.19	581	.18
WBL	2	2880	245	.09	214	.07*
WBT	4	6400	2011	.31*	1942	.30
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .64 .63

10. I-5 SB Ramps & Magic Mtn

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		1266		1233	
SBT	0.5	3200	0	.40*	0	.39*
SBR	2	3200	140	.04	138	.04
EBL	0	0	0		0	
EBT	3	4800	805	.17	1551	.32*
EBR	2	3200	845	.26	691	.22
WBL	2	2880	100	.03	210	.07*
WBT	4	6400	2051	.32*	2260	.35
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.88**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		1270		1240	
SBT	0.5	4800	0	.26*	0	.26*
SBR	1	1600	140	.09	140	.09
EBL	0	0	0		0	
EBT	3	4800	1065	.22	1867	.39*
EBR	2	3200	1095	.34	823	.26
WBL	2	2880	100	.03	210	.07*
WBT	4	6400	2529	.40*	2648	.41
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.76**		**.82**

11. I-5 NB Ramps & Magic Mtn

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	999	.29*	888	.25*
NBT	0.5	3500	0	.09	1	.12
NBR	1.5		325		420	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	54	.02	180	.05
EBT	3	5250	1107	.21*	1383	.26*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	835	{.12}	967	{.17}
WBR	1.5		269		677	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.61**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1172	.33*	1000	.29*
NBT	0.5	3500	0	.09	1	.12
NBR	1.5		325		420	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	54	.02	180	.05
EBT	3	5250	1339	.26*	1638	.31*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1081	.15	1176	{.19}
WBR	1.5		269		684	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.70**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1068	.31*	1026	.29*
NBT	0.5	3500	0	.13	0	.09
NBR	1.5		460		330	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	120	.03	300	.09
EBT	3	5250	1952	.37*	2475	.47*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1082	{.18}	1454	{.26}
WBR	1.5		690		1117	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.86**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1213	{.24}*	1122	.21*
NBT	0	7000	0	.24	0	
NBR	1.5		460		330	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	120	.03	300	.09
EBT	3	5250	2215	.42*	2797	.53*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1416	{.20}	1746	{.30}
WBR	1.5		690		1120	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.76**		**.84**

12. I-5 SB Ramps & Valencia

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	294	.10*	169	.06*
SBT	0	0	0		0	
SBR	1	1600	320	.20	88	.06
EBL	0	0	0		0	
EBT	3	4800	978	.20	639	.13
EBR	f		554		146	
WBL	0	0	0		0	
WBT	2	3200	1016	.32*	1236	.39*
WBR	f		1087		1172	
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.55**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	328	.11*	202	.07*
SBT	0	0	0		0	
SBR	1	1600	315	.20	17	.01
EBL	0	0	0		0	
EBT	3	4800	986	.21	688	.14
EBR	f		579		199	
WBL	0	0	0		0	
WBT	2	3200	1222	.38*	1358	.42*
WBR	f		1152		1154	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.59**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	274	.10*	206	.07*
SBT	0	0	0		0	
SBR	1	1600	364	.23	313	.20
EBL	0	0	0		0	
EBT	3	4800	1056	.22	953	.20
EBR	f		653		415	
WBL	0	0	0		0	
WBT	2	3200	1252	.39*	1633	.51*
WBR	f		931		890	
Right Turn Adjustment			SBR	.13*	SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.81**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	324	.11*	220	.08*
SBT	0	0	0		0	
SBR	1	1600	364	.23	313	.20
EBL	0	0	0		0	
EBT	3	4800	1070	.22	1014	.21
EBR	f		678		474	
WBL	0	0	0		0	
WBT	3	4800	1393	.29*	1763	.37*
WBR	f		931		890	
Right Turn Adjustment			SBR	.12*	SBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.67**

12. I-5 SB Ramps & Valencia

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	291	.10*	266	.09*
SBT	0	0	0		0	
SBR	1	1600	370	.23	520	.33
EBL	0	0	0		0	
EBT	3	4800	1316	.27	1542	.32
EBR	f		974		681	
WBL	0	0	0		0	
WBT	2	3200	1408	.44*	2418	.76*
WBR	f		1160		830	
Right Turn Adjustment			SBR	.13*	SBR	.24*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**1.19**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	341	.12*	280	.10*
SBT	0	0	0		0	
SBR	1	1600	370	.23	520	.33
EBL	0	0	0		0	
EBT	3	4800	1330	.28	1611	.34
EBR	f		1001		741	
WBL	0	0	0		0	
WBT	3	4800	1522	.32*	2532	.53*
WBR	f		1160		830	
Right Turn Adjustment			SBR	.11*	SBR	.23*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.96**

13. I-5 NB Ramps & Valencia

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	550	.16*	328	.09*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	955	.27
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1191	.26*	1144	.24
EBR	0	0	164		127	
WBL	2	3500	142	.04*	180	.05
WBT	4	7000	1702	.24	2087	.30*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.11*	NBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.62**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	640	.18*	372	.11*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	955	.27
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1255	.27*	1220	.26
EBR	0	0	164		127	
WBL	2	3500	151	.04*	183	.05
WBT	4	7000	1753	.25	2172	.31*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.09*	NBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.64**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	572	.16*	458	.13*
NBT	0	0	0		0	
NBR	2	3500	1230	.35	1240	.35
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1527	.32*	1668	.36*
EBR	0	0	140		200	
WBL	2	3500	171	.05*	288	.08*
WBT	4	7000	2096	.30	2830	.40
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.15*	NBR	.16*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.83**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	641	.18*	491	.14*
NBT	0	0	0		0	
NBR	2	3500	1230	.35	1240	.35
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1591	.33*	1752	.37*
EBR	0	0	140		200	
WBL	2	3500	180	.05*	290	.08*
WBT	4	7000	2141	.31	2912	.42
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.13*	NBR	.15*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.84**

14. I-5 SB Ramps & McBean

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	202	.13*	192	.12*
SBT	0	0	0		0	
SBR	1	1600	187	.12	210	.13
EBL	0	0	0		0	
EBT	2	3200	706	.22*	1068	.33
EBR	1	1600	430	.27	176	.11
WBL	0	0	0		0	
WBT	2	3200	575	.18	1135	.35*
WBR	1	1600	559	.35	608	.38
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .45 .58

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	239	.15*	220	.14*
SBT	0	0	0		0	
SBR	1	1600	193	.12	219	.14
EBL	0	0	0		0	
EBT	2	3200	610	.19	1137	.36
EBR	1	1600	432	.27	239	.15
WBL	0	0	0		0	
WBT	2	3200	670	.21*	1154	.36*
WBR	1	1600	559	.35	525	.33
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .46 .60

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	251	.16*	329	.21*
SBT	0	0	0		0	
SBR	1	1600	205	.13	206	.13
EBL	0	0	0		0	
EBT	2	3200	824	.26*	1053	.33
EBR	1	1600	340	.21	169	.11
WBL	0	0	0		0	
WBT	2	3200	566	.18	1286	.40*
WBR	1	1600	429	.27	464	.29
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .71

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	288	.18*	349	.22*
SBT	0	0	0		0	
SBR	1	1600	211	.13	214	.13
EBL	0	0	0		0	
EBT	2	3200	826	.26*	1106	.35
EBR	1	1600	340	.21	236	.15
WBL	0	0	0		0	
WBT	2	3200	653	.20	1318	.41*
WBR	1	1600	429	.27	464	.29
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .54 .73

14. I-5 SB Ramps & McBean

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	412	.26*	467	.29*
SBT	0	0	0		0	
SBR	1	1600	274	.17	252	.16
EBL	0	0	0		0	
EBT	2	3200	1156	.36*	1274	.40
EBR	1	1600	320	.20	44	.03
WBL	0	0	0		0	
WBT	2	3200	811	.25	1774	.55*
WBR	1	1600	390	.24	310	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .72 .94

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	451	.16*	491	.17*
SBT	0	0	0		0	
SBR	1	1600	280	.18	260	.16
EBL	0	0	0		0	
EBT	2	3200	1160	.36*	1331	.42
EBR	1	1600	320	.20	111	.07
WBL	0	0	0		0	
WBT	2	3200	932	.29	1831	.57*
WBR	1	1600	390	.24	310	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .62 .84

15. I-5 NB Ramps & McBean

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	160	.05*	341	.10*
NBT	0	0	0		0	
NBR	2	3500	595	.17	541	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	863	.25*	1109	.32*
EBR	1	1750	268	.15	295	.17
WBL	0	0	0		0	
WBT	3	5250	866	.19	1361	.30
WBR	0	0	147		209	
Right Turn Adjustment			NBR	.12*	NBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.57**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	205	.06*	346	.10*
NBT	0	0	0		0	
NBR	2	3500	595	.17	541	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	901	.26*	1182	.34*
EBR	1	1750	268	.15	297	.17
WBL	0	0	0		0	
WBT	3	5250	907	.20	1389	.31
WBR	0	0	158		223	
Right Turn Adjustment			NBR	.11*	NBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.59**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	279	.08*	502	.14*
NBT	0	0	0		0	
NBR	2	3500	540	.15	630	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1238	.35*	1351	.39*
EBR	1	1750	370	.21	370	.21
WBL	0	0	0		0	
WBT	3	5250	951	.20	1571	.35
WBR	0	0	110		283	
Right Turn Adjustment			NBR	.07*	NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.67**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	351	.10*	531	.15*
NBT	0	0	0		0	
NBR	2	3500	540	.15	630	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1281	.37*	1432	.41*
EBR	1	1750	370	.21	370	.21
WBL	0	0	0		0	
WBT	3	5250	1001	.21	1601	.36
WBR	0	0	120		300	
Right Turn Adjustment			NBR	.05*	NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.69**

16. I-5 SB/Marriott & Pico/Lyons

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	91	.06	108	.07
SBL	1.5		458		492	
SBT	0.5	3200	102	.18*	118	.19*
SBR	1	1600	41	.03	140	.09
EBL	0	0	0		0	
EBT	2	3200	1045	.35*	1081	.35
EBR	0	0	67		48	
WBL	1	1600	63	.04*	71	.04
WBT	2	3200	641	.20	1333	.42*
WBR	1	1600	445	.28	342	.21
Right Turn Adjustment			NBR	.02*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.73**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	91	.06	108	.07
SBL	1.5		495		511	
SBT	0.5	3200	102	.19*	129	.20*
SBR	1	1600	58	.04	145	.09
EBL	0	0	0		0	
EBT	2	3200	986	.33*	1092	.36
EBR	0	0	67		48	
WBL	1	1600	63	.04*	71	.04
WBT	2	3200	648	.20	1338	.42*
WBR	1	1600	417	.26	321	.20
Right Turn Adjustment			NBR	.03*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.74**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	72	.05	80	.05
SBL	1.5		538		354	
SBT	0.5	3200	50	.18*	71	.13*
SBR	1	1600	161	.10	87	.05
EBL	0	0	0		0	
EBT	2	3200	833	.27*	1245	.40*
EBR	0	0	43		44	
WBL	1	1600	42	.03*	58	.04*
WBT	2	3200	810	.25	1414	.44
WBR	1	1600	329	.21	278	.17
Right Turn Adjustment			NBR	.03*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.69**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	72	.05	80	.05
SBL	1.5		575		365	
SBT	0.5	3200	50	.20*	71	.14*
SBR	1	1600	178	.11	94	.06
EBL	0	0	0		0	
EBT	2	3200	833	.27*	1266	.41*
EBR	0	0	43		44	
WBL	1	1600	42	.03*	58	.04*
WBT	2	3200	826	.26	1419	.44
WBR	1	1600	329	.21	278	.17
Right Turn Adjustment			NBR	.03*	NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.71**

16. I-5 SB/Marriott & Pico/Lyons

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	70	.04	410	.26
SBL	1.5		754		314	
SBT	0.5	3200	10	.24*	110	.13*
SBR	1	1600	324	.20	13	.01
EBL	0	0	0		0	
EBT	2	3200	650	.21	1580	.51*
EBR	0	0	30		40	
WBL	1	1600	30	.02	530	.33*
WBT	2	3200	1061	.33*	1326	.41
WBR	1	1600	280	.18	250	.16
Right Turn Adjustment					NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**1.08**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1600	70	.04	410	.26
SBL	1.5		791		330	
SBT	0.5	3200	10	.25*	110	.14*
SBR	1	1600	340	.21	20	.01
EBL	0	0	0		0	
EBT	2	3200	650	.21	1600	.51*
EBR	0	0	30		40	
WBL	1	1600	30	.02	530	.33*
WBT	2	3200	1080	.34*	1330	.42
WBR	1	1600	280	.18	250	.16
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.69**		**1.08**

17. I-5 NB On/Off & Lyons Ave

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		302	{.09}*	713	{.20}*
NBT	0.5	3500	4	.09	1	.20
NBR	f		292		477	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	109	.06*	167	.10*
EBT	2	3500	995	.28	1260	.36
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	917	.26*	1114	.32*
WBR	0	0	449		612	.35
Right Turn Adjustment					WBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.75**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		302	{.09}*	715	{.20}*
NBT	0.5	3500	4	.09	1	.20
NBR	f		292		477	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	113	.06*	168	.10*
EBT	2	3500	1032	.29	1294	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	933	.27*	1115	.32*
WBR	0	0	479	.27	649	.37
Right Turn Adjustment					WBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.77**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		230	{.07}*	738	{.21}*
NBT	0.5	3500	10	.07	0	.21
NBR	f		280		400	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04	89	.05
EBT	2	3500	1354	.39*	1524	.44*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1161	.31	1308	.37
WBR	0	0	473		933	.53
Right Turn Adjustment					WBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.89**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		230	{.07}*	740	{.21}*
NBT	0.5	3500	10	.07	0	.21
NBR	f		280		400	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04	90	.05*
EBT	2	3500	1391	.40*	1561	.45
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1.5	5250	1180	.34	1310	.43*
WBR	1.5		501	.29	971	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.79**

25. The Old Rd & Rye Canyon

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	386	.24*	332	.21*
NBR	f		1272		1014	
SBL	1	1600	324	.20*	301	.19*
SBT	2	3200	234	.07	331	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	312	.20*	469	.29*
WBT	0	0	0		0	
WBR	f		1228		1526	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .79

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	150	.09*	273	.17*
NBR	f		1381		1108	
SBL	1	1600	335	.21*	320	.20*
SBT	2	3200	160	.05	235	.07
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	409	.26*	510	.32*
WBT	0	0	0		0	
WBR	f		1272		1486	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .66 .79

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	595	.37*	702	.44*
NBR	f		1384		1230	
SBL	1	1600	459	.29*	431	.27*
SBT	2	3200	346	.11	697	.22
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	439	.27*	636	.40*
WBT	0	0	0		0	
WBR	f		1165		1420	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.03 1.21

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3200	599	.19*	708	.22*
NBR	2	3200	1496	.47	1337	.42
SBL	2	2880	459	.16*	431	.15*
SBT	2	3200	360	.11	713	.22
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	534	.33*	703	.44*
WBT	0	0	0		0	
WBR	2	3200	1208	.38	1420	.44
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .78 .91

25. The Old Rd & Rye Canyon

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	995	.62*	1304	.82*
NBR	f		1466		1207	
SBL	1	1600	680	.43*	760	.48*
SBT	2	3200	466	.15	994	.31
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	922	.58*	1022	.64*
WBT	0	0	0		0	
WBR	f		751		1237	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.73 2.04

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1000	.21*	1310	.27*
NBR	2	3200	1562	.49	1292	.40
SBL	2	2880	680	.24*	760	.26*
SBT	3	4800	480	.10	1010	.21
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	1012	.23*	1122	.26*
WBT	0	0	0		0	
WBR	2	3200	770	.24	1240	.39
Right Turn Adjustment			NBR	.05*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .83 .89

26. The Old Rd & Magic Mountain

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	21	.01	20	.01
NBT	3	4800	510	.11*	559	.12*
NBR	1	1600	87	.05	228	.14
SBL	2	2880	177	.06*	267	.09*
SBT	3	4800	356	.07	513	.11
SBR	1	1600	2	.00	1	.00
EBL	2	2880	32	.01	25	.01
EBT	4	6400	26	.00*	63	.01*
EBR	1	1600	5	.00	11	.01
WBL	2	2880	153	.05*	187	.06*
WBT	4	6400	21	.00	11	.00
WBR	f		1210		988	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.32**		**.38**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	460	.16*	64	.02
NBT	3	4800	409	.09	543	.11*
NBR	1	1600	87	.05	237	.15
SBL	2	2880	113	.04	188	.07*
SBT	3	4800	342	.07*	475	.10
SBR	1	1600	109	.07	69	.04
EBL	2	2880	141	.05*	127	.04
EBT	4	6400	573	.09	515	.08*
EBR	1	1600	40	.03	113	.07
WBL	2	2880	156	.05	196	.07*
WBT	4	6400	734	.11*	342	.05
WBR	f		1078		945	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.43**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	270	.09	156	.05
NBT	3	4800	512	.11*	446	.09*
NBR	1	1600	101	.06	156	.10
SBL	2	2880	269	.09*	398	.14*
SBT	3	4800	183	.04	557	.12
SBR	1	1600	203	.13	280	.18
EBL	2	2880	219	.08*	295	.10
EBT	4	6400	460	.07	790	.12*
EBR	1	1600	51	.03	256	.16
WBL	2	2880	152	.05	173	.06*
WBT	4	6400	330	.05*	439	.07
WBR	f		1180		1159	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.43**		**.51**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	441	.15	183	.06
NBT	3	4800	512	.11*	446	.09*
NBR	1	1600	101	.06	156	.10
SBL	2	2880	269	.09*	398	.14*
SBT	3	4800	183	.04	557	.12
SBR	1	1600	316	.20	366	.23
EBL	2	2880	336	.12*	413	.14*
EBT	4	6400	941	.15	1188	.19
EBR	1	1600	71	.04	276	.17
WBL	2	2880	152	.05	173	.06
WBT	4	6400	749	.12*	760	.12*
WBR	f		1180		1159	
Right Turn Adjustment			SBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.59**

26. The Old Rd & Magic Mountain

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	390	.14	320	.11*
NBT	3	4800	530	.11*	370	.08
NBR	1	1600	150	.09	140	.09
SBL	2	2880	700	.24*	490	.17
SBT	3	4800	110	.02	660	.14*
SBR	1	1600	294	.18	643	.40
EBL	2	2880	319	.11*	398	.14
EBT	4	6400	801	.13	1613	.25*
EBR	1	1600	87	.05	540	.34
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	661	.10*	768	.12
WBR	f		1340		1450	
Right Turn Adjustment					Multi	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.79**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	441	.15	351	.12*
NBT	3	4800	530	.11*	370	.08
NBR	1	1600	150	.09	140	.09
SBL	2	2880	700	.24*	490	.17
SBT	3	4800	110	.02	660	.14*
SBR	1	1600	402	.25	763	.48
EBL	2	2880	422	.15*	492	.17
EBT	4	6400	1310	.20	2060	.32*
EBR	1	1600	110	.07	560	.35
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	1139	.18*	1158	.18
WBR	f		1340		1450	
Right Turn Adjustment					SBR	.15*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for SBR						
TOTAL CAPACITY UTILIZATION				**.78**		**.89**

27. The Old Rd & Valencia

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	828	.29*	119	.04
NBT	3	4800	319	.07	616	.13*
NBR	1	1600	133	.08	306	.19
SBL	2	2880	150	.05	249	.09*
SBT	3	4800	195	.04*	523	.11
SBR	1	1600	289	.18	115	.07
EBL	2	2880	387	.13*	95	.03
EBT	4	6400	1099	.17	259	.04*
EBR	1	1600	672	.42	76	.05
WBL	2	2880	133	.05	490	.17*
WBT	3	4800	937	.20*	308	.06
WBR	f		170		409	
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.53**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	841	.29*	204	.07
NBT	3	4800	609	.13	620	.13*
NBR	1	1600	133	.08	293	.18
SBL	2	2880	150	.05	247	.09*
SBT	3	4800	195	.04*	565	.12
SBR	1	1600	292	.18	111	.07
EBL	2	2880	357	.12*	96	.03
EBT	4	6400	1133	.18	376	.06*
EBR	1	1600	685	.43	313	.20
WBL	2	2880	136	.05	440	.15*
WBT	3	4800	1076	.22*	404	.08
WBR	f		228		412	
Right Turn Adjustment			SBR	.05*	EBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.59**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	461	.16*	176	.06
NBT	3	4800	410	.09	564	.12*
NBR	1	1600	117	.07	314	.20
SBL	2	2880	125	.04	284	.10*
SBT	3	4800	166	.03*	628	.13
SBR	1	1600	186	.12	144	.09
EBL	2	2880	320	.11*	157	.05
EBT	4	6400	1474	.23	814	.13*
EBR	1	1600	447	.28	288	.18
WBL	2	2880	95	.03	428	.15*
WBT	3	4800	1282	.27*	1039	.22
WBR	f		218		404	
Right Turn Adjustment			SBR	.01*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.60**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	474	.16*	261	.09*
NBT	3	4800	568	.12	564	.12
NBR	1	1600	117	.07	314	.20
SBL	2	2880	125	.04	284	.10
SBT	3	4800	168	.04*	628	.13*
SBR	1	1600	189	.12	145	.09
EBL	2	2880	320	.11*	158	.05
EBT	4	6400	1512	.24	933	.15*
EBR	1	1600	460	.29	527	.33
WBL	2	2880	95	.03	428	.15*
WBT	3	4800	1423	.30*	1157	.24
WBR	f		218		415	
Right Turn Adjustment					EBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.73**

27. The Old Rd & Valencia

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	585	.20*	287	.10*
NBT	3	4800	306	.06	590	.12
NBR	1	1600	130	.08	430	.27
SBL	2	2880	130	.05	380	.13
SBT	3	4800	185	.04*	740	.15*
SBR	1	1600	177	.11	219	.14
EBL	2	2880	260	.09	239	.08*
EBT	4	6400	2201	.34*	1494	.23
EBR	1	1600	315	.20	433	.27
WBL	2	2880	120	.04*	520	.18
WBT	3	4800	1321	.28	1924	.40*
WBR	f		378		455	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.83**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	763	.26*	402	.14*
NBT	3	4800	341	.07	590	.12
NBR	1	1600	130	.08	430	.27
SBL	2	2880	130	.05	380	.13
SBT	3	4800	190	.04*	740	.15*
SBR	1	1600	180	.11	220	.14
EBL	2	2880	260	.09*	240	.08*
EBT	4	6400	2241	.35	1623	.25
EBR	1	1600	330	.21	655	.41
WBL	2	2880	120	.04	520	.18
WBT	3	4800	1432	.30*	2022	.42*
WBR	f		380		470	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.89**

28. The Old Rd & McBean

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	78	.05*	288	.18*
NBT	3	4800	404	.08	677	.14
NBR	1	1600	128	.08	784	.49
SBL	1	1600	83	.05	98	.06
SBT	2	3200	568	.18*	730	.23*
SBR	1	1600	458	.29	345	.22
EBL	2	2880	761	.26*	244	.08
EBT	3	4800	764	.16	458	.10*
EBR	1	1600	228	.14	169	.11
WBL	2	2880	418	.15	893	.31*
WBT	2	3200	268	.11*	704	.25
WBR	0	0	91		84	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .70 .92

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	78	.05*	288	.18*
NBT	3	4800	490	.10	710	.15
NBR	1	1600	128	.08	802	.50
SBL	1	1600	85	.05	212	.13
SBT	3	4800	575	.12*	806	.17*
SBR	1	1600	465	.29	389	.24
EBL	2	2880	892	.31*	253	.09
EBT	3	4800	668	.14	459	.10*
EBR	1	1600	228	.14	169	.11
WBL	2	2880	425	.15	911	.32*
WBT	2	3200	273	.09*	686	.21
WBR	1	1600	178	.11	116	.07
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .91

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	66	.04*	192	.12*
NBT	3	4800	371	.08	662	.14
NBR	1	1600	190	.12	631	.39
SBL	1	1600	98	.06	204	.13
SBT	2	3200	355	.11*	825	.26*
SBR	1	1600	209	.13	260	.16
EBL	2	2880	396	.14*	199	.07
EBT	3	4800	816	.17	422	.09*
EBR	1	1600	156	.10	111	.07
WBL	2	2880	319	.11	793	.28*
WBT	2	3200	225	.14*	739	.27
WBR	0	0	219		117	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .53 .85

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	66	.04	192	.12
NBT	3	4800	423	.09*	704	.15*
NBR	1	1600	190	.12	632	.40
SBL	1	1600	100	.06*	323	.20*
SBT	3	4800	362	.08	922	.19
SBR	1	1600	213	.13	282	.18
EBL	2	2880	429	.15	208	.07
EBT	3	4800	816	.17*	423	.09*
EBR	1	1600	156	.10	111	.07
WBL	2	2880	322	.11*	798	.28*
WBT	2	3200	229	.07	742	.23
WBR	1	1600	306	.19	149	.09
Right Turn Adjustment			WBR	.01*	NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .54 .86

28. The Old Rd & McBean

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05	140	.09*
NBT	3	4800	383	.08*	769	.16
NBR	1	1600	280	.18	630	.39
SBL	1	1600	156	.10*	208	.13
SBT	2	3200	242	.08	1040	.33*
SBR	1	1600	16	.01	258	.16
EBL	2	2880	107	.04	200	.07*
EBT	3	4800	1090	.23*	470	.10
EBR	1	1600	120	.08	90	.06
WBL	2	2880	247	.09*	895	.31
WBT	2	3200	256	.16	927	.35*
WBR	0	0	551	.34	204	
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.94**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05	140	.09
NBT	3	4800	441	.09*	811	.17*
NBR	1	1600	280	.18	630	.39
SBL	1	1600	160	.10*	333	.21*
SBT	3	4800	250	.05	1112	.23
SBR	1	1600	20	.01	280	.18
EBL	2	2880	141	.05	210	.07
EBT	3	4800	1090	.23*	470	.10*
EBR	1	1600	120	.08	90	.06
WBL	2	2880	250	.09*	900	.31*
WBT	2	3200	260	.08	930	.29
WBR	1	1600	672	.42	261	.16
Right Turn Adjustment			Multi	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.89**

29. The Old Rd & Pico Canyon

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	107	.07	211	.13
NBT	2	3200	419	.16*	510	.18*
NBR	0	0	99		79	
SBL	2	2880	423	.15*	673	.23*
SBT	2	3200	645	.21	377	.14
SBR	0	0	35		67	
EBL	1	1600	86	.05	60	.04*
EBT	2	3200	942	.29*	534	.17
EBR	1	1600	107	.07	37	.02
WBL	1	1600	83	.05*	61	.04
WBT	2	3200	433	.14	934	.29*
WBR	f		485		965	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.84**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	107	.07	211	.13
NBT	2	3200	438	.17*	527	.19*
NBR	0	0	99		79	
SBL	2	2880	423	.15*	622	.22*
SBT	2	3200	645	.21	406	.15
SBR	0	0	35		78	
EBL	1	1600	121	.08	60	.04*
EBT	2	3200	882	.28*	596	.19
EBR	1	1600	105	.07	37	.02
WBL	1	1600	84	.05*	61	.04
WBT	2	3200	444	.14	942	.29*
WBR	f		500		965	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.84**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	101	.06	179	.11
NBT	2	3200	294	.11*	508	.18*
NBR	0	0	67		80	
SBL	2	2880	332	.12*	519	.18*
SBT	2	3200	366	.14	412	.21
SBR	0	0	73		245	
EBL	1	1600	223	.14*	71	.04*
EBT	2	3200	659	.21	673	.21
EBR	1	1600	88	.06	131	.08
WBL	1	1600	42	.03	32	.02
WBT	2	3200	774	.24*	964	.30*
WBR	f		334		676	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.80**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	101	.06	179	.11
NBT	2	3200	305	.12*	527	.19*
NBR	0	0	67		80	
SBL	2	2880	332	.12*	540	.19*
SBT	2	3200	366	.14	453	.22
SBR	0	0	73		256	
EBL	1	1600	235	.15*	71	.04*
EBT	2	3200	659	.21	673	.21
EBR	1	1600	88	.06	131	.08
WBL	1	1600	42	.03	32	.02
WBT	2	3200	789	.25*	972	.30*
WBR	f		353		679	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.82**

29. The Old Rd & Pico Canyon

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	100	.06	559	.35*
NBT	2	3200	228	.09*	531	.23
NBR	0	0	50		200	
SBL	2	2880	320	.11*	710	.25
SBT	2	3200	160	.09	434	.23*
SBR	0	0	130		299	
EBL	1	1600	364	.23*	50	.03
EBT	2	3200	350	.11	480	.15*
EBR	1	1600	80	.05	690	.43
WBL	1	1600	10	.01	180	.11*
WBT	2	3200	1165	.36*	362	.11
WBR	f		271		677	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.89**		**.96**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	100	.06	560	.35*
NBT	2	3200	240	.09*	550	.23
NBR	0	0	50		200	
SBL	2	2880	320	.11*	730	.25
SBT	2	3200	160	.09	450	.24*
SBR	0	0	130		310	
EBL	1	1600	380	.24*	50	.03
EBT	2	3200	350	.11	480	.15*
EBR	1	1600	80	.05	690	.43
WBL	1	1600	10	.01	180	.11*
WBT	2	3200	1180	.37*	370	.12
WBR	f		290		680	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.91**		**.97**

30. Ave Stanford & Rye Canyon

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	308	.09*	405	.12*
NBT	1	1750	31	.03	127	.09
NBR	0	0	29		31	
SBL	1	1750	26	.01	104	.06
SBT	1	1750	49	.03*	211	.12*
SBR	1	1750	57	.03	296	.17
EBL	1	1750	195	.11*	79	.05
EBT	3	5250	1189	.30	1310	.31*
EBR	0	0	388		329	
WBL	1	1750	21	.01	19	.01*
WBT	3	5250	1221	.24*	1264	.25
WBR	0	0	60		47	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.66**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	343	.10*	434	.12*
NBT	1	1750	31	.03	129	.09
NBR	0	0	29		31	
SBL	1	1750	26	.01	105	.06
SBT	1	1750	51	.03*	216	.12*
SBR	1	1750	57	.03	296	.17
EBL	1	1750	195	.11*	79	.05
EBT	3	5250	1275	.32	1402	.33*
EBR	0	0	413		346	
WBL	1	1750	21	.01	19	.01*
WBT	3	5250	1323	.26*	1303	.26
WBR	0	0	60		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.68**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	201	.06*	129	.04*
NBT	1	1750	10	.03	210	.15
NBR	0	0	50		50	
SBL	1	1750	30	.02	119	.07
SBT	1	1750	58	.03*	388	.22*
SBR	1	1750	100	.06	340	.19
EBL	1	1750	150	.09	130	.07*
EBT	3	5250	1684	.35*	1671	.36
EBR	0	0	162		237	
WBL	1	1750	10	.01*	20	.01
WBT	3	5250	1290	.25	1689	.34*
WBR	0	0	10		80	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.77**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	210	.06*	150	.04*
NBT	1	1750	10	.03	210	.15
NBR	0	0	50		50	
SBL	1	1750	30	.02	120	.07
SBT	1	1750	60	.03*	390	.22*
SBR	1	1750	100	.06	340	.19
EBL	1	1750	150	.09	130	.07*
EBT	3	5250	1761	.37*	1752	.38
EBR	0	0	180		240	
WBL	1	1750	10	.01*	20	.01
WBT	3	5250	1392	.27	1772	.35*
WBR	0	0	10		80	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.78**

33. Rye/Copper Hill & NRR

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	113	.03*	206	.06
NBT	3	5250	764	.15	1171	.22*
NBR	f		109		181	
SBL	2	3500	114	.03	216	.06*
SBT	3	5250	1439	.27*	716	.14
SBR	f		686		480	
EBL	2	3500	386	.11*	949	.27*
EBT	4	7000	563	.08	1440	.21
EBR	1	1750	163	.09	246	.14
WBL	2	3500	209	.06	156	.04
WBT	4	7000	1488	.21*	867	.12*
WBR	f		271		206	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.77**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	118	.03*	214	.06
NBT	3	5250	793	.15	1230	.23*
NBR	f		123		181	
SBL	2	3500	114	.03	216	.06*
SBT	3	5250	1529	.29*	726	.14
SBR	f		724		525	
EBL	2	3500	400	.11*	994	.28*
EBT	4	7000	582	.08	1532	.22
EBR	1	1750	170	.10	251	.14
WBL	2	3500	209	.06	156	.04
WBT	4	7000	1538	.22*	941	.13*
WBR	f		271		206	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.80**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	433	.12*	373	.11
NBT	3	5250	1124	.21	1267	.24*
NBR	f		190		98	
SBL	2	3500	130	.04	250	.07*
SBT	3	5250	1535	.29*	883	.17
SBR	f		1170		789	
EBL	2	3500	323	.09*	1018	.29*
EBT	4	7000	497	.07	1938	.28
EBR	1	1750	273	.16	472	.27
WBL	2	3500	330	.09	460	.13
WBT	4	7000	1257	.18*	1007	.14*
WBR	f		680		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.84**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	440	.13*	380	.11
NBT	3	5250	1161	.22	1321	.25*
NBR	f		190		100	
SBL	2	3500	130	.04	250	.07*
SBT	3	5250	1622	.31*	931	.18
SBR	f		1211		800	
EBL	2	3500	330	.09*	1040	.30*
EBT	4	7000	510	.07	2012	.29
EBR	1	1750	280	.16	480	.27
WBL	2	3500	330	.09	460	.13
WBT	4	7000	1260	.18*	1020	.15*
WBR	f		680		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**.87**

35. Copper Hill & Decoro

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	706	.13	2297	.44*
NBR	1	1750	175	.10	270	.15
SBL	1	1750	336	.19	82	.05*
SBT	3	5250	2404	.46*	625	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	240	.07*	132	.04*
WBT	0	0	0		0	
WBR	1	1750	205	.12	122	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.63**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	735	.14	2381	.45*
NBR	1	1750	178	.10	272	.16
SBL	1	1750	336	.19	82	.05*
SBT	3	5250	2517	.48*	662	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	242	.07*	135	.04*
WBT	0	0	0		0	
WBR	1	1750	205	.12	122	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.64**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	862	.16	2873	.55*
NBR	1	1750	177	.10	69	.04
SBL	1	1750	340	.19	140	.08*
SBT	3	5250	2947	.56*	632	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	143	.04*	88	.03*
WBT	0	0	0		0	
WBR	1	1750	130	.07	230	.13
Right Turn Adjustment					WBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.80**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	891	.17	2941	.56*
NBR	1	1750	180	.10	70	.04
SBL	1	1750	340	.19	140	.08*
SBT	3	5250	3052	.58*	671	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	150	.04*	90	.03*
WBT	0	0	0		0	
WBR	1	1750	130	.07	230	.13
Right Turn Adjustment					WBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.81**

36. Tourney & Valencia

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	60	.02*	257	.07*
SBT	0	0	0		0	
SBR	1	1750	96	.05	377	.22
EBL	2	3500	372	.11*	96	.03*
EBT	4	7000	1746	.25	1973	.28
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1683	.28*	1830	.27*
WBR	0	0	272		90	
Right Turn Adjustment					SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.60**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	60	.02*	257	.07*
SBT	0	0	0		0	
SBR	1	1750	98	.06	381	.22
EBL	2	3500	376	.11*	97	.03*
EBT	4	7000	1807	.26	2048	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1741	.29*	1914	.29*
WBR	0	0	272		90	
Right Turn Adjustment					SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.62**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	170	.05*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	228	.13	666	.38
EBL	2	3500	696	.20*	329	.09*
EBT	4	7000	2040	.29	2579	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1961	.32*	2374	.37*
WBR	0	0	270		190	
Right Turn Adjustment					SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.87**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	170	.05*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	230	.13	670	.38
EBL	2	3500	700	.20*	330	.09*
EBT	4	7000	2101	.30	2662	.38
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2011	.33*	2452	.38*
WBR	0	0	270		190	
Right Turn Adjustment					SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.88**

37. Tourney & Magic Mountain

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	105	.03*	289	.08*
NBT	0	0	0		0	
NBR	1	1750	74	.04	234	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1165	.22*	1639	.31*
EBR	1	1750	265	.15	73	.04
WBL	1	1750	296	.17*	131	.07*
WBT	3	5250	951	.18	1179	.22
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .56

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	108	.03*	315	.09*
NBT	0	0	0		0	
NBR	1	1750	74	.04	234	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1358	.26*	1877	.36*
EBR	1	1750	301	.17	87	.05
WBL	1	1750	296	.17*	131	.07*
WBT	3	5250	1192	.23	1366	.26
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .56 .62

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	37	.02	265	.15*
NBT	2	3500	440	.13*	470	.17
NBR	0	0	30		140	
SBL	1	1750	30	.02*	100	.06
SBT	2	3500	230	.07	500	.14*
SBR	2	3500	190	.05	579	.17
EBL	2	3500	455	.13*	329	.09
EBT	3	5250	1596	.30	2262	.43*
EBR	1	1750	225	.13	36	.02
WBL	1	1750	160	.09	70	.04*
WBT	3	5250	1486	.29*	1401	.27
WBR	0	0	50		10	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .86

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	291	.17*
NBT	2	3500	440	.13*	470	.17
NBR	0	0	30		140	
SBL	1	1750	30	.02*	100	.06
SBT	2	3500	230	.07	500	.14*
SBR	2	3500	221	.06	672	.19
EBL	2	3500	491	.14*	371	.11*
EBT	4	7000	1784	.25	2526	.36
EBR	1	1750	261	.15	50	.03
WBL	1	1750	160	.09	70	.04
WBT	3	5250	1786	.35*	1574	.30*
WBR	0	0	50		10	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .82

44. McBean & Valencia

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	238	.07*	178	.05
NBT	3	5250	971	.18	1223	.23*
NBR	2	3500	274	.08	548	.16
SBL	2	3500	71	.02	205	.06*
SBT	3	5250	801	.15*	1186	.23
SBR	2	3500	701	.20	732	.21
EBL	2	3500	518	.15*	822	.23*
EBT	3	5250	956	.18	1227	.23
EBR	1	1750	52	.03	140	.08
WBL	2	3500	431	.12	635	.18
WBT	3	5250	1187	.23*	1084	.21*
WBR	1	1750	119	.07	195	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .83

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	254	.07*	188	.05
NBT	3	5250	977	.19	1229	.23*
NBR	2	3500	274	.08	548	.16
SBL	2	3500	72	.02	207	.06*
SBT	3	5250	805	.15*	1195	.23
SBR	2	3500	701	.20	735	.21
EBL	2	3500	518	.15*	824	.24*
EBT	3	5250	962	.18	1242	.24
EBR	1	1750	53	.03	155	.09
WBL	2	3500	431	.12	635	.18
WBT	3	5250	1202	.23*	1093	.21*
WBR	1	1750	119	.07	200	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .84

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	257	.07*	161	.05
NBT	3	5250	1042	.20	1355	.26*
NBR	2	3500	330	.09	700	.20
SBL	2	3500	58	.02	229	.07*
SBT	3	5250	896	.17*	1385	.26
SBR	2	3500	880	.25	1027	.29
EBL	2	3500	510	.15*	998	.29*
EBT	3	5250	1104	.21	1233	.23
EBR	1	1750	19	.01	279	.16
WBL	2	3500	430	.12	700	.20
WBT	3	5250	1045	.20*	1141	.22*
WBR	1	1750	230	.13	391	.22
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .69 .94

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	270	.08*	170	.05
NBT	3	5250	1050	.20	1360	.26*
NBR	2	3500	330	.09	700	.20
SBL	2	3500	60	.02	230	.07*
SBT	3	5250	900	.17*	1390	.26
SBR	2	3500	880	.25	1030	.29
EBL	2	3500	510	.15*	1000	.29*
EBT	3	5250	1110	.21	1250	.24
EBR	1	1750	20	.01	300	.17
WBL	2	3500	430	.12	700	.20
WBT	3	5250	1060	.20*	1150	.22*
WBR	1	1750	230	.13	400	.23
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .70 .94

45. McBean & Magic Mtn

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	120	.03	218	.06
NBT	3	5250	1212	.23*	1915	.36*
NBR	f		34		160	
SBL	2	3500	393	.11*	268	.08*
SBT	4	7000	1879	.27	1826	.26
SBR	f		530		287	
EBL	2	3500	673	.19*	648	.19*
EBT	2	3500	828	.24	864	.25
EBR	1	1750	123	.07	273	.16
WBL	2	3500	63	.02	180	.05
WBT	3	5250	416	.08*	727	.14*
WBR	1	1750	98	.06	437	.25
Right Turn Adjustment					WBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.92**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	140	.04	254	.07
NBT	3	5250	1212	.23*	1915	.36*
NBR	f		34		160	
SBL	2	3500	393	.11*	268	.08*
SBT	4	7000	1879	.27	1826	.26
SBR	f		618		333	
EBL	2	3500	749	.21*	722	.21*
EBT	3	5250	922	.18	969	.18
EBR	1	1750	139	.08	305	.17
WBL	2	3500	63	.02	180	.05
WBT	3	5250	532	.10*	817	.16*
WBR	1	1750	98	.06	437	.25
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for WBR						
TOTAL CAPACITY UTILIZATION				**.75**		**.92**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	178	.05	315	.09
NBT	3	5250	1280	.24*	2450	.47*
NBR	f		40		270	
SBL	2	3500	590	.17*	330	.09*
SBT	4	7000	1880	.27	2100	.30
SBR	f		582		97	
EBL	2	3500	430	.12	370	.11
EBT	2	3500	1379	.39*	1633	.47*
EBR	1	1750	114	.07	425	.24
WBL	2	3500	70	.02*	210	.06*
WBT	3	5250	724	.14	1183	.23
WBR	1	1750	370	.21	560	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.92**		**1.19**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	200	.06	351	.10
NBT	3	5250	1280	.24*	2450	.47*
NBR	f		40		270	
SBL	2	3500	590	.17*	330	.09*
SBT	4	7000	1880	.27	2100	.30
SBR	f		733		110	
EBL	2	3500	481	.14	452	.13
EBT	3	5250	1492	.28*	1763	.34*
EBR	1	1750	130	.07	451	.26
WBL	2	3500	70	.02*	210	.06*
WBT	3	5250	832	.16	1292	.25
WBR	1	1750	370	.21	560	.32
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for WBR						
TOTAL CAPACITY UTILIZATION				**.81**		**1.06**

48. McBean & Newhall Ranch

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	225	.06*	334	.10
NBT	3	5250	657	.13	1660	.32*
NBR	1	1750	238	.14	1070	.61
SBL	2	3500	414	.12	181	.05*
SBT	4	7000	1579	.23*	1047	.15
SBR	f		270		44	
EBL	2	3500	97	.03*	401	.11
EBT	4	7000	753	.11	1511	.22*
EBR	1	1750	302	.17	520	.30
WBL	2	3500	466	.13	425	.12*
WBT	3	5250	1893	.36*	1154	.22
WBR	1	1750	93	.05	349	.20
Right Turn Adjustment					NBR	.20*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**1.01**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	225	.06*	334	.10
NBT	3	5250	672	.13	1664	.32*
NBR	2	3500	287	.08	1138	.33
SBL	2	3500	414	.12	181	.05*
SBT	4	7000	1634	.23*	1076	.15
SBR	f		284		46	
EBL	2	3500	97	.03*	433	.12
EBT	4	7000	763	.11	1542	.22*
EBR	1	1750	302	.17	520	.30
WBL	2	3500	481	.14	428	.12*
WBT	4	7000	1930	.28*	1217	.17
WBR	1	1750	93	.05	349	.20
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.70**		**.81**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07	290	.08
NBT	3	5250	895	.17*	1986	.38*
NBR	1	1750	124	.07	1156	.66
SBL	2	3500	530	.15*	180	.05*
SBT	4	7000	1720	.25	1304	.19
SBR	f		187		58	
EBL	2	3500	90	.03*	237	.07*
EBT	4	7000	831	.12	1967	.28
EBR	1	1750	320	.18	620	.35
WBL	2	3500	908	.26	260	.07
WBT	3	5250	1819	.35*	1576	.30*
WBR	1	1750	60	.03	520	.30
Right Turn Adjustment			EBR	.01*	NBR	.21*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**1.11**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07	290	.08
NBT	3	5250	910	.17*	2011	.38*
NBR	2	3500	151	.04	1211	.35
SBL	2	3500	530	.15*	180	.05*
SBT	4	7000	1751	.25	1331	.19
SBR	f		190		60	
EBL	2	3500	90	.03	250	.07
EBT	4	7000	840	.12*	2001	.29*
EBR	1	1750	320	.18	620	.35
WBL	2	3500	992	.28*	260	.07*
WBT	4	7000	1840	.26	1631	.23
WBR	1	1750	60	.03	520	.30
Right Turn Adjustment			EBR	.01*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.83**		**.89**

49. McBean & Decoro

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	177	.10*	90	.05
NBT	3	5250	431	.08	1266	.24*
NBR	1	1750	166	.09	511	.29
SBL	1	1750	155	.09	99	.06*
SBT	3	5250	1059	.20*	607	.12
SBR	1	1750	309	.18	62	.04
EBL	2	3500	161	.05*	346	.10
EBT	2	3500	141	.04	443	.13*
EBR	1	1750	93	.05	69	.04
WBL	2	3500	622	.18	244	.07*
WBT	2	3500	782	.25*	202	.09
WBR	0	0	107		127	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.60**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	177	.10*	90	.05
NBT	3	5250	433	.08	1273	.24*
NBR	1	1750	173	.10	523	.30
SBL	1	1750	155	.09	99	.06*
SBT	3	5250	1082	.21*	615	.12
SBR	1	1750	314	.18	62	.04
EBL	2	3500	162	.05*	366	.10
EBT	2	3500	141	.04	456	.13*
EBR	1	1750	93	.05	69	.04
WBL	2	3500	642	.18	255	.07*
WBT	2	3500	794	.26*	203	.09
WBR	0	0	107		127	
Right Turn Adjustment					NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.61**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	170	.10*	50	.03
NBT	3	5250	398	.08	1511	.29*
NBR	1	1750	153	.09	544	.31
SBL	1	1750	120	.07	150	.09*
SBT	3	5250	1398	.27*	683	.13
SBR	1	1750	173	.10	40	.02
EBL	2	3500	49	.01*	261	.07
EBT	2	3500	90	.03	370	.11*
EBR	1	1750	100	.06	100	.06
WBL	2	3500	443	.13	239	.07*
WBT	2	3500	510	.17*	139	.08
WBR	0	0	70		130	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.66**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	170	.10*	50	.03
NBT	3	5250	400	.08	1520	.29*
NBR	1	1750	160	.09	560	.32
SBL	1	1750	120	.07	150	.09*
SBT	3	5250	1420	.27*	690	.13
SBR	1	1750	180	.10	40	.02
EBL	2	3500	50	.01*	280	.08
EBT	2	3500	90	.03	380	.11*
EBR	1	1750	100	.06	100	.06
WBL	2	3500	450	.13	250	.07*
WBT	2	3500	530	.17*	140	.08
WBR	0	0	70		130	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.66**

51. Wiley Cyn & Lyons

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	172	.10*	245	.14*
NBT	2	3500	200	.06	483	.14
NBR	1	1750	144	.08	274	.16
SBL	1	1750	145	.08	147	.08
SBT	2	3500	408	.12*	533	.15*
SBR	1	1750	365	.21	354	.20
EBL	2	3500	171	.05	342	.10
EBT	2	3500	803	.23*	1085	.31*
EBR	1	1750	115	.07	83	.05
WBL	1	1750	171	.10*	235	.13*
WBT	3	5250	705	.15	986	.22
WBR	0	0	61		163	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.83**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	178	.10*	251	.14*
NBT	2	3500	200	.06	483	.14
NBR	1	1750	144	.08	274	.16
SBL	1	1750	145	.08	147	.08
SBT	2	3500	408	.12*	533	.15*
SBR	1	1750	367	.21	356	.20
EBL	2	3500	172	.05	342	.10
EBT	2	3500	832	.24*	1112	.32*
EBR	1	1750	119	.07	85	.05
WBL	1	1750	171	.10*	235	.13*
WBT	3	5250	740	.15	1015	.22
WBR	0	0	61		163	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.84**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	154	.09*	314	.18*
NBT	2	3500	190	.05	640	.18
NBR	1	1750	180	.10	330	.19
SBL	1	1750	180	.10	110	.06
SBT	2	3500	500	.14*	870	.25*
SBR	1	1750	468	.27	578	.33
EBL	2	3500	249	.07	540	.15
EBT	2	3500	942	.27*	1301	.37*
EBR	1	1750	96	.05	19	.01
WBL	1	1750	170	.10*	290	.17*
WBT	3	5250	585	.11	1222	.26
WBR	0	0	10		160	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**1.07**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	160	.09*	320	.18*
NBT	2	3500	190	.05	640	.18
NBR	1	1750	180	.10	330	.19
SBL	1	1750	180	.10	110	.06
SBT	2	3500	500	.14*	870	.25*
SBR	1	1750	470	.27	580	.33
EBL	2	3500	250	.07	540	.15
EBT	3	5250	971	.20*	1331	.26*
EBR	0	0	100		20	
WBL	1	1750	170	.10*	290	.17*
WBT	3	5250	621	.12	1251	.27
WBR	0	0	10		160	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.96**

54. Orchard Village & Wiley Cyn

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	157	.09	122	.07
NBT	2	3500	797	.28*	935	.35*
NBR	0	0	173		275	
SBL	1	1750	114	.07*	121	.07*
SBT	2	3500	733	.21	1032	.29
SBR	1	1750	312	.18	239	.14
EBL	2	3500	206	.06	294	.08
EBT	2	3500	193	.11*	336	.14*
EBR	0	0	201	.11	171	
WBL	1	1750	164	.09*	156	.09*
WBT	2	3500	313	.09	346	.10
WBR	1	1750	74	.04	96	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.75**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	157	.09	122	.07
NBT	2	3500	816	.28*	947	.35*
NBR	0	0	173		275	
SBL	1	1750	114	.07*	123	.07*
SBT	2	3500	745	.21	1069	.31
SBR	1	1750	312	.18	239	.14
EBL	2	3500	206	.06	294	.08
EBT	2	3500	193	.11*	336	.14*
EBR	0	0	201	.11	171	
WBL	1	1750	164	.09*	156	.09*
WBT	2	3500	313	.09	346	.10
WBR	1	1750	78	.04	97	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.75**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	690	.29*	990	.45*
NBR	0	0	340		600	
SBL	1	1750	565	.32*	669	.38*
SBT	2	3500	538	.15	1059	.30
SBR	1	1750	340	.19	190	.11
EBL	2	3500	240	.07	310	.09
EBT	2	3500	360	.13*	757	.26*
EBR	0	0	110		148	
WBL	1	1750	390	.22*	400	.23*
WBT	2	3500	670	.19	690	.20
WBR	1	1750	495	.28	556	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**1.06**		**1.42**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	710	.20*	1000	.29*
NBR	1	1750	340	.19	600	.34
SBL	1	1750	570	.33*	680	.39*
SBT	2	3500	550	.16	1091	.31
SBR	1	1750	340	.19	190	.11
EBL	2	3500	240	.07	310	.09
EBT	2	3500	360	.13*	760	.26*
EBR	0	0	110		150	
WBL	1	1750	390	.22*	400	.23*
WBT	2	3500	670	.19	690	.20
WBR	1	1750	500	.29	560	.32
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.98**		**1.27**

55. Orchard Village & McBean

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		443		341	
NBT	0.5	3500	48	.14*	36	.11*
NBR	2	3500	736	.21	899	.26
SBL	0	0	18		62	
SBT	1	1750	27	.03*	53	.07*
SBR	d	1750	15	.01	31	.02
EBL	1	1750	43	.02	33	.02
EBT	3	5250	521	.15*	926	.26*
EBR	0	0	378	.22	592	.34
WBL	2	3500	801	.23*	1015	.29*
WBT	3	5250	623	.13	753	.15
WBR	0	0	44		19	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .65 .83

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		473		357	
NBT	0.5	3500	48	.15*	36	.11*
NBR	2	3500	736	.21	899	.26
SBL	1.5		18		62	
SBT	1.5	5250	27	.01*	53	.02*
SBR	1	1750	15	.01	31	.02
EBL	1	1750	43	.02	33	.02
EBT	3	5250	521	.15*	927	.26*
EBR	0	0	392	.22	633	.36
WBL	2	3500	801	.23*	1015	.29*
WBT	3	5250	623	.13	754	.15
WBR	0	0	44		19	
Right Turn Adjustment					EBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .64 .80

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		958		843	
NBT	0.5	3500	60	.29*	60	.26*
NBR	2	3500	850	.24	1100	.31
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	470	.13*	909	.26*
EBR	0	0	831	.47	1106	.63
WBL	2	3500	840	.24*	1190	.34*
WBT	3	5250	620	.12	899	.18
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.12*	EBR	.17*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .90 1.20

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		991		860	
NBT	0.5	3500	60	.30*	60	.26*
NBR	2	3500	850	.24	1100	.31
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	470	.13*	910	.26*
EBR	0	0	850	.49	1151	.66
WBL	2	3500	840	.24*	1190	.34*
WBT	3	5250	620	.12	900	.18
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.13*	EBR	.20*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .91 1.18

57. Valencia & Magic Mtn

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	49	.03*	80	.05
NBT	3	5250	878	.19	1700	.39*
NBR	0	0	97		336	
SBL	1	1750	23	.01	45	.03*
SBT	3	5250	1786	.34*	1326	.25
SBR	2	3500	565	.16	532	.15
EBL	2	3500	323	.09	445	.13
EBT	2	3500	303	.10*	590	.18*
EBR	0	0	48		34	
WBL	1	1750	378	.22*	219	.13*
WBT	2	3500	390	.11	445	.13
WBR	1	1750	32	.02	47	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.83**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	49	.03*	80	.05
NBT	3	5250	881	.19	1706	.39*
NBR	0	0	97		338	
SBL	1	1750	23	.01	45	.03*
SBT	3	5250	1795	.34*	1331	.25
SBR	2	3500	637	.18	556	.16
EBL	2	3500	354	.10	472	.13
EBT	2	3500	328	.11*	615	.19*
EBR	0	0	55		34	
WBL	1	1750	383	.22*	219	.13*
WBT	2	3500	432	.12	471	.13
WBR	1	1750	32	.02	47	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.84**

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	130	.07
NBT	3	5250	816	.20	1803	.48*
NBR	0	0	260		696	
SBL	1	1750	20	.01	50	.03*
SBT	3	5250	1628	.31*	1216	.23
SBR	2	3500	744	.21	578	.17
EBL	2	3500	482	.14	582	.17
EBT	2	3500	855	.26*	1260	.37*
EBR	0	0	63		40	
WBL	1	1750	657	.38*	448	.26*
WBT	2	3500	994	.28	917	.26
WBR	1	1750	70	.04	40	.02
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**1.10**		**1.24**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	130	.07
NBT	3	5250	820	.21	1810	.48*
NBR	0	0	260		700	
SBL	1	1750	20	.01	50	.03*
SBT	3	5250	1640	.31*	1220	.23
SBR	2	3500	791	.23	600	.17
EBL	2	3500	511	.15	621	.18
EBT	2	3500	901	.28*	1301	.38*
EBR	0	0	70		40	
WBL	2	3500	660	.19*	450	.13*
WBT	2	3500	1051	.30	961	.27
WBR	1	1750	70	.04	40	.02
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.93**		**1.12**

65. Bouquet & Soledad

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	21	.01*	67	.04
NBT	3	5250	536	.10	1602	.31*
NBR	1	1750	362	.21	538	.31
SBL	3	5250	343	.07	371	.07*
SBT	2.5	7000	1774	{.40}*	1077	{.24}
SBR	1.5		1116		866	
EBL	3	5250	288	.05*	1099	.21*
EBT	3	5250	842	.17	1485	.29
EBR	0	0	58		24	
WBL	3	5250	405	.08	589	.11
WBT	2.5	7000	1189	.23*	1122	{.22}*
WBR	1.5		246		522	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .79 .91

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	21	.01*	67	.04
NBT	3	5250	536	.10	1603	.31*
NBR	1	1750	362	.21	539	.31
SBL	3	5250	344	.07	375	.07*
SBT	2.5	7000	1792	{.41}*	1079	{.24}
SBR	1.5		1157		869	
EBL	3	5250	288	.05*	1106	.21*
EBT	3	5250	864	.18	1510	.29
EBR	0	0	58		25	
WBL	3	5250	415	.08	592	.11
WBT	2.5	7000	1225	.23*	1134	{.22}*
WBR	1.5		252		524	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .80 .91

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	3	5250	710	.14	1820	.35*
NBR	1	1750	220	.13	510	.29
SBL	3	5250	379	.07	402	.08*
SBT	2.5	7000	1920	{.44}*	1430	{.28}
SBR	1.5		1262		828	
EBL	3	5250	330	.06*	1308	.25*
EBT	3	5250	867	.19	1126	.24
EBR	0	0	120		147	
WBL	3	5250	160	.03	380	.07
WBT	2.5	7000	876	.17*	941	{.21}*
WBR	1.5		290		635	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .78 .99

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	3	5250	710	.14	1820	.35*
NBR	1	1750	220	.13	510	.29
SBL	3	5250	380	.07	410	.08*
SBT	2.5	7000	1920	{.44}*	1430	{.28}
SBR	1.5		1270		830	
EBL	3	5250	330	.06*	1310	.25*
EBT	3	5250	890	.19	1151	.25
EBR	0	0	120		150	
WBL	3	5250	160	.03	380	.07
WBT	2.5	7000	921	.18*	950	{.21}*
WBR	1.5		290		640	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .79 .99

66. Bouquet & Newhall Ranch

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	407	.12*	585	.17
NBT	4	7000	569	.08	2396	.34*
NBR	1	1750	159	.09	377	.22
SBL	1	1750	230	.13	153	.09*
SBT	4	7000	2351	.34*	1443	.21
SBR	1	1750	521	.30	443	.25
EBL	3	5250	308	.06	895	.17
EBT	2	3500	761	.22*	1437	.41*
EBR	2	3500	496	.14	651	.19
WBL	2	3500	393	.11*	257	.07*
WBT	4	7000	1358	.19	846	.12
WBR	1	1750	85	.05	271	.15
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .89 1.01

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	413	.12*	592	.17
NBT	4	7000	569	.08	2401	.34*
NBR	1	1750	159	.09	377	.22
SBL	1	1750	230	.13	153	.09*
SBT	4	7000	2395	.34*	1443	.21
SBR	1	1750	530	.30	460	.26
EBL	3	5250	318	.06	919	.18
EBT	3	5250	802	.15*	1492	.28*
EBR	2	3500	500	.14	660	.19
WBL	2	3500	403	.12*	258	.07*
WBT	4	7000	1386	.20	882	.13
WBR	1	1750	85	.05	271	.15
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .83 .88

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	559	.16*	781	.22*
NBT	4	7000	570	.08	2529	.36
NBR	1	1750	310	.18	590	.34
SBL	1	1750	100	.06	70	.04
SBT	4	7000	2195	.31*	1470	.21*
SBR	1	1750	763	.44	417	.24
EBL	3	5250	230	.04	662	.13
EBT	2	3500	873	.25*	2005	.57*
EBR	2	3500	836	.24	1029	.29
WBL	2	3500	587	.17*	140	.04*
WBT	4	7000	1446	.21	986	.14
WBR	1	1750	70	.04	100	.06
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .99 1.14

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	560	.16*	790	.23*
NBT	4	7000	570	.08	2530	.36
NBR	1	1750	310	.18	590	.34
SBL	1	1750	100	.06	70	.04
SBT	4	7000	2200	.31*	1470	.21*
SBR	1	1750	811	.46	430	.25
EBL	3	5250	240	.05	680	.13
EBT	3	5250	890	.17*	2051	.39*
EBR	2	3500	840	.24	1040	.30
WBL	2	3500	590	.17*	140	.04*
WBT	4	7000	1470	.21	1011	.14
WBR	1	1750	70	.04	100	.06
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .95 .97

94. Commerce Center & SR-126

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	58	.04	81	.05*
NBT	1	1600	104	.07*	68	.04
NBR	1	1600	25	.02	16	.01
SBL	2	2880	539	.19*	1298	.45*
SBT	1	1600	62	.04	265	.17
SBR	1	1600	48	.03	47	.03
EBL	1	1600	100	.06*	47	.03
EBT	2	3200	687	.21	1086	.34*
EBR	d	1600	35	.02	43	.03
WBL	1	1600	91	.06	25	.02*
WBT	2	3200	749	.23*	821	.26
WBR	f		2231		544	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .65 .96

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	245	.15	218	.14
NBT	1	1600	671	.42*	256	.16*
NBR	1	1600	219	.14	385	.24
SBL	2	2880	541	.19*	1255	.44*
SBT	1	1600	237	.15	559	.35
SBR	1	1600	48	.03	47	.03
EBL	1	1600	100	.06	47	.03
EBT	2	3200	681	.28*	1059	.39*
EBR	0	0	205		197	
WBL	1	1600	355	.22*	315	.20*
WBT	2	3200	649	.20	813	.25
WBR	f		2154		538	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.21 1.29

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	89	.06	196	.12*
NBT	1	1600	507	.32*	183	.11
NBR	1	1600	68	.04	95	.06
SBL	2	2880	402	.14*	1233	.43*
SBT	1	1600	146	.09	526	.33
SBR	1	1600	92	.06	250	.16
EBL	1	1600	235	.15*	78	.05
EBT	2	3200	1137	.39	1335	.48*
EBR	0	0	117		187	
WBL	1	1600	68	.04	71	.04*
WBT	2	3200	1060	.33*	1282	.40
WBR	f		1623		501	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.04 1.17

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	169	.11	326	.20
NBT	1	1600	807	.50*	361	.23*
NBR	1	1600	262	.16	464	.29
SBL	2	2880	402	.14	1233	.43
SBT	1	1600	320	.20*	769	.48*
SBR	1	1600	92	.06	250	.16
EBL	1	1600	235	.15	78	.05
EBT	2	3200	1137	.44*	1335	.51*
EBR	0	0	279		310	
WBL	1	1600	332	.21*	361	.23*
WBT	2	3200	1060	.33	1282	.40
WBR	f		1623		501	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.45 1.55

94. Commerce Center & SR-126

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	152	.10	381	.24*
NBT	1	1600	566	.35*	206	.13
NBR	1	1600	26	.02	89	.06
SBL	2	2880	340	.12*	1450	.50*
SBT	1	1600	63	.04	652	.41
SBR	1	1600	140	.09	530	.33
EBL	1	1600	440	.28*	130	.08
EBT	2	3200	1650	.58	2000	.74*
EBR	0	0	221		380	
WBL	1	1600	74	.05	30	.02*
WBT	2	3200	1480	.46*	2180	.68
WBR	f		1490		550	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.31 1.60

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	232	.15	513	.32*
NBT	1	1600	866	.54*	384	.24
NBR	1	1600	203	.13	427	.27
SBL	2	2880	340	.12	1450	.50
SBT	1	1600	243	.15*	895	.56*
SBR	1	1600	140	.09	530	.33
EBL	1	1600	440	.28	130	.08
EBT	2	3200	1650	.64*	2000	.78*
EBR	0	0	383		503	
WBL	1	1600	284	.18*	204	.13*
WBT	2	3200	1480	.46	2180	.68
WBR	f		1490		550	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION 1.61 1.89

105. Westridge & Valencia

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	81	.05	5	.00
NBT	1	1600	11	.01*	0	.00*
NBR	1	1600	77	.05	32	.02
SBL	2	2880	356	.12*	113	.04*
SBT	1	1600	25	.02	0	.00
SBR	1	1600	66	.04	2	.00
EBL	1	1600	9	.01*	1	.00
EBT	3	4800	1556	.33	272	.06*
EBR	0	0	9		5	
WBL	1	1600	15	.01	37	.02*
WBT	3	4800	2003	.42*	237	.05
WBR	1	1600	124	.08	123	.08
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.22**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	81	.05	5	.00
NBT	1	1600	11	.01*	0	.00*
NBR	1	1600	77	.05	32	.02
SBL	2	2880	409	.14*	479	.17*
SBT	1	1600	25	.02	0	.00
SBR	1	1600	106	.07	32	.02
EBL	1	1600	58	.04*	23	.01
EBT	3	4800	1556	.33	272	.06*
EBR	0	0	9		5	
WBL	1	1600	15	.01	37	.02*
WBT	3	4800	2003	.42*	237	.05
WBR	1	1600	286	.18	331	.21
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.71**		**.36**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	36	.02	2	.00
NBT	1	1600	5	.00*	0	.00*
NBR	1	1600	35	.02	15	.01
SBL	2	2880	164	.06*	171	.06*
SBT	1	1600	11	.01	0	.00
SBR	1	1600	48	.03	32	.02
EBL	1	1600	44	.03*	17	.01*
EBT	3	4800	1662	.35	888	.19
EBR	0	0	4		2	
WBL	1	1600	7	.00	17	.01
WBT	3	4800	1648	.34*	1000	.21*
WBR	1	1600	83	.05	89	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.38**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	36	.02	2	.00
NBT	1	1600	5	.00*	0	.00*
NBR	1	1600	35	.02	15	.01
SBL	2	2880	217	.08*	537	.19*
SBT	1	1600	11	.01	0	.00
SBR	1	1600	88	.06	62	.04
EBL	1	1600	93	.06*	39	.02*
EBT	3	4800	1662	.35	888	.19
EBR	0	0	4		2	
WBL	1	1600	7	.00	17	.01
WBT	3	4800	1648	.34*	1000	.21*
WBR	1	1600	245	.15	297	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.52**

105. Westridge & Valencia

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	10	.01
NBT	1	1600	10	.01	10	.01*
NBR	1	1600	60	.04	30	.02
SBL	2	2880	36	.01	200	.07*
SBT	1	1600	20	.01*	10	.01
SBR	1	1600	41	.03	71	.04
EBL	1	1600	72	.05	38	.02*
EBT	3	4800	2000	.42*	1560	.33
EBR	0	0	10		10	
WBL	1	1600	10	.01*	30	.02
WBT	3	4800	1400	.29	2000	.42*
WBR	1	1600	109	.07	98	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.62**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	10	.01
NBT	1	1600	10	.01	10	.01*
NBR	1	1600	60	.04	30	.02
SBL	2	2880	91	.03	558	.19*
SBT	1	1600	20	.01*	10	.01
SBR	1	1600	81	.05	101	.06
EBL	1	1600	121	.08	60	.04*
EBT	3	4800	2000	.42*	1560	.33
EBR	0	0	10		10	
WBL	1	1600	10	.01*	30	.02
WBT	3	4800	1400	.29	2000	.42*
WBR	1	1600	406	.25	315	.20
Right Turn Adjustment			NBR	.01*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.76**

108. McBean & Pico Cyn

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	929	.32*	366	.13*
SBT	0	0	0		0	
SBR	1	1600	63	.04	84	.05
EBL	1	1600	134	.08*	61	.04*
EBT	2	3200	171	.05	166	.05
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	109	.07*	128	.08*
WBR	1	1600	418	.26	722	.45
Right Turn Adjustment					WBR	.27*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.62**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	929	.32*	366	.13*
SBT	0	0	0		0	
SBR	1	1600	63	.04	90	.06
EBL	1	1600	137	.09*	61	.04*
EBT	2	3200	171	.05	166	.05
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	110	.07*	134	.08*
WBR	1	1600	418	.26	722	.45
Right Turn Adjustment					WBR	.27*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.62**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	538	.19*	306	.11*
SBT	0	0	0		0	
SBR	1	1600	68	.04	150	.09
EBL	1	1600	174	.11*	102	.06*
EBT	2	3200	306	.10	577	.18
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	322	.20*	451	.28*
WBR	1	1600	272	.17	480	.30
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.55**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	538	.19*	306	.11*
SBT	0	0	0		0	
SBR	1	1600	68	.04	156	.10
EBL	1	1600	177	.11*	102	.06*
EBT	2	3200	306	.10	577	.18
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	323	.20*	457	.29*
WBR	1	1600	272	.17	480	.30
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.56**

108. McBean & Pico Cyn

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	260	.09*	300	.10*
SBT	0	0	0		0	
SBR	1	1600	100	.06	254	.16
EBL	1	1600	257	.16*	150	.09*
EBT	2	3200	280	.09	1070	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	419	.26*	794	.50*
WBR	1	1600	170	.11	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.79**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	260	.09*	300	.10*
SBT	0	0	0		0	
SBR	1	1600	100	.06	260	.16
EBL	1	1600	260	.16*	150	.09*
EBT	2	3200	280	.09	1070	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	420	.26*	800	.50*
WBR	1	1600	170	.11	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.79**

109. McBean & Poe

Existing + Ambient Growth (2021)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	217	.14*	345	.22*
NBT	2	3200	539	.17	316	.11
NBR	0	0	12		29	
SBL	1	1600	89	.06	4	.00
SBT	2	3200	885	.28*	207	.06*
SBR	d	1600	109	.07	139	.09
EBL	1	1600	330	.21*	124	.08*
EBT	1	1600	42	.03	5	.00
EBR	1	1600	453	.28	208	.13
WBL	1	1600	51	.03	15	.01
WBT	1	1600	12	.04*	1	.01*
WBR	0	0	53		14	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.47**

Exist + Ambient With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	217	.14*	345	.22*
NBT	2	3200	542	.17	316	.11
NBR	0	0	12		29	
SBL	1	1600	89	.06	4	.00
SBT	2	3200	885	.28*	213	.07*
SBR	d	1600	109	.07	140	.09
EBL	1	1600	331	.21*	124	.08*
EBT	1	1600	42	.03	5	.00
EBR	1	1600	453	.28	208	.13
WBL	1	1600	51	.03	15	.01
WBT	1	1600	12	.04*	1	.01*
WBR	0	0	53		14	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.48**

2021 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	182	.11*	305	.19*
NBT	2	3200	357	.11	222	.07
NBR	0	0	6		13	
SBL	1	1600	40	.03	2	.00
SBT	2	3200	444	.14*	210	.07*
SBR	d	1600	102	.06	243	.15
EBL	1	1600	316	.20*	148	.09*
EBT	1	1600	19	.01	2	.00
EBR	1	1600	319	.20	230	.14
WBL	1	1600	23	.01	7	.00
WBT	1	1600	6	.02*	1	.00*
WBR	0	0	24		6	
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.46**

2021 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	182	.11*	305	.19*
NBT	2	3200	360	.11	222	.07
NBR	0	0	6		13	
SBL	1	1600	40	.03	2	.00
SBT	2	3200	444	.14*	216	.07*
SBR	d	1600	102	.06	244	.15
EBL	1	1600	317	.20*	148	.09*
EBT	1	1600	19	.01	2	.00
EBR	1	1600	319	.20	230	.14
WBL	1	1600	23	.01	7	.00
WBT	1	1600	6	.02*	1	.00*
WBR	0	0	24		6	
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.46**

109. McBean & Poe

2035 Cumulative Without Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	170	.11*	310	.19*
NBT	2	3200	257	.08	160	.05
NBR	0	0	0		0	
SBL	1	1600	0	.00	0	.00
SBT	2	3200	110	.03*	264	.08*
SBR	d	1600	160	.10	409	.26
EBL	1	1600	389	.24*	220	.14*
EBT	1	1600	0	.00	0	.00
EBR	1	1600	250	.16	290	.18
WBL	1	1600	0	.00	0	.00
WBT	1	1600	0	.00*	0	.00*
WBR	0	0	0		0	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.58**

2035 Cumulative With Project (All Condo) With M

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	170	.11*	310	.19*
NBT	2	3200	260	.08	160	.05
NBR	0	0	0		0	
SBL	1	1600	0	.00	0	.00
SBT	2	3200	110	.03*	270	.08*
SBR	d	1600	160	.10	410	.26
EBL	1	1600	390	.24*	220	.14*
EBT	1	1600	0	.00	0	.00
EBR	1	1600	250	.16	290	.18
WBL	1	1600	0	.00	0	.00
WBT	1	1600	0	.00*	0	.00*
WBR	0	0	0		0	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.58**

Appendix H

CONSTRUCTION TRAFFIC ESTIMATES

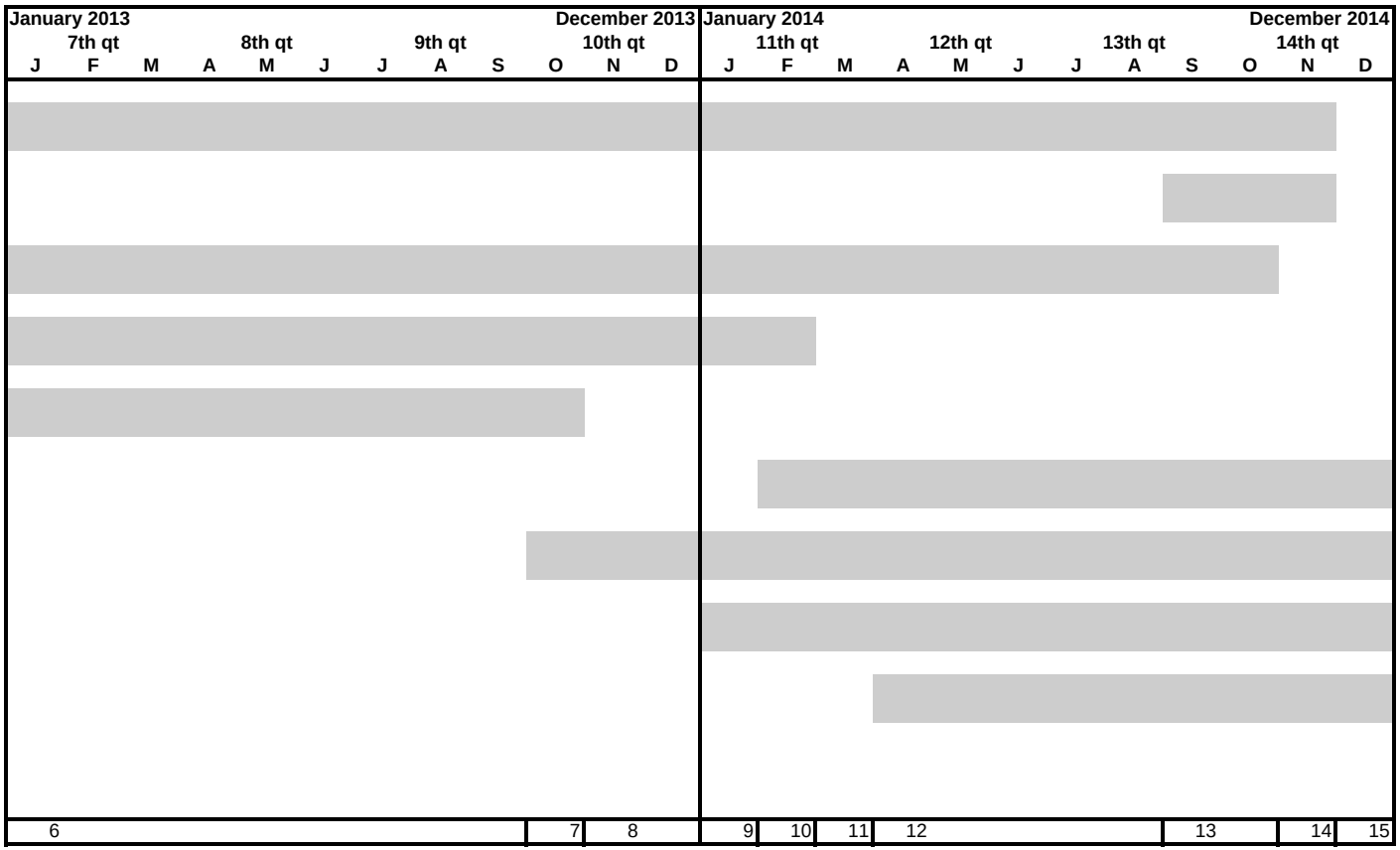
(Source: Impact Sciences, Inc.)

Mission Village Construction Schedule

Year			**January 2011**										**December 2011**	**January 2012**										**December 2012**
Quarter									**1st qt**			**2nd qt**			**3rd qt**			**4th qt**			**5th qt**			**6th qt**
Month			**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Mass Grading																										
Est. Worker Trips	67.50	trips/day																								
Fine Grading (Grade Control/Bank Stabilization)																										
Est. Worker Trips	35.00	trips/day																								
Sewer																										
Est. Worker Trips	12.50	trips/day																								
Water																										
Est. Worker Trips	12.50	trips/day																								
Storm Drain																										
Est. Worker Trips	12.50	trips/day																								
Street Paving																										
Est. Worker Trips	12.50	trips/day																								
Building Construction																										
Est. Worker Trips	488.86	trips/day																								
Architectural Coating																										
Est. Worker Trips	6.93	trips/day																								
Paving (parking lots, walkways, etc.)																										
Est. Worker Trips	12.50	trips/day																								
Mass Grading (Utilities Corridor)																										
Est. Worker Trips	15.00	trips/day																								
Time Slice Number									1						2		3				4		5			

Mission Village Construction Schedule

Year		
Quarter		
Month		
Mass Grading		
Est. Worker Trips	67.50	trips/day
Fine Grading (Grade Control/Bank Stabilization)		
Est. Worker Trips	35.00	trips/day
Sewer		
Est. Worker Trips	12.50	trips/day
Water		
Est. Worker Trips	12.50	trips/day
Storm Drain		
Est. Worker Trips	12.50	trips/day
Street Paving		
Est. Worker Trips	12.50	trips/day
Building Construction		
Est. Worker Trips	488.86	trips/day
Architectural Coating		
Est. Worker Trips	6.93	trips/day
Paving (parking lots, walkways, etc.)		
Est. Worker Trips	12.50	trips/day
Mass Grading (Utilities Corridor)		
Est. Worker Trips	15.00	trips/day
Time Slice Number		



Mission Village Construction Schedule

Year			January 2015											December 2015	January 2016											December 2016
Quarter			15th qt			16th qt			17th qt			18th qt			19th qt			20th qt			21st qt			22nd qt		
Month			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Mass Grading																										
Est. Worker Trips	67.50	trips/day																								
Fine Grading (Grade Control/Bank Stabilization)																										
Est. Worker Trips	35.00	trips/day																								
Sewer																										
Est. Worker Trips	12.50	trips/day																								
Water																										
Est. Worker Trips	12.50	trips/day																								
Storm Drain																										
Est. Worker Trips	12.50	trips/day																								
Street Paving																										
Est. Worker Trips	12.50	trips/day																								
Building Construction																										
Est. Worker Trips	488.86	trips/day																								
Architectural Coating																										
Est. Worker Trips	6.93	trips/day																								
Paving (parking lots, walkways, etc.)																										
Est. Worker Trips	12.50	trips/day																								
Mass Grading (Utilities Corridor)																										
Est. Worker Trips	15.00	trips/day																								
Time Slice Number			16												17											

Mission Village Construction Schedule

Year			January 2017											December 2017	January 2018											December 2018
Quarter				23rd qt			24th qt			25th qt			26th qt			27th qt			28th qt						
Month			J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Mass Grading																										
Est. Worker Trips	67.50	trips/day																								
Fine Grading (Grade Control/Bank Stabilization)																										
Est. Worker Trips	35.00	trips/day																								
Sewer																										
Est. Worker Trips	12.50	trips/day																								
Water																										
Est. Worker Trips	12.50	trips/day																								
Storm Drain																										
Est. Worker Trips	12.50	trips/day																								
Street Paving																										
Est. Worker Trips	12.50	trips/day																								
Building Construction																										
Est. Worker Trips	488.86	trips/day																								
Architectural Coating																										
Est. Worker Trips	6.93	trips/day																								
Paving (parking lots, walkways, etc.)																										
Est. Worker Trips	12.50	trips/day																								
Mass Grading (Utilities Corridor)																										
Est. Worker Trips	15.00	trips/day																								
Time Slice Number			18												19											

Appendix I
TRAFFIC SIGNAL WARRANT SUMMARY

Mission Village
On-Site Signal Warrant Verification

Major Street ≤ 40 MPH				
1. B St & C St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	63	0	44	No
PM Peak Hour	128	0	28	No
4. A St & B St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	216	4	160	No
PM Peak Hour	250	4	83	No
5. A St & C St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	231	0	16	No
PM Peak Hour	158	0	9	No
6. Q1 St & A St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	264	89	0	No
PM Peak Hour	197	50	0	No
7. R St & A St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	562	189	182	No
PM Peak Hour	334	454	68	No
8. EE Dr & A St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	793	0	49	No
PM Peak Hour	766	0	92	No
14. Westridge Pkwy & OO Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	916	0	55	No
PM Peak Hour	1,286	0	44	No
18. EE Dr & II Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	40	0	21	No
PM Peak Hour	63	0	14	No
19. EE Dr & DD Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	186	29	115	No
PM Peak Hour	361	5	178	No
20. EE Dr & FF Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	507	41	127	No
PM Peak Hour	395	313	100	No
21. Westridge & QQ St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	821	82	0	No
PM Peak Hour	1,178	126	0	No

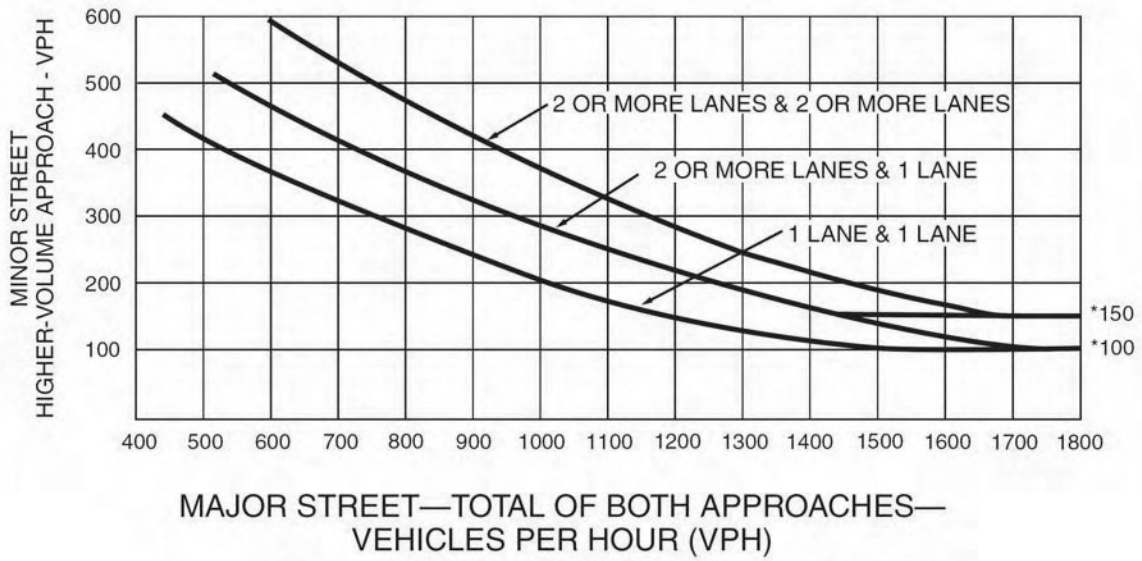
Mission Village
On-Site Signal Warrant Verification

Major Street ≤ 40 MPH				
22. Westridge & RR St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	831	56	0	No
PM Peak Hour	1,156	108	0	No
23. Westridge & Entrada				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	906	40	0	No
PM Peak Hour	1,281	18	0	No
24. II Dr & DD Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	24	5	45	No
PM Peak Hour	81	25	27	No
25. II Dr & CC Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	75	0	10	No
PM Peak Hour	139	0	39	No
26. HH St & Driveway				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	411	37	102	No
PM Peak Hour	431	20	56	No
27. HH St & DD Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	496	1	0	No
PM Peak Hour	430	13	0	No
28. HH St & CC Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	461	0	149	No
PM Peak Hour	517	10	79	No
29. KK Dr & LL St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	71	0	17	No
PM Peak Hour	79	0	11	No
30. KK Dr & LL2 Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	70	9	0	No
PM Peak Hour	62	10	0	No
31. K St & B St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	31	48	0	No
PM Peak Hour	80	30	0	No

Mission Village
On-Site Signal Warrant Verification

Major Street > 40 MPH				
2. B St & Magic Mountain Pkwy				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	1,869	84	0	Yes
PM Peak Hour	2,240	55	0	No
3. A St & Magic Mountain Pkwy				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	1,919	236	0	Yes
PM Peak Hour	2,292	159	0	Yes
9. Commerce Ctr Dr & A St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	1,822	136	634	Yes
PM Peak Hour	2,589	73	384	Yes
10. KK Dr/HH St & Magic Mountain				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	2,074	312	59	Yes
PM Peak Hour	2,570	189	38	Yes
11. II Dr & Magic Mountain Pkwy				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	2,216	64	0	No
PM Peak Hour	2,610	111	0	Yes
12. Westridge Pkwy & Magic Mountain Pkwy				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	2,460	92	655	Yes
PM Peak Hour	3,062	314	438	Yes
13. Commerce Ctr Dr & Magic Mountain Pkwy				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	3,260	486	0	Yes
PM Peak Hour	2,737	1,625	0	Yes
15. Commerce Ctr Dr & DD Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	1,825	0	254	Yes
PM Peak Hour	2,218	0	363	Yes
16. Commerce Ctr & FF Dr				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	1,804	0	66	No
PM Peak Hour	2,109	0	238	Yes
17. Commerce Ctr Dr & GG St				
	Major Streets	**Minor Street A**	**Minor Street B**	**Meets Signal Warrant?**
AM Peak Hour	2,629	130	0	Yes
PM Peak Hour	2,617	596	0	Yes

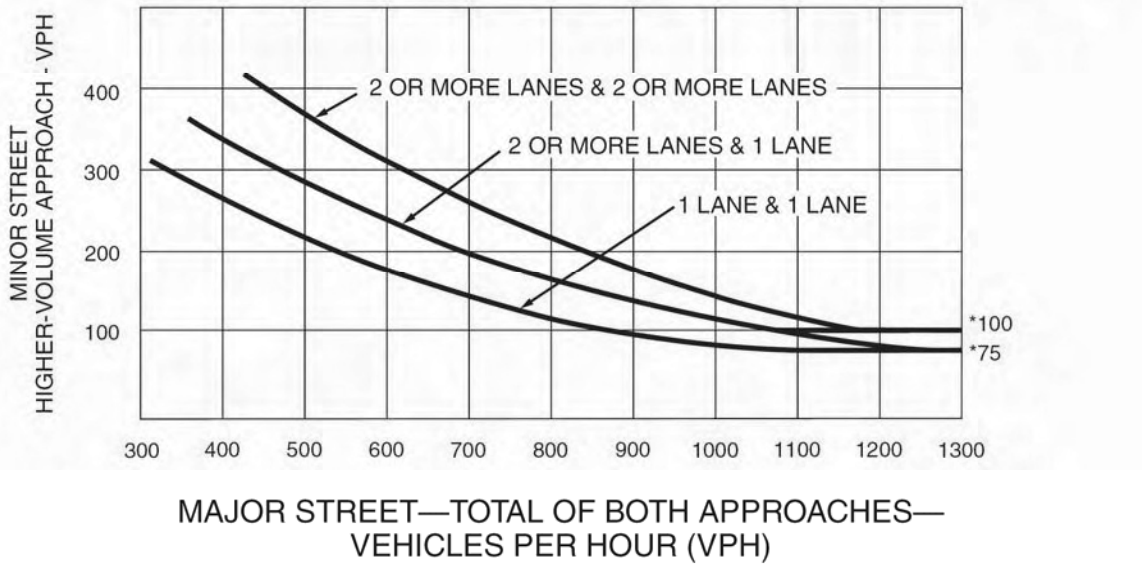
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE ~~70~~ 64 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix J
TRAFFIC SHARES SUMMARY

Intersection Location	Project Volume		Exist Volume		Buildout Volume		Project Share %		Weighted Average
	AM	PM	AM	PM	AM	PM	AM	PM	AM + PM
7. I-5 SB Ramps & SR-126	380	501	4,211	4,194	6,850	7,720	14.40%	14.21%	14.3%
9. The Old Road & I-5 SB Ramps (at Rye Canyon Road)	34	19	1,927	2,137	3,000	4,830	3.17%	.71%	1.4%
10. I-5 SB Ramps & Magic Mountain Pkwy	973	827	2,011	1,946	6,180	6,910	23.34%	16.66%	19.7%
11. I-5 NB Ramps & Magic Mountain Pkwy	728	698	2,502	2,901	6,100	7,400	20.23%	15.51%	17.6%
12. I-5 SB Ramps & Valencia Blvd	201	253	3,427	2,782	5,720	6,510	8.77%	6.79%	7.5%
13. I-5 NB Ramps & Valencia Boulevard	184	196	3,863	3,439	5,920	6,880	8.95%	5.70%	6.9%
14. I-5 SB Ramps & McBean Pkwy	167	209	2,145	2,732	3,530	4,330	12.06%	13.08%	12.6%
16. I-5 SB Loop Ramp & Pico Canyon Road	71	47	2,381	3,011	3,280	4,620	7.90%	2.92%	4.7%
17. I-5 NB Ramps & Lyons Ave	82	78	2,583	3,940	3,660	5,070	7.61%	6.90%	7.2%
18. I-5 SB Ramps & Calgrove Blvd	34	23	1,276	1,291	2,100	2,160	4.13%	2.65%	3.4%
19. I-5 NB Ramps & Calgrove Blvd	30	32	1,075	1,408	1,900	2,500	3.64%	2.93%	3.2%
25. The Old Road & Rye Canyon Road	220	206	3,029	3,205	5,500	6,730	8.90%	5.84%	7.1%
26. The Old Road & Magic Mountain Pkwy	1,248	1,078	2,097	2,318	6,820	8,640	26.42%	17.05%	21.1%
28. The Old Road & McBean Pkwy	232	329	3,426	4,414	3,760	6,160	69.46%	18.84%	27.0%
29. The Old Road & Pico Canyon Road	62	78	3,115	3,635	3,290	5,250	35.43%	4.83%	7.8%
30. Ave Stanford & Rye Canyon Rd	205	187	2,777	2,899	3,960	5,250	17.33%	7.95%	11.1%
33. Rye Canyon Rd/Copper Hill Rd & Newhall Ranch Road	198	235	4,833	5,149	8,140	9,090	5.99%	5.96%	6.0%
36. Tourney & Valencia Boulevard	113	158	3,385	3,367	5,480	6,750	5.39%	4.67%	4.9%
37. Tourney & Magic Mountain Parkway	551	507	2,203	2,491	5,510	6,760	16.66%	11.88%	14.0%
44. McBean Pkwy & Valencia Blvd	49	81	5,179	6,378	6,850	9,680	2.93%	2.45%	2.6%
45. McBean Pkwy & Magic Mountain	453	387	5,438	5,497	8,090	10,330	17.08%	8.01%	11.2%
48. McBean Pkwy & Newhall Ranch	186	206	6,050	6,862	7,920	10,360	9.95%	5.89%	7.3%
51. Wiley & Lyons	76	66	3,310	4,017	3,800	6,440	15.51%	2.72%	4.9%
53. Valley & Lyons	49	46	2,616	3,756	3,580	5,410	5.08%	2.78%	3.6%
54. Orchard Village & Wiley	42	61	3,347	3,316	4,820	6,500	2.85%	1.92%	2.2%
55. Orchard Village & McBean	51	63	3,094	3,715	4,800	6,390	2.99%	2.36%	2.6%
57. Valencia Blvd & Magic Mountain	201	160	3,751	4,619	6,870	7,920	6.44%	4.85%	5.6%
65. Bouquet Canyon Road & Soledad	76	53	5,492	7,390	7,230	9,680	4.37%	2.31%	3.2%
66. Bouquet Canyon Road & Newhall Ranch	111	121	5,861	7,889	8,650	10,900	3.98%	4.02%	4.0%
80. Wolcott & SR-126	233	239	1,613	2,350	4,940	6,420	7.00%	5.87%	6.4%
81. Commerce Center Drive & Henry Mayo	1,209	1,446	302	402	2,660	3,430	51.27%	47.75%	49.3%
94 (82/83). Commerce Center Drive & SR-126	1,685	1,750	3,814	3,502	6,420	8,560	64.66%	34.60%	44.8%
96. San Martinez Grande Canyon Road & SR-126	72	65	1,317	1,886	2,520	3,590	5.99%	3.81%	4.7%
101. Long Canyon Road & Valencia Blvd	69	58	0	0	2,690	3,360	2.57%	1.73%	2.1%
102. Magic Mountain Pkwy & Valencia Blvd	238	330	0	0	3,080	5,050	7.73%	6.53%	7.0%
103. Pico Canyon Road & Valencia Blvd	18	26	0	0	2,720	4,430	.66%	.59%	0.6%
104. Poe Pkwy & Valencia Blvd	27	30	0	0	2,270	2,910	1.19%	1.03%	1.1%
106. Commerce Center Drive & Magic Mountain Pkwy	2,002	2,184	0	0	3,670	4,100	54.55%	53.27%	53.9%
107. Westridge Pkwy & Magic Mountain	1,813	1,983	0	0	2,610	3,060	69.46%	64.80%	66.9%
110. Chiquito Canyon Road/Long Canyon Road & SR-126	159	152	1,493	2,022	5,350	6,640	4.12%	3.29%	3.7%
118. Six Flags Entrance & Magic Mountain	1,387	1,331	87	106	3,600	5,010	39.48%	27.14%	32.3%

Stage	Description	Project Volume		Exist Volume		Buildout Volume		Project Share %		Weighted Average
		AM	PM	AM	PM	AM	PM	AM	PM	AM + PM
1	Construct access to Landmark Village from SR-126	58	44	0	0	2,513	2,918	2.31%	1.51%	1.9%
	Construct access to Water Treatment Plant from SR-126	--	--	0	0	--	--	--	--	--
	Extend Magic Mountain Parkway into Mission Village.	608	758	0	0	1,956	2,306	31.08%	32.87%	32.1%
	Extend Westridge Parkway to Magic Mountain Parkway	479	645	0	0	868	993	55.18%	64.95%	60.4%
	Widen The Old Road between Feedmill Road & the relocated Rye Canyon interchange	38	25	1,751	2,009	2,887	4,419	3.35%	1.04%	1.8%
	Extend Magic Mountain Parkway into Homestead	413	492	0	0	1,853	2,173	22.29%	22.64%	22.5%
2	Construct Commerce Center Drive Bridge/connect Mission Village to SR-126	1,208	1,212	0	0	2,074	2,376	58.24%	51.01%	54.4%
	Extend Valencia Boulevard into Legacy Village	22	19	0	0	2,046	2,613	1.08%	0.73%	0.9%
3	Extend Magic Mountain Parkway into Potrero Village	240	331	0	0	615	1,246	39.02%	26.57%	30.7%
	Construct segments of Valencia Blvd (Potrero Village) & Long Canyon Road	183	255	0	0	2,940	4,731	6.22%	5.39%	5.7%
	Construct Long Canyon Road Bridge/connect Legacy Village (South) to SR-126	38	31	0	0	2,154	2,799	1.76%	1.11%	1.4%
	Widen SR-126 to 8-lanes between Commerce Center Drive and Long Canyon Road	232	239	1,353	1,714	4,655	5,627	7.03%	6.11%	6.5%
4	Extend Valencia Boulevard to Potrero Village/Magic Mountain Parkway	14	24	0	0	2,499	4,185	0.56%	0.57%	0.6%
	Widen The Old Road between the relocated Rye Canyon interchange to just north of SR-126	27	27	889	880	1,341	1,823	5.97%	2.86%	3.9%
5	Construct Valencia Blvd west of Long Canyon Road	24	16	0	0	717	936	3.35%	1.71%	2.4%
	Construct access to Legacy Village (North) from SR-126 at Chiquito Cyn Rd and at San Martinez Grande Cyn Rd	73	72	0	0	2,284	2,533	3.20%	2.84%	3.0%
	Extend Pico Canyon Road to Valencia Blvd	10	11	0	0	605	1,672	1.65%	0.66%	0.9%
6	Construct access to Legacy Village (North) from SR-126 at County Line	4	5	0	0	84	118	4.76%	4.24%	4.5%
7	Construct 3rd river crossing Bridge (Potrero/Valencia)	17	18	0	0	570	796	2.98%	2.26%	2.6%

Appendix K
I-5 FREEWAY IMPROVEMENT SCHEDULE

Subject: Re: I-5 North Project - Phases 1 & 2
From: Ashraf A Habbak
Date: Tue, 14 Sep 2010 15:46:49 -0700
To: Daryl Zerfass

Hi Daryl,

The tentative schedule of delivery is shown below for I-5 North area projects:

EA	Start PS&E	RTL	Award	CCA
2332A		5/31/11	10/1/11	7/22/13
23321	1/3/11	6/15/13	12/15/13	2/10/16
23322	1/3/11	6/15/13	12/15/13	2/10/16

EA 2332A is the truck lanes project: One N/B lane from Weldon Cyn. To South of Calgrove Blvd & One S/B Lane from South of Pico Cyn / Lyons Ave. to Weldon Cyn OC.
Funding has been identified for design and construction.

EA 23321 is HOV & Aux Lanes (NB&SB) from SR-14 to Pico Cyn / Lyons Ave & one Truck lane (S/B) from South of Calgrove to Weldon Cyn.
Funding has been identified for design but not yet for construction.

EA 23322 is HOV & Aux Lanes (NB&SB) from Pico Cyn / Lyons Ave to Parker Road.
Funding has been identified for design but not yet for construction.

Please let me know if you have any questions.

Ashraf Habbak, P.E., PMP, AVS
Project Manager

Daryl Zerfass

09/14/2010 03:11 PM

To Ashraf Habbak
cc
Subject I-5 North Project - Phases 1 & 2

Hi Ashraf,

I am in the process of preparing some planning studies for the Santa Clarita Valley. As part of these studies, we are evaluating conditions on the I-5 freeway that includes the area covered by the Truck Lane/HOV Lane project from SR-14 to Parker Road. For the study it is necessary to have an estimate for the completion date of the full project (i.e., adding the truck lanes between Pico Canyon Road and SR-14 plus adding the HOV lanes between Parker Road and SR-14).

I realize the project may be phased, and if you have an estimate for when each phase will be completed that would be helpful. If that is too speculative, a reasonable estimate for the final year in which the project is completed based on what you know today will suffice.

Please feel free to give me a call if you need further details or wish to discuss. I appreciate whatever help you can provide.

Thanks,
Daryl
--
Daryl Zerfass, P.E.
AUSTIN-FOUST ASSOCIATES, INC.
(714) 667-0496

WESTSIDE SANTA CLARITA VALLEY

Roadway Phasing Analysis

NOVEMBER 2006

AUSTIN-FOUST ASSOCIATES, INC.

WESTSIDE SANTA CLARITA VALLEY
Roadway Phasing Analysis

Prepared by:

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2223 Wellington Avenue, Suite 300
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November 14, 2006

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WESTSIDE SANTA CLARITA VALLEY
Roadway Phasing Analysis

The purpose of this analysis is to evaluate the phased construction of new roadways within the Westside area of the Santa Clarita Valley. Traffic volume forecasts are presented and are utilized to evaluate the proposed phasing plan.

1.0 BACKGROUND

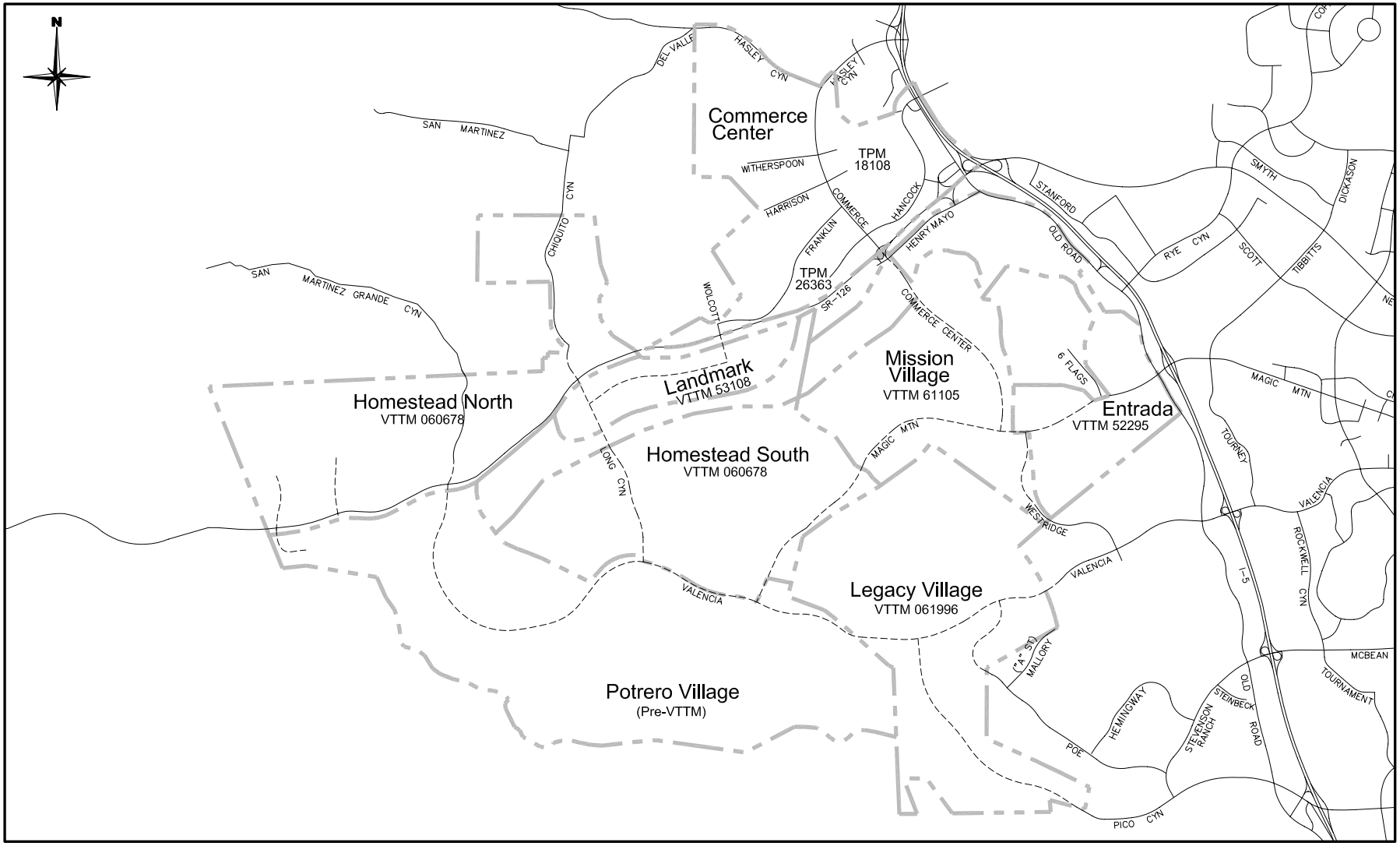
The Westside of the Santa Clarita Valley is defined for the purpose of this analysis as the general area west of the Interstate 5 freeway, north of the existing Stevenson Ranch area, south of the Hasley Canyon/Val Verde area, and east of the Ventura County line, as depicted in Figure 1. It includes the Newhall Ranch Specific Plan area and the entire area is generally under a single ownership. The Newhall Ranch Specific Plan along with Entrada, Legacy Village and the buildout of the Commerce Center represent all the projects that will build out this area over the next 25 years.

As the land development occurs, new roadway infrastructure will be constructed to serve the Westside area. New highways, which include three bridge crossings of the Santa Clara River, as well as extensions of existing highways such as Magic Mountain Parkway, Valencia Boulevard, Pico Canyon Road, and Commerce Center Drive, will provide the backbone highway system for the Westside. This analysis evaluates the phasing of that infrastructure in relation to the projected development.

2.0 METHODOLOGY

The timing and order of roadway construction is primarily based on the land development of the areas served by the roads. A draft master land use phasing plan has been prepared by the land owner for use with this analysis, and the plan provides the basis for the trip generation characteristics (amount and location) within the area being studied.

Several milestone years are modeled using versions of the Santa Clarita Valley Consolidated Traffic Model (SCVCTM) specially prepared for this analysis. These horizon years start at year 2011 and



Legend

- Westside Planning Area Boundaries
- Existing Roadway
- Future Roadway

Figure 1

WESTSIDE PROJECT AREA

continue through the year 2030. Detailed land use projections for the Westside area are utilized for the trip generation estimates for each of the horizon years. Outside the Westside area, trip generation estimates are interpolated using the SCVCTM Interim Year setting and Long-range Cumulative setting as the basis for the interpolation.

Figure 2 illustrates how the land use for the Westside area is projected to increase over time. Also shown in the figure is the corresponding trip generation for the same time period. Note that the Westside area as used in this analysis includes the Commerce Center, which accounts for the majority of the non-residential development of the initial years of the land use plan.

Figure 3 provides the corresponding information for the non-Westside portion of the Santa Clarita Valley. Details of the land use projections for the Westside area are provided in the following section.

3.0 WESTSIDE LAND USE

With the exception of the Commerce Center area, which currently has around 6.5 MSF of occupied industrial park uses, the existing condition of the Westside area is largely undeveloped. A summary of the Westside land use by development area is provided in Table 1, which shows the estimated dates for first occupancy and buildout.

Table 2 provides a summary of occupancy projections for the Westside area. Detailed land use and trip generation estimates for each planning area are provided in Appendix A for each of the horizon years selected for analysis.

4.0 ROADWAY PHASING PLAN

A master phasing plan for Westside area roadways has been developed to serve the areas listed in the previous section. A total of seven distinct stages have been identified and are illustrated in Figure 4 through Figure 10.

The figures are organized such that roadway construction is identified by the years in which the construction needs to take place, which will tie in with the issuance of Certificates of Occupancy.

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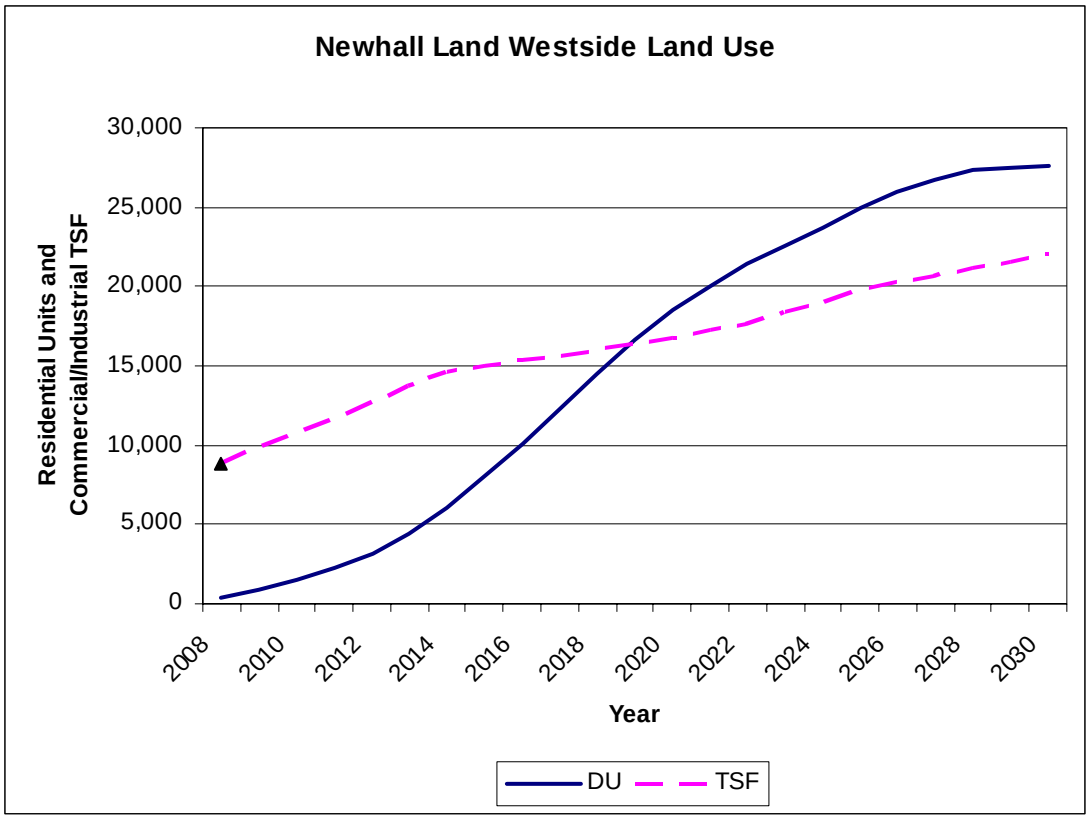


▲Initial 9 MSF includes the existing Commerce Center plus estimated Commerce Center occupancies through 2008.

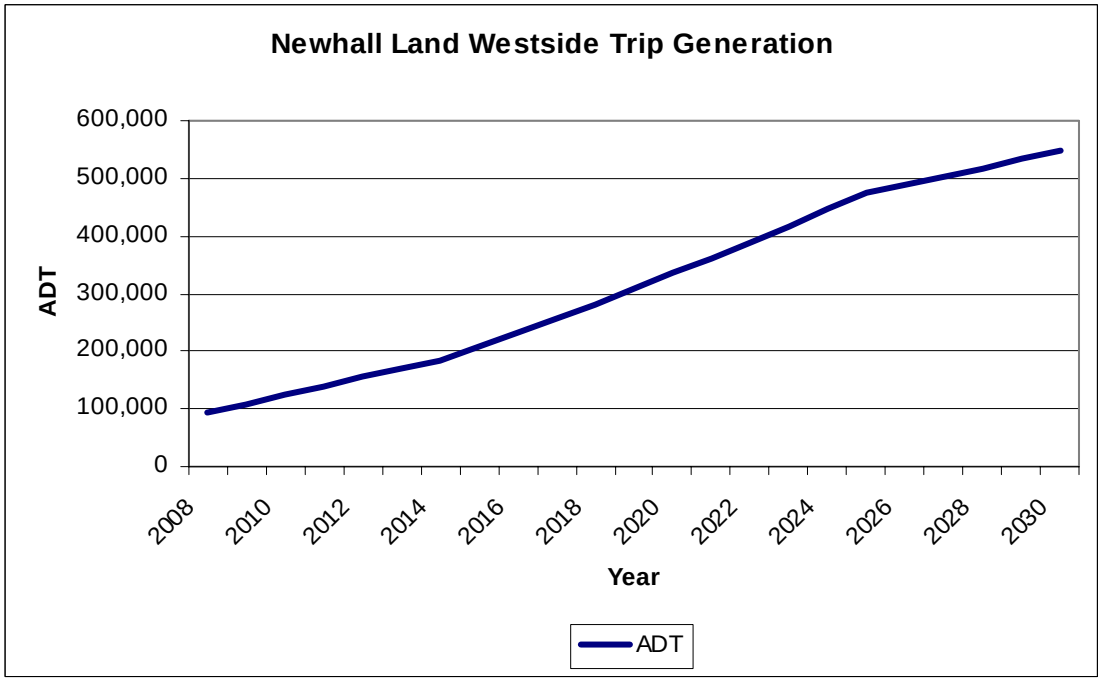
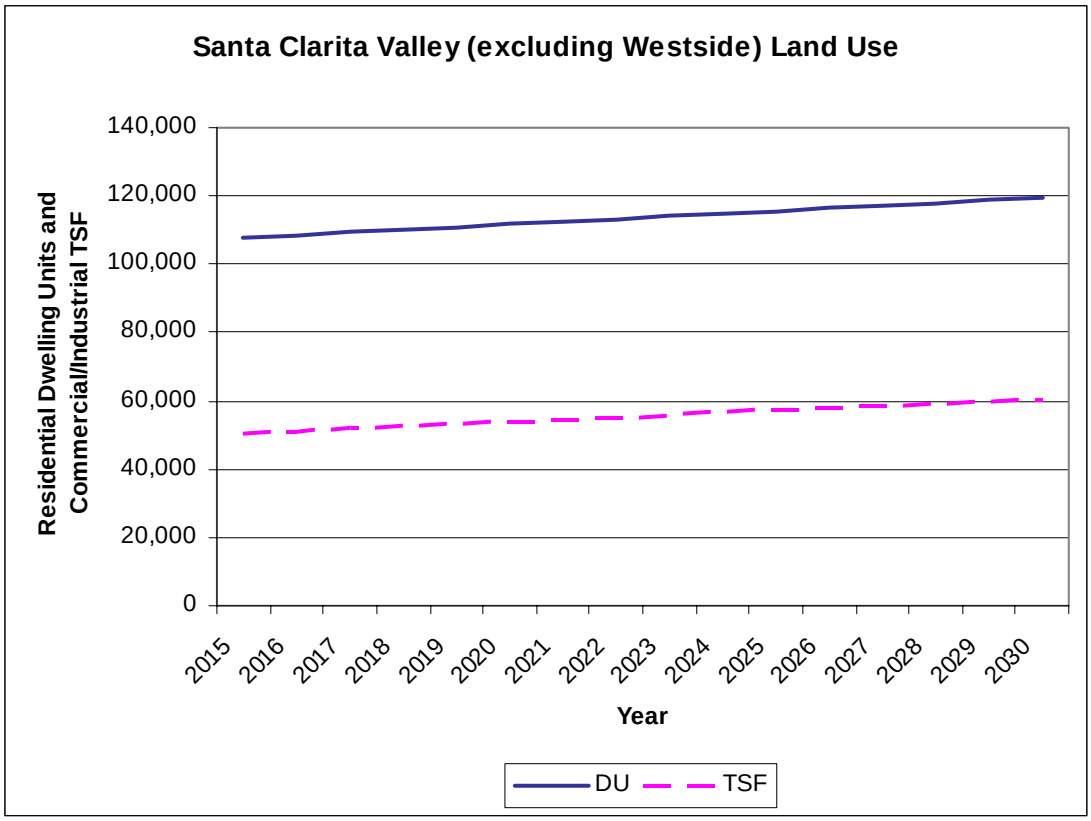


Figure 2: Westside Land Use and ADT Growth Trends



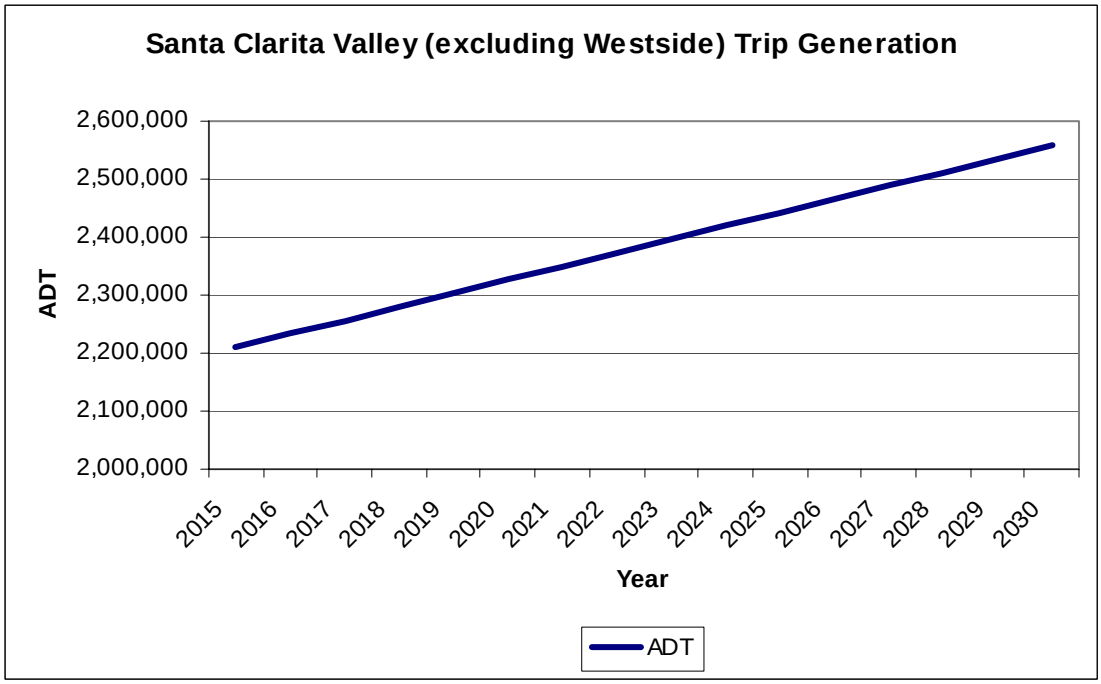


Figure 3: Santa Clarita Valley (excluding Westside) Growth Trends

Table 1: Westside Land Use by Development Area

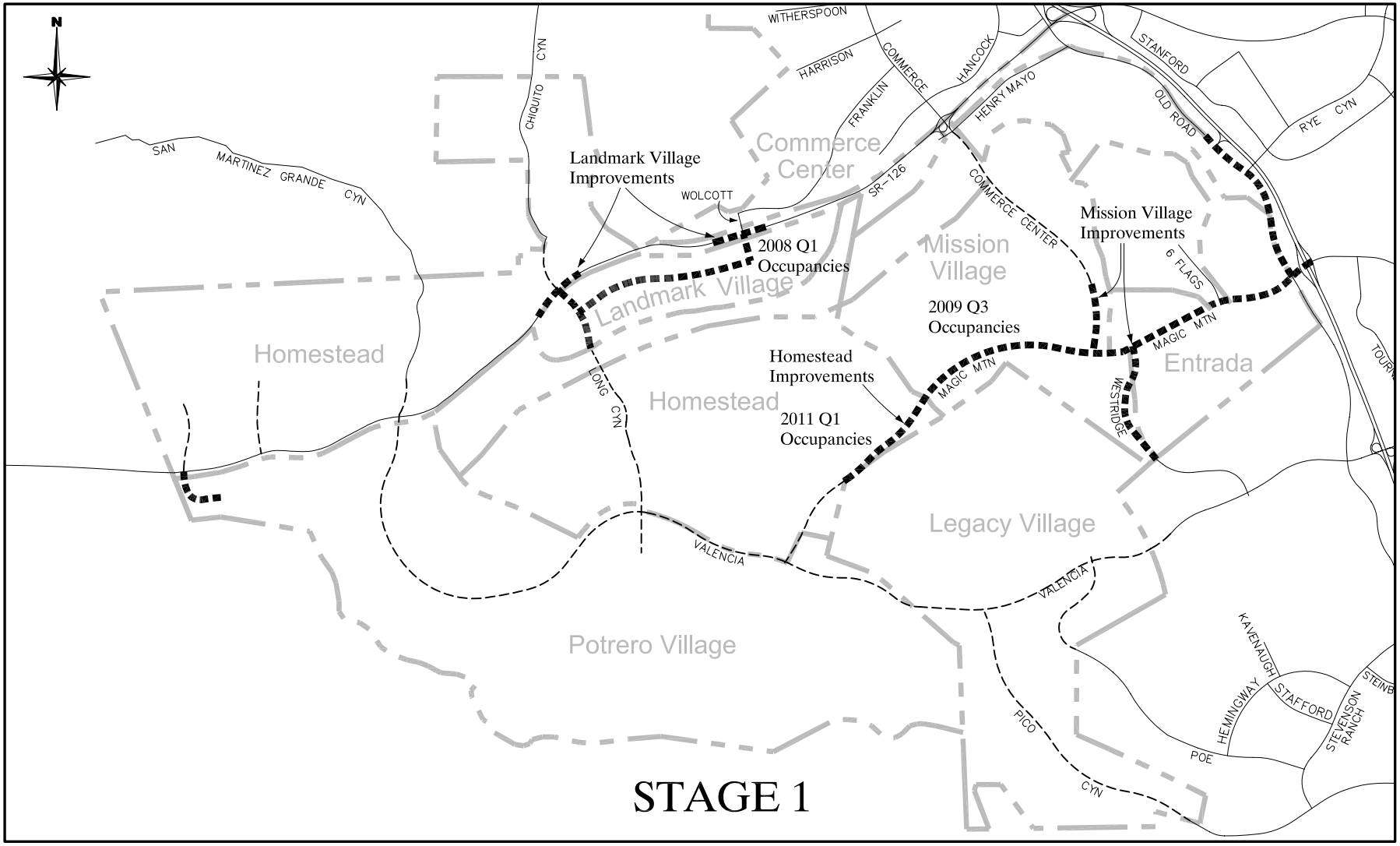
Area/Land Use	Amount	First Occupancy	Buildout
LANDMARK VILLAGE (NEWHALL RANCH)			
Residential	1,444 DU	2008	2011
Commercial	1,033 TSF	2008	2011
MISSION VILLAGE (NEWHALL RANCH)			
Residential	5,331 DU	2009	2023
Commercial	1,299 TSF	2009	2023
HOMESTEAD (NEWHALL RANCH)			
Residential	5,686 DU	2011	2025
Commercial	1,330 TSF	2023	2030
ENTRADA			
Residential	3,230 DU	2011	2019
Commercial	3,285 TSF[1]	2008	2030
Hotel	300 Room	2023	2023
LEGACY VILLAGE (STEVENSON RANCH)			
Residential	3,500 DU	2012	2020
Commercial	375 TSF	2019	2022
POTRERO VILLAGE (NEWHALL RANCH)			
Residential	8,424 DU	2013	2030
Commercial	1,257 TSF[2]	2019	2030
COMMERCE CENTER			
Commercial	13,100 TSF[3,4]	existing	2014
TOTAL			
Residential	27,615 DU	2008	2030
Commercial	21,679 TSF	existing	2030
Hotel	300 Room	2023	2023

[1]VTTM 52295 only. Excludes other development by others that is part of the same traffic analysis zone.
[2]Excludes water reclamation plant.
[3]Includes existing development in the Commerce Center.
[4]Sterling Project (approximately 1.3 MSF) is not included in the above total but traffic forecasts include full occupancy of the Sterling site by 2011.

Table 2: Westside Area Occupancy Projections

	Cumulative Occupancy Projections by Year													
	2008-2011		2012		2013-2014		2015-2018		2019-2022		2023-2025		2026-2030	
Location	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***
Landmark Village	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*
Mission Village	531	*.29*	932	*.29*	1,874	*.31*	3,930	*.64*	5,297	*.96*	5,331	*1.30*	5,331	*1.30*
Homestead (No.)	--	--	--	--	--	--	--	--	479	--	1,779	*.60*	1,779	*1.33*
Homestead (So.)	112	--	312	--	851	--	2,289	--	3,907	--	3,907	--	3,907	--
Potrero Village	--	--	--	--	114	--	1,169	--	3,516	*.50*	5,810	*.90*	8,424	*1.36*
Legacy Village	--	--	97	--	597	--	2,586	--	3,500	*.38*	3,500	*.38*	3,500	*.38*
Entrada	150	*.43*[1]	391	*.43*	1,186	*.43*	3,097	*1.23*	3,230	*1.68*	3,230	*2.47*	3,230	*3.58*
Commerce Center	--	*10.46*[2]	--	*11.42*	--	*13.10*	--	*13.10*	--	*13.10*	--	*13.10*	--	*13.10*
Total	2,237	*12.21*	3,176	*13.17*	6,066	*14.87*	14,515	*16.00*	21,373	*17.65*	25,001	*19.78*	27,615	*22.08*
Net Increase from Previous Period	--	--	939	*.96*	2,890	*1.70*	8,449	*1.13*	6,858	*1.65*	3,628	*2.13*	2,614	*2.30*

[1]Includes existing Castaic Junction area development and anticipated occupancies between existing and 2011.
[2]Includes existing Commerce Center development and anticipated occupancies between existing and 2011.

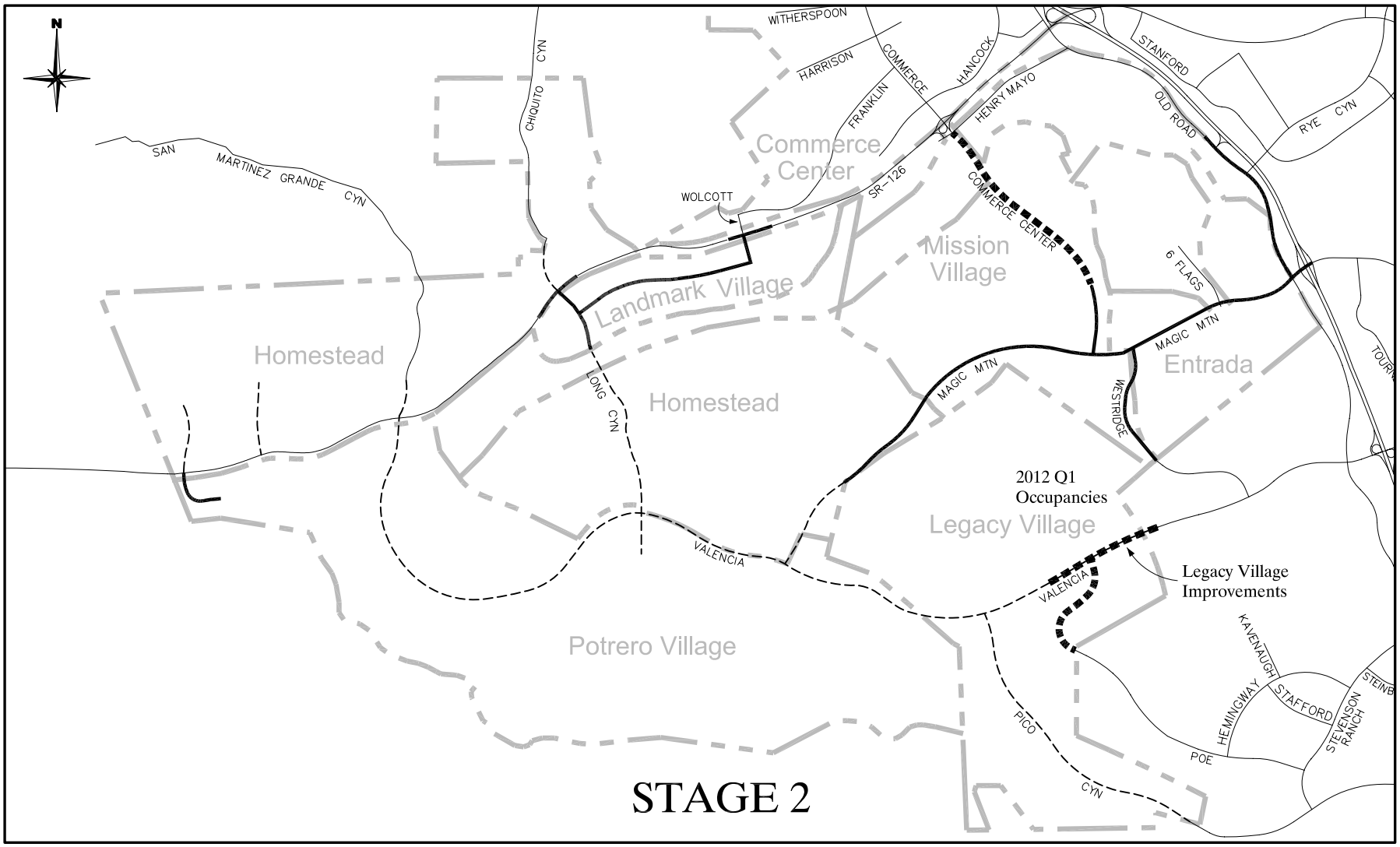


Legend

Construction This Stage
Planned Roadway (Future Stage)

Figure 4

STAGE 1 ROADWAY CONSTRUCTION (2007-2010) - FOR OCCUPANCIES THROUGH 2,240 DU/12.2 MSF (2011)

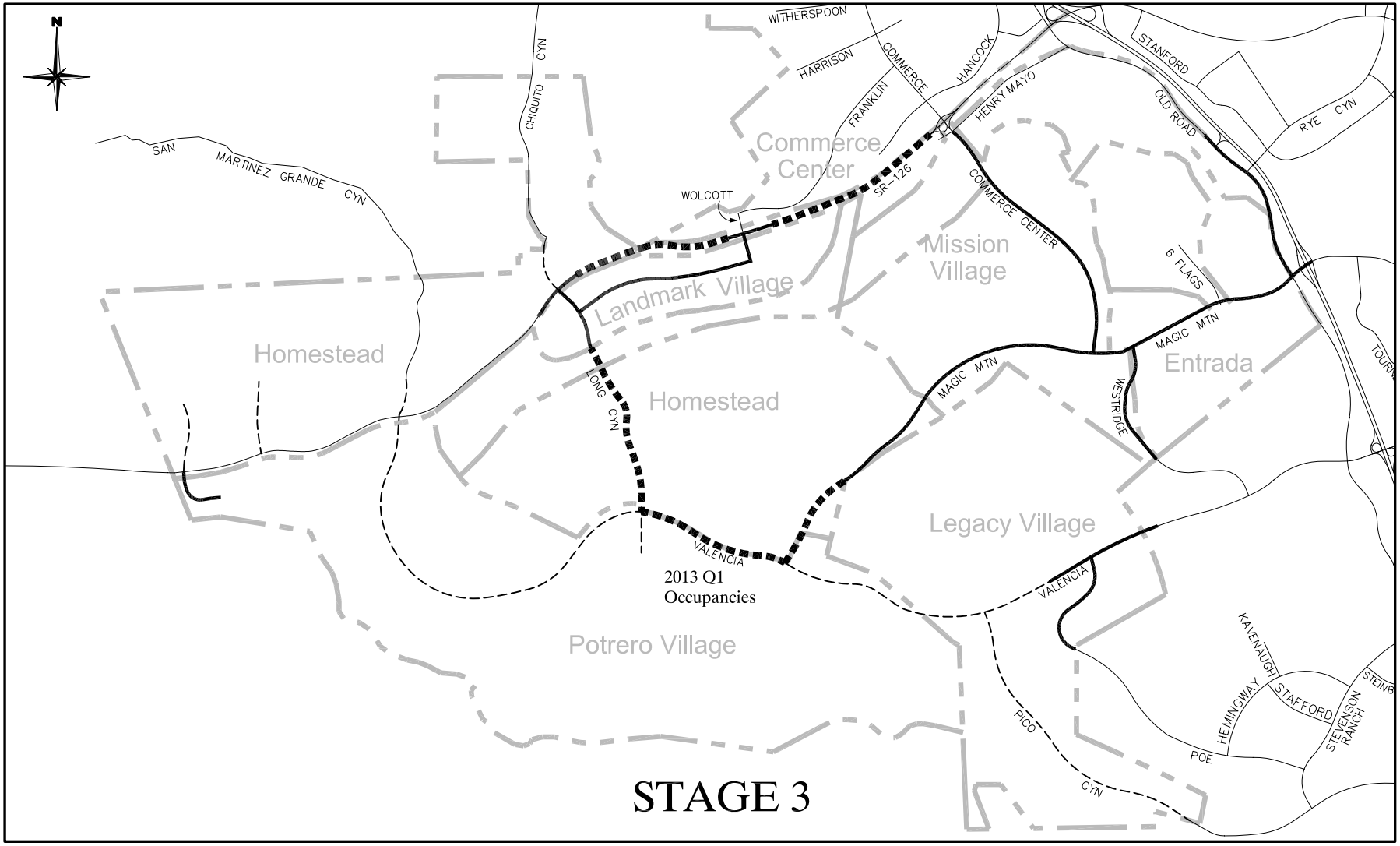


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 5

STAGE 2 ROADWAY CONSTRUCTION (2010-2011) - FOR OCCUPANCIES THROUGH 3,180 DU/13.2 MSF (2012)



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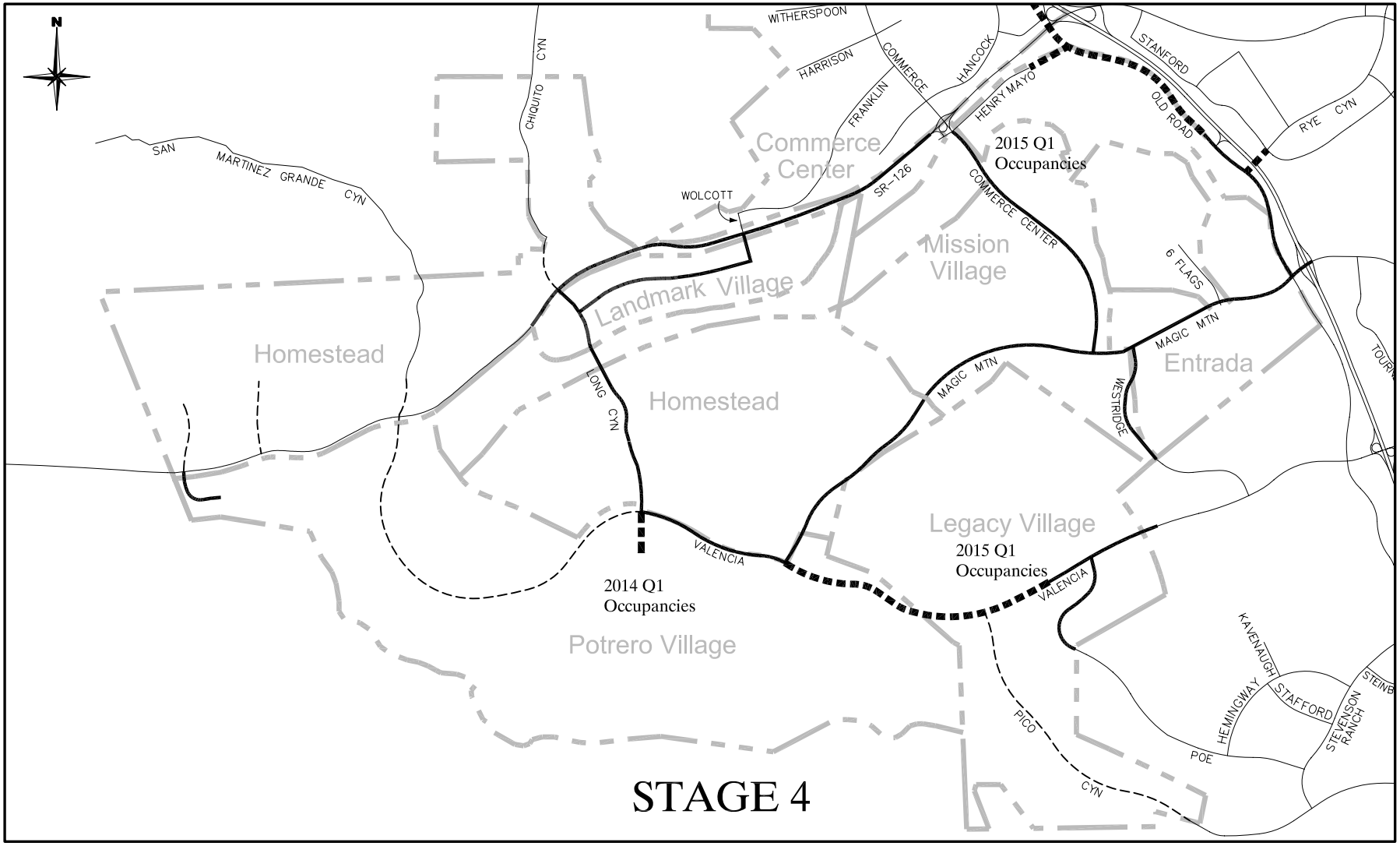
- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 6

STAGE 3 ROADWAY CONSTRUCTION (2012) - FOR OCCUPANCIES THROUGH 6,070 DU/14.9 MSF (2014)

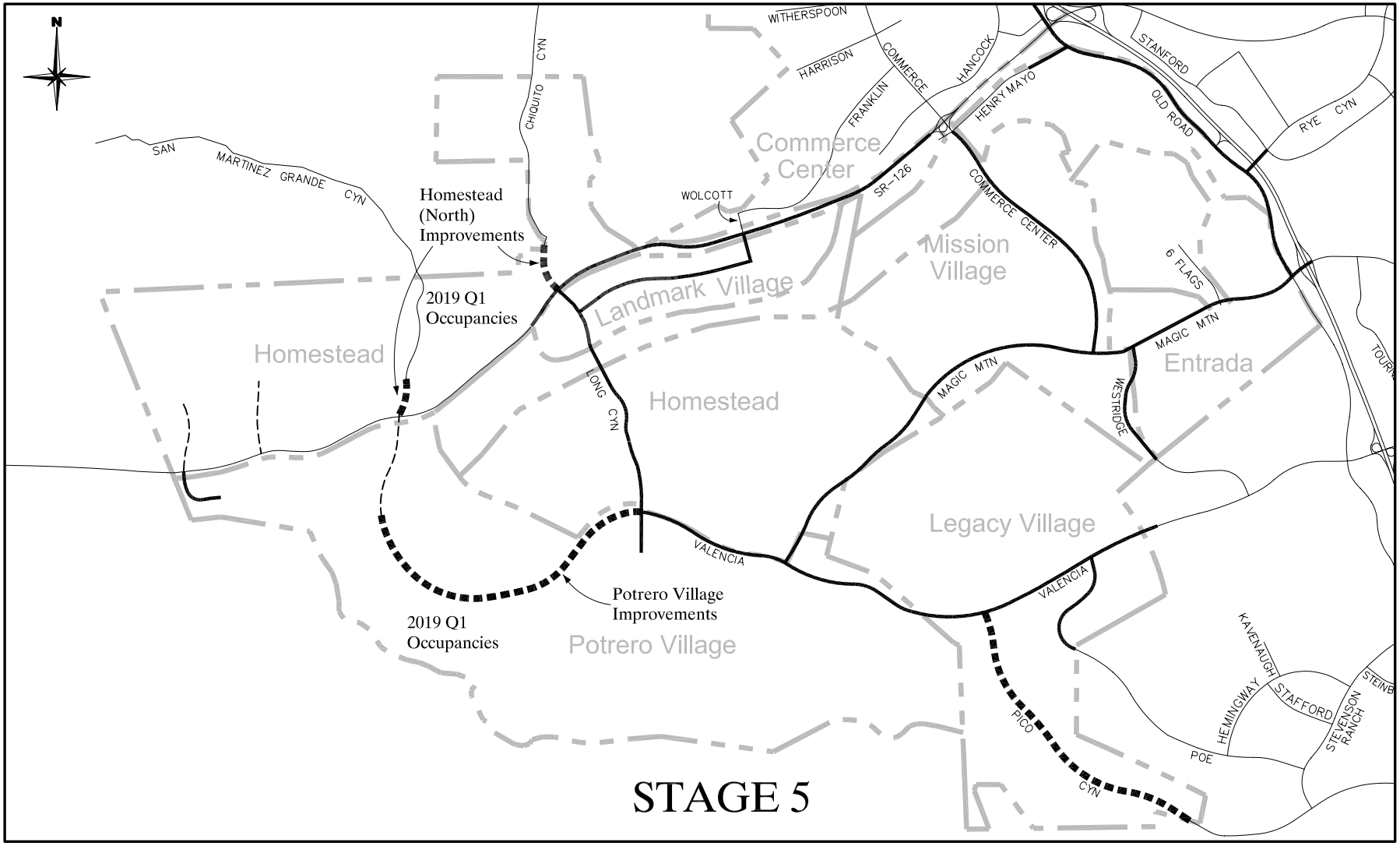


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 7

STAGE 4 ROADWAY CONSTRUCTION (2013-2014) - FOR OCCUPANCIES THROUGH 14,520 DU/16.0 MSF (2018)

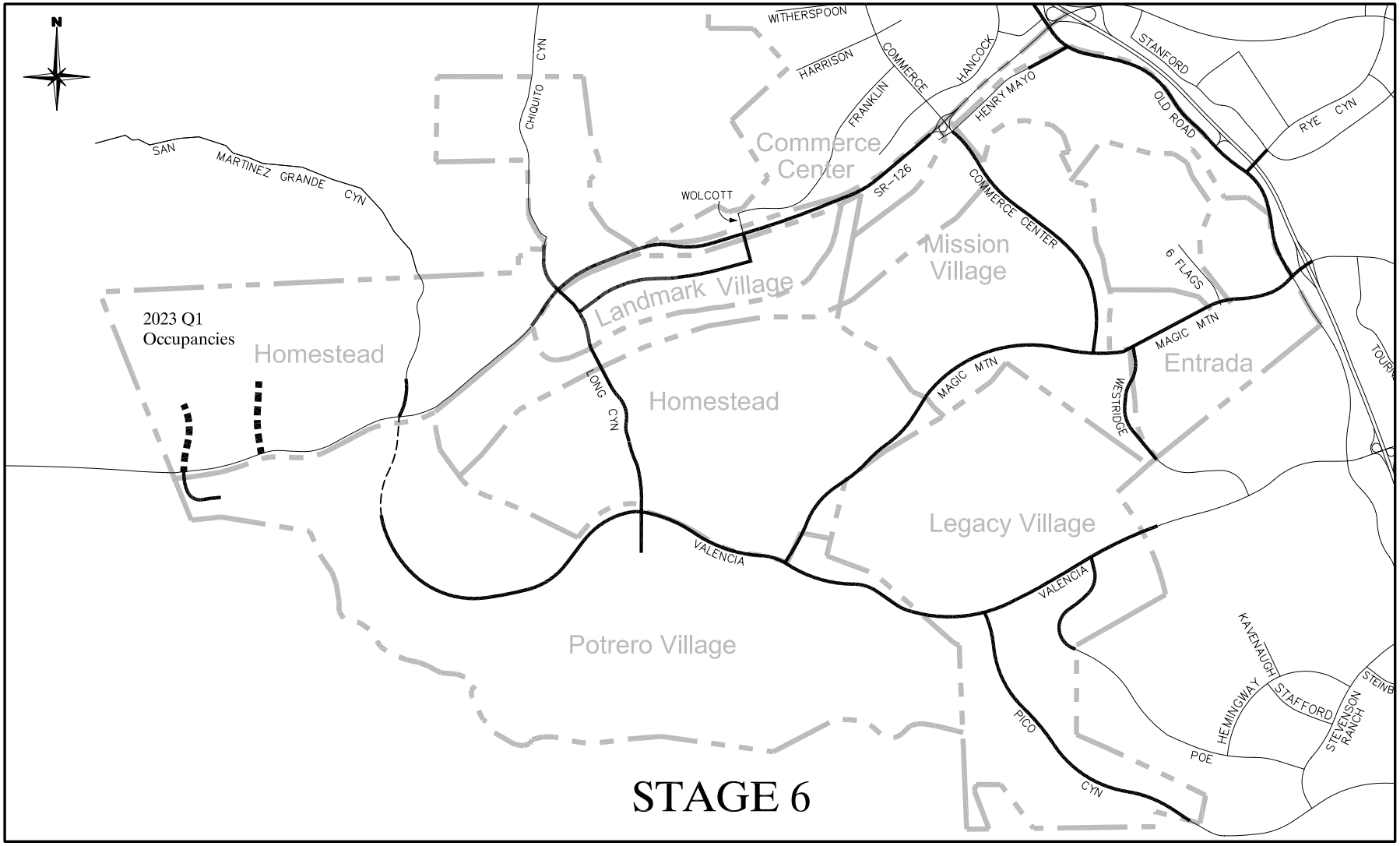


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 8

STAGE 5 ROADWAY CONSTRUCTION (2015-2018) - FOR OCCUPANCIES THROUGH 21,380 DU/17.7 MSF (2022)

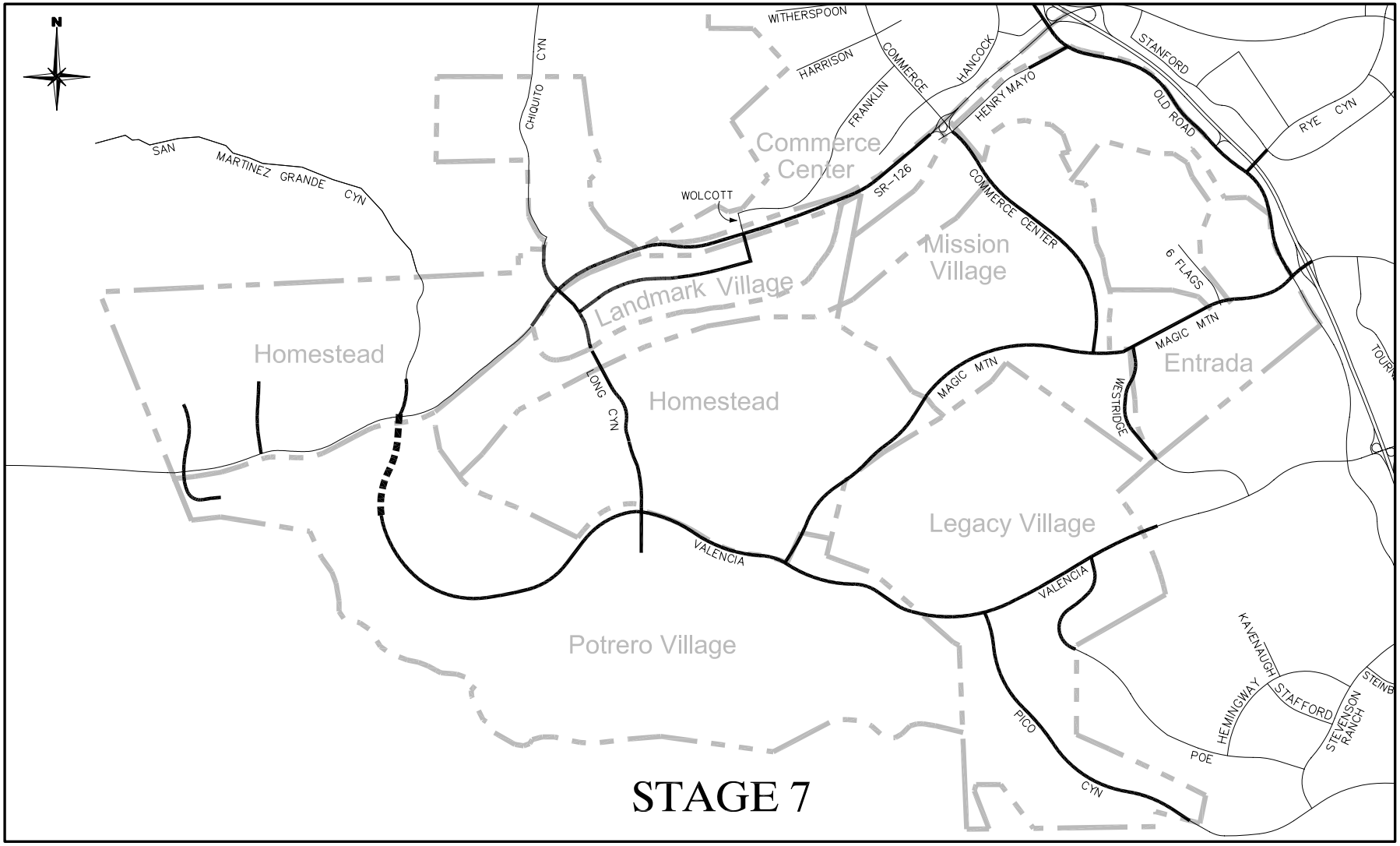


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 9

STAGE 6 ROADWAY CONSTRUCTION (2019 - 2022) - FOR OCCUPANCIES THROUGH 25,000 DU/19.8 MSF (2025)



Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 10

STAGE 7 ROADWAY CONSTRUCTION (2023-2030) - FOR OCCUPANCIES THROUGH 27,620 DU/22.1 MSF (PROJECT BUILDOUT)

Completing the roadway construction by the years indicated will serve the land use plan as currently envisioned for that year and the years immediately following, after which additional infrastructure will be needed to serve additional development. Therefore, the infrastructure shown in each stage of construction will accommodate the land use development that will be occurring while the next stage of new roadways are being constructed. A description of each roadway construction stage, the estimated completion dates for the construction, and the amount of development that can be supported by that stage, is provided in Table 3.

Table 3: Roadway Construction Stages

Stage	Description	Completion Date	Max DU	Max MSF
1	Construct access to Landmark Village from SR-126 Construct access to Water Treatment Plant from SR-126 Extend Magic Mountain Parkway into Mission Village Extend Westridge Parkway to Magic Mountain Parkway Widen The Old Road between Feedmill Road & the relocated Rye Canyon interchange Extend Magic Mountain Parkway into Homestead	End of 2007 End of 2007 Mid 2009 Mid 2009 Mid 2010 End of 2010	2,237	12.21
2	Construct Commerce Center Drive Bridge/connect Mission Village to SR-126 Extend Valencia Boulevard into Legacy Village Extend Poe Parkway to Valencia Boulevard	End of 2011 End of 2011 End of 2011	3,176	13.17
3	Extend Magic Mountain Parkway into Potrero Village Construct segments of Valencia Blvd (Potrero Village) & Long Canyon Road Construct Long Canyon Road Bridge/connect Homestead (South) to SR-126 Widen SR-126 to 8-lanes between Commerce Center Drive and Long Canyon Road	End of 2012 End of 2012 End of 2012 End of 2012	6,066	14.87
4	Extend Valencia Boulevard to Potrero Village/Magic Mountain Parkway Widen The Old Road between the relocated Rye Canyon interchange to just north of SR-126	End of 2014 End of 2014	14,515	16.00
5	Construct Valencia Blvd west of Long Canyon Road Construct access to Homestead (North) from SR-126 at Chiquito Cyn Rd and at San Martinez Grande Cyn Rd Extend Pico Canyon Road to Valencia Blvd	End of 2018 End of 2018 End of 2018	21,373	17.65
6	Construct access to Homestead (North) from SR-126 at County Line	End of 2022	25,001	19.78
7	Construct 3rd river crossing Bridge (Potrero/Valencia)	2030	27,615	22.08

DU = Dwelling Units MSF = Million Square Feet (non-residential uses)
Max = Maximum amount of land use to be supported by Stage

The following section presents traffic model forecasts for the key stages of the phasing plan.

5.0 TRAFFIC FORECASTS BY PHASE

Key roadway construction stages have been modeled using the corresponding amount of land use development to be supported by the new roadways. Figures illustrate the Average Daily Traffic (ADT) volumes and the corresponding amounts of Westside land use development for each of the following scenarios:

- Year 2011 Land Use Projections with Stage 1 Roadways (Figure 11 & Figure 12)
- Year 2012 Land Use Projections with Stage 2 Roadways (Figure 13 & Figure 14)
- Year 2014 Land Use Projections with Stage 3 Roadways (Figure 15 & Figure 16)
- Year 2018 Land Use Projections with Stage 4 Roadways (Figure 17 & Figure 18)
- Year 2022 Land Use Projections with Stage 5 Roadways (Figure 19 & Figure 20)
- Year 2025 Land Use Projections with Stage 6 Roadways (Figure 21 & Figure 22)
- Year 2030 Land Use Projections with Stage 6[1] Roadways (Figure 23 & Figure 24)

As noted earlier, the roadways shown for each phase will be adequate to support the land development up to that year. Roadway construction from the next stage will then need to be in place to accommodate the additional development of subsequent years.

In addition to the roadway improvements outlined in the previous section, various intersection specific improvements will be required as part of each stage. Table 4 lists the intersection improvements needed to maintain acceptable levels of service through buildout of the Westside area. Constructing these intersection improvements as part of the indicated stages will result in the Intersection Capacity Utilization (ICU) values shown in Table 5 and the corresponding Levels of Service (LOS) shown in Table 6 for the AM peak hour and in Table 7 for the PM peak hour. Detailed ICU worksheets are provided in Appendix B.

In all cases, levels of service are maintained at LOS D or better up to and including buildout of the Westside area with the roadways constructed during Stage 6. Stage 7 will then complete the Westside roadway network (the County Highway Plan) by constructing the 3rd Santa Clara River crossing to complete the final segment of Valencia Boulevard (Potrero Canyon Road) between SR-126 and Potrero Village.

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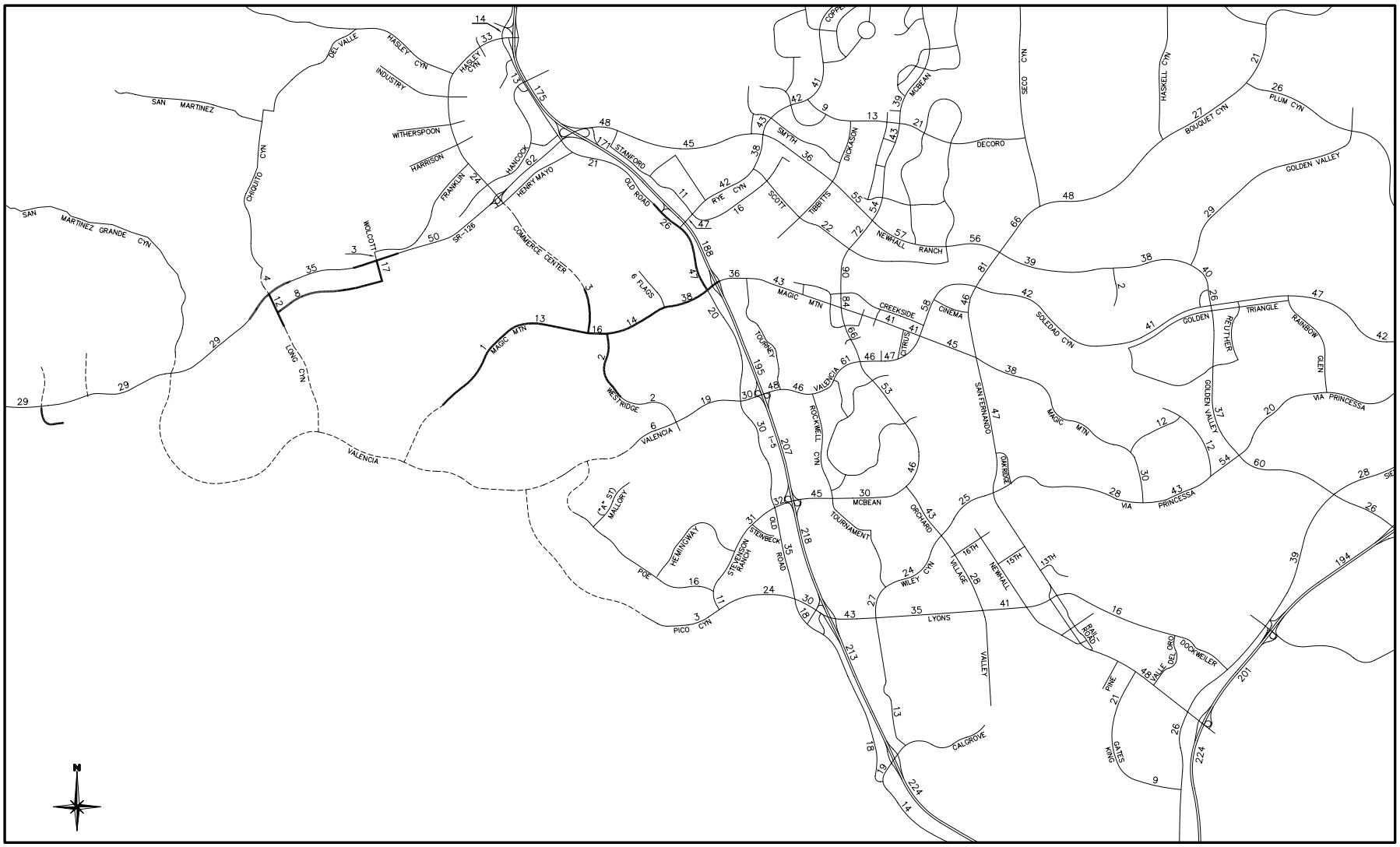
[1] Year 2030 with Stage 7 Roadways (buildout conditions) was evaluated as part of the Newhall Ranch Specific Plan EIR and is not included as part of this phasing analysis.



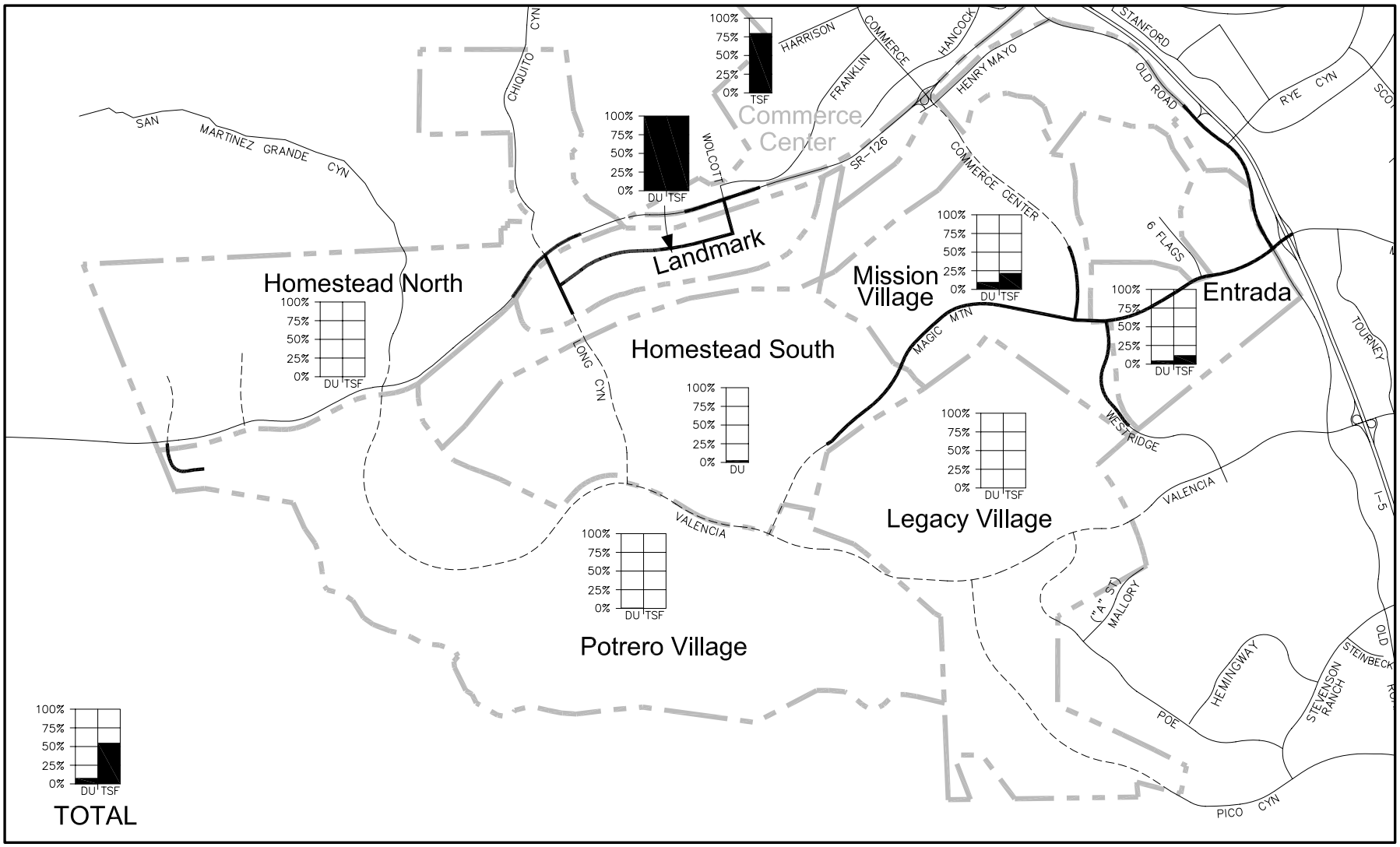
Legend

New/Upgraded Westside Roadway

Future Westside Roadway

Figure 11

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2011



Legend

Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 12

PROJECT DEVELOPMENT BY PLANNING AREA -2011

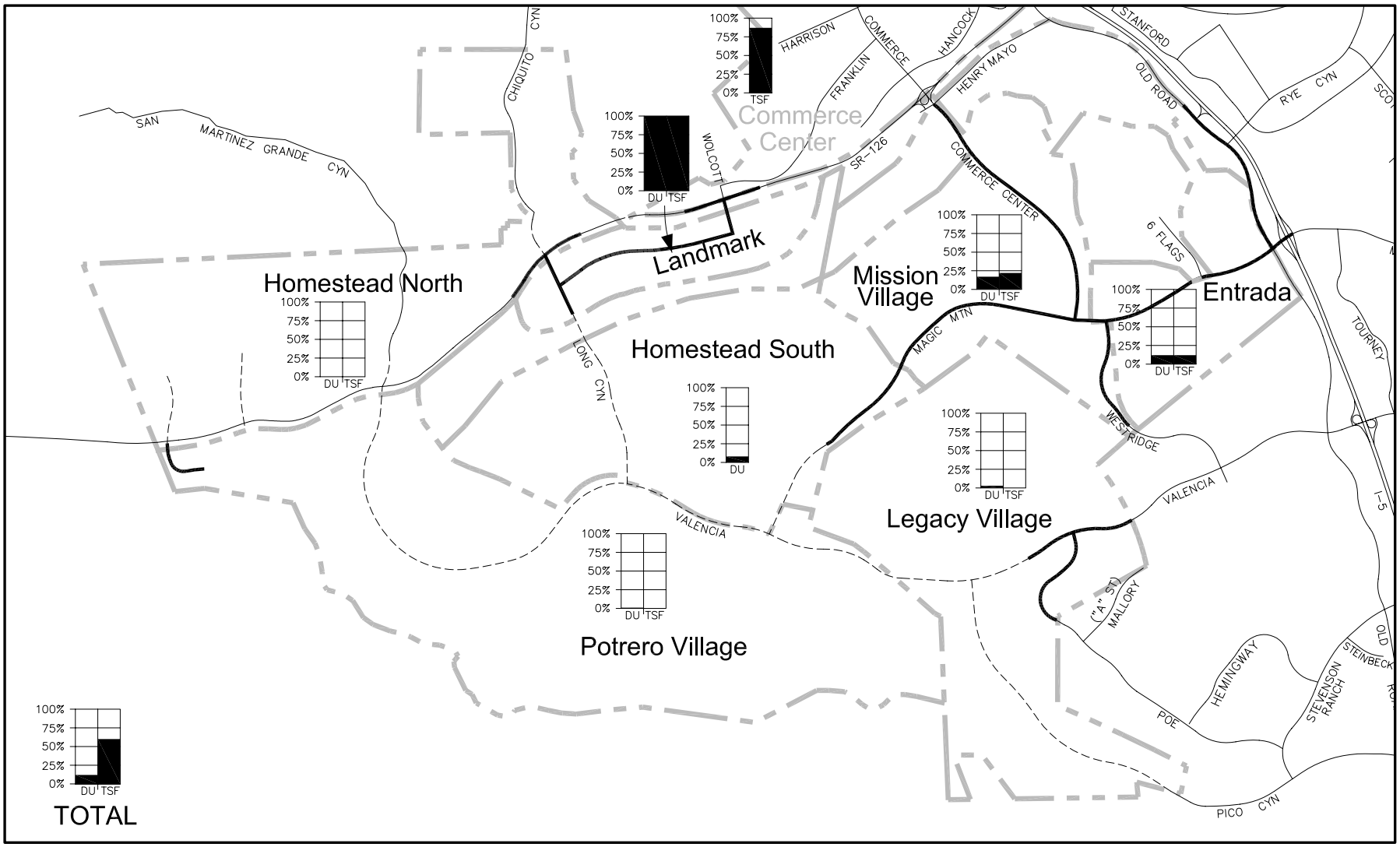
Legend

New/Upgraded Westside Roadway

Future Westside Roadway

Figure 13

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2012



Legend

Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 14

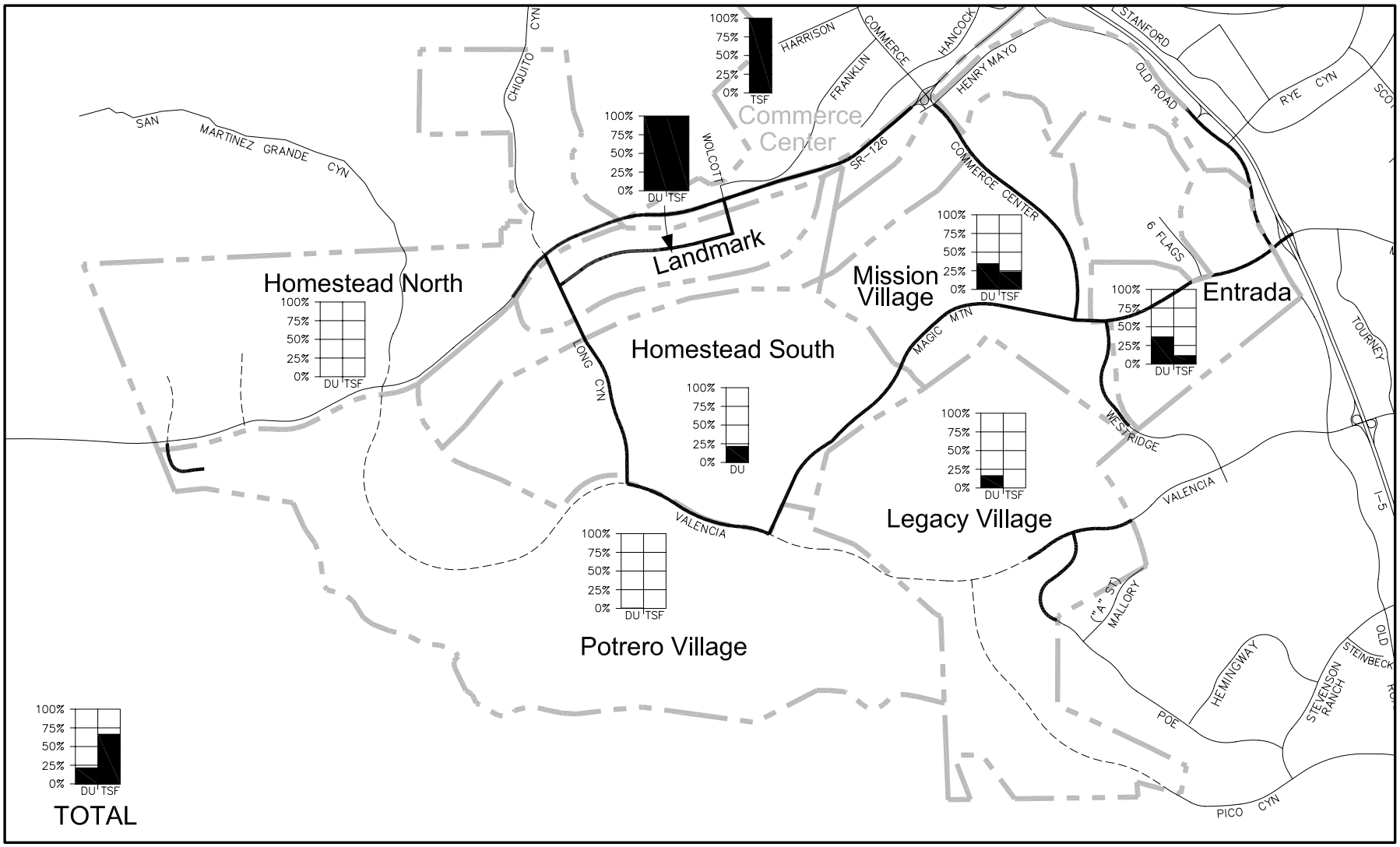
PROJECT DEVELOPMENT BY PLANNING AREA -2012

Legend

New/Upgraded Westside Roadway
Future Westside Roadway

Figure 15

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2014



Legend

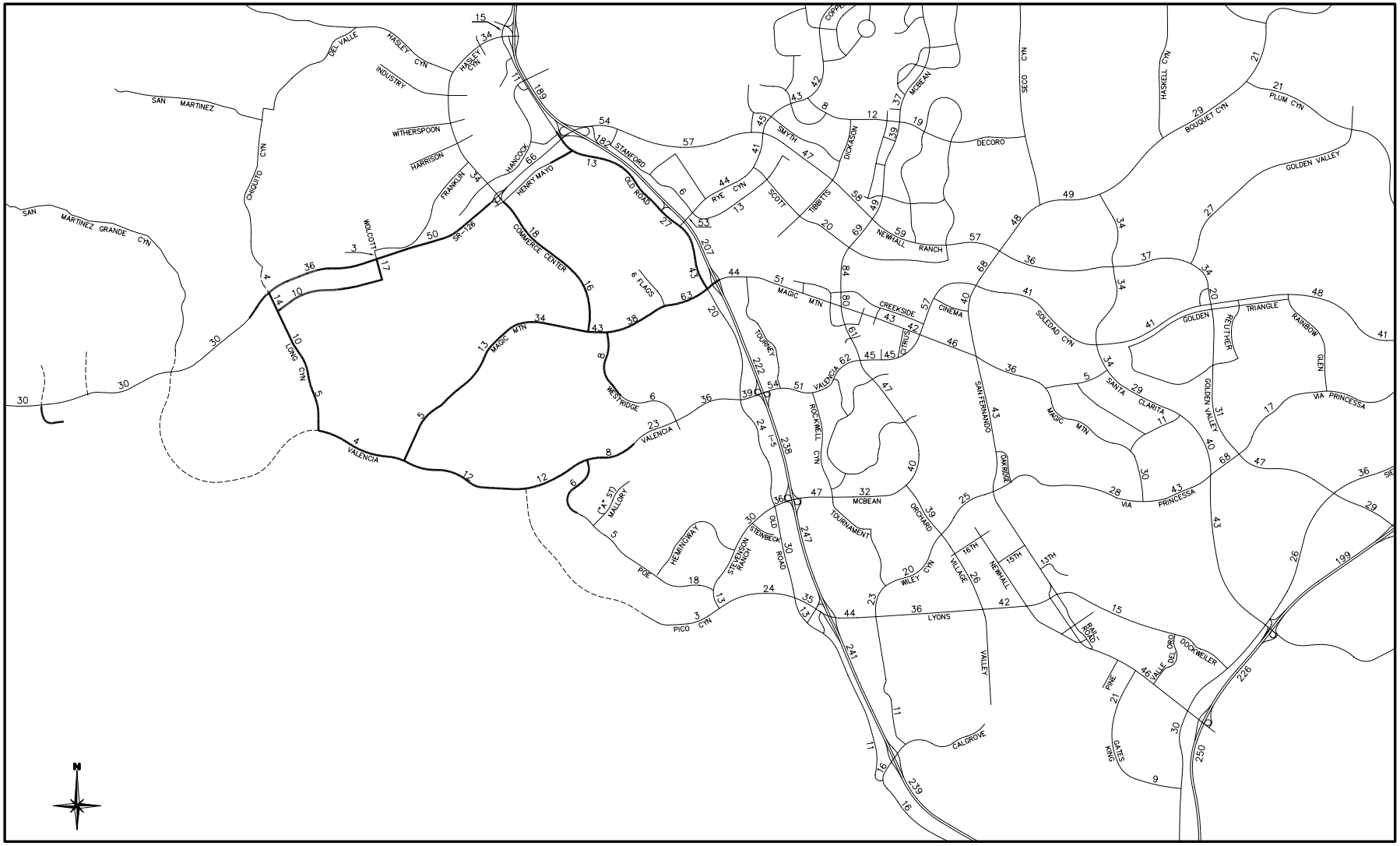
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 16

PROJECT DEVELOPMENT BY PLANNING AREA -2014



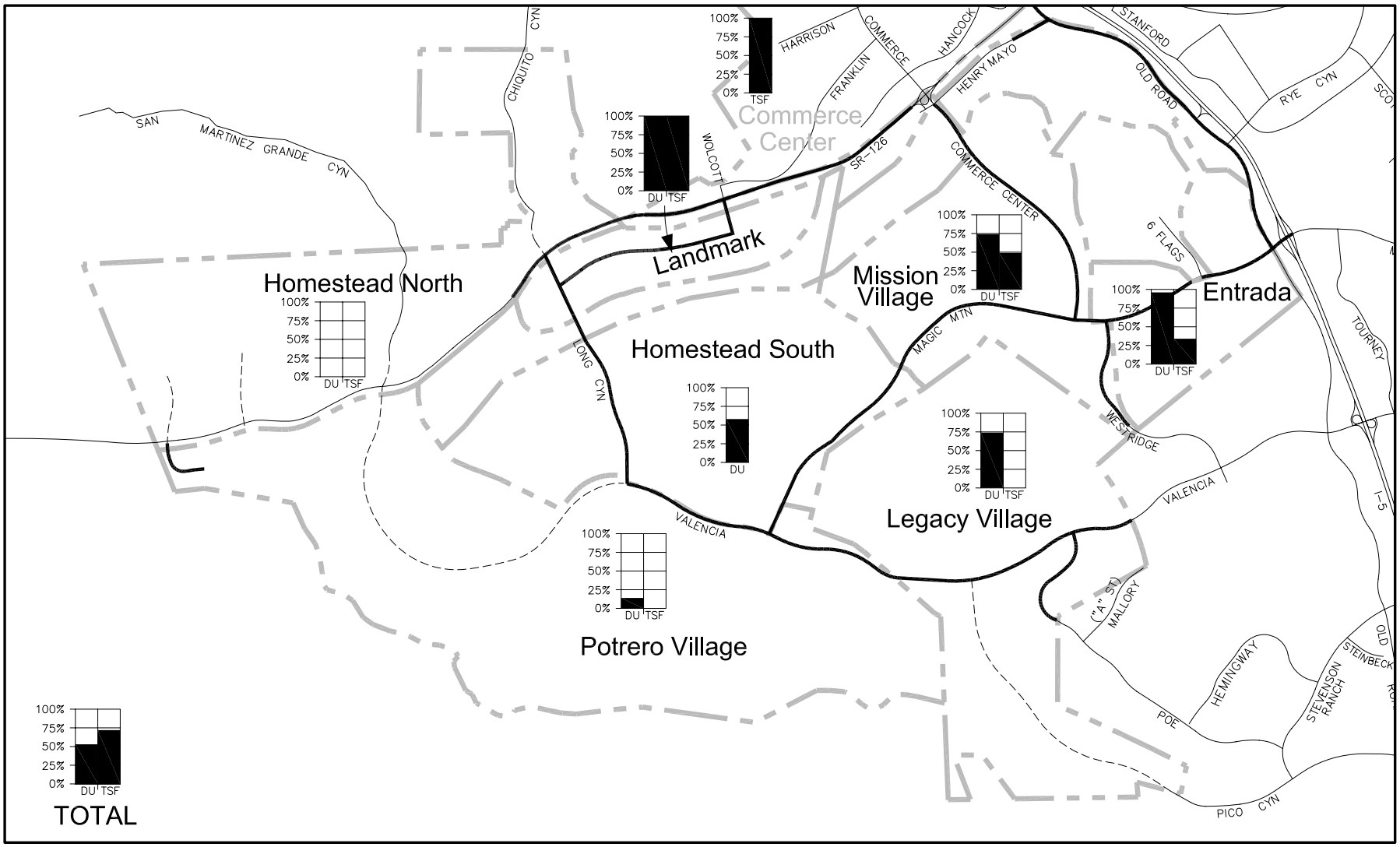
Legend

New/Upgraded Westside Roadway

Future Westside Roadway

Figure 17

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2018



Legend

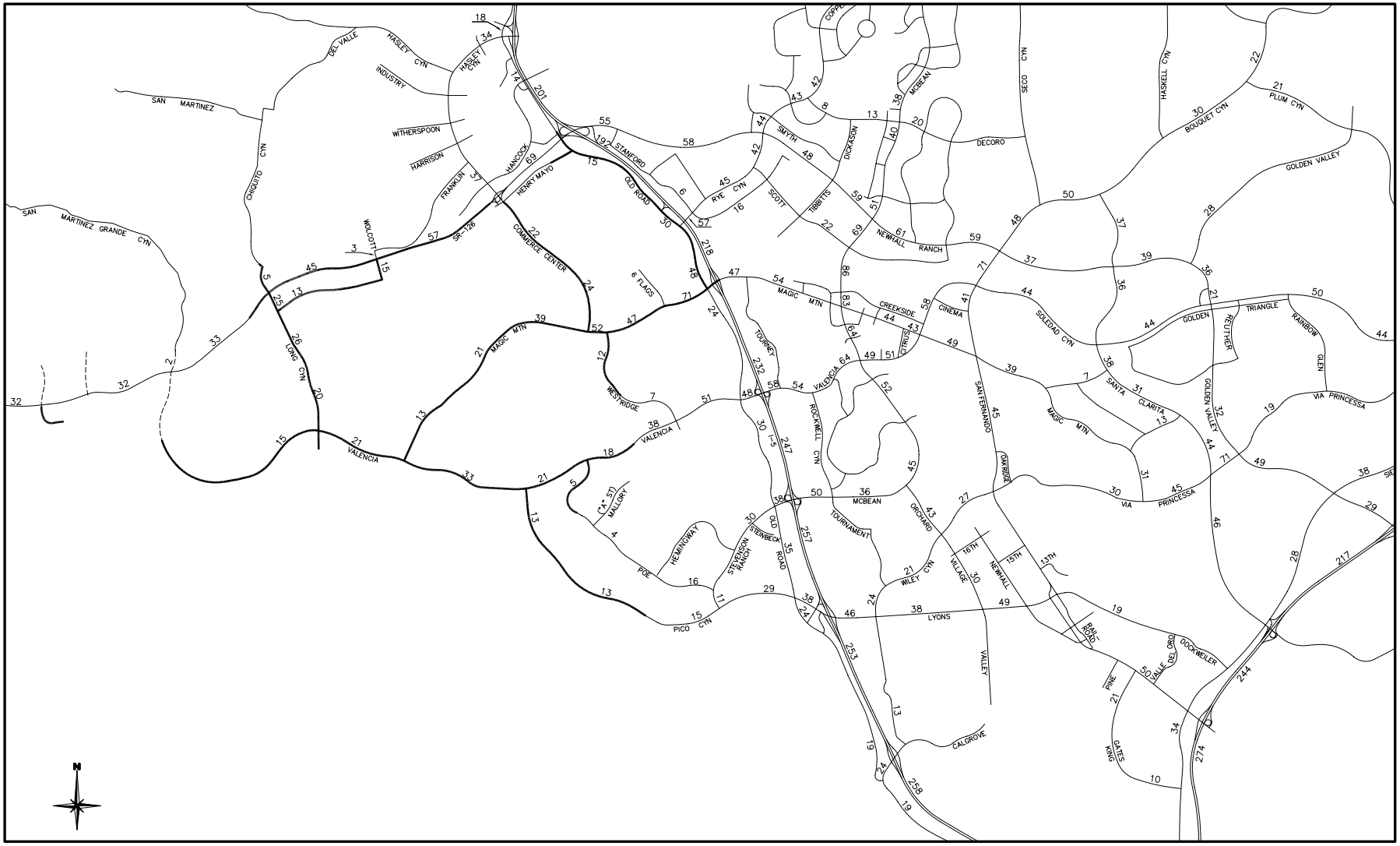
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 18

PROJECT DEVELOPMENT BY PLANNING AREA -2018

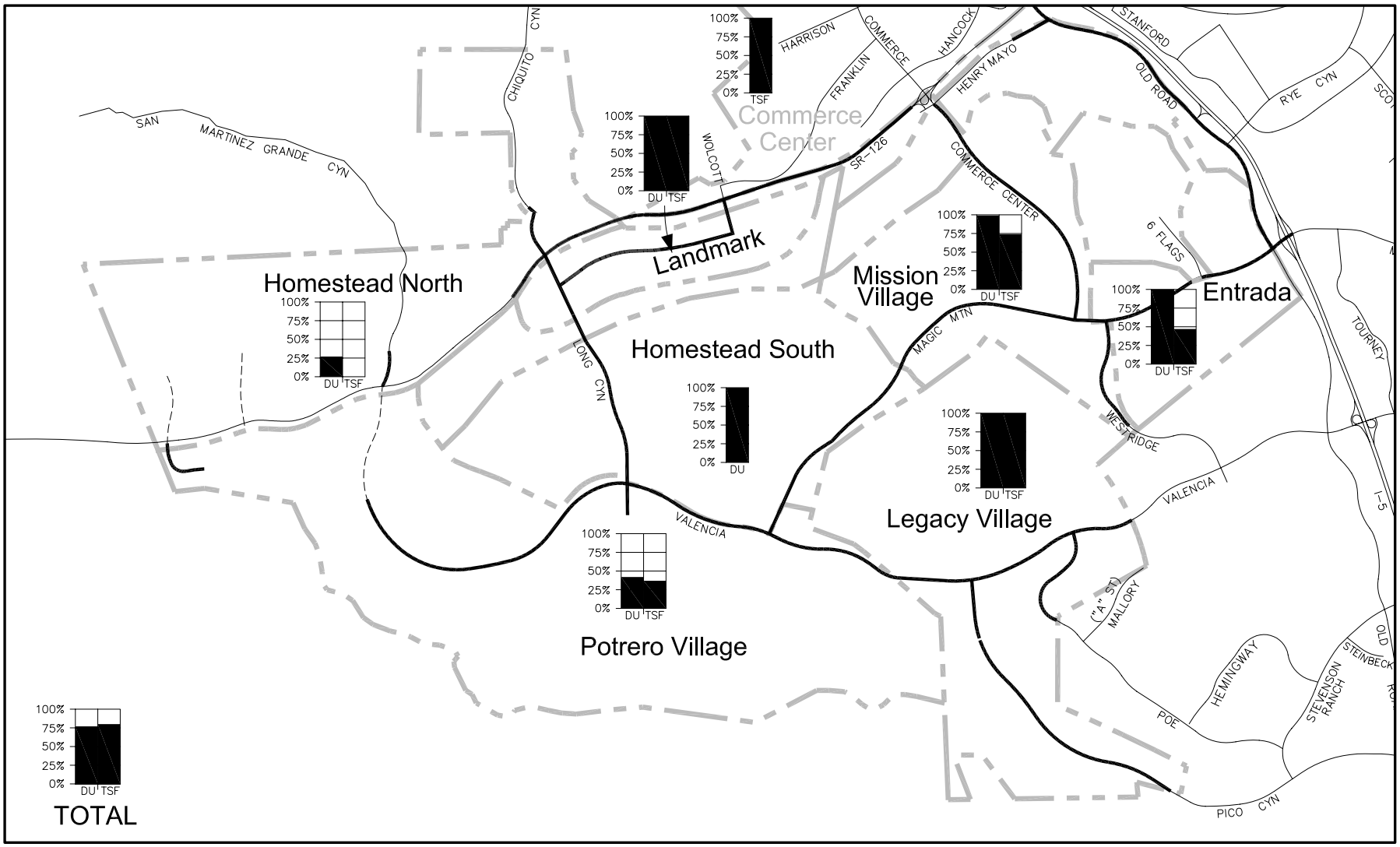


Legend

New/Upgraded Westside Roadway
Future Westside Roadway

Figure 19

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2022



Legend

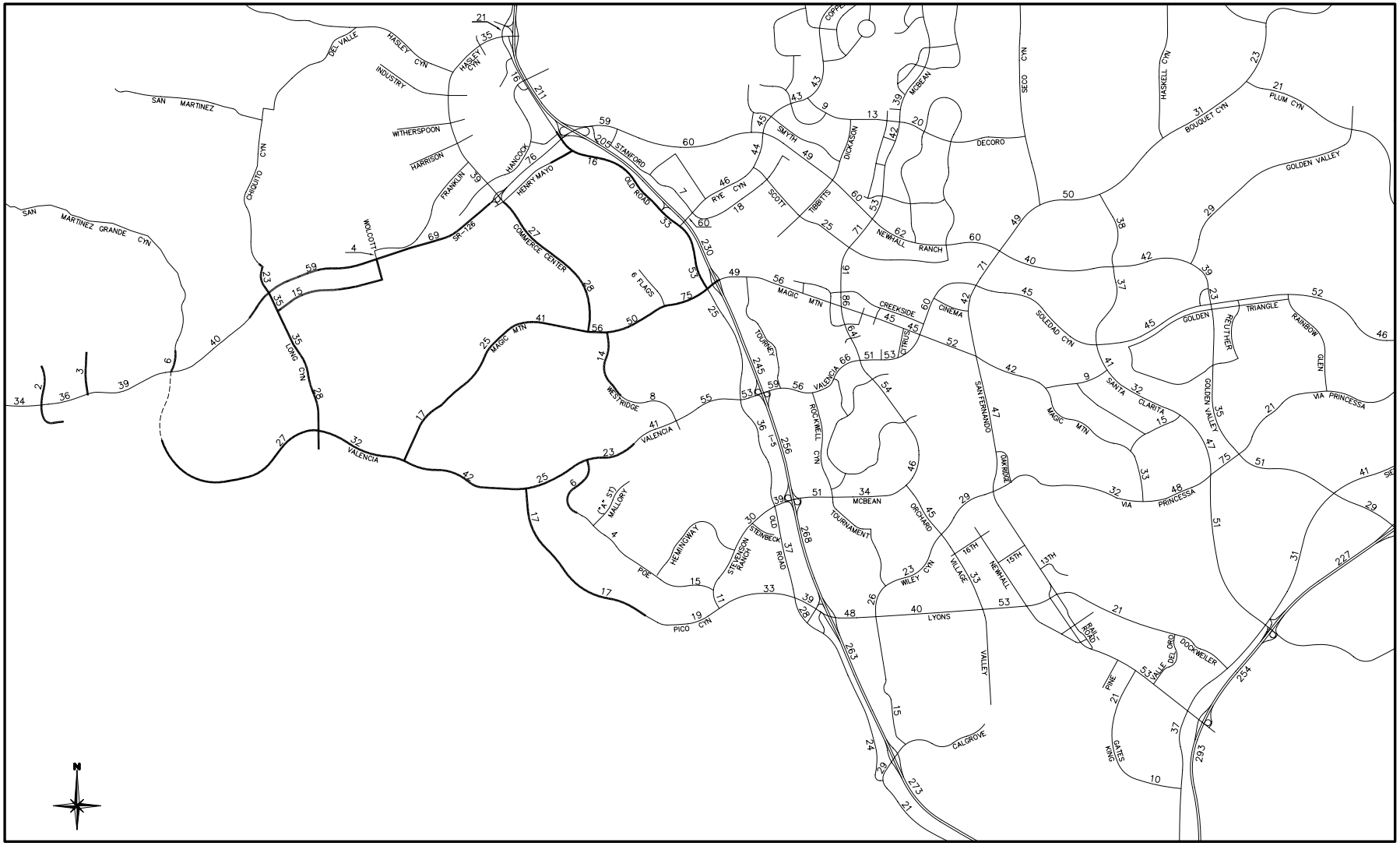
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 20

PROJECT DEVELOPMENT BY PLANNING AREA -2022



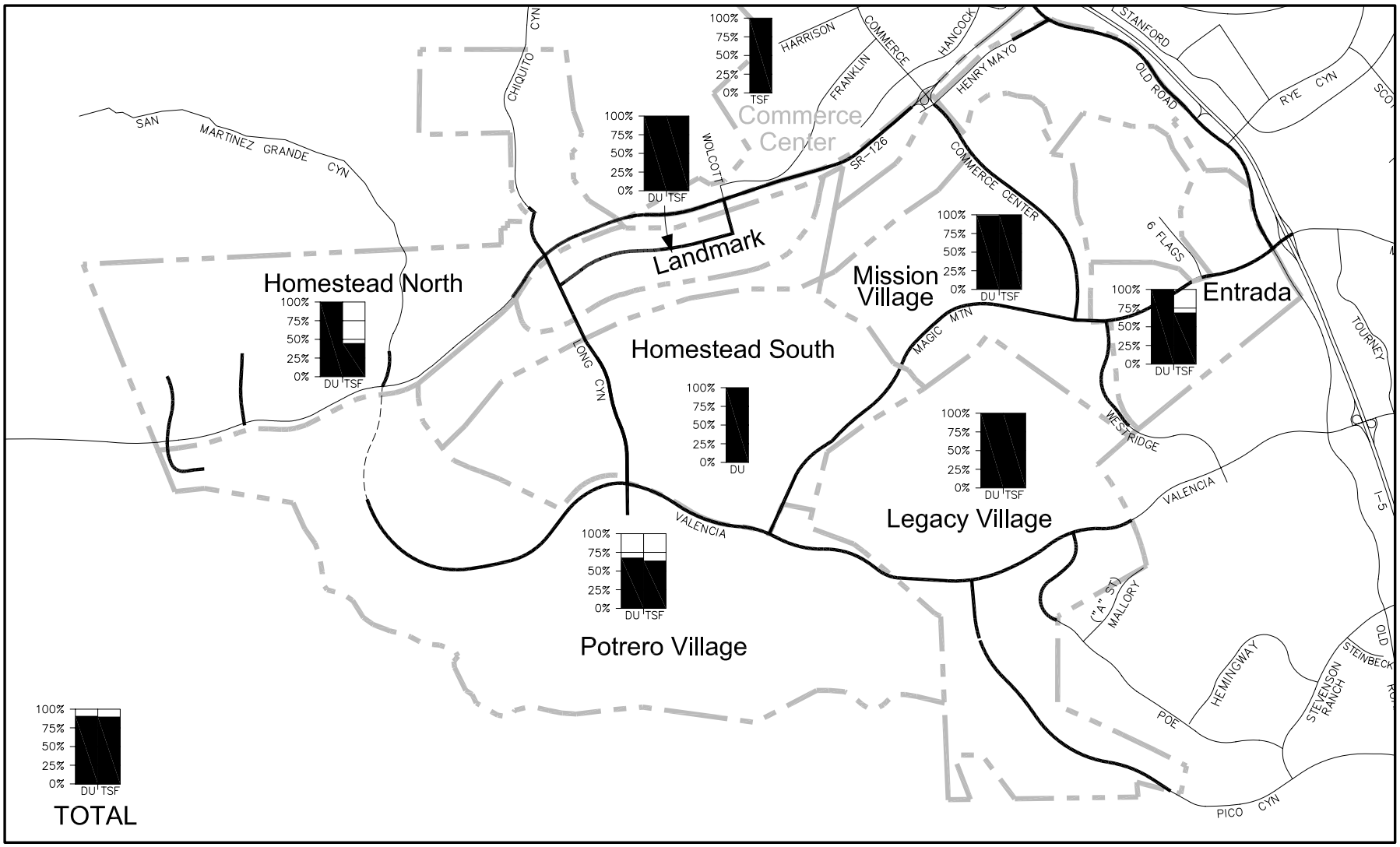
Legend

New/Upgraded Westside Roadway

Future Westside Roadway

Figure 21

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2025



Legend

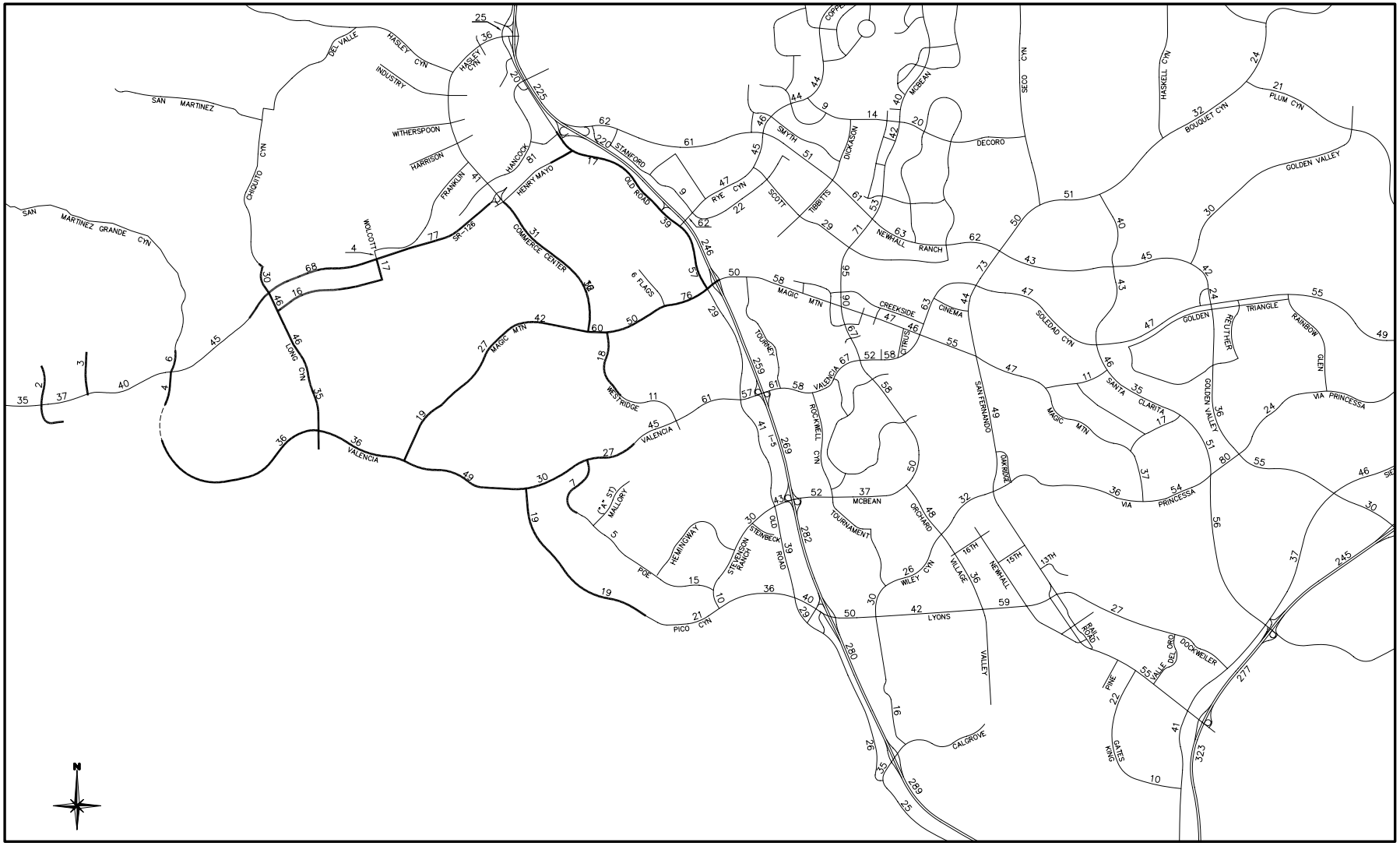
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 22

PROJECT DEVELOPMENT BY PLANNING AREA -2025



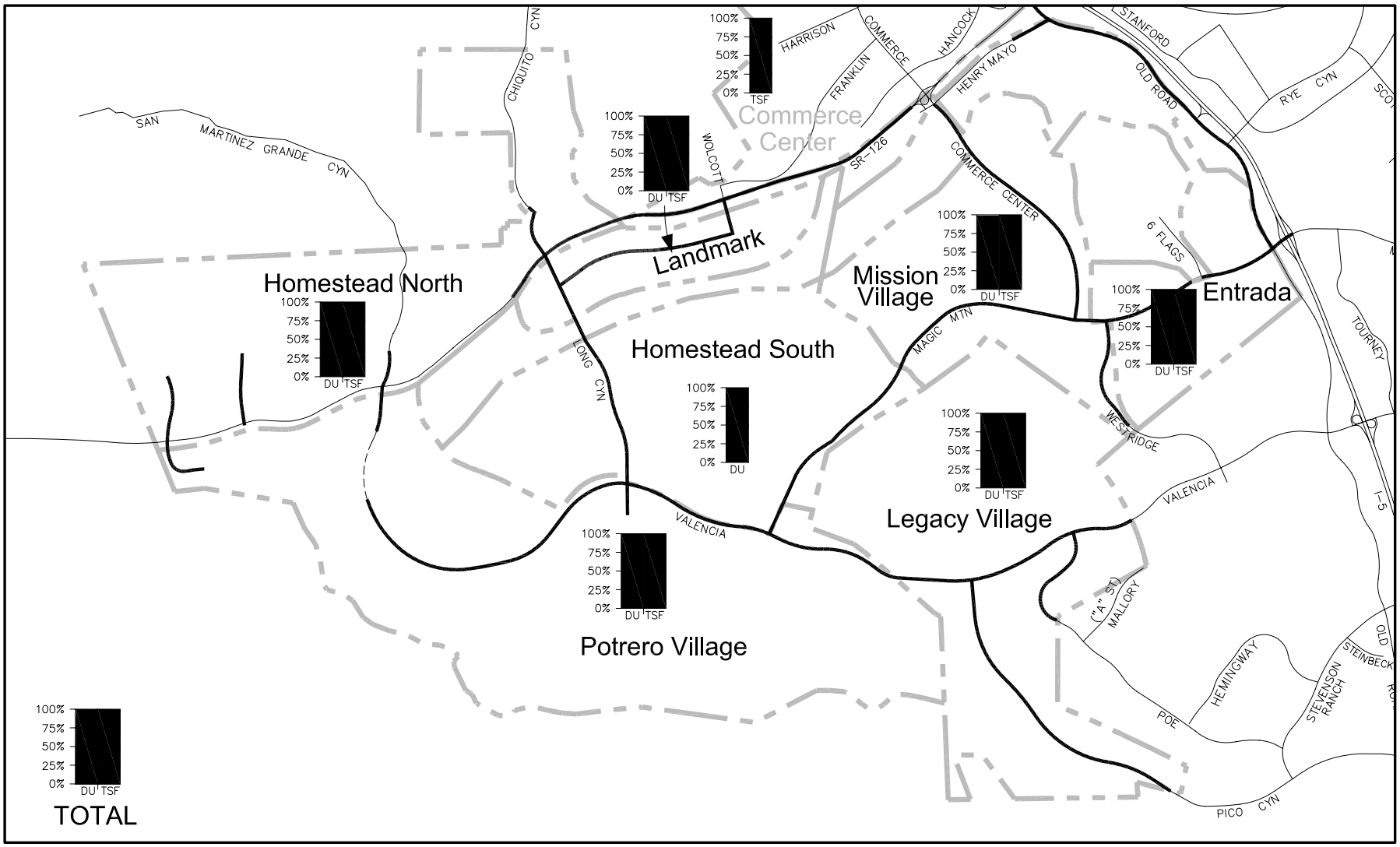
Legend

New/Upgraded Westside Roadway

Future Westside Roadway

Figure 23

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2030



Legend

Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 24

PROJECT DEVELOPMENT BY PLANNING AREA -2030

Table 4: Intersection Improvements by Stage

Stage	Intersection	Improvements
1	7. I-5 SB Ramps & SR-126	Add 4th WBT
	9. The Old Road & I-5 SB Ramps (at Rye Canyon Road)	Relocate intersection north of the existing location. Provide 1 NBL (U-Turns only), 2 NBT, 1 shared NBT/NBR, 1 NBR, 2 SBL, 3 SBT, 2 WBL, and 1 WBR
	10. I-5 SB Ramps & Magic Mountain Pkwy	Add 2nd SBR, 3rd EBT, 2nd EBR, 2nd WBL, and 4th WBT (part of the Magic Mountain Interchange Phase 2 project)
	11. I-5 NB Ramps & Magic Mountain Pkwy	Add shared NBL/NBR, 2nd EBL, 3rd EBT and convert 4th WBT to shared WBT/WBR (part of the Magic Mountain Interchange Phase 2 project)
	25. The Old Road & Rye Canyon Road	Add 2nd & 3rd NBT, 2nd SBL, and 3rd SBT. Restripe 1st WBR to a shared WBL/WBR.
	26. The Old Road & Magic Mountain Pkwy	Add 2nd NBL, 3rd NBT, 1st NBR, 2nd SBL, shared SBT/SBR, 1st SBR, 2nd EBL, 3rd & 4th EBT, 2nd WBL, and 4th WBT
	28. The Old Road & McBean Pkwy	Signal modification to add a northbound right-turn overlap phase.
	80. Wolcott Way & SR-126	Add 1st NBL, 1st & 2nd NBR, 2nd SBL, 3rd EBT, 1st EBR, 2nd WBL, and 3rd WBT
	81. Commerce Center Drive & Henry Mayo Drive	Add 1st EBL, 1st & 2nd EBT, and 1st WBT (part of SR-126 grade separation project)
	82/83. Commerce Center Drive & SR-126	Construct grade separation for Commerce Center Drive at SR-126 to include direct on- and off-ramps for WB SR-126, a loop on-ramp for SB Commerce Center Drive to EB SR-126, a direct on-ramp for NB Commerce Center Drive to EB SR-126, and a direct off-ramp for EB SR-126 to Commerce Center Drive
	106. Commerce Center Drive & Magic Mountain Pkwy	Construct new intersection. Provide 2 SBL, 1 SBR, 2 EBL, 3 EBT, 3 WBT, and 1 WBR with right-of-way reserved for future conversion to a free-flow right-turn lane (part of the project to extend Magic Mountain Parkway to west of Commerce Center Drive)
	107. Westridge Pkwy & Magic Mountain Pkwy	Construct new intersection. Provide 1 NBL, 1 shared NBL/NBR, 1 NBR, 3 EBT, 1 EBR, 2 WBL, and 3 WBT (part of the project to extend Westridge Parkway to Magic Mountain Parkway)
	110. Chiquito Canyon Road/Long Canyon Road & SR-126	Add 1st NBL, 1st & 2nd NBT, 1st & 2nd NBR, 2nd SBL, convert SBR to 1st SBT, add 2nd SBT, 1st EBR, and 1st & 2nd WBL (part of the project to construct Long Canyon Road south of SR-126)
	118. Six Flags Entrance & Magic Mountain Pkwy	Add 1st SBR, 1st & 2nd EBL, 2nd, 3rd & 4th EBT, and 2nd, 3rd & 4th WBT (part of the project to extend Magic Mountain Parkway to west of Commerce Center Drive)

(Continued)

Table 4: Intersection Improvements by Stage (Continued)

Stage	Intersection	Improvements
2	28. The Old Road & McBean Pkwy	Restripe southbound approach to add a 2nd SBL, signal modification to provide right-turn overlap phasing for NBR
	81. Commerce Center Drive & Henry Mayo Drive	Add 1st NBL, 1st, 2nd & 3rd NBT, 2nd SBL, 1st, 2nd & 3rd SBT, 1st EBR, 1st WBL, (part of the project to extend Commerce Center Drive south over the Santa Clara River)
	104. Poe Pkwy & Valencia Blvd	Construct new intersection. Provide 1 NBL, 1 NBR, 2 EBT, 1 EBR, 1 WBL, and 2 WBT (part of the project to extend Poe Parkway to Valencia Boulevard)
3	101. Long Canyon Road & Valencia Blvd	Construct new intersection. Provide 2 SBL and 1 free-flow WBR (part of the project to construct Valencia Boulevard between Long Canyon Road & Magic Mountain Parkway)
	102. Magic Mountain Pkwy & Valencia Blvd (Newhall Ranch)	Construct new intersection. Provide 1 free-flow SBR, and 2 EBL (part of the project to construct Valencia Boulevard between Long Canyon Road & Magic Mountain Parkway)
4	25. The Old Road & Rye Canyon Road	Add 2nd & 3rd WBL
	101. Long Canyon Road & Valencia Blvd	Add 1st NBT, 1st NBR, 1st SBT, and 1st WBL
	102. Magic Mountain Pkwy & Valencia Blvd (Newhall Ranch)	Add 1st & 2nd NBL, 1st & 2nd NBT, 1st NBR, 1st & 2nd SBL, 1st & 2nd SBT, 1st & 2nd EBT, 1st EBR, 1st WBL, 1st & 2nd WBT, 1st WBR (part of the project to extend Valencia Boulevard west to Magic Mountain Parkway)
5	12. I-5 SB Ramps & Valencia Blvd	Convert 2nd WBR to a shared WBT/WBR
	28. The Old Road & McBean Pkwy	Add 1st WBR
	96. San Martinez Grande Canyon Road & SR-126	Add 1st SBL, and 1st WBR
	101. Long Canyon Road & Valencia Blvd	Add 1st NBL, 1st SBR, 1st & 2nd EBL, 1st, 2nd & 3rd EBT, and 1st & 2nd WBT (part of the project to extend Valencia Boulevard west of Long Canyon Road)
	103. Pico Canyon Road & Valencia Blvd	Construct new intersection. Provide 2 NBL, 1 NBR, 2 EBT, 1 EBR, 1 WBL, and 2 WBT (part of the project to extend Pico Canyon Road to Valencia Boulevard)
	106. Commerce Center Drive & Magic Mountain Pkwy	Convert WBR to a free-flow right-turn lane
	110. Chiquito Canyon Road/Long Canyon Road & SR-126	Add 2nd NBL, 3rd SBT, 1st SBR, 2nd EBL, 3rd & 4th EBT, and 3rd WBT

(Continued)

Table 4: Intersection Improvements by Stage (Continued)

Stage	Intersection	Improvements
6a	14. I-5 SB Ramps & McBean Pkwy	Add 2nd SBL
	17. I-5 NB Ramps & Lyons Ave	Add 1st free-flow WBR
6b	10. I-5 SB Ramps & Magic Mountain Pkwy	Convert 1st SBR to a shared SBL/SBR
	16. I-5 SB Loop Ramp & Pico Canyon Road	Restripe eastbound approach to add a 3rd EBT.
	18. I-5 SB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT
	19. I-5 NB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT
	26. The Old Road & Magic Mountain Pkwy	Add 5th EBT
	29. The Old Road & Pico Canyon Road	Convert SBR to 2nd SBT
	80. Wolcott & SR-126	Add 4th EBT, 4th WBT, and right-turn overlap signal phasing for NBR
	96. San Martinez Grande Canyon Road & SR-126	Add 1st NBL, 1st NBT, 2nd SBL, 1st SBR, 1st EBR, and 1st WBL

NB = Northbound	NBL = NB Left-turn Lane	NBT = NB Through Lane	NBR = NB Right-turn Lane
SB = Southbound	SBL = SB Left-turn Lane	SBT = SB Through Lane	SBR = SB Right-turn Lane
EB = Eastbound	EBL = EB Left-turn Lane	EBT = EB Through Lane	EBR = EB Right-turn Lane
WB = Westbound	WBL = WB Left-turn Lane	WBT = WB Through Lane	WBR = WB Right-turn Lane

See Figure B-1 for intersection locations.

Table 5: Intersection Capacity Utilization Summary

	Exist.		2011		2012		2014		2018		2022		2025		2030	
Intersection	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
7. I-5 SB Ramps & SR-126	.42	.31	.79	.59	.77	.65	.77	.67	.75	.64	.73	.66	.74	.70	.77	.75
8. I-5 NB Ramps & SR-126	.37	.29	.64	.60	.61	.62	.62	.64	.60	.61	.58	.64	.63	.69	.69	.77
9. Old Road & I-5 SB Ramps (at Rye Canyon)	.73	.92	.52	.62	.43	.53	.43	.54	.47	.65	.49	.68	.54	.74	.60	.82
10. I-5 SB Ramps & Magic Mountain	.58	.59	.55	.68	.58	.66	.59	.68	.60	.81	.63	.84	.68	.86	.64	.77
11. I-5 NB Ramps & Magic Mountain	.63	.70	.51	.66	.53	.66	.56	.69	.65	.79	.69	.82	.72	.84	.75	.87
12. I-5 SB Ramps & Valencia	.47	.42	.56	.66	.54	.65	.54	.72	.64	.86	.58	.78	.59	.83	.60	.86
13. I-5 NB Ramps & Valencia	.53	.51	.57	.65	.56	.64	.58	.66	.64	.67	.69	.69	.70	.71	.73	.73
14. I-5 SB Ramps & McBean	.56	.66	.55	.71	.52	.70	.53	.71	.57	.80	.60	.85	.52	.80	.52	.81
15. I-5 NB Ramps & McBean	.41	.66	.53	.71	.54	.69	.54	.70	.56	.72	.58	.76	.61	.81	.63	.85
16. I-5 SB On-Loop & Lyons	.55	.60	.56	.76	.57	.72	.57	.71	.57	.76	.58	.81	.60	.87	.58	.85
17. I-5 NB Ramps & Lyons	.53	.68	.50	.75	.45	.76	.44	.77	.48	.87	.49	.89	.51	.86	.53	.89
18. I-5 SB Ramps & Calgrove	.49	.64	.68	.66	.66	.70	.66	.70	.70	.74	.74	.82	.77	.89	.60	.68
19. I-5 NB Ramps & Calgrove	.64	.52	.79	.51	.78	.51	.78	.52	.82	.56	.85	.64	.88	.71	.67	.67
20. I-5 SB Ramp & Lyons	.44	.46	.41	.59	.40	.57	.40	.57	.46	.60	.50	.62	.51	.66	.53	.70
25. Old Road & Rye Canyon	.87	.84	.70	.80	.71	.72	.75	.74	.85	.66	.83	.73	.85	.78	.94	.85
26. Old Road & Magic Mountain	.49	.63	.55	.61	.51	.59	.58	.67	.68	.71	.73	.80	.78	.85	.85	.85
27. Old Road & Valencia	.54	.61	.52	.59	.58	.60	.60	.66	.66	.71	.75	.85	.76	.87	.79	.90
28. Old Road & McBean	.48	.72	.59	.89	.56	.84	.55	.86	.57	.77	.58	.77	.57	.77	.55	.82
29. Old Road & Pico	.55	.62	.83	.74	.84	.74	.87	.75	.79	.73	.80	.81	.82	.88	.84	.89
80. Wolcott & SR-126	.34	.46	.54	.77	.54	.80	.55	.79	.56	.74	.66	.77	.77	.86	.76	.79
81. Commerce Center & Henry Mayo	--	--	.22	.37	.37	.36	.44	.42	.50	.47	.65	.54	.75	.61	.78	.72
82. Commerce Center & SR-126 EB Ramps	--	--	.13	.18	.32	.26	.38	.34	.37	.39	.42	.41	.45	.43	.47	.46
83. Commerce Center & SR-126 WB Ramps	--	--	.54	.41	.67	.55	.74	.62	.78	.69	.80	.72	.81	.78	.80	.87
96. Martinez/Potrero & SR-126	.33	.46	.37	.45	.38	.46	.38	.46	.41	.50	.44	.52	.56	.64	.70	.72
101. Long Canyon & Valencia	--	--	--	--	--	--	.10	.10	.12	.20	.31	.41	.47	.65	.50	.81
102. Newhall Ranch & Valencia	--	--	--	--	--	--	.10	.10	.24	.21	.36	.40	.43	.51	.68	.71
103. Pico Canyon & Valencia	--	--	--	--	--	--	--	--	.26	.29	.53	.59	.63	.74	.66	.80
104. Poe & Valencia	--	--	--	--	.23	.19	.24	.19	.38	.33	.57	.52	.64	.59	.68	.63
105. Westridge & Valencia	.48	.20	.31	.17	.40	.22	.45	.31	.46	.40	.54	.54	.56	.58	.56	.64
106. Commerce Center & Magic Mountain	--	--	.19	.24	.69	.33	.84	.47	.78	.56	.59	.67	.67	.72	.74	.74
107. Westridge & Magic Mountain	--	--	.21	.26	.40	.32	.48	.44	.56	.53	.63	.63	.66	.67	.67	.67
110. Chiquito Canyon & SR-126	.38	.44	.56	.58	.58	.58	.58	.58	.59	.59	.69	.63	.87	.90	n/a[1]	n/a[1]
118. Six Flags Entrance & Magic Mountain	--	--	.25	.47	.29	.46	.32	.50	.39	.59	.44	.65	.44	.67	.45	.74

[1]not applicable – This scenario has been evaluated using the Highway Capacity Manual Signalized Intersection methodology (see worksheets in Appx. B)
See Figure B-1 for intersection locations.

Table 6: AM Peak Hour Level of Service Summary

Intersection	Exist.	2011	2012	2014	2018	2022	2025	2030
7. I-5 SB Ramps & SR-126	A	C	C	C	C	C	C	C
8. I-5 NB Ramps & SR-126	A	B	B	B	A	A	B	B
9. Old Road & I-5 SB Ramps (at Rye Canyon)	C	A	A	A	A	A	A	A
10. I-5 SB Ramps & Magic Mountain	A	A	A	A	A	B	B	B
11. I-5 NB Ramps & Magic Mountain	B	A	A	A	B	B	C	C
12. I-5 SB Ramps & Valencia	A	A	A	A	B	A	A	A
13. I-5 NB Ramps & Valencia	A	A	A	A	B	B	B	C
14. I-5 SB Ramps & McBean	A	A	A	A	A	A	A	A
15. I-5 NB Ramps & McBean	A	A	A	A	A	A	B	B
16. I-5 SB On-Loop & Lyons	A	A	A	A	A	A	A	A
17. I-5 NB Ramps & Lyons	A	A	A	A	A	A	A	A
18. I-5 SB Ramps & Calgrove	A	B	B	B	B	C	C	A
19. I-5 NB Ramps & Calgrove	B	C	C	C	D	D	D	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	A	A	A
25. Old Road & Rye Canyon	D	B	C	C	D	D	D	D
26. Old Road & Magic Mountain	A	A	A	A	B	C	C	D
27. Old Road & Valencia	A	A	A	A	B	C	C	C
28. Old Road & McBean	A	A	A	A	A	A	A	A
29. Old Road & Pico	A	D	D	D	C	C	D	D
80. Wolcott & SR-126	A	A	A	A	A	B	C	C
81. Commerce Center & Henry Mayo	--	A	A	A	A	B	C	C
82. Commerce Center & SR-126 EB Ramps	--	A	A	A	A	A	A	A
83. Commerce Center & SR-126 WB Ramps	--	A	B	C	C	C	D	C
96. Martinez/Potrero & SR-126	A	A	A	A	A	A	A	B
101. Long Canyon & Valencia	--	--	--	A	A	A	A	A
102. Newhall Ranch & Valencia	--	--	--	A	A	A	A	B
103. Pico Canyon & Valencia	--	--	--	--	A	A	B	B
104. Poe & Valencia	--	--	A	A	A	A	B	B
105. Westridge & Valencia	A	A	A	A	A	A	A	A
106. Commerce Center & Magic Mountain	--	A	B	D	C	A	B	C
107. Westridge & Magic Mountain	--	A	A	A	A	B	B	B
110. Chiquito Canyon & SR-126	A	A	A	A	A	B	D	D
118. Six Flags Entrance & Magic Mountain	--	A	A	A	A	A	A	A

See Figure B-1 for intersection locations.

Table 7: PM Peak Hour Level of Service Summary

Intersection	Exist.	2011	2012	2014	2018	2022	2025	2030
7. I-5 SB Ramps & SR-126	A	A	B	B	B	B	B	C
8. I-5 NB Ramps & SR-126	A	A	B	B	B	B	B	C
9. Old Road & I-5 SB Ramps (at Rye Canyon)	E	B	A	A	B	B	C	D
10. I-5 SB Ramps & Magic Mountain	A	B	B	B	D	D	D	C
11. I-5 NB Ramps & Magic Mountain	B	B	B	B	C	D	D	D
12. I-5 SB Ramps & Valencia	A	B	B	C	D	C	D	D
13. I-5 NB Ramps & Valencia	A	B	B	B	B	B	C	C
14. I-5 SB Ramps & McBean	B	C	B	C	C	D	C	D
15. I-5 NB Ramps & McBean	B	C	B	B	C	C	D	D
16. I-5 SB On-Loop & Lyons	A	C	C	C	C	D	D	D
17. I-5 NB Ramps & Lyons	B	C	C	C	D	D	D	D
18. I-5 SB Ramps & Calgrove	B	B	B	B	C	D	D	B
19. I-5 NB Ramps & Calgrove	A	A	A	A	A	B	C	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	B	B	B
25. Old Road & Rye Canyon	D	C	C	C	B	C	C	D
26. Old Road & Magic Mountain	B	B	A	B	C	C	D	D
27. Old Road & Valencia	B	A	A	B	C	D	D	D
28. Old Road & McBean	C	D	D	D	C	C	C	D
29. Old Road & Pico	B	C	C	C	C	D	D	D
80. Wolcott & SR-126	A	C	C	C	C	C	D	C
81. Commerce Center & Henry Mayo	--	A	A	A	A	A	B	C
82. Commerce Center & SR-126 EB Ramps	--	A	A	A	A	A	A	A
83. Commerce Center & SR-126 WB Ramps	--	A	A	B	B	C	C	D
96. Martinez/Potrero & SR-126	A	A	A	A	A	A	B	C
101. Long Canyon & Valencia	--	--	--	A	A	A	B	D
102. Newhall Ranch & Valencia	--	--	--	A	A	A	A	C
103. Pico Canyon & Valencia	--	--	--	--	A	A	C	C
104. Poe & Valencia	--	--	A	A	A	A	A	B
105. Westridge & Valencia	A	A	A	A	A	A	A	B
106. Commerce Center & Magic Mountain	--	A	A	A	A	B	C	C
107. Westridge & Magic Mountain	--	A	A	A	A	B	B	B
110. Chiquito Canyon & SR-126	A	A	A	A	A	B	D	D
118. Six Flags Entrance & Magic Mountain	--	A	A	A	A	B	B	C

See Figure B-1 for intersection locations.

6.0 NON-WESTSIDE AREAS

The original Newhall Ranch Specific Plan EIR addressed areas not covered in this analysis, such as the Ventura County communities of Fillmore and Piru, roadways within the City of Santa Clarita, and the State highway system (see Appendix D for the list of Newhall Ranch Specific Plan final mitigation measures).

Analysis for the Ventura County communities that satisfies the Specific Plan Conditions of Approval has been completed separate from this report, and an analysis of City of Santa Clarita roadways and intersections based on the traffic forecasts summarized in this report has been prepared as part of a separate document for City staff to review.

Caltrans is currently in the process of developing a comprehensive improvement program for the I-5 freeway through the Santa Clarita Valley. The project, which is in the Project Approval/Environmental Documentation (PA/ED) stage, will add a High Occupancy Vehicle (HOV) lane in each direction between SR-14 and the Parker Road interchange. The project will also add a truck lane in each direction between SR-14 and the Pico/Lyons Canyon Road interchange. It is also proposed that an early implementation project be constructed before construction begins for the full project. The early implementation project consists of the northbound HOV lane from SR-14 to the crest of the segment between SR-14 and the Calgrove interchange, as well as the southbound truck lane from the Pico/Lyons Canyon Road interchange to SR-14.

South of the SR-14 interchange, a single HOV lane in each direction is currently under construction. Direct HOV to HOV connectors between the existing SR-14 HOV lanes and the I-5 HOV lanes under construction are currently in the design stage. Ultimately, the MTA has identified the need to construct additional lanes south of the SR-14 interchange to accommodate the projected future traffic volumes. In the *North County Combined Highway Corridors Study – Final Report* (MTA, June 2004), multiple concepts to add additional capacity between SR-14 and I-210 are identified, with a recommended configuration pending the completion of subsequent design phases.

Following is the timing of the planned I-5 freeway improvements based on the anticipated construction schedule for the project currently in the PA/ED stage. As the project to add additional

capacity south of SR-14 does not have an identified time frame for construction, for the purpose of this analysis it is not presumed to be constructed until the year 2030.

- Northbound HOV Lane: SR-14 to crest of grade (south of Calgrove interchange) – 2010
- Southbound Truck Lane: Pico/Lyons Canyon interchange to SR-14 – 2010
- Complete HOV/Truck Lane project: SR-14 to Parker interchange – between 2015 & 2018
- Additional Lane(s) project: South of SR-14 – 2030

Table 8 summarizes the I-5 peak hour mainline freeway LOS values for each of the Westside phasing scenarios identified in the previous section. As with the arterial roadway forecasts presented in the previous sections, each of these scenarios includes cumulative development projections for outside the Westside area. Traffic volume forecasts for each of the scenarios, together with the I-5 improvements listed above, result in the indicated LOS values. Detailed V/C calculations are provided in Appendix C.

7.0 CONCLUSIONS

The construction stages outlined in this report will provide for the access needs of the Westside area by ensuring that the necessary roadway infrastructure is developed together with the phased land use development. Furthermore, the freeway improvements planned for I-5 through the Santa Clarita Valley will accommodate the projected traffic demands as the Valley builds out over the next 25 years.

A comprehensive plan such as this provides for some flexibility in regards to individual planning areas that proceed faster or slower than anticipated here. The roadway phasing plan will remain valid if the total number of units remains in line with the overall pattern assumed in this analysis, and if the placement of the development is relatively consistent with the projected plan. An update to this phasing study, such as every five years or given a substantial change to anticipated development, would provide a means to adjust the overall phasing plan as actual travel patterns evolve over time.

Table 8: I-5 Level of Service Summary

AM SOUTHBOUND	2006	2011	2012	2014	2018	2022	2025	2030
403. I-5 s/o Parker	A	C	C	C	C	C	C	C
404. I-5 s/o Hasley	B	C	C	C	C	C	C	C
405. I-5 s/o SR-126	B	C	C	C	C	C	C	C
406. I-5 s/o Rye Cyn	B	C	C	C	C	C	C	D
407. I-5 s/o Magic Mtn	C	C	C	C	C	C	C	D
408. I-5 s/o Valencia	C	C	C	C	C	D	D	D
409. I-5 s/o McBean	C	C	C	C	C	D	D	D
410. I-5 s/o Lyons	D	C	C	C	C	C	C	C
411. I-5 s/o Calgrove	D	C	C	C	C	C	C	C
412. I-5 s/o SR-14	E	D	D	E	E	E	E	E

AM NORTHBOUND	2006	2011	2012	2014	2018	2022	2025	2030
403. I-5 s/o Parker	A	B	B	B	B	B	B	B
404. I-5 s/o Hasley	A	C	C	C	C	C	C	C
405. I-5 s/o SR-126	B	C	C	C	C	C	C	C
406. I-5 s/o Rye Cyn	B	C	C	C	C	C	C	C
407. I-5 s/o Magic Mtn	C	D	D	D	C	C	D	D
408. I-5 s/o Valencia	C	D	D	D	D	D	D	D
409. I-5 s/o McBean	C	D	D	D	D	D	D	D
410. I-5 s/o Lyons	C	D	D	D	C	C	D	D
411. I-5 s/o Calgrove	C	C	C	C	C	C	C	C
412. I-5 s/o SR-14	B	B	B	B	B	C	C	C

PM SOUTHBOUND	2006	2011	2012	2014	2018	2022	2025	2030
403. I-5 s/o Parker	A	C	C	C	C	C	C	D
404. I-5 s/o Hasley	B	D	D	D	C	D	D	D
405. I-5 s/o SR-126	B	D	D	D	D	D	D	D
406. I-5 s/o Rye Cyn	C	E	E	E	E	E	E	E
407. I-5 s/o Magic Mtn	C	E	E	E	E	E	E	E
408. I-5 s/o Valencia	D	E	E	E	E	E	E	E
409. I-5 s/o McBean	D	E	E	E	E	E	E	E
410. I-5 s/o Lyons	D	D	D	D	C	C	C	C
411. I-5 s/o Calgrove	D	D	D	D	C	C	C	C
412. I-5 s/o SR-14	C	C	C	C	C	C	C	C

PM NORTHBOUND	2006	2011	2012	2014	2018	2022	2025	2030
403. I-5 s/o Parker	B	D	D	D	D	D	D	D
404. I-5 s/o Hasley	B	D	D	D	D	D	D	D
405. I-5 s/o SR-126	B	C	C	C	C	C	D	D
406. I-5 s/o Rye Cyn	B	C	C	C	C	C	D	D
407. I-5 s/o Magic Mtn	C	D	D	D	C	D	D	D
408. I-5 s/o Valencia	D	D	D	D	D	D	D	D
409. I-5 s/o McBean	D	D	D	D	D	D	D	D
410. I-5 s/o Lyons	D	E	E	E	D	D	D	D
411. I-5 s/o Calgrove	E	D	D	D	D	D	D	D
412. I-5 s/o SR-14	E	E	E	E	E	E	E	E

Level of Service (LOS) estimated based on the following range of V/C ratios (source: Highway Capacity Manual 2000):

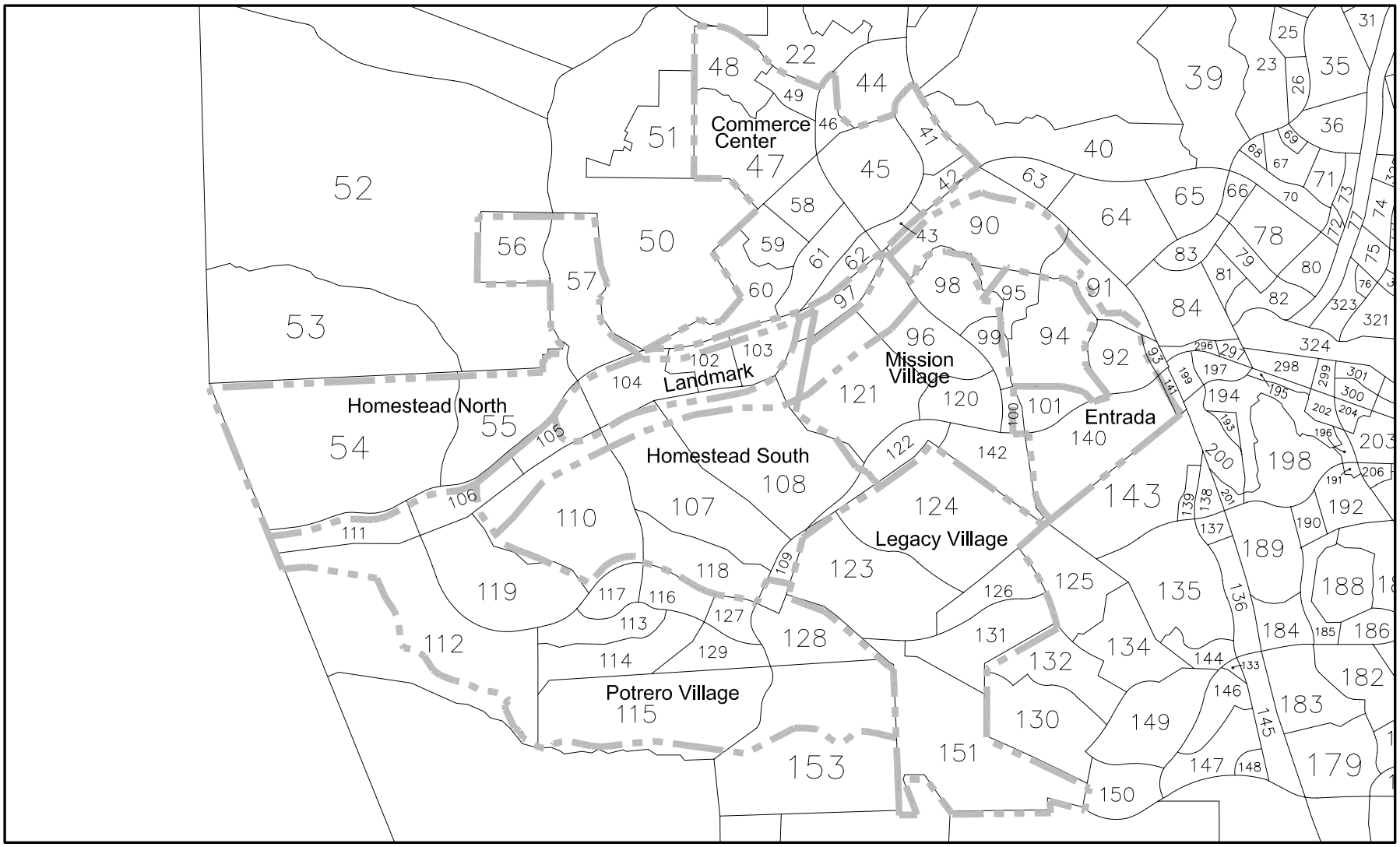
LOS	V/C
A	0.00 – 0.34
B	0.35 – 0.56
C	0.57 – 0.76
D	0.77 - 0.90
E	0.91 – 1.00
F	above 1.00

See Appendix C for V/C calculations.

APPENDIX A

LAND USE AND TRIP GENERATION BY PLANNING AREA

a. Traffic Analysis Zone (TAZ) Map



Legend

Planning Area Boundary
TAZ Boundary
XX TAZ Number

Figure A-1

SCVCTM TAZ MAP
- WESTSIDE PROJECT AREA

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

b. Year 2011

LANDMARK VILLAGE (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
120	4.	Condominium/Townhouse	531.00 DU	53	255	308	250	138	388	4248
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	400.00 STU	104	80	184	32	36	68	580
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		431	451	882	803	816	1619	17122

MISSION VILLAGE (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
4.	Condominium/Townhouse	531.00 DU	53	255	308	250	138	388	4248
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	400.00 STU	104	80	184	32	36	68	580
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		431	451	882	803	816	1619	17122

HOMESTEAD S/O RIVER (2011) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4. Condominium/Townhouse	112.00 DU	11	54	65	53	29	82	896
	51. Developed Park	8.70 AC	0	0	0	0	0	0	23
	SUB-TOTAL		11	54	65	53	29	82	919

HOMESTEAD S/O RIVER (2011) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	112.00 DU	11	54	65	53	29	82	896
51. Developed Park	8.70 AC	0	0	0	0	0	0	23
TOTAL		11	54	65	53	29	82	919

ENTRADA (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	150.00 DU	29	84	113	96	56	152	1485
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		60	104	164	191	159	350	3907

ENTRADA (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	150.00 DU	29	84	113	96	56	152	1485
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		504	211	715	562	798	1360	13900

COMMERCE CENTER (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30.	Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
		SUB-TOTAL		402	73	475	95	380	475	4380
42	30.	Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
		SUB-TOTAL		151	28	179	36	143	179	1650
43	30.	Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
		SUB-TOTAL		151	27	178	36	142	178	1643
45	30.	Industrial Park	660.20 TSF	363	66	429	86	343	429	3961
		SUB-TOTAL		363	66	429	86	343	429	3961
46	13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30.	Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
		SUB-TOTAL		300	82	382	197	371	568	5529
47	30.	Industrial Park	3254.10 TSF	1790	325	2115	423	1692	2115	19525
		SUB-TOTAL		1790	325	2115	423	1692	2115	19525
48	30.	Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
		SUB-TOTAL		396	72	468	94	374	468	4320
49	30.	Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
		SUB-TOTAL		420	76	496	99	397	496	4586
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
		SUB-TOTAL		153	115	268	115	115	230	3820
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
		SUB-TOTAL		410	74	484	97	387	484	4469
62	30.	Industrial Park	287.30 TSF	158	29	187	37	149	186	1724
		SUB-TOTAL		158	29	187	37	149	186	1724

COMMERCE CENTER (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	9618.60 TSF	5290	961	6251	1252	5000	6252	57712
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		5498	1113	6611	1506	5254	6760	64386

TOTAL (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	458.00 DU	87	256	343	293	170	463	4533
4.	Condominium/Townhouse	1328.00 DU	133	637	770	624	345	969	10624
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00 TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	104.57 TSF	114	73	187	348	378	726	8895
13.	Commercial Shops	102.50 TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1150.00 STU	299	230	529	92	104	196	1668
30.	Industrial Park	9682.48 TSF	5325	967	6292	1260	5033	6293	58095
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40 TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20 AC	0	0	0	0	1	1	87
	TOTAL		8155	2981	11136	4703	9192	13895	137585

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

c. Year 2012

LANDMARK VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
120	4.	Condominium/Townhouse	932.00 DU	93	447	540	438	242	680	7456
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		523	683	1206	1007	938	1945	20620

MISSION VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	932.00 DU	93	447	540	438	242	680	7456
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		523	683	1206	1007	938	1945	20620

HOMESTEAD S/O RIVER (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4. Condominium/Townhouse	312.00 DU	31	150	181	147	81	228	2496
	51. Developed Park	8.70 AC	0	0	0	0	0	0	23
	SUB-TOTAL		31	150	181	147	81	228	2519

HOMESTEAD S/O RIVER (2012) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	312.00 DU	31	150	181	147	81	228	2496
51. Developed Park	8.70 AC	0	0	0	0	0	0	23
TOTAL		31	150	181	147	81	228	2519

ENTRADA (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	391.00 DU	74	219	293	250	145	395	3871
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		105	239	344	345	248	593	6293

ENTRADA (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	391.00 DU	74	219	293	250	145	395	3871
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		549	346	895	716	887	1603	16286

LEGACY VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
126	4. Condominium/Townhouse	97.00 DU	10	47	57	46	25	71	776
	SUB-TOTAL		10	47	57	46	25	71	776

LEGACY VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	97.00 DU	10	47	57	46	25	71	776
TOTAL		10	47	57	46	25	71	776

COMMERCE CENTER (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	980.20 TSF	539	98	637	127	510	637	5881
	SUB-TOTAL		539	98	637	127	510	637	5881
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	3574.10 TSF	1966	357	2323	465	1859	2324	21445
	SUB-TOTAL		1966	357	2323	465	1859	2324	21445
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	607.30 TSF	334	61	395	79	316	395	3644
	SUB-TOTAL		334	61	395	79	316	395	3644

COMMERCE CENTER (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	10578.60 TSF	5818	1057	6875	1377	5501	6878	63472
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6026	1209	7235	1631	5755	7386	70146

TOTAL (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	699.00	DU	132	391	523	447	259	706	6919
4.	Condominium/Townhouse	2026.00	DU	203	972	1175	952	526	1478	16208
5.	Apartment	451.00	DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00	TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	104.57	TSF	114	73	187	348	378	726	8895
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1350.00	STU	351	270	621	108	122	230	1958
30.	Industrial Park	10642.48	TSF	5853	1063	6916	1385	5534	6919	63855
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40	TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20	AC	0	0	0	0	1	1	87
	TOTAL			8850	3587	12437	5326	9981	15307	151605

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

d. Year 2014

LANDMARK VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
		SUB-TOTAL		25	16	41	76	83	159	1956
120	4.	Condominium/Townhouse	1874.00 DU	187	900	1087	881	487	1368	14992
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		695	1196	1891	1474	1210	2684	28591

MISSION VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	1874.00 DU	187	900	1087	881	487	1368	14992
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		720	1212	1932	1550	1293	2843	30547

HOMESTEAD S/O RIVER (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4.	Condominium/Townhouse	851.00 DU	85	408	493	400	221	621	6808
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		85	408	493	400	221	621	6831

HOMESTEAD S/O RIVER (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	851.00 DU	85	408	493	400	221	621	6808
51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
	TOTAL		85	408	493	400	221	621	6831

POTRERO VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
128	3. Single Family (6-10du/ac)	114.00 DU	22	64	86	73	42	115	1129
	SUB-TOTAL		22	64	86	73	42	115	1129

POTRERO VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	114.00 DU	22	64	86	73	42	115	1129
TOTAL		22	64	86	73	42	115	1129

ENTRADA (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	614.00 DU	61	295	356	289	160	449	4912
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		201	635	836	750	475	1225	12997

ENTRADA (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	614.00 DU	61	295	356	289	160	449	4912
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		645	742	1387	1121	1114	2235	22990

LEGACY VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
126	4. Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	SUB-TOTAL		59	281	340	275	152	427	4680
131	4. Condominium/Townhouse	12.00 DU	1	6	7	6	3	9	96
	SUB-TOTAL		1	6	7	6	3	9	96

LEGACY VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	597.00 DU	60	287	347	281	155	436	4776
TOTAL		60	287	347	281	155	436	4776

COMMERCE CENTER (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30.	Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
		SUB-TOTAL		402	73	475	95	380	475	4380
42	30.	Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
		SUB-TOTAL		151	28	179	36	143	179	1650
43	30.	Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
		SUB-TOTAL		151	27	178	36	142	178	1643
45	30.	Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
		SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30.	Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
		SUB-TOTAL		300	82	382	197	371	568	5529
47	30.	Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
		SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30.	Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
		SUB-TOTAL		396	72	468	94	374	468	4320
49	30.	Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
		SUB-TOTAL		420	76	496	99	397	496	4586
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
		SUB-TOTAL		153	115	268	115	115	230	3820
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
		SUB-TOTAL		410	74	484	97	387	484	4469
62	30.	Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
		SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	994.00 DU	189	556	745	636	368	1004	9840
4.	Condominium/Townhouse	4621.00 DU	462	2218	2680	2172	1201	3373	36968
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00 TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	127.57 TSF	139	89	228	424	461	885	10851
13.	Commercial Shops	102.50 TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1650.00 STU	429	330	759	132	149	281	2393
30.	Industrial Park	12322.48 TSF	6777	1231	8008	1604	6406	8010	73935
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40 TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20 AC	0	0	0	0	1	1	87
	TOTAL		10193	5242	15435	7054	11747	18801	187757

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

e. Year 2018

LANDMARK VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	855.00 DU	86	410	496	402	222	624	6840
		SUB-TOTAL		109	479	588	481	268	749	8058
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	250.00 TSF	300	58	358	75	248	323	2550
		SUB-TOTAL		307	62	369	96	270	366	3077
99	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		0	0	0	1	1	2	53
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
		SUB-TOTAL		25	16	41	76	83	159	1956
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	351.00 DU	35	168	203	165	91	256	2808
		SUB-TOTAL		35	168	203	165	91	256	2808

MISSION VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
4.	Condominium/Townhouse	3807.00 DU	382	1826	2208	1790	990	2780	30456
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	250.00 TSF	300	58	358	75	248	323	2550
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		1294	2301	3595	2795	2287	5082	53997

HOMESTEAD S/O RIVER (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
		SUB-TOTAL		88	258	346	295	171	466	4564
108	4.	Condominium/Townhouse	1828.00 DU	183	877	1060	859	475	1334	14624
	20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		339	997	1336	907	529	1436	15517

HOMESTEAD S/O RIVER (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
4.	Condominium/Townhouse	1828.00 DU	183	877	1060	859	475	1334	14624
20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
	TOTAL		427	1255	1682	1202	700	1902	20081

POTRERO VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
127	4. Condominium/Townhouse	542.00 DU	54	260	314	255	141	396	4336
	SUB-TOTAL		54	260	314	255	141	396	4336
128	3. Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
	SUB-TOTAL		86	252	338	288	167	455	4455
129	3. Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
	SUB-TOTAL		34	99	133	113	65	178	1752

POTRERO VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	627.00 DU	120	351	471	401	232	633	6207
4. Condominium/Townhouse	542.00 DU	54	260	314	255	141	396	4336
TOTAL		174	611	785	656	373	1029	10543

ENTRADA (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		477	282	759	538	725	1263	12808
92	4.	Condominium/Townhouse	867.00 DU	87	416	503	407	225	632	6936
	10.	Commercial Center (>30ac)	350.00 TSF	165	105	270	574	623	1197	14021
	40.	Commercial Office	250.00 TSF	388	48	436	53	323	376	2890
		SUB-TOTAL		640	569	1209	1034	1171	2205	23847
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2117.00 DU	212	1016	1228	995	550	1545	16936
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	350.00 TSF	165	105	270	574	623	1197	14021
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	450.00 TSF	698	86	784	95	581	676	5202
	TOTAL		1382	1791	3173	2621	2536	5157	54740

LEGACY VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
124	7. Senior (Active)	801.00 DU	64	96	160	128	80	208	2972
	SUB-TOTAL		64	96	160	128	80	208	2972
126	4. Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	SUB-TOTAL		59	281	340	275	152	427	4680
131	4. Condominium/Townhouse	1200.00 DU	120	576	696	564	312	876	9600
	20. Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	SUB-TOTAL		354	756	1110	636	393	1029	10905

LEGACY VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	1785.00 DU	179	857	1036	839	464	1303	14280
7. Senior (Active)	801.00 DU	64	96	160	128	80	208	2972
20. Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
TOTAL		477	1133	1610	1039	625	1664	18557

COMMERCE CENTER (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	584.00	DU	111	327	438	374	217	591	5782
3.	Single Family (6-10du/ac)	1507.00	DU	287	843	1130	964	558	1522	14918
4.	Condominium/Townhouse	10764.00	DU	1079	5164	6243	5059	2798	7857	86112
5.	Apartment	859.00	DU	69	369	438	352	181	533	5928
7.	Senior (Active)	801.00	DU	64	96	160	128	80	208	2972
10.	Commercial Center (>30ac)	350.00	TSF	165	105	270	574	623	1197	14021
11.	Commercial Center(10-30a)	654.30	TSF	478	307	785	1557	1688	3245	35371
12.	Commercial Center (<10ac)	133.77	TSF	146	93	239	445	483	928	11378
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	3150.00	STU	819	630	1449	252	284	536	4568
30.	Industrial Park	12322.48	TSF	6777	1231	8008	1604	6406	8010	73935
31.	Business Park	250.00	TSF	300	58	358	75	248	323	2550
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	1220.40	TSF	1893	232	2125	257	1575	1832	14108
51.	Developed Park	53.40	AC	0	0	0	1	2	3	140
	TOTAL			12415	9620	22035	11942	15443	27385	279402

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

f. Year 2022

LANDMARK VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	350.00 TSF	420	81	501	105	347	452	3570
		SUB-TOTAL		427	85	512	126	369	495	4097
99	4.	Condominium/Townhouse	436.00 DU	44	209	253	205	113	318	3488
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		44	209	253	206	114	320	3541
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5006.00 DU	502	2403	2905	2353	1302	3655	40048
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	350.00 TSF	420	81	501	105	347	452	3570
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		1907	3037	4944	3542	3044	6586	68815

HOMESTEAD S/O RIVER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00 DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	700.00 STU	182	140	322	56	63	119	1015
	21.	High School	1300.00 STU	416	182	598	78	117	195	2327
	51.	Developed Park	20.50 AC	0	0	0	1	1	2	53
		SUB-TOTAL		719	736	1455	583	437	1020	10567
108	4.	Condominium/Townhouse	2189.00 DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
		SUB-TOTAL		7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00 DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00 DU	55	263	318	258	142	400	4384
	51.	Developed Park	9.40 AC	0	0	0	0	0	0	24
		SUB-TOTAL		90	366	456	376	210	586	6230
118	4.	Condominium/Townhouse	161.00 DU	16	77	93	76	42	118	1288
		SUB-TOTAL		16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
2.	Single Family (1-5du/ac)	645.00 DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00 DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	1600.00 STU	416	320	736	128	144	272	2320
21.	High School	1300.00 STU	416	182	598	78	117	195	2327
51.	Developed Park	38.60 AC	0	0	0	1	1	2	100
	TOTAL		1285	2431	3716	2160	1353	3513	37301

HOMESTEAD N/O RIVER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
55	3. Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4. Condominium/Townhouse	315.00 DU	32	151	183	148	82	230	2520
	SUB-TOTAL		63	243	306	253	143	396	4144

HOMESTEAD N/O RIVER (2022) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
4. Condominium/Townhouse	315.00 DU	32	151	183	148	82	230	2520
TOTAL		63	243	306	253	143	396	4144

POTRERO VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
115	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198
116	4.	Condominium/Townhouse	400.00 DU	40	192	232	188	104	292	3200
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
		SUB-TOTAL		186	286	472	664	620	1284	14012
117	4.	Condominium/Townhouse	400.00 DU	40	192	232	188	104	292	3200
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
		SUB-TOTAL		186	286	472	664	620	1284	14012
119	5.	Apartment	531.00 DU	42	228	270	218	112	330	3664
		SUB-TOTAL		42	228	270	218	112	330	3664
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752

POTRERO VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1207.00 DU	231	675	906	772	447	1219	11949
4.	Condominium/Townhouse	1688.00 DU	169	810	979	793	439	1232	13504
5.	Apartment	531.00 DU	42	228	270	218	112	330	3664
11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		778	1962	2740	2811	2099	4910	53303

ENTRADA (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	200.00 TSF	94	60	154	328	356	684	8012
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	40.	Commercial Office	300.00 TSF	465	57	522	63	387	450	3468
		SUB-TOTAL		726	361	1087	887	1210	2097	21976
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	400.00 TSF	188	120	308	656	712	1368	16024
	40.	Commercial Office	250.00 TSF	388	48	436	53	323	376	2890
		SUB-TOTAL		676	648	1324	1179	1295	2474	26914
101	10.	Commercial Center (>30ac)	200.00 TSF	94	60	154	328	356	684	8012
		SUB-TOTAL		94	60	154	328	356	684	8012
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	800.00 TSF	376	240	616	1312	1424	2736	32048
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	550.00 TSF	853	105	958	116	710	826	6358
	TOTAL		1761	2009	3770	3443	3501	6944	74987

LEGACY VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30.	Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
		SUB-TOTAL		402	73	475	95	380	475	4380
42	30.	Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
		SUB-TOTAL		151	28	179	36	143	179	1650
43	30.	Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
		SUB-TOTAL		151	27	178	36	142	178	1643
45	30.	Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
		SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30.	Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
		SUB-TOTAL		300	82	382	197	371	568	5529
47	30.	Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
		SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30.	Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
		SUB-TOTAL		396	72	468	94	374	468	4320
49	30.	Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
		SUB-TOTAL		420	76	496	99	397	496	4586
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
		SUB-TOTAL		153	115	268	115	115	230	3820
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
		SUB-TOTAL		410	74	484	97	387	484	4469
62	30.	Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
		SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1101.00	DU	209	616	825	706	408	1114	10901
3.	Single Family (6-10du/ac)	2729.00	DU	520	1526	2046	1746	1011	2757	27016
4.	Condominium/Townhouse	15153.00	DU	1519	7272	8791	7122	3940	11062	121224
5.	Apartment	1390.00	DU	111	597	708	570	293	863	9592
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	800.00	TSF	376	240	616	1312	1424	2736	32048
11.	Commercial Center(10-30a)	1204.30	TSF	880	566	1446	2866	3107	5973	65104
12.	Commercial Center (<10ac)	133.77	TSF	146	93	239	445	483	928	11378
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	4150.00	STU	1079	830	1909	332	374	706	6018
21.	High School	1300.00	STU	416	182	598	78	117	195	2327
30.	Industrial Park	12322.48	TSF	6777	1231	8008	1604	6406	8010	73935
31.	Business Park	350.00	TSF	420	81	501	105	347	452	3570
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	1765.40	TSF	2738	336	3074	371	2278	2649	20408
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	83.30	AC	0	0	0	2	3	5	217
	TOTAL			15525	13866	29391	17737	20627	38364	396738

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

g. Year 2025

LANDMARK VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
		SUB-TOTAL		837	163	1000	228	707	935	7580
99	4.	Condominium/Townhouse	470.00 DU	47	226	273	221	122	343	3760
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		47	226	273	222	123	345	3813
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5040.00 DU	505	2420	2925	2369	1311	3680	40320
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		2320	3132	5452	3660	3391	7051	72570

HOMESTEAD S/O RIVER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00	DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00	DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	1000.00	STU	260	200	460	80	90	170	1450
	21.	High School	2000.00	STU	640	280	920	120	180	300	3580
	51.	Developed Park	20.50	AC	0	0	0	1	1	2	53
		SUB-TOTAL			1021	894	1915	649	527	1176	12255
108	4.	Condominium/Townhouse	2189.00	DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00	STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70	AC	0	0	0	0	0	0	23
		SUB-TOTAL			453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00	DU	7	21	28	24	14	38	376
		SUB-TOTAL			7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00	DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00	DU	55	263	318	258	142	400	4384
	20.	Elementary/Middle School	900.00	STU	234	180	414	72	81	153	1305
	51.	Developed Park	9.40	AC	0	0	0	0	0	0	24
		SUB-TOTAL			324	546	870	448	291	739	7535
118	4.	Condominium/Townhouse	161.00	DU	16	77	93	76	42	118	1288
		SUB-TOTAL			16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	645.00	DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00	DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00	DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	2800.00	STU	728	560	1288	224	252	476	4060
21.	High School	2000.00	STU	640	280	920	120	180	300	3580
51.	Developed Park	38.60	AC	0	0	0	1	1	2	100
	TOTAL			1821	2769	4590	2298	1524	3822	40294

HOMESTEAD N/O RIVER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
54	3.	Single Family (6-10du/ac)	62.00 DU	12	35	47	40	23	63	614
	4.	Condominium/Townhouse	589.00 DU	59	283	342	277	153	430	4712
		SUB-TOTAL		71	318	389	317	176	493	5326
55	3.	Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4.	Condominium/Townhouse	922.00 DU	92	443	535	433	240	673	7376
	51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
		SUB-TOTAL		123	535	658	538	301	839	9015
56	2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
	4.	Condominium/Townhouse	23.00 DU	2	11	13	11	6	17	184
		SUB-TOTAL		6	22	28	23	13	36	372
57	12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
	31.	Business Park	439.60 TSF	528	101	629	132	435	567	4484
	40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
		SUB-TOTAL		751	159	910	338	769	1107	10410

HOMESTEAD N/O RIVER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
3.	Single Family (6-10du/ac)	226.00 DU	43	127	170	145	84	229	2238
4.	Condominium/Townhouse	1534.00 DU	153	737	890	721	399	1120	12272
12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
31.	Business Park	439.60 TSF	528	101	629	132	435	567	4484
40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
	TOTAL		951	1034	1985	1216	1259	2475	25123

POTRERO VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
115	3.	Single Family (6-10du/ac)	603.00 DU	115	338	453	386	223	609	5970
		SUB-TOTAL		115	338	453	386	223	609	5970
116	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
		SUB-TOTAL		392	668	1060	1422	1292	2714	29624
117	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
		SUB-TOTAL		392	668	1060	1422	1292	2714	29624
119	5.	Apartment	1022.00 DU	82	439	521	419	215	634	7052
		SUB-TOTAL		82	439	521	419	215	634	7052
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752
153	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198

POTRERO VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1810.00 DU	346	1013	1359	1158	670	1828	17919
4.	Condominium/Townhouse	2888.00 DU	289	1386	1675	1357	751	2108	23104
5.	Apartment	1022.00 DU	82	439	521	419	215	634	7052
11.	Commercial Center(10-30a)	800.00 TSF	584	376	960	1904	2064	3968	43248
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		1345	3275	4620	4914	3769	8683	93885

ENTRADA (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	300.00 TSF	141	90	231	492	534	1026	12018
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	263.88 TSF	145	26	171	34	137	171	1583
	40.	Commercial Office	400.00 TSF	620	76	696	84	516	600	4624
		SUB-TOTAL		1038	430	1468	1098	1621	2719	28338
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	550.00 TSF	259	165	424	902	979	1881	22033
	14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
	40.	Commercial Office	300.00 TSF	465	57	522	63	387	450	3468
		SUB-TOTAL		926	768	1694	1531	1713	3244	35970
101	10.	Commercial Center (>30ac)	388.30 TSF	183	116	299	637	691	1328	15555
		SUB-TOTAL		183	116	299	637	691	1328	15555
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	1238.30 TSF	583	371	954	2031	2204	4235	49606
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
30.	Industrial Park	263.88 TSF	145	26	171	34	137	171	1583
40.	Commercial Office	700.00 TSF	1085	133	1218	147	903	1050	8092
	TOTAL		2412	2254	4666	4315	4665	8980	97948

LEGACY VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30.	Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
		SUB-TOTAL		402	73	475	95	380	475	4380
42	30.	Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
		SUB-TOTAL		151	28	179	36	143	179	1650
43	30.	Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
		SUB-TOTAL		151	27	178	36	142	178	1643
45	30.	Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
		SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30.	Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
		SUB-TOTAL		300	82	382	197	371	568	5529
47	30.	Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
		SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30.	Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
		SUB-TOTAL		396	72	468	94	374	468	4320
49	30.	Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
		SUB-TOTAL		420	76	496	99	397	496	4586
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
		SUB-TOTAL		153	115	268	115	115	230	3820
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
		SUB-TOTAL		410	74	484	97	387	484	4469
62	30.	Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
		SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1120.00	DU	213	627	840	718	415	1133	11089
3.	Single Family (6-10du/ac)	3394.00	DU	647	1899	2546	2172	1257	3429	33600
4.	Condominium/Townhouse	17606.00	DU	1763	8451	10214	8275	4578	12853	140848
5.	Apartment	1881.00	DU	151	808	959	771	396	1167	12980
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	1238.30	TSF	583	371	954	2031	2204	4235	49606
11.	Commercial Center(10-30a)	1604.30	TSF	1172	754	1926	3818	4139	7957	86728
12.	Commercial Center (<10ac)	189.18	TSF	206	131	337	629	682	1311	16090
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
14.	Hotel	300.00	ROOM	102	66	168	96	87	183	2469
20.	Elementary/Middle School	5350.00	STU	1391	1070	2461	428	482	910	7758
21.	High School	2000.00	STU	640	280	920	120	180	300	3580
30.	Industrial Park	12522.48	TSF	6887	1251	8138	1630	6510	8140	75135
31.	Business Park	1131.10	TSF	1358	260	1618	339	1120	1459	11537
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	2020.40	TSF	3133	384	3517	424	2606	3030	23356
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	89.10	AC	0	0	0	2	3	5	232
	TOTAL			18580	16648	35228	21931	25095	47026	488008

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

h. Year 2030 (Buildout)

LANDMARK VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
		SUB-TOTAL		837	163	1000	228	707	935	7580
99	4.	Condominium/Townhouse	470.00 DU	47	226	273	221	122	343	3760
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		47	226	273	222	123	345	3813
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5040.00 DU	505	2420	2925	2369	1311	3680	40320
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		2320	3132	5452	3660	3391	7051	72570

HOMESTEAD S/O RIVER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00 DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	1200.00 STU	312	240	552	96	108	204	1740
	21.	High School	2400.00 STU	768	336	1104	144	216	360	4296
	51.	Developed Park	20.50 AC	0	0	0	1	1	2	53
		SUB-TOTAL		1201	990	2191	689	581	1270	13261
108	4.	Condominium/Townhouse	2189.00 DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
		SUB-TOTAL		7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00 DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00 DU	55	263	318	258	142	400	4384
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	9.40 AC	0	0	0	0	0	0	24
		SUB-TOTAL		324	546	870	448	291	739	7535
118	4.	Condominium/Townhouse	161.00 DU	16	77	93	76	42	118	1288
		SUB-TOTAL		16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	645.00 DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00 DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	3000.00 STU	780	600	1380	240	270	510	4350
21.	High School	2400.00 STU	768	336	1104	144	216	360	4296
51.	Developed Park	38.60 AC	0	0	0	1	1	2	100
	TOTAL		2001	2865	4866	2338	1578	3916	41300

HOMESTEAD N/O RIVER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
54	3.	Single Family (6-10du/ac)	62.00 DU	12	35	47	40	23	63	614
	4.	Condominium/Townhouse	589.00 DU	59	283	342	277	153	430	4712
		SUB-TOTAL		71	318	389	317	176	493	5326
55	3.	Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4.	Condominium/Townhouse	922.00 DU	92	443	535	433	240	673	7376
	51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
		SUB-TOTAL		123	535	658	538	301	839	9015
56	2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
	4.	Condominium/Townhouse	23.00 DU	2	11	13	11	6	17	184
		SUB-TOTAL		6	22	28	23	13	36	372
57	12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
	31.	Business Park	1169.60 TSF	1404	269	1673	351	1158	1509	11930
	40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
		SUB-TOTAL		1627	327	1954	557	1492	2049	17856

HOMESTEAD N/O RIVER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
3.	Single Family (6-10du/ac)	226.00 DU	43	127	170	145	84	229	2238
4.	Condominium/Townhouse	1534.00 DU	153	737	890	721	399	1120	12272
12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
31.	Business Park	1169.60 TSF	1404	269	1673	351	1158	1509	11930
40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
	TOTAL		1827	1202	3029	1435	1982	3417	32569

POTRERO VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
106	5.	Apartment	520.00 DU	42	224	266	213	109	322	3588
		SUB-TOTAL		42	224	266	213	109	322	3588
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
113	4.	Condominium/Townhouse	354.00 DU	35	170	205	166	92	258	2832
		SUB-TOTAL		35	170	205	166	92	258	2832
114	4.	Condominium/Townhouse	560.00 DU	56	269	325	263	146	409	4480
		SUB-TOTAL		56	269	325	263	146	409	4480
115	3.	Single Family (6-10du/ac)	603.00 DU	115	338	453	386	223	609	5970
		SUB-TOTAL		115	338	453	386	223	609	5970
116	4.	Condominium/Townhouse	1262.00 DU	126	606	732	593	328	921	10096
	11.	Commercial Center(10-30a)	628.50 TSF	459	295	754	1496	1622	3118	33977
		SUB-TOTAL		585	901	1486	2089	1950	4039	44073
117	4.	Condominium/Townhouse	1261.00 DU	126	605	731	593	328	921	10088
	11.	Commercial Center(10-30a)	628.50 TSF	459	295	754	1496	1622	3118	33977
		SUB-TOTAL		585	900	1485	2089	1950	4039	44065
119	5.	Apartment	1679.00 DU	134	722	856	688	353	1041	11585
		SUB-TOTAL		134	722	856	688	353	1041	11585
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752
153	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198

POTRERO VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1810.00 DU	346	1013	1359	1158	670	1828	17919
4.	Condominium/Townhouse	4325.00 DU	432	2076	2508	2032	1125	3157	34600
5.	Apartment	2199.00 DU	176	946	1122	901	462	1363	15173
11.	Commercial Center(10-30a)	1257.00 TSF	918	590	1508	2992	3244	6236	67954
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		1916	4686	6602	7159	5570	12729	138208

ENTRADA (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	400.00 TSF	188	120	308	656	712	1368	16024
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	543.88 TSF	299	54	353	71	283	354	3263
	40.	Commercial Office	773.02 TSF	1198	147	1345	162	997	1159	8936
		SUB-TOTAL		1817	559	2376	1377	2426	3803	38336
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	800.00 TSF	376	240	616	1312	1424	2736	32048
	14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
	40.	Commercial Office	400.00 TSF	620	76	696	84	516	600	4624
		SUB-TOTAL		1198	862	2060	1962	2287	4249	47141
95	11.	Commercial Center(10-30a)	115.21 TSF	84	54	138	274	297	571	6228
		SUB-TOTAL		84	54	138	274	297	571	6228
101	10.	Commercial Center (>30ac)	388.30 TSF	183	116	299	637	691	1328	15555
		SUB-TOTAL		183	116	299	637	691	1328	15555
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	1588.30 TSF	747	476	1223	2605	2827	5432	63627
11.	Commercial Center(10-30a)	250.21 TSF	183	117	300	595	645	1240	13526
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
30.	Industrial Park	543.88 TSF	299	54	353	71	283	354	3263
40.	Commercial Office	1173.02 TSF	1818	223	2041	246	1513	1759	13560
	TOTAL		3547	2531	6078	5299	6341	11640	125345

LEGACY VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30.	Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
		SUB-TOTAL		402	73	475	95	380	475	4380
42	30.	Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
		SUB-TOTAL		151	28	179	36	143	179	1650
43	30.	Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
		SUB-TOTAL		151	27	178	36	142	178	1643
45	30.	Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
		SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30.	Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
		SUB-TOTAL		300	82	382	197	371	568	5529
47	30.	Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
		SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30.	Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
		SUB-TOTAL		396	72	468	94	374	468	4320
49	30.	Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
		SUB-TOTAL		420	76	496	99	397	496	4586
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
		SUB-TOTAL		153	115	268	115	115	230	3820
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
		SUB-TOTAL		410	74	484	97	387	484	4469
62	30.	Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
		SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1120.00	DU	213	627	840	718	415	1133	11089
3.	Single Family (6-10du/ac)	3394.00	DU	647	1899	2546	2172	1257	3429	33600
4.	Condominium/Townhouse	19043.00	DU	1906	9141	11047	8950	4952	13902	152344
5.	Apartment	3058.00	DU	245	1315	1560	1253	643	1896	21101
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	1588.30	TSF	747	476	1223	2605	2827	5432	63627
11.	Commercial Center(10-30a)	2176.51	TSF	1590	1022	2612	5180	5616	10796	117662
12.	Commercial Center (<10ac)	189.18	TSF	206	131	337	629	682	1311	16090
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
14.	Hotel	300.00	ROOM	102	66	168	96	87	183	2469
20.	Elementary/Middle School	5550.00	STU	1443	1110	2553	444	500	944	8048
21.	High School	2400.00	STU	768	336	1104	144	216	360	4296
30.	Industrial Park	12802.48	TSF	7041	1279	8320	1667	6656	8323	76815
31.	Business Park	1861.10	TSF	2234	428	2662	558	1843	2401	18983
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	2493.42	TSF	3866	474	4340	523	3216	3739	28824
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	89.10	AC	0	0	0	2	3	5	232
	TOTAL			21342	18600	39942	25419	29349	54768	568180

APPENDIX B

INTERSECTION CAPACITY UTILIZATION WORKSHEETS

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure B-1.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

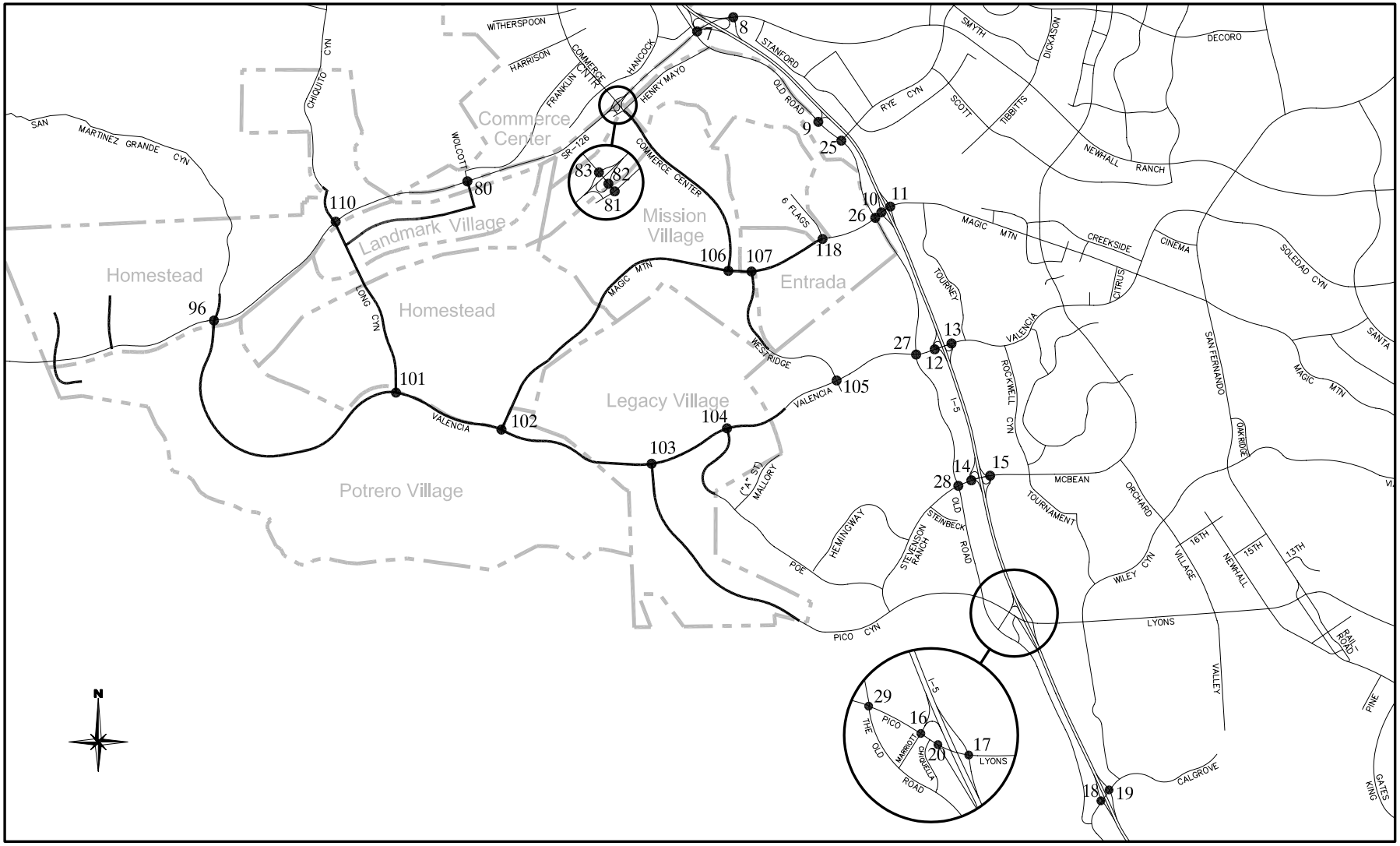
Example of Right-turn Capacity Utilization For Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)



Legend

Intersection Location

New Westside Roadway

Figure B-1

INTERSECTION STUDY LOCATIONS

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (typically 75%)

5. Right-turn Adjustment for ICU Calculation

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example of Shared Lane Utilization for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}.$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}.$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}.$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}.$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}.$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}.$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

$$\text{V/C (Left)} = \text{V/C (Through)}$$

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}.$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

7. I-5 SB Ramps & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	219	.06*	80	.02*
SBT	0	0	0		0	
SBR	2	3500	153	.04	185	.05
EBL	0	0	0		0	
EBT	4	7000	281	.04	532	.08
EBR	f		617		1260	
WBL	0	0	0		0	
WBT	3	5250	1343	.26*	848	.16*
WBR	f		10		196	
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.42**		**.31**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	1020	.29*	780	.22*
SBT	0	0	0		0	
SBR	2	3500	400	.11	220	.06
EBL	0	0	0		0	
EBT	4	7000	640	.09	1780	.25
EBR	f		1130		1380	
WBL	0	0	0		0	
WBT	4	7000	2800	.40*	1870	.27*
WBR	f		20		80	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.59**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	1010	.29*	930	.27*
SBT	0	0	0		0	
SBR	2	3500	440	.13	260	.07
EBL	0	0	0		0	
EBT	4	7000	700	.10	1950	.28*
EBR	f		1060		1320	
WBL	0	0	0		0	
WBT	4	7000	2650	.38*	1870	.27
WBR	f		20		140	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.65**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	980	.28*	930	.27*
SBT	0	0	0		0	
SBR	2	3500	430	.12	280	.08
EBL	0	0	0		0	
EBT	4	7000	760	.11	2090	.30*
EBR	f		1090		1250	
WBL	0	0	0		0	
WBT	4	7000	2700	.39*	1910	.27
WBR	f		10		140	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.67**

7. I-5 SB Ramps & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	980	.28*	850	.24*
SBT	0	0	0		0	
SBR	2	3500	460	.13	340	.10
EBL	0	0	0		0	
EBT	4	7000	930	.13	2070	.30*
EBR	f		1100		1300	
WBL	0	0	0		0	
WBT	4	7000	2570	.37*	1860	.27
WBR	f		20		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.64**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	950	.27*	860	.25*
SBT	0	0	0		0	
SBR	2	3500	510	.15	450	.13
EBL	0	0	0		0	
EBT	4	7000	1290	.18	2200	.31*
EBR	f		1240		1240	
WBL	0	0	0		0	
WBT	4	7000	2500	.36*	2110	.30
WBR	f		20		280	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.66**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	890	.25*	830	.24*
SBT	0	0	0		0	
SBR	2	3500	590	.17	510	.15
EBL	0	0	0		0	
EBT	4	7000	1510	.22	2500	.36*
EBR	f		1420		1360	
WBL	0	0	0		0	
WBT	4	7000	2750	.39*	2480	.35
WBR	f		30		260	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.70**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	840	.24*	880	.25*
SBT	0	0	0		0	
SBR	2	3500	660	.19	530	.15
EBL	0	0	0		0	
EBT	4	7000	1630	.23	2810	.40*
EBR	f		1550		1420	
WBL	0	0	0		0	
WBT	4	7000	3010	.43*	2700	.39
WBR	f		30		260	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.75**

8. I-5 NB Ramps & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1061	.20*	638	.12*
NBT	0	0	0		0	
NBR	1	1750	231	.13	50	.03
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	425	.06	514	.07*
EBR	f		73		189	
WBL	0	0	0		0	
WBT	3	5250	363	.07*	311	.06
WBR	f		145		334	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.37**		**.29**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1240	.24*	1210	.23*
NBT	0	0	0		0	
NBR	1	1750	30	.02	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1290	.18	1880	.27*
EBR	f		150		470	
WBL	0	0	0		0	
WBT	3	5250	1590	.30*	720	.14
WBR	f		290		670	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.60**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	960	.18*	1150	.22*
NBT	0	0	0		0	
NBR	1	1750	60	.03	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1340	.19	2120	.30*
EBR	f		170		510	
WBL	0	0	0		0	
WBT	3	5250	1720	.33*	850	.16
WBR	f		320		700	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.62**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	960	.18*	1170	.22*
NBT	0	0	0		0	
NBR	1	1750	60	.03	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1340	.19	2240	.32*
EBR	f		190		520	
WBL	0	0	0		0	
WBT	3	5250	1760	.34*	860	.16
WBR	f		310		690	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.64**

8. I-5 NB Ramps & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	940	.18*	1090	.21*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1440	.21	2130	.30*
EBR	f		250		560	
WBL	0	0	0		0	
WBT	3	5250	1660	.32*	1050	.20
WBR	f		330		700	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.61**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	910	.17*	1200	.23*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1650	.24	2180	.31*
EBR	f		330		640	
WBL	0	0	0		0	
WBT	3	5250	1630	.31*	1170	.22
WBR	f		350		700	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.64**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1000	.19*	1380	.26*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1740	.25	2330	.33*
EBR	f		400		750	
WBL	0	0	0		0	
WBT	3	5250	1800	.34*	1330	.25
WBR	f		360		700	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.69**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1040	.20*	1500	.29*
NBT	0	0	0		0	
NBR	1	1750	120	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1760	.25	2630	.38*
EBR	f		450		800	
WBL	0	0	0		0	
WBT	3	5250	2030	.39*	1450	.28
WBR	f		370		710	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.77**

9. Rye/Old Rd & I-5 SB Ramps

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	43	.02	22	.01*
NBT	2	3500	675	.19*	425	.12
NBR	1	1750	1013	.58	1325	.76
SBL	1	1750	51	.03*	83	.05
SBT	2	3500	598	.17	699	.20*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		294		164	
WBT	0	3500	0	.08*	0	.05*
WBR	0.5		2		2	
Right Turn Adjustment			NBR	.33*	NBR	.56*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.92**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	870	.25*	840	.24*
NBR	2	3500	580	.17	770	.22
SBL	2	3500	140	.04*	720	.21*
SBT	3	5250	150	.03	650	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	470	.13*	260	.07*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.52**		**.62**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	620	.18*	690	.20*
NBR	2	3500	650	.19	650	.19
SBL	2	3500	130	.04*	710	.20*
SBT	3	5250	120	.02	500	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	400	.11*	90	.03*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.43**		**.53**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	680	.19*	680	.19*
NBR	2	3500	700	.20	740	.21
SBL	2	3500	120	.03*	730	.21*
SBT	3	5250	110	.02	550	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	400	.11*	140	.04*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.43**		**.54**

9. Rye/Old Rd & I-5 SB Ramps

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	760	.22*	740	.21*
NBR	2	3500	830	.24	1050	.30
SBL	2	3500	180	.05*	880	.25*
SBT	3	5250	170	.03	440	.08
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	360	.10*	160	.05*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .47 .65

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	800	.23*	900	.26*
NBR	2	3500	840	.24	1000	.29
SBL	2	3500	210	.06*	900	.26*
SBT	3	5250	200	.04	510	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	360	.10*	210	.06*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .49 .68

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	870	.25*	1010	.29*
NBR	2	3500	790	.23	1030	.29
SBL	2	3500	230	.07*	950	.27*
SBT	3	5250	250	.05	580	.11
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	420	.12*	290	.08*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .54 .74

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	1030	.29*	1130	.32*
NBR	2	3500	730	.21	1050	.30
SBL	2	3500	280	.08*	1030	.29*
SBT	3	5250	310	.06	660	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	470	.13*	390	.11*
WBT	0	0	0		0	
WBR	1	1750	10	.01	20	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .60 .82

10. I-5 SB Ramps & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		432		358	
SBT	0.5	3500	0	.12*	0	.10*
SBR	1	1750	32	.02	57	.03
EBL	0	0	0		0	
EBT	2	3500	291	.08*	439	.13*
EBR	f		104		251	
WBL	1	1750	498	.28*	454	.26*
WBT	3	5250	1442	.27	1267	.24
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.59**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	640	.18*	1260	.36*
SBT	0	0	0		0	
SBR	2	3500	60	.02	40	.01
EBL	0	0	0		0	
EBT	3	5250	370	.07	980	.19
EBR	2	3500	680	.19	810	.23
WBL	2	3500	60	.02	30	.01
WBT	4	7000	1870	.27*	1560	.22*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.68**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	640	.18*	1160	.33*
SBT	0	0	0		0	
SBR	2	3500	60	.02	50	.01
EBL	0	0	0		0	
EBT	3	5250	410	.08	930	.18
EBR	2	3500	670	.19	780	.22
WBL	2	3500	60	.02	30	.01
WBT	4	7000	2080	.30*	1600	.23*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.66**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	640	.18*	1120	.32*
SBT	0	0	0		0	
SBR	2	3500	60	.02	50	.01
EBL	0	0	0		0	
EBT	3	5250	570	.11	1060	.20
EBR	2	3500	850	.24	820	.23
WBL	2	3500	60	.02	30	.01
WBT	4	7000	2160	.31*	1810	.26*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.68**

10. I-5 SB Ramps & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	680	.19*	1250	.36*
SBT	0	0	0		0	
SBR	2	3500	100	.03	60	.02
EBL	0	0	0		0	
EBT	3	5250	950	.18	1200	.23
EBR	2	3500	1120	.32	1070	.31
WBL	2	3500	50	.01	40	.01
WBT	4	7000	2180	.31*	2460	.35*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.81**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	750	.21*	1240	.35*
SBT	0	0	0		0	
SBR	2	3500	100	.03	80	.02
EBL	0	0	0		0	
EBT	3	5250	1100	.21	1350	.26
EBR	2	3500	1200	.34	1100	.31
WBL	2	3500	40	.01	30	.01
WBT	4	7000	2250	.32*	2720	.39*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.84**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	820	.23*	1270	.36*
SBT	0	0	0		0	
SBR	2	3500	90	.03	80	.02
EBL	0	0	0		0	
EBT	3	5250	1160	.22	1480	.28
EBR	2	3500	1230	.35	1160	.33
WBL	2	3500	30	.01	30	.01
WBT	4	7000	2420	.35*	2830	.40*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.86**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		920	.18*	1320	.25*
SBT	0	7000	0		0	
SBR	1.5		60	.03	80	.05
EBL	0	0	0		0	
EBT	3	5250	1220	.23	1620	.31
EBR	2	3500	1270	.36	1200	.34
WBL	2	3500	20	.01	20	.01
WBT	4	7000	2530	.36*	2950	.42*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.77**

11. I-5 NB Ramps & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		1147	{.33}*	1181	{.34}*
NBT	0.5	3500	2	.33	7	.34
NBR	1	1750	363	.21	695	.40
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	21	.01	39	.02
EBT	2	3500	703	.20*	698	.20*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	793	.11	578	.08
WBR	f		279		413	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.70**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1220	.23*	960	.18*
NBT	0	7000	0		0	
NBR	1.5		100	.06	280	.16
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	60	.02	260	.07
EBT	3	5250	950	.18*	1990	.38*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	710	.14	630	.12
WBR	1.5		940	.27	800	.23
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.66**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1260	.24*	980	.19*
NBT	0	7000	0		0	
NBR	1.5		100	.06	280	.16
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	50	.01	140	.04
EBT	3	5250	1000	.19*	1950	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	880	{.14}	650	.12
WBR	1.5		670		760	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.66**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1270	.24*	1030	.20*
NBT	0	7000	0		0	
NBR	1.5		100	.06	270	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	60	.02	140	.04
EBT	3	5250	1150	.22*	2030	.39*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	930	{.15}	810	.15
WBR	1.5		690		750	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.69**

11. I-5 NB Ramps & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1350	.26*	1340	.26*
NBT	0	7000	0		0	
NBR	1.5		90	.05	110	.06
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	90	.03	180	.05
EBT	3	5250	1540	.29*	2270	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	870	{.15}	1160	{.18}
WBR	1.5		770		740	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.79**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1350	.26*	1370	.26*
NBT	0	7000	0		0	
NBR	1.5		100	.06	100	.06
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	100	.03	200	.06
EBT	3	5250	1750	.33*	2390	.46*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	940	{.17}	1380	{.21}
WBR	1.5		880		780	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.82**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1370	.26*	1390	.26*
NBT	0	7000	0		0	
NBR	1.5		90	.05	90	.05
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	100	.03	230	.07
EBT	3	5250	1870	.36*	2520	.48*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1090	{.18}	1470	{.23}
WBR	1.5		860		850	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.84**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1400	.27*	1410	.27*
NBT	0	7000	0		0	
NBR	1.5		90	.05	80	.05
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	130	.04	280	.08
EBT	3	5250	2020	.38*	2650	.50*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1150	{.19}	1560	{.24}
WBR	1.5		900		870	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.87**

12. I-5 SB Ramps & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	209	.06*	236	.07*
SBT	0	0	0		0	
SBR	1	1750	262	.15	54	.03
EBL	0	0	0		0	
EBT	3	5250	586	.11	498	.09
EBR	f		407		127	
WBL	0	0	0		0	
WBT	2	3500	760	.22*	878	.25*
WBR	f		844		1029	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.42**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	330	.09*	380	.11*
SBT	0	0	0		0	
SBR	1	1750	260	.15	380	.22
EBL	0	0	0		0	
EBT	3	5250	470	.09	670	.13
EBR	f		440		390	
WBL	0	0	0		0	
WBT	2	3500	1070	.31*	1190	.34*
WBR	f		1510		1010	
Right Turn Adjustment			SBR	.06*	SBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.66**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	350	.10*
SBT	0	0	0		0	
SBR	1	1750	210	.12	330	.19
EBL	0	0	0		0	
EBT	3	5250	440	.08	650	.12
EBR	f		450		400	
WBL	0	0	0		0	
WBT	2	3500	1120	.32*	1250	.36*
WBR	f		1380		1000	
Right Turn Adjustment			SBR	.02*	SBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.65**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	360	.10*	380	.11*
SBT	0	0	0		0	
SBR	1	1750	210	.12	370	.21
EBL	0	0	0		0	
EBT	3	5250	510	.10	710	.14
EBR	f		470		350	
WBL	0	0	0		0	
WBT	2	3500	1120	.32*	1440	.41*
WBR	f		1360		950	
Right Turn Adjustment			SBR	.02*	SBR	.10*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.72**

12. I-5 SB Ramps & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	370	.11*	420	.12*
SBT	0	0	0		0	
SBR	1	1750	270	.15	410	.23
EBL	0	0	0		0	
EBT	3	5250	820	.16	790	.15
EBR	f		690		570	
WBL	0	0	0		0	
WBT	2	3500	1360	.39*	1850	.53*
WBR	f		1180		990	
Right Turn Adjustment			SBR	.04*	SBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.86**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	390	.11*
SBT	0	0	0		0	
SBR	1	1750	320	.18	470	.27
EBL	0	0	0		0	
EBT	3	5250	1080	.21	1080	.21
EBR	f		920		740	
WBL	0	0	0		0	
WBT	3	5250	1580	.30*	2140	.41*
WBR	f		1170		920	
Right Turn Adjustment			SBR	.08*	SBR	.16*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.78**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	370	.11*	440	.13*
SBT	0	0	0		0	
SBR	1	1750	320	.18	550	.31
EBL	0	0	0		0	
EBT	3	5250	1110	.21	1240	.24
EBR	f		970		790	
WBL	0	0	0		0	
WBT	3	5250	1620	.31*	2220	.42*
WBR	f		1140		870	
Right Turn Adjustment			SBR	.07*	SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.83**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	340	.19	570	.33
EBL	0	0	0		0	
EBT	3	5250	1190	.23	1390	.26
EBR	f		910		510	
WBL	0	0	0		0	
WBT	3	5250	1650	.31*	2280	.43*
WBR	f		1190		890	
Right Turn Adjustment			SBR	.09*	SBR	.20*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.86**

13. I-5 NB Ramps & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	291	.08*	273	.08*
NBT	0	0	0		0	
NBR	2	3500	945	.27	876	.25
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	697	.16	668	.14
EBR	0	0	157		79	
WBL	2	3500	80	.02	147	.04
WBT	4	7000	1266	.18*	1645	.24*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.17*	NBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.51**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	480	.14*	210	.06*
NBT	0	0	0		0	
NBR	2	3500	970	.28	1170	.33
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	700	.15	860	.20
EBR	0	0	100		190	
WBL	2	3500	280	.08	290	.08
WBT	4	7000	2130	.30*	2010	.29*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.03*	NBR	.20*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.65**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	510	.15*	230	.07*
NBT	0	0	0		0	
NBR	2	3500	970	.28	1170	.33
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	720	.15	830	.19
EBR	0	0	70		180	
WBL	2	3500	270	.08	290	.08
WBT	4	7000	2010	.29*	2030	.29*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.02*	NBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.64**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	510	.15*	300	.09*
NBT	0	0	0		0	
NBR	2	3500	970	.28	1140	.33
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	810	.17	910	.21
EBR	0	0	70		190	
WBL	2	3500	270	.08	280	.08
WBT	4	7000	2020	.29*	2110	.30*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.04*	NBR	.17*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.66**

13. I-5 NB Ramps & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	610	.17*	470	.13*
NBT	0	0	0		0	
NBR	2	3500	1030	.29	1100	.31
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1120	.23*	1060	.23
EBR	0	0	100		160	
WBL	2	3500	270	.08*	270	.08
WBT	4	7000	1990	.28	2380	.34*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.06*	NBR	.10*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.67**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	710	.20*	460	.13*
NBT	0	0	0		0	
NBR	2	3500	1010	.29	980	.28
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1360	.28*	1320	.29
EBR	0	0	110		180	
WBL	2	3500	290	.08*	270	.08
WBT	4	7000	2120	.30	2620	.37*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.03*	NBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.69**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	700	.20*	480	.14*
NBT	0	0	0		0	
NBR	2	3500	1020	.29	920	.26
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1430	.29*	1510	.33*
EBR	0	0	110		200	
WBL	2	3500	310	.09*	270	.08*
WBT	4	7000	2160	.31	2650	.38
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.02*	NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.71**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	670	.19*	480	.14*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	880	.25
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1460	.30*	1660	.36*
EBR	0	0	120		230	
WBL	2	3500	440	.13*	300	.09*
WBT	4	7000	2260	.32	2740	.39
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.01*	NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.73**

14. I-5 SB Ramps & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	144	.08*	406	.23*
SBT	0	0	0		0	
SBR	1	1750	57	.03	451	.26
EBL	0	0	0		0	
EBT	2	3500	627	.18	950	.27
EBR	1	1750	374	.21	93	.05
WBL	0	0	0		0	
WBT	2	3500	1326	.38*	1043	.30*
WBR	1	1750	215	.12	480	.27
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .56 .66

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	210	.12*	350	.20*
SBT	0	0	0		0	
SBR	1	1750	290	.17	320	.18
EBL	0	0	0		0	
EBT	2	3500	1140	.33*	1360	.39
EBR	1	1750	370	.21	250	.14
WBL	0	0	0		0	
WBT	2	3500	530	.15	1430	.41*
WBR	1	1750	450	.26	300	.17
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .55 .71

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	230	.13*	330	.19*
SBT	0	0	0		0	
SBR	1	1750	290	.17	300	.17
EBL	0	0	0		0	
EBT	2	3500	1020	.29*	1370	.39
EBR	1	1750	380	.22	350	.20
WBL	0	0	0		0	
WBT	2	3500	580	.17	1450	.41*
WBR	1	1750	450	.26	310	.18
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .70

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	240	.14*	350	.20*
SBT	0	0	0		0	
SBR	1	1750	280	.16	210	.12
EBL	0	0	0		0	
EBT	2	3500	1010	.29*	1350	.39
EBR	1	1750	380	.22	370	.21
WBL	0	0	0		0	
WBT	2	3500	600	.17	1440	.41*
WBR	1	1750	450	.26	340	.19
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .53 .71

14. I-5 SB Ramps & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	290	.17*	460	.26*
SBT	0	0	0		0	
SBR	1	1750	310	.18	390	.22
EBL	0	0	0		0	
EBT	2	3500	1060	.30*	1340	.38
EBR	1	1750	390	.22	160	.09
WBL	0	0	0		0	
WBT	2	3500	580	.17	1550	.44*
WBR	1	1750	440	.25	310	.18
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .57 .80

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	330	.19*	450	.26*
SBT	0	0	0		0	
SBR	1	1750	270	.15	360	.21
EBL	0	0	0		0	
EBT	2	3500	1080	.31*	1360	.39
EBR	1	1750	380	.22	190	.11
WBL	0	0	0		0	
WBT	2	3500	670	.19	1730	.49*
WBR	1	1750	450	.26	320	.18
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .60 .85

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	380	.11*	550	.16*
SBT	0	0	0		0	
SBR	1	1750	260	.15	340	.19
EBL	0	0	0		0	
EBT	2	3500	1070	.31*	1310	.37
EBR	1	1750	370	.21	180	.10
WBL	0	0	0		0	
WBT	2	3500	710	.20	1790	.51*
WBR	1	1750	440	.25	310	.18
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .80

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	420	.12*	540	.15*
SBT	0	0	0		0	
SBR	1	1750	250	.14	340	.19
EBL	0	0	0		0	
EBT	2	3500	1060	.30*	1340	.38
EBR	1	1750	360	.21	270	.15
WBL	0	0	0		0	
WBT	2	3500	800	.23	1810	.52*
WBR	1	1750	430	.25	320	.18
Right Turn Adjustment					SBR	.04*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .81

15. I-5 NB Ramps & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	135	.04*	338	.10*
NBT	0	0	0		0	
NBR	2	3500	284	.08	742	.21
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	633	.18	1213	.35*
EBR	1	1750	133	.08	142	.08
WBL	0	0	0		0	
WBT	3	5250	1406	.27*	1185	.23
WBR	1	1750	101	.06	122	.07
Right Turn Adjustment					NBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.41**		**.66**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	90	.03*	410	.12*
NBT	0	0	0		0	
NBR	2	3500	520	.15	710	.20
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	990	.28*	1430	.41*
EBR	1	1750	370	.21	280	.16
WBL	0	0	0		0	
WBT	3	5250	890	.17	1290	.25
WBR	1	1750	120	.07	170	.10
Right Turn Adjustment			NBR	.12*	NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.71**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	110	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	540	.15	640	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1000	.29*	1420	.41*
EBR	1	1750	270	.15	280	.16
WBL	0	0	0		0	
WBT	3	5250	930	.18	1300	.25
WBR	1	1750	110	.06	170	.10
Right Turn Adjustment			NBR	.12*	NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.69**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	110	.03*	420	.12*
NBT	0	0	0		0	
NBR	2	3500	520	.15	670	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1020	.29*	1450	.41*
EBR	1	1750	250	.14	260	.15
WBL	0	0	0		0	
WBT	3	5250	950	.18	1340	.26
WBR	1	1750	110	.06	170	.10
Right Turn Adjustment			NBR	.12*	NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.70**

15. I-5 NB Ramps & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	100	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	520	.15	670	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1090	.31*	1510	.43*
EBR	1	1750	280	.16	290	.17
WBL	0	0	0		0	
WBT	3	5250	930	.18	1390	.26
WBR	1	1750	120	.07	190	.11
Right Turn Adjustment			NBR	.12*	NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.72**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	120	.03*	530	.15*
NBT	0	0	0		0	
NBR	2	3500	530	.15	820	.23
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1160	.33*	1520	.43*
EBR	1	1750	270	.15	290	.17
WBL	0	0	0		0	
WBT	3	5250	1020	.19	1480	.28
WBR	1	1750	130	.07	210	.12
Right Turn Adjustment			NBR	.12*	NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.76**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	90	.03*	470	.13*
NBT	0	0	0		0	
NBR	2	3500	560	.16	890	.25
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1210	.35*	1600	.46*
EBR	1	1750	250	.14	270	.15
WBL	0	0	0		0	
WBT	3	5250	1080	.21	1600	.30
WBR	1	1750	160	.09	230	.13
Right Turn Adjustment			NBR	.13*	NBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.81**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	100	.03*	480	.14*
NBT	0	0	0		0	
NBR	2	3500	640	.18	970	.28
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1220	.35*	1630	.47*
EBR	1	1750	250	.14	250	.14
WBL	0	0	0		0	
WBT	3	5250	1150	.22	1610	.31
WBR	1	1750	170	.10	270	.15
Right Turn Adjustment			NBR	.15*	NBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.85**

16. I-5 SB Loop & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	67	.04	68	.04
SBL	1.5		332		375	
SBT	0.5	3500	136	.13*	71	.13*
SBR	1	1750	45	.03	118	.07
EBL	0	0	0		0	
EBT	2	3500	895	.27*	873	.27
EBR	0	0	56		58	
WBL	1	1750	48	.03*	53	.03
WBT	2	3500	612	.17	1281	.37*
WBR	1	1750	427	.24	282	.16
Right Turn Adjustment			NBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.60**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	70	.04	70	.04
SBL	1.5		460		460	
SBT	0.5	3500	10	.13*	310	.22*
SBR	1	1750	410	.23	10	.01
EBL	0	0	0		0	
EBT	2	3500	530	.16	1150	.34*
EBR	0	0	30		50	
WBL	1	1750	30	.02	170	.10*
WBT	2	3500	800	.23*	1180	.34
WBR	1	1750	380	.22	120	.07
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.76**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		490		410	
SBT	0.5	3500	10	.14*	280	.20*
SBR	1	1750	430	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	500	.15	1100	.33*
EBR	0	0	30		50	
WBL	1	1750	30	.02	160	.09*
WBT	2	3500	760	.22*	1150	.33
WBR	1	1750	280	.16	110	.06
Right Turn Adjustment			SBR	.11*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.72**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		520		440	
SBT	0.5	3500	10	.15*	290	.21*
SBR	1	1750	430	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	490	.15	1070	.32*
EBR	0	0	30		50	
WBL	1	1750	30	.02	140	.08*
WBT	2	3500	770	.22*	1190	.34
WBR	1	1750	290	.17	100	.06
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.71**

16. I-5 SB Loop & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		660		560	
SBT	0.5	3500	10	.19*	330	.25*
SBR	1	1750	440	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	560	.17	1090	.33*
EBR	0	0	30		50	
WBL	1	1750	30	.02	140	.08*
WBT	2	3500	760	.22*	1260	.36
WBR	1	1750	260	.15	110	.06
Right Turn Adjustment			SBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.76**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		720		540	
SBT	0.5	3500	10	.21*	320	.25*
SBR	1	1750	430	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	620	.19	1260	.37*
EBR	0	0	30		50	
WBL	1	1750	30	.02	150	.09*
WBT	2	3500	800	.23*	1480	.42
WBR	1	1750	260	.15	110	.06
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.81**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	70	.04	70	.04
SBL	1.5		710		580	
SBT	0.5	3500	10	.21*	300	.25*
SBR	1	1750	420	.24	10	.01
EBL	0	0	0		0	
EBT	2	3500	740	.22*	1410	.42*
EBR	0	0	30		50	
WBL	1	1750	30	.02*	170	.10*
WBT	2	3500	850	.24	1610	.46
WBR	1	1750	250	.14	110	.06
Right Turn Adjustment			Multi	.05*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.87**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	70	.04	70	.04
SBL	1.5		770		610	
SBT	0.5	3500	10	.22*	310	.26*
SBR	1	1750	400	.23	10	.01
EBL	0	0	0		0	
EBT	3	5250	820	.16	1520	.30
EBR	0	0	30		50	
WBL	1	1750	30	.02	170	.10
WBT	2	3500	890	.25*	1700	.49*
WBR	1	1750	250	.14	110	.06
Right Turn Adjustment			SBR	.01*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.85**

17. I-5 NB Ramps & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		251	{.07}*	685	{.20}*
NBT	0.5	3500	1	.07	0	.20
NBR	f		334		645	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	158	.09*	183	.10*
EBT	2	3500	719	.21	1081	.31
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1066	.27*	1017	.28*
WBR	0	0	326		445	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.68**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	530	{.15}*
NBT	0.5	3500	10	.03	0	.15
NBR	f		170		410	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	90	.05*	160	.09
EBT	2	3500	950	.27	1590	.45*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1120	.32*	930	.27
WBR	0	0	550		720	.41
Right Turn Adjustment					WBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.75**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	540	{.15}*
NBT	0.5	3500	10	.03	0	.15
NBR	f		170		350	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	80	.05*	160	.09
EBT	2	3500	950	.27	1510	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	980	.27*	880	.25
WBR	0	0	430		730	.42
Right Turn Adjustment					WBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.45**		**.76**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	530	{.15}*
NBT	0.5	3500	10	.03	0	.15
NBR	f		170		340	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04*	160	.09
EBT	2	3500	980	.28	1520	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	990	.27*	880	.25
WBR	0	0	440		750	.43
Right Turn Adjustment					WBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.44**		**.77**

17. I-5 NB Ramps & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	580	{.17}*
NBT	0.5	3500	10	.03	0	.17
NBR	f		170		320	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06*	170	.10
EBT	2	3500	1130	.32	1600	.46*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	950	.27*	910	.26
WBR	0	0	510	.29	870	.50
Right Turn Adjustment			WBR	.02*	WBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.87**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	660	{.19}*
NBT	0.5	3500	10	.03	0	.19
NBR	f		160		340	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	150	.09
EBT	2	3500	1270	.36*	1690	.48*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	990	.28	1100	.31
WBR	0	0	500	.29	890	.51
Right Turn Adjustment					WBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.89**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		130	{.04}*	790	{.23}*
NBT	0.5	3500	10	.04	0	.23
NBR	f		160		340	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	140	.08
EBT	2	3500	1300	.37*	1850	.53*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1010	.19	1140	.22
WBR	f		510		910	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.86**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		120	{.04}*	760	{.22}*
NBT	0.5	3500	10	.04	0	.22
NBR	f		160		370	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	140	.08
EBT	2	3500	1380	.39*	1980	.57*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1090	.21	1270	.24
WBR	f		530		950	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.89**

18. I-5 SB Ramps & Calgrove

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		21		91	
SBT	0.5	1750	1	.01*	3	.05*
SBR	1	1750	255	.15	135	.08
EBL	0	0	0		0	
EBT	1	1750	110	.11*	657	.42*
EBR	0	0	74		70	
WBL	1	1750	466	.27*	123	.07*
WBT	1	1750	350	.20	212	.12
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.64**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		130	
SBT	0.5	1750	10	.02*	10	.08*
SBR	1	1750	270	.15	230	.13
EBL	0	0	0		0	
EBT	1	1750	370	.33*	660	.42*
EBR	0	0	200		80	
WBL	1	1750	400	.23*	100	.06*
WBT	1	1750	430	.25	180	.10
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.66**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		130	
SBT	0.5	1750	10	.02*	10	.08*
SBR	1	1750	280	.16	220	.13
EBL	0	0	0		0	
EBT	1	1750	350	.31*	680	.46*
EBR	0	0	200		130	
WBL	1	1750	400	.23*	110	.06*
WBT	1	1750	450	.26	180	.10
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.70**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		130	
SBT	0.5	1750	10	.02*	10	.08*
SBR	1	1750	290	.17	200	.11
EBL	0	0	0		0	
EBT	1	1750	340	.31*	670	.46*
EBR	0	0	200		130	
WBL	1	1750	400	.23*	110	.06*
WBT	1	1750	450	.26	180	.10
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.70**

18. I-5 SB Ramps & Calgrove

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		160	
SBT	0.5	1750	10	.02*	10	.10*
SBR	1	1750	350	.20	380	.22
EBL	0	0	0		0	
EBT	1	1750	410	.35*	740	.47*
EBR	0	0	210		80	
WBL	1	1750	400	.23*	120	.07*
WBT	1	1750	450	.26	160	.09
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.74**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		40		180	
SBT	0.5	1750	10	.03*	10	.11*
SBR	1	1750	380	.22	380	.22
EBL	0	0	0		0	
EBT	1	1750	440	.38*	830	.53*
EBR	0	0	230		90	
WBL	1	1750	400	.23*	140	.08*
WBT	1	1750	470	.27	260	.15
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.74**		**.82**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		50		210	
SBT	0.5	1750	10	.03*	10	.13*
SBR	1	1750	410	.23	390	.22
EBL	0	0	0		0	
EBT	1	1750	480	.41*	900	.57*
EBR	0	0	240		90	
WBL	1	1750	400	.23*	160	.09*
WBT	1	1750	500	.29	280	.16
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.89**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		50		220	
SBT	0.5	1750	10	.03*	10	.13*
SBR	1	1750	450	.26	450	.26
EBL	0	0	0		0	
EBT	2	3500	550	.24*	1020	.34*
EBR	0	0	290		160	
WBL	1	1750	400	.23*	190	.11*
WBT	2	3500	530	.15	360	.10
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.68**

19. I-5 NB Ramps & Calgrove

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		45	{.03}*	123	{.07}*
NBT	0.5	1750	4	.03	0	.07
NBR	1	1750	70	.04	264	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04*	304	.17*
EBT	1	1750	60	.03	444	.25
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	771	.47*	212	.16*
WBR	0	0	55		61	
Right Turn Adjustment					NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.52**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		110	{.06}*	120	{.07}*
NBT	0.5	1750	0	.06	0	.07
NBR	1	1750	30	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	290	.17*	300	.17*
EBT	1	1750	90	.05	500	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	150	.13*
WBR	0	0	60		80	
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.51**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	120	{.07}*
NBT	0.5	1750	0	.07	0	.07
NBR	1	1750	40	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	270	.15*	300	.17*
EBT	1	1750	90	.05	510	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	170	.14*
WBR	0	0	60		80	
Right Turn Adjustment					NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.51**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	120	{.07}*
NBT	0.5	1750	0	.07	0	.07
NBR	1	1750	40	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	270	.15*	290	.17*
EBT	1	1750	80	.05	500	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	180	.15*
WBR	0	0	70		80	
Right Turn Adjustment					NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.52**

19. I-5 NB Ramps & Calgrove

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	80	{.05}*
NBT	0.5	1750	0	.07	0	.05
NBR	1	1750	40	.02	230	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	310	.18*	340	.19*
EBT	1	1750	110	.06	560	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	760	.47*	200	.18*
WBR	0	0	70		110	
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .82 .56

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	140	{.08}*
NBT	0.5	1750	0	.07	0	.08
NBR	1	1750	50	.03	270	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	330	.19*	400	.23*
EBT	1	1750	120	.07	610	.35
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	780	.49*	250	.23*
WBR	0	0	80		150	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .85 .64

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		140	{.08}*	160	{.09}*
NBT	0.5	1750	0	.08	0	.09
NBR	1	1750	60	.03	290	.17
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	350	.20*	440	.25*
EBT	1	1750	150	.09	670	.38
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	790	.50*	290	.27*
WBR	0	0	90		180	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .88 .71

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		160	{.09}*	200	{.11}*
NBT	0.5	1750	0	.09	0	.11
NBR	1	1750	70	.04	330	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	390	.22*	510	.29*
EBT	2	3500	180	.05	750	.21
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	820	.26*	360	.17*
WBR	0	0	100		220	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .67

20. I-5 SB Ramp & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	877	.25	1264	.36*
EBR	1	1750	591	.34	332	.19
WBL	0	0	0		0	
WBT	3	5250	1317	.25*	1702	.32
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.44**		**.46**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1070	.31*	1730	.49*
EBR	1	1750	370	.21	190	.11
WBL	0	0	0		0	
WBT	3	5250	1220	.23	1470	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.41**		**.59**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1050	.30*	1660	.47*
EBR	1	1750	370	.21	160	.09
WBL	0	0	0		0	
WBT	3	5250	1080	.21	1420	.27
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.40**		**.57**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1060	.30*	1660	.47*
EBR	1	1750	380	.22	150	.09
WBL	0	0	0		0	
WBT	3	5250	1090	.21	1410	.27
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.40**		**.57**

20. I-5 SB Ramp & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1270	.36*	1760	.50*
EBR	1	1750	380	.22	210	.12
WBL	0	0	0		0	
WBT	3	5250	1050	.20	1490	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.60**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1410	.40*	1830	.52*
EBR	1	1750	370	.21	230	.13
WBL	0	0	0		0	
WBT	3	5250	1090	.21	1760	.34
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.62**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1440	.41*	1970	.56*
EBR	1	1750	450	.26	260	.15
WBL	0	0	0		0	
WBT	3	5250	1130	.22	1920	.37
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.66**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1520	.43*	2100	.60*
EBR	1	1750	530	.30	270	.15
WBL	0	0	0		0	
WBT	3	5250	1200	.23	2030	.39
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.70**

25. Old Road & Rye

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	378	.24*	302	.19*
NBR	f		1614		1551	
SBL	1	1600	602	.38*	483	.30*
SBT	2	3200	288	.09	339	.11
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	247	.15*	398	.25*
WBT	0	0	0		0	
WBR	f		1336		1445	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .87 .84

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	800	.17*	610	.13*
NBR	2	3200	1700	.53	1260	.39
SBL	2	2880	210	.07*	450	.16*
SBT	3	4800	320	.07	670	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		870		1140	
WBT	0	4800	0	{.36}*	0	{.41}*
WBR	1.5		920		1020	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .70 .80

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	480	.10*	530	.11*
NBR	2	3200	1720	.54	1290	.40
SBL	2	2880	200	.07*	290	.10*
SBT	3	4800	230	.05	480	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		790		1230	
WBT	0	4800	0	{.35}*	0	{.41}*
WBR	1.5		970		850	
Right Turn Adjustment			NBR	.09*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .71 .72

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	470	.10*	530	.11*
NBR	2	3200	1870	.58	1300	.41
SBL	2	2880	190	.07*	330	.11*
SBT	3	4800	240	.05	550	.11
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		740		1230	
WBT	0	4800	0	{.37}*	0	{.42}*
WBR	1.5		1120		930	
Right Turn Adjustment			NBR	.11*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .75 .74

25. Old Road & Rye

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	500	.10*	590	.12*
NBR	2	3200	2100	.66	1420	.44
SBL	2	2880	220	.08*	350	.12*
SBT	3	4800	240	.05	460	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	660	.15*	1230	.28*
WBT	0	0	0		0	
WBR	2	3200	1340	.42	1200	.38
Right Turn Adjustment			Multi	.41*	NBR	.04*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .84 .66

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	520	.11*	720	.15*
NBR	2	3200	2090	.65	1490	.47
SBL	2	2880	240	.08*	450	.16*
SBT	3	4800	250	.05	500	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	780	.18*	1370	.32*
WBT	0	0	0		0	
WBR	2	3200	1380	.43	1210	.38
Right Turn Adjustment			Multi	.36*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .83 .73

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	560	.12*	780	.16*
NBR	2	3200	2090	.65	1540	.48
SBL	2	2880	290	.10*	580	.20*
SBT	3	4800	300	.06	560	.12
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	830	.19*	1360	.31*
WBT	0	0	0		0	
WBR	2	3200	1380	.43	1320	.41
Right Turn Adjustment			Multi	.34*	NBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .85 .78

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	700	.15*	860	.18*
NBR	2	3200	2030	.63	1610	.50
SBL	2	2880	340	.12*	710	.25*
SBT	3	4800	380	.08	670	.14
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	3	4320	980	.23*	1380	.32*
WBT	0	0	0		0	
WBR	2	3200	1400	.44	1400	.44
Right Turn Adjustment			Multi	.25*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR NBR

TOTAL CAPACITY UTILIZATION .85 .85

26. Old Road & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		19	.01	24	.02
NBT	1.5	4800	510	.16*	557	.17*
NBR	d	1600	53	.03	175	.11
SBL	1.5		216		375	
SBT	1.5	4800	351	.12*	512	.20*
SBR	0		5		62	
EBL	1	1600	26	.02	22	.01
EBT	2	3200	38	.01*	76	.02*
EBR	1	1600	9	.01	16	.01
WBL	1	1600	156	.10*	218	.14*
WBT	3	4800	15	.00	7	.00
WBR	f		1249		1079	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .49 .63

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	120	.04	150	.05*
NBT	3	4800	580	.12*	330	.07
NBR	1	1600	150	.09	120	.08
SBL	2	2880	410	.14*	430	.15
SBT	2.5	6400	120	.04	820	{.20}*
SBR	1.5		310	.10	640	
EBL	2	2880	320	.11*	410	.14
EBT	4	6400	490	.08	1250	.20*
EBR	1	1600	30	.02	230	.14
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	520	.08*	620	.10
WBR	f		1230		810	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .61

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	140	.05	190	.07*
NBT	3	4800	500	.10*	320	.07
NBR	1	1600	150	.09	110	.07
SBL	2	2880	300	.10*	460	.16
SBT	2.5	6400	120	.04	860	{.18}*
SBR	1.5		250	.08	470	
EBL	2	2880	240	.08*	380	.13
EBT	4	6400	620	.10	1140	.18*
EBR	1	1600	30	.02	370	.23
WBL	2	2880	190	.07	170	.06*
WBT	4	6400	810	.13*	670	.10
WBR	f		1140		810	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .51 .59

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	150	.05	230	.08*
NBT	3	4800	530	.11*	330	.07
NBR	1	1600	150	.09	100	.06
SBL	2	2880	240	.08*	400	.14
SBT	2.5	6400	120	{.03}	870	{.21}*
SBR	1.5		270		610	
EBL	2	2880	390	.14*	410	.14*
EBT	4	6400	1030	.16	1380	.22
EBR	1	1600	40	.03	450	.28
WBL	2	2880	190	.07	160	.06
WBT	4	6400	950	.15*	910	.14*
WBR	f		1070		780	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .58 .67

26. Old Road & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	190	.07	200	.07*
NBT	3	4800	550	.11*	350	.07
NBR	1	1600	150	.09	100	.06
SBL	2	2880	340	.12*	490	.17
SBT	2.5	6400	80	{.02}	580	.18*
SBR	1.5		290		810	.25
EBL	2	2880	570	.20*	470	.16*
EBT	4	6400	1590	.25	1680	.26
EBR	1	1600	80	.05	240	.15
WBL	2	2880	180	.06	160	.06
WBT	4	6400	990	.15*	1260	.20*
WBR	f		1110		1100	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.71**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	190	.07	210	.07*
NBT	3	4800	570	.12*	410	.09
NBR	1	1600	140	.09	100	.06
SBL	2	2880	370	.13*	500	.17
SBT	2.5	6400	90	.03	660	.21*
SBR	1.5		390	.12	890	.28
EBL	2	2880	600	.21*	560	.19*
EBT	4	6400	1790	.28	1850	.29
EBR	1	1600	90	.06	300	.19
WBL	2	2880	170	.06	170	.06
WBT	4	6400	1100	.17*	1470	.23*
WBR	f		1080		1150	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.80**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	240	.08	310	.11*
NBT	3	4800	570	.12*	350	.07
NBR	1	1600	140	.09	90	.06
SBL	2	2880	440	.15*	620	.22
SBT	2.5	6400	90	.03	660	.21*
SBR	1.5		410	.13	900	.28
EBL	2	2880	640	.22*	580	.20*
EBT	4	6400	1810	.28	1930	.30
EBR	1	1600	100	.06	330	.21
WBL	2	2880	170	.06	160	.06
WBT	4	6400	1190	.19*	1500	.23*
WBR	f		1140		1250	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.85**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	290	.10	430	.15*
NBT	3	4800	590	.12*	340	.07
NBR	1	1600	140	.09	100	.06
SBL	2	2880	550	.19*	660	.23
SBT	2.5	6400	90	.03	560	.18*
SBR	1.5		490	.15	960	.30
EBL	2	2880	630	.22*	580	.20*
EBT	5	8000	1800	.23	2050	.26
EBR	1	1600	110	.07	480	.30
WBL	2	2880	160	.06	140	.05
WBT	4	6400	1150	.18*	1500	.23*
WBR	f		1280		1390	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**.86**

27. Old Road & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	486	.17*	261	.09
NBT	3	4800	345	.07	766	.16*
NBR	1	1600	69	.04	432	.27
SBL	2	2880	159	.06	379	.13*
SBT	3	4800	306	.06*	765	.16
SBR	1	1600	164	.10	145	.09
EBL	2	2880	210	.07*	206	.07
EBT	4	6400	579	.09	377	.06*
EBR	1	1600	183	.11	175	.11
WBL	2	2880	298	.10	463	.16*
WBT	3	4800	679	.14*	388	.08
WBR	f		363		463	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.61**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	330	.11*	150	.05*
NBT	3	4800	250	.05	560	.12
NBR	1	1600	70	.04	310	.19
SBL	2	2880	150	.05	300	.10
SBT	3	4800	180	.04*	810	.17*
SBR	1	1600	120	.08	80	.05
EBL	2	2880	170	.06*	100	.03
EBT	4	6400	720	.11	450	.07*
EBR	1	1600	250	.16	150	.09
WBL	2	2880	80	.03	570	.20*
WBT	3	4800	1000	.21*	630	.13
WBR	f		260		370	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.59**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	490	.17*	150	.05*
NBT	3	4800	190	.04	570	.12
NBR	1	1600	40	.03	310	.19
SBL	2	2880	140	.05	290	.10
SBT	3	4800	180	.04*	980	.20*
SBR	1	1600	130	.08	90	.06
EBL	2	2880	170	.06*	100	.03
EBT	4	6400	730	.11	450	.07*
EBR	1	1600	190	.12	140	.09
WBL	2	2880	70	.02	520	.18*
WBT	3	4800	1020	.21*	690	.14
WBR	f		250		370	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.60**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	530	.18*	210	.07*
NBT	3	4800	210	.04	600	.13
NBR	1	1600	40	.03	320	.20
SBL	2	2880	140	.05	300	.10
SBT	3	4800	180	.04*	1060	.22*
SBR	1	1600	130	.08	110	.07
EBL	2	2880	190	.07*	110	.04
EBT	4	6400	830	.13	450	.07*
EBR	1	1600	230	.14	200	.13
WBL	2	2880	80	.03	540	.19*
WBT	3	4800	1020	.21*	870	.18
WBR	f		250		390	
Right Turn Adjustment					EBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.66**

27. Old Road & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	2880	400	.14*	320	.11
NBT	3	4800	170	.04	590	.12*
NBR	1	1600	30	.02	210	.13
SBL	2	2880	140	.05	310	.11*
SBT	3	4800	180	.04*	460	.10
SBR	1	1600	120	.08	180	.11
EBL	2	2880	290	.10*	160	.06*
EBT	4	6400	1420	.22	860	.13
EBR	1	1600	290	.18	170	.11
WBL	2	2880	70	.02	340	.12
WBT	3	4800	1330	.28*	1520	.32*
WBR	f		240		370	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.71**

SCVCTM 4.1 2022 with Stage 5 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	2880	480	.17*	500	.17*
NBT	3	4800	160	.03	670	.14
NBR	1	1600	20	.01	200	.13
SBL	2	2880	140	.05	300	.10
SBT	3	4800	180	.04*	580	.12*
SBR	1	1600	150	.09	200	.13
EBL	2	2880	330	.11*	210	.07*
EBT	4	6400	1970	.31	1360	.21
EBR	1	1600	330	.21	280	.18
WBL	2	2880	80	.03	330	.11
WBT	3	4800	1590	.33*	1890	.39*
WBR	f		240		350	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.85**

SCVCTM 4.1 2025 with Stage 6a Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	2880	500	.17*	480	.17*
NBT	3	4800	190	.04	700	.15
NBR	1	1600	30	.02	240	.15
SBL	2	2880	140	.05	360	.13
SBT	3	4800	190	.04*	550	.11*
SBR	1	1600	150	.09	200	.13
EBL	2	2880	320	.11*	210	.07*
EBT	4	6400	2050	.32	1470	.23
EBR	1	1600	360	.23	330	.21
WBL	2	2880	70	.02	360	.13
WBT	3	4800	1620	.34*	2020	.42*
WBR	f		260		350	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.76**		**.87**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	2880	550	.19*	490	.17
NBT	3	4800	230	.05	800	.17*
NBR	1	1600	40	.03	280	.18
SBL	2	2880	140	.05	360	.13*
SBT	3	4800	200	.04*	580	.12
SBR	1	1600	160	.10	200	.13
EBL	2	2880	340	.12*	210	.07*
EBT	4	6400	2060	.32	1310	.20
EBR	1	1600	330	.21	580	.36
WBL	2	2880	70	.02	400	.14
WBT	3	4800	1650	.34*	2040	.43*
WBR	f		280		370	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.90**

28. Old Road & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	47	.03*	178	.11*
NBT	3	4800	178	.04	505	.11
NBR	1	1600	138	.09	592	.37
SBL	1	1600	62	.04	166	.10
SBT	2	3200	250	.08*	397	.12*
SBR	1	1600	73	.05	231	.14
EBL	1	1600	141	.09	170	.11*
EBT	3	4800	852	.18*	437	.09
EBR	1	1600	128	.08	114	.07
WBL	2	2880	254	.09*	593	.21
WBT	2	3200	186	.11	588	.20*
WBR	0	0	154		47	
Right Turn Adjustment					NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.72**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	90	.06*	150	.09*
NBT	3	4800	280	.06	630	.13
NBR	1	1600	360	.23	770	.48
SBL	1	1600	50	.03	320	.20
SBT	2	3200	220	.07*	790	.25*
SBR	1	1600	30	.02	260	.16
EBL	1	1600	130	.08	160	.10*
EBT	3	4800	1120	.23*	510	.11
EBR	1	1600	120	.08	110	.07
WBL	2	2880	270	.09*	790	.27
WBT	2	3200	260	.16	870	.29*
WBR	0	0	270	.17	70	
Right Turn Adjustment			NBR	.04*	NBR	.06*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.59**		**.89**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05*	150	.09*
NBT	3	4800	340	.07	640	.13
NBR	1	1600	380	.24	770	.48
SBL	2	2880	40	.01	420	.15
SBT	2	3200	180	.06*	840	.26*
SBR	1	1600	10	.01	210	.13
EBL	1	1600	110	.07	150	.09*
EBT	3	4800	1000	.21*	510	.11
EBR	1	1600	130	.08	110	.07
WBL	2	2880	300	.10*	800	.28
WBT	2	3200	250	.16	860	.30*
WBR	0	0	300	.19	90	
Right Turn Adjustment			NBR	.04*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.56**		**.84**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05*	150	.09*
NBT	3	4800	380	.08	700	.15
NBR	1	1600	370	.23	760	.48
SBL	2	2880	60	.02	470	.16
SBT	2	3200	200	.06*	900	.28*
SBR	1	1600	10	.01	250	.16
EBL	1	1600	110	.07	160	.10*
EBT	3	4800	980	.20*	500	.10
EBR	1	1600	130	.08	110	.07
WBL	2	2880	290	.10*	730	.25
WBT	2	3200	250	.16	810	.29*
WBR	0	0	310	.19	110	
Right Turn Adjustment			NBR	.04*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.55**		**.86**

28. Old Road & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	80	.05*	120	.08*
NBT	3	4800	220	.05	670	.14
NBR	1	1600	350	.22	760	.48
SBL	2	2880	110	.04	200	.07
SBT	2	3200	210	.07*	500	.16*
SBR	1	1600	10	.01	140	.09
EBL	1	1600	80	.05	130	.08*
EBT	3	4800	1020	.21*	510	.11
EBR	1	1600	120	.08	100	.06
WBL	2	2880	310	.11*	820	.28
WBT	2	3200	250	.16	930	.35*
WBR	0	0	320	.20	180	
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .57 .77

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	120	.08*
NBT	3	4800	220	.05	730	.15
NBR	1	1600	350	.22	740	.46
SBL	2	2880	130	.05	290	.10
SBT	2	3200	230	.07*	590	.18*
SBR	1	1600	10	.01	170	.11
EBL	1	1600	80	.05	130	.08
EBT	3	4800	1010	.21*	510	.11*
EBR	1	1600	110	.07	100	.06
WBL	2	2880	300	.10*	810	.28*
WBT	2	3200	240	.08	890	.28
WBR	1	1600	390	.24	370	.23
Right Turn Adjustment			NBR	.06*	NBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .58 .77

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	110	.07*
NBT	3	4800	260	.05	770	.16
NBR	1	1600	330	.21	700	.44
SBL	2	2880	150	.05	280	.10
SBT	2	3200	240	.08*	670	.21*
SBR	1	1600	10	.01	160	.10
EBL	1	1600	90	.06	140	.09
EBT	3	4800	990	.21*	490	.10*
EBR	1	1600	110	.07	90	.06
WBL	2	2880	310	.11*	830	.29*
WBT	2	3200	250	.08	920	.29
WBR	1	1600	390	.24	360	.23
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .57 .77

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04*	120	.08
NBT	3	4800	300	.06	870	.18*
NBR	1	1600	320	.20	690	.43
SBL	2	2880	140	.05	440	.15*
SBT	2	3200	230	.07*	790	.25
SBR	1	1600	10	.01	170	.11
EBL	1	1600	100	.06	160	.10
EBT	3	4800	980	.20*	470	.10*
EBR	1	1600	110	.07	90	.06
WBL	2	2880	320	.11*	830	.29*
WBT	2	3200	250	.08	910	.28
WBR	1	1600	450	.28	410	.26
Right Turn Adjustment			NBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .55 .82

29. Old Road & Pico

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	65	.04*	106	.07
NBT	2	3200	169	.08	349	.13*
NBR	0	0	84		56	
SBL	2	2880	288	.10	467	.16*
SBT	1	1600	301	.19*	222	.14
SBR	1	1600	19	.01	29	.02
EBL	1	1600	52	.03	61	.04*
EBT	2	3200	607	.19*	251	.08
EBR	1	1600	117	.07	23	.01
WBL	1	1600	51	.03*	70	.04
WBT	2	3200	320	.10	594	.19*
WBR	f		292		664	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.62**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04	400	.25
NBT	2	3200	230	.09*	610	.26*
NBR	0	0	50		220	
SBL	2	2880	300	.10*	600	.21*
SBT	1	1600	150	.09	280	.18
SBR	1	1600	150	.09	270	.17
EBL	1	1600	360	.23*	60	.04*
EBT	2	3200	260	.08	140	.04
EBR	1	1600	50	.03	60	.04
WBL	1	1600	10	.01	70	.04
WBT	2	3200	1000	.31*	430	.13*
WBR	f		250		600	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.83**		**.74**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04	400	.25*
NBT	2	3200	260	.10*	610	.26
NBR	0	0	50		210	
SBL	2	2880	300	.10*	580	.20
SBT	1	1600	150	.09	350	.22*
SBR	1	1600	140	.09	290	.18
EBL	1	1600	390	.24*	60	.04*
EBT	2	3200	230	.07	130	.04
EBR	1	1600	50	.03	60	.04
WBL	1	1600	10	.01	70	.04
WBT	2	3200	970	.30*	410	.13*
WBR	f		260		600	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.74**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	70	.04	380	.24*
NBT	2	3200	280	.10*	640	.25
NBR	0	0	50		150	
SBL	2	2880	290	.10*	560	.19
SBT	1	1600	150	.09	350	.22*
SBR	1	1600	150	.09	290	.18
EBL	1	1600	410	.26*	70	.04*
EBT	2	3200	220	.07	190	.06
EBR	1	1600	50	.03	60	.04
WBL	1	1600	10	.01	50	.03
WBT	2	3200	980	.31*	480	.15*
WBR	f		250		600	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.87**		**.75**

29. Old Road & Pico

SCVCTM 4.1 2018 with Stage 4 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	100	.06	410	.26
NBT	2	3200	210	.08*	570	.25*
NBR	0	0	50		220	
SBL	2	2880	300	.10*	520	.18*
SBT	1	1600	150	.09	230	.14
SBR	1	1600	140	.09	170	.11
EBL	1	1600	310	.19*	60	.04*
EBT	2	3200	280	.09	180	.06
EBR	1	1600	50	.03	70	.04
WBL	1	1600	10	.01	90	.06
WBT	2	3200	1020	.32*	500	.16*
WBR	f		220		610	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.73**

SCVCTM 4.1 2022 with Stage 5 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	120	.08*	440	.28*
NBT	2	3200	210	.08	600	.23
NBR	0	0	50		150	
SBL	2	2880	290	.10	540	.19
SBT	1	1600	160	.10*	270	.17*
SBR	1	1600	140	.09	180	.11
EBL	1	1600	300	.19*	60	.04*
EBT	2	3200	360	.11	370	.12
EBR	1	1600	70	.04	90	.06
WBL	1	1600	10	.01	100	.06
WBT	2	3200	1040	.33*	690	.22*
WBR	f		220		620	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.81**

SCVCTM 4.1 2025 with Stage 6a Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	140	.09*	400	.25*
NBT	2	3200	230	.09	620	.24
NBR	0	0	50		150	
SBL	2	2880	290	.10	570	.20
SBT	1	1600	160	.10*	370	.23*
SBR	1	1600	160	.10	160	.10
EBL	1	1600	300	.19*	60	.04*
EBT	2	3200	480	.15	460	.14
EBR	1	1600	80	.05	110	.07
WBL	1	1600	10	.01	80	.05
WBT	2	3200	1100	.34*	830	.26*
WBR	f		220		610	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.88**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	140	.09*	410	.26
NBT	2	3200	240	.09	670	.26*
NBR	0	0	50		150	
SBL	2	2880	280	.10	610	.21*
SBT	2	3200	170	.11*	460	.18
SBR	0	0	170		120	
EBL	1	1600	310	.19*	70	.04*
EBT	2	3200	570	.18	520	.16
EBR	1	1600	90	.06	220	.14
WBL	1	1600	10	.01	80	.05
WBT	2	3200	1110	.35*	890	.28*
WBR	f		240		640	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.89**

80. Wolcott & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	1		0	
NBT	1	1600	3	.00	0	.00
NBR	0	0	3		0	
SBL	1.5		1		9	
SBT	0.5	3200	1	.00*	0	.00*
SBR	1	1600	5	.00	21	.01
EBL	1	1600	14	.01*	2	.00
EBT	2	3200	655	.21	1150	.36*
EBR	0	0	6		0	
WBL	1	1600	3	.00	1	.00
WBT	2	3200	748	.23*	870	.27
WBR	1	1600	2	.00	6	.00
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.34**		**.46**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	90	.06*	10	.01*
NBR	2	3200	320	.10	810	.25
SBL	2	2880	10	.00	180	.06*
SBT	1	1600	20	.01	50	.03
SBR	1	1600	10	.01	60	.04
EBL	1	1600	130	.08	10	.01
EBT	3	4800	910	.19*	1500	.31*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	550	.19*	610	.21*
WBT	3	4800	1180	.25	1310	.27
WBR	1	1600	160	.10	10	.01
Right Turn Adjustment					NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.77**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	100	.06*	10	.01*
NBR	2	3200	320	.10	820	.26
SBL	2	2880	10	.00	190	.07*
SBT	1	1600	20	.01	40	.03
SBR	1	1600	10	.01	60	.04
EBL	1	1600	130	.08	10	.01
EBT	3	4800	930	.19*	1520	.32*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	550	.19*	620	.22*
WBT	3	4800	1230	.26	1350	.28
WBR	1	1600	170	.11	10	.01
Right Turn Adjustment					NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.80**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	110	.07*	10	.01*
NBR	2	3200	310	.10	810	.25
SBL	2	2880	10	.00	210	.07*
SBT	1	1600	20	.01	40	.03
SBR	1	1600	10	.01	70	.04
EBL	1	1600	200	.13	10	.01
EBT	3	4800	940	.20*	1540	.32*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	530	.18*	620	.22*
WBT	3	4800	1190	.25	1330	.28
WBR	1	1600	180	.11	10	.01
Right Turn Adjustment					NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.79**

80. Wolcott & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	90	.06*	10	.01*
NBR	2	3200	320	.10	750	.23
SBL	2	2880	10	.00	210	.07*
SBT	1	1600	20	.01	40	.03
SBR	1	1600	10	.01	90	.06
EBL	1	1600	270	.17	10	.01
EBT	3	4800	1090	.23*	1410	.29*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	480	.17*	610	.21*
WBT	3	4800	940	.20	1390	.29
WBR	1	1600	180	.11	10	.01
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .56 .74

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	70	.04*	10	.01*
NBR	2	3200	330	.10	650	.20
SBL	2	2880	20	.01*	190	.07*
SBT	1	1600	10	.01	30	.02
SBR	1	1600	20	.01	150	.09
EBL	1	1600	380	.24	10	.01
EBT	3	4800	1750	.36*	1670	.35*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	430	.15*	570	.20*
WBT	3	4800	1080	.23	2000	.42
WBR	1	1600	170	.11	10	.01
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .66 .77

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	60	.04*	10	.01*
NBR	2	3200	320	.10	620	.19
SBL	2	2880	10	.00	170	.06*
SBT	1	1600	10	.01	30	.02
SBR	1	1600	30	.02	190	.12
EBL	1	1600	440	.28	10	.01
EBT	3	4800	2330	.49*	2230	.46*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	390	.14*	550	.19*
WBT	3	4800	1550	.32	2730	.57
WBR	1	1600	140	.09	10	.01
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .77 .86

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	60	.04*	10	.01*
NBR	2	3200	310	.10	610	.19
SBL	2	2880	10	.00	160	.06*
SBT	1	1600	10	.01	40	.03
SBR	1	1600	30	.02	250	.16
EBL	1	1600	490	.31*	10	.01
EBT	4	6400	2680	.42	2690	.42*
EBR	1	1600	10	.01	10	.01
WBL	2	2880	390	.14	540	.19*
WBT	4	6400	1960	.31*	3120	.49
WBR	1	1600	140	.09	10	.01
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .76 .79

81. Commerce Ctr & Henry Mayo

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	10	.01*	190	.12*
SBT	0	0	0		0	
SBR	1	1600	20	.01	60	.04
EBL	1	1600	80	.05*	230	.14*
EBT	2	3200	20	.01	160	.05
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	20	.01*	20	.01*
WBR	1	1600	110	.07	70	.04
Right Turn Adjustment			WBR	.05*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.22**		**.37**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	10	.01
NBT	3	4800	1020	.21*	260	.06*
NBR	0	0	10		10	
SBL	2	2880	0	.00	140	.05*
SBT	3	4800	60	.02	320	.08
SBR	0	0	20		70	
EBL	1	1600	80	.05*	230	.14*
EBT	2	3200	20	.01	60	.02
EBR	1	1600	90	.06	220	.14
WBL	1.5		0		20	
WBT	0.5	3200	10	.01*	10	.01*
WBR	1	1600	20	.01	40	.03
Clearance Interval				.10*		.10*
Note: Assumes E/W Split Phasing						
TOTAL CAPACITY UTILIZATION				**.37**		**.36**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	10	.01
NBT	3	4800	1320	.28*	270	.06*
NBR	0	0	20		10	
SBL	2	2880	0	.00	190	.07*
SBT	3	4800	90	.02	520	.12
SBR	0	0	20		60	
EBL	1	1600	80	.05*	260	.16*
EBT	2	3200	30	.01	50	.02
EBR	1	1600	80	.05	280	.18
WBL	1.5		10	.01	40	
WBT	0.5	3200	20	.01*	10	.02*
WBR	1	1600	20	.01	40	.03
Right Turn Adjustment					EBR	.01*
Clearance Interval				.10*		.10*
Note: Assumes E/W Split Phasing						
TOTAL CAPACITY UTILIZATION				**.44**		**.42**

81. Commerce Ctr & Henry Mayo

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	20	.01*
NBT	3	4800	1340	.29*	480	.11
NBR	0	0	70		40	
SBL	2	2880	10	.00	140	.05
SBT	3	4800	170	.04	740	.17*
SBR	0	0	20		60	
EBL	1	1600	130	.08*	260	.16*
EBT	2	3200	60	.02	40	.01
EBR	1	1600	80	.05	210	.13
WBL	1.5		40		100	
WBT	0.5	3200	10	.02*	10	.03*
WBR	1	1600	40	.03	60	.04
Right Turn Adjustment			WBR	.01*		
Clearance Interval				.10*		.10*

Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .50 .47

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	20	.01*
NBT	3	4800	1440	.32*	660	.15
NBR	0	0	110		80	
SBL	2	2880	20	.01*	50	.02
SBT	3	4800	230	.05	890	.20*
SBR	0	0	20		60	
EBL	1	1600	320	.20*	290	.18*
EBT	2	3200	120	.04	60	.02
EBR	1	1600	120	.08	230	.14
WBL	1.5		60		150	
WBT	0.5	3200	10	.02*	10	.05*
WBR	1	1600	50	.03	110	.07
Clearance Interval				.10*		.10*

Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .65 .54

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	20	.01
NBT	3	4800	1540	.35*	890	.21*
NBR	0	0	140		110	
SBL	2	2880	20	.01*	60	.02*
SBT	3	4800	300	.07	950	.21
SBR	0	0	20		50	
EBL	1	1600	400	.25*	300	.19*
EBT	2	3200	170	.05	90	.03
EBR	1	1600	200	.13	320	.20
WBL	1.5		110		220	
WBT	0.5	3200	10	.04*	10	.07*
WBR	1	1600	60	.04	180	.11
Right Turn Adjustment					WBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .75 .61

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	20	.01	20	.01
NBT	3	4800	1620	.39*	980	.23*
NBR	0	0	240		140	
SBL	2	2880	70	.02*	70	.02*
SBT	3	4800	280	.06	1040	.23
SBR	0	0	20		50	
EBL	1	1600	380	.24*	300	.19*
EBT	2	3200	250	.08	140	.04
EBR	1	1600	220	.14	380	.24
WBL	1.5		90		300	
WBT	0.5	3200	10	.03*	10	.10*
WBR	1	1600	80	.05	270	.17
Right Turn Adjustment					Multi	.08*
Clearance Interval				.10*		.10*

Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .78 .72

82. Commerce Ctr & SR-126 EB Rmp

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	160	.03*	230	.05
NBR	f		30		80	
SBL	0	0	0		0	
SBT	2	3200	40	.01	250	.08*
SBR	f		340		1160	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.13**		**.18**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1050	.22*	400	.08
NBR	f		70		120	
SBL	0	0	0		0	
SBT	2	3200	90	.03	520	.16*
SBR	f		380		1300	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.32**		**.26**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1320	.28*	440	.09
NBR	f		90		130	
SBL	0	0	0		0	
SBT	2	3200	120	.04	780	.24*
SBR	f		420		1400	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.34**

82. Commerce Ctr & SR-126 EB Rmp

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1310	.27*	540	.11
NBR	f		200		250	
SBL	0	0	0		0	
SBT	2	3200	200	.06	940	.29*
SBR	f		420		1430	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.37**		**.39**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1520	.32*	740	.15
NBR	f		300		320	
SBL	0	0	0		0	
SBT	2	3200	260	.08	1000	.31*
SBR	f		400		1370	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.42**		**.41**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1690	.35*	950	.20
NBR	f		320		420	
SBL	0	0	0		0	
SBT	2	3200	340	.11	1060	.33*
SBR	f		380		1330	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.45**		**.43**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	4800	1760	.37*	1130	.24
NBR	f		330		410	
SBL	0	0	0		0	
SBT	2	3200	370	.12	1160	.36*
SBR	f		330		1400	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.46**

83. Commerce Ctr & SR-126 WB Rmps

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	90	.03*	50	.02*
NBT	3	4800	80	.02	180	.04
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	360	.08*	1360	.28*
SBR	1	1600	110	.07	220	.14
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	20	.01*	40	.01*
WBT	0	0	0		0	
WBR	2	3200	1270	.40	460	.14
Right Turn Adjustment			WBR	.32*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .54 .41

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	290	.10*	140	.05*
NBT	3	4800	760	.16	250	.05
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	430	.09*	1710	.36*
SBR	1	1600	110	.07	240	.15
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	40	.01*	110	.04*
WBT	0	0	0		0	
WBR	2	3200	1280	.40	510	.16
Right Turn Adjustment			WBR	.37*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .55

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	270	.09	120	.04*
NBT	3	4800	1050	.22*	320	.07
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	490	.10	2040	.43*
SBR	1	1600	120	.08	270	.17
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	40	.01*	140	.05*
WBT	0	0	0		0	
WBR	2	3200	1350	.42	550	.17
Right Turn Adjustment			WBR	.41*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .62

83. Commerce Ctr & SR-126 WB Rmps

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	170	.06	160	.06*
NBT	3	4800	1150	.24*	380	.08
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	520	.11	2140	.45*
SBR	1	1600	120	.08	320	.20
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	100	.03*	230	.08*
WBT	0	0	0		0	
WBR	2	3200	1420	.44	510	.16
Right Turn Adjustment			WBR	.41*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .78 .69

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	200	.07	270	.09*
NBT	3	4800	1320	.28*	480	.10
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	540	.11	2080	.43*
SBR	1	1600	140	.09	500	.31
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	110	.04*	290	.10*
WBT	0	0	0		0	
WBR	2	3200	1350	.42	540	.17
Right Turn Adjustment			WBR	.38*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .80 .72

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	260	.09	410	.14*
NBT	3	4800	1430	.30*	530	.11
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	560	.12	2060	.43*
SBR	1	1600	160	.10	610	.38
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	150	.05*	320	.11*
WBT	0	0	0		0	
WBR	2	3200	1300	.41	510	.16
Right Turn Adjustment			WBR	.36*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .81 .78

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	310	.11	550	.19*
NBT	3	4800	1440	.30*	580	.12
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	4800	560	.12	2220	.46*
SBR	1	1600	180	.11	630	.39
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	2880	140	.05*	340	.12*
WBT	0	0	0		0	
WBR	2	3200	1280	.40	520	.16
Right Turn Adjustment			WBR	.35*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .80 .87

96. Martinez/Potrero & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	3		7	
SBT	1	1600	0	.00*	0	.01*
SBR	0	0	2		4	
EBL	1	1600	1	.00	2	.00
EBT	2	3200	592	.19	1126	.35*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	738	.23*	796	.25
WBR	0	0	2		4	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.33**		**.46**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	10		10	
SBT	1	1600	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1600	10	.01	0	.00
EBT	2	3200	840	.26*	1010	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	680	.22	1090	.34*
WBR	0	0	10		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.37**		**.45**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	10		10	
SBT	1	1600	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1600	10	.01	0	.00
EBT	2	3200	860	.27*	1020	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	710	.23	1110	.35*
WBR	0	0	10		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.46**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	10		10	
SBT	1	1600	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1600	10	.01	0	.00
EBT	2	3200	860	.27*	1020	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	700	.22	1110	.35*
WBR	0	0	10		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.46**

96. Martinez/Potrero & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	30		20	
SBT	1	1600	0	.03*	0	.02*
SBR	0	0	10		10	
EBL	1	1600	10	.01	10	.01*
EBT	2	3200	890	.28*	1050	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	740	.23	1140	.37*
WBR	0	0	10		40	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.41**		**.50**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	70	.04*	40	.03*
SBT	1	1600	0	.01	0	.01
SBR	0	0	20		10	
EBL	1	1600	10	.01	10	.01*
EBT	2	3200	960	.30*	1130	.35
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	810	.25	1230	.38*
WBR	1	1600	30	.02	70	.04
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.44**		**.52**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1600	90	.06*	50	.03*
SBT	1	1600	0	.02	0	.01
SBR	0	0	30		20	
EBL	1	1600	20	.01	30	.02*
EBT	2	3200	1270	.40*	1330	.42
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3200	900	.28	1570	.49*
WBR	1	1600	40	.03	120	.08
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.64**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	10	.01	10	.01
NBT	1	1600	10	.12*	10	.06*
NBR	0	0	180		90	
SBL	2	2880	130	.05*	70	.02*
SBT	1	1600	0	.00	10	.01
SBR	1	1600	30	.02	20	.01
EBL	1	1600	20	.01	30	.02*
EBT	2	3200	1320	.41*	1350	.42
EBR	1	1600	10	.01	10	.01
WBL	1	1600	30	.02*	180	.11
WBT	2	3200	920	.29	1670	.52*
WBR	1	1600	50	.03	170	.11
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.72**

101. Long Cyn & Potrero Cyn

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	0	.00	10	.00
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	f		20		20	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.10**		**.10**

101. Long Cyn & Potrero Cyn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	70	.02*	280	.10*
SBT	1	1600	0	.00	0	.00
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	0	0	0		0	
WBR	f		440		170	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.12**		**.20**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	110	.04*	350	.12
SBT	0.5	3200	0	.00	0	{.13}*
SBR	1.5		140		590	
EBL	2	2880	440	.15*	400	.14*
EBT	3	4800	140	.03	80	.02
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	2	3200	60	.02*	140	.04*
WBR	f		480		240	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.31**		**.41**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	140	.05*	450	.16
SBT	0.5	3200	0	.00	0	{.23}*
SBR	1.5		240		1000	
EBL	2	2880	860	.30*	620	.22*
EBT	3	4800	200	.04	280	.06
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	2	3200	60	.02*	310	.10*
WBR	f		520		320	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.65**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	240	.08*	470	.16
SBT	0.5	3200	0	.00	0	{.26}*
SBR	1.5		320		1160	
EBL	2	2880	900	.31*	780	.27*
EBT	3	4800	100	.02	510	.11
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	2	3200	40	.01*	560	.18*
WBR	f		570		450	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.81**

102. Newhall Ranch & Potrero Cyn

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	f		20		20	
EBL	2	2880	10	.00	10	.00
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.10**		**.10**

102. Newhall Ranch & Potrero Cyn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	0	.00	0	.00
NBT	2	3200	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	100	.03*	90	.03*
SBT	2	3200	0	.00	0	.00
SBR	f		20		20	
EBL	2	2880	0	.00	10	.00
EBT	2	3200	50	.02	220	.07*
EBR	1	1600	0	.00	0	.00
WBL	1	1600	0	.00	0	.00
WBT	2	3200	340	.11*	120	.04
WBR	1	1600	70	.04	160	.10
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.24**		**.21**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	0	.00	0	.00
NBT	2	3200	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	290	.10*	170	.06*
SBT	2	3200	0	.00	0	.00
SBR	f		100		180	
EBL	2	2880	70	.02*	140	.05*
EBT	2	3200	410	.13	610	.19
EBR	1	1600	0	.00	0	.00
WBL	1	1600	0	.00	0	.00
WBT	2	3200	450	.14*	620	.19*
WBR	1	1600	210	.13	310	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.36**		**.40**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	0	.00	0	.00
NBT	2	3200	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	280	.10*	190	.07*
SBT	2	3200	0	.00	0	.00
SBR	f		120		280	
EBL	2	2880	130	.05*	230	.08*
EBT	2	3200	690	.22	880	.28
EBR	1	1600	0	.00	0	.00
WBL	1	1600	0	.00	0	.00
WBT	2	3200	580	.18*	830	.26*
WBR	1	1600	250	.16	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.43**		**.51**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	40	.01	30	.01*
NBT	2	3200	320	.10*	190	.06
NBR	1	1600	350	.22	340	.21
SBL	2	2880	310	.11*	180	.06
SBT	2	3200	80	.03	340	.11*
SBR	f		150		420	
EBL	2	2880	220	.08*	280	.10
EBT	2	3200	750	.23	950	.30*
EBR	1	1600	20	.01	80	.05
WBL	1	1600	90	.06	280	.18*
WBT	2	3200	690	.22*	990	.31
WBR	1	1600	300	.19	310	.19
Right Turn Adjustment			NBR	.07*	NBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.71**

103. Pico Cyn & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	0	.00	0	.00
NBT	0	0	0		0	
NBR	1	1600	0	.00	0	.00
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	470	.15	510	.16
EBR	1	1600	0	.00	0	.00
WBL	1	1600	0	.00	0	.00
WBT	2	3200	500	.16*	610	.19*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.26**		**.29**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	150	.05*	380	.13*
NBT	0	0	0		0	
NBR	1	1600	20	.01	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1170	.37*	840	.26
EBR	1	1600	140	.09	270	.17
WBL	1	1600	10	.01*	20	.01
WBT	2	3200	660	.21	1160	.36*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.59**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	230	.08*	600	.21*
NBT	0	0	0		0	
NBR	1	1600	20	.01	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1400	.44*	1050	.33
EBR	1	1600	260	.16	390	.24
WBL	1	1600	10	.01*	20	.01
WBT	2	3200	760	.24	1370	.43*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.74**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	260	.09*	670	.23*
NBT	0	0	0		0	
NBR	1	1600	10	.01	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1460	.46*	1060	.33
EBR	1	1600	380	.24	560	.35
WBL	1	1600	10	.01*	20	.01
WBT	2	3200	870	.27	1490	.47*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.80**

104. Poe & Valencia

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	0	0	0		0	
NBR	1	1600	190	.12	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	0	.00*	0	.00*
EBR	1	1600	0	.00	0	.00
WBL	1	1600	70	.04*	140	.09*
WBT	2	3200	0	.00	0	.00
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.23**		**.19**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	0	0	0		0	
NBR	1	1600	200	.13	40	.03
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	0	.00*	0	.00*
EBR	1	1600	0	.00	0	.00
WBL	1	1600	70	.04*	150	.09*
WBT	2	3200	0	.00	0	.00
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.10*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.24**		**.19**

104. Poe & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	190	.12*	150	.09*
NBT	0	0	0		0	
NBR	1	1600	140	.09	40	.03
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	380	.12*	300	.09*
EBR	1	1600	90	.06	210	.13
WBL	1	1600	60	.04*	80	.05*
WBT	2	3200	310	.10	460	.14
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.33**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	160	.10*	140	.09*
NBT	0	0	0		0	
NBR	1	1600	160	.10	60	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1070	.33*	680	.21
EBR	1	1600	120	.08	180	.11
WBL	1	1600	60	.04*	70	.04
WBT	2	3200	500	.16	1040	.33*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.52**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	180	.11*	170	.11*
NBT	0	0	0		0	
NBR	1	1600	150	.09	60	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1280	.40*	840	.26
EBR	1	1600	130	.08	220	.14
WBL	1	1600	50	.03*	80	.05
WBT	2	3200	580	.18	1220	.38*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.59**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	210	.13*	180	.11*
NBT	0	0	0		0	
NBR	1	1600	150	.09	70	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3200	1340	.42*	820	.26
EBR	1	1600	130	.08	250	.16
WBL	1	1600	40	.03*	100	.06
WBT	2	3200	670	.21	1330	.42*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.63**

105. Westridge & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	36	.02	1	.00
NBT	1	1600	1	.00*	3	.00*
NBR	1	1600	47	.03	30	.02
SBL	2	2880	335	.12*	100	.03*
SBT	1	1600	9	.01	2	.00
SBR	1	1600	26	.02	0	.00
EBL	1	1600	4	.00	2	.00
EBT	3	4800	985	.21	209	.04*
EBR	0	0	15		3	
WBL	1	1600	29	.02	23	.01*
WBT	3	4800	1230	.26*	157	.03
WBR	1	1600	61	.04	120	.08
Right Turn Adjustment					Multi	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.20**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	0	.00	0	.00
SBT	1	1600	0	.00*	0	.00*
SBR	1	1600	20	.01	10	.01
EBL	1	1600	20	.01*	10	.01*
EBT	3	4800	480	.10	280	.06
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	940	.20*	220	.05*
WBR	1	1600	50	.03	100	.06
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.31**		**.17**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	10	.00	10	.00
SBT	1	1600	0	.00*	0	.00*
SBR	1	1600	60	.04	50	.03
EBL	1	1600	110	.07*	30	.02*
EBT	3	4800	510	.11	280	.06
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	860	.18*	310	.06*
WBR	1	1600	360	.23	140	.09
Right Turn Adjustment			WBR	.05*	Multi	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.40**		**.22**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00
NBR	1	1600	0	.00	0	.00
SBL	2	2880	30	.01*	10	.00
SBT	1	1600	0	.00	0	.00*
SBR	1	1600	90	.06	60	.04
EBL	1	1600	130	.08*	40	.03*
EBT	3	4800	640	.13	360	.08
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	840	.18*	450	.09*
WBR	1	1600	430	.27	260	.16
Right Turn Adjustment			WBR	.08*	Multi	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.45**		**.31**

105. Westridge & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	80	.03*	30	.01*
SBT	1	1600	0	.00	0	.00
SBR	1	1600	80	.05	50	.03
EBL	1	1600	130	.08*	40	.03*
EBT	3	4800	1370	.29	820	.17
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	1180	.25*	1260	.26*
WBR	1	1600	270	.17	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.40**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	80	.03*	50	.02*
SBT	1	1600	0	.00	0	.00
SBR	1	1600	90	.06	60	.04
EBL	1	1600	130	.08	40	.03*
EBT	3	4800	1990	.41*	1460	.30
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	1530	.32	1880	.39*
WBR	1	1600	290	.18	320	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.54**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	60	.02*	100	.03*
SBT	1	1600	0	.00	0	.00
SBR	1	1600	90	.06	70	.04
EBL	1	1600	140	.09	40	.03*
EBT	3	4800	2120	.44*	1580	.33
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	1560	.33	2010	.42*
WBR	1	1600	320	.20	310	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.58**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	0	.00	0	.00
NBT	1	1600	0	.00*	0	.00*
NBR	1	1600	0	.00	0	.00
SBL	2	2880	60	.02*	230	.08*
SBT	1	1600	0	.00	0	.00
SBR	1	1600	80	.05	90	.06
EBL	1	1600	140	.09	50	.03*
EBT	3	4800	2130	.44*	1540	.32
EBR	0	0	0		0	
WBL	1	1600	0	.00	0	.00
WBT	3	4800	1610	.34	2070	.43*
WBR	1	1600	350	.22	300	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.64**

106. Commerce Center & Magic Mtn

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	0	.00	0	.00
SBT	0	0	0		0	
SBR	1	1600	0	.00	0	.00
EBL	2	2880	0	.00	0	.00
EBT	3	4800	420	.09*	650	.14
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	360	.08	670	.14*
WBR	1	1600	0	.00	0	.00
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.19**		**.24**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	70	.02*	270	.09*
SBT	0	0	0		0	
SBR	1	1600	90	.06	50	.03
EBL	2	2880	240	.08*	20	.01*
EBT	3	4800	440	.09	590	.12
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	340	.07*	600	.13*
WBR	1	1600	810	.51	100	.06
Right Turn Adjustment			WBR	.42*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.33**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	80	.03*	460	.16*
SBT	0	0	0		0	
SBR	1	1600	100	.06	80	.05
EBL	2	2880	240	.08	10	.00
EBT	3	4800	850	.18*	790	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	460	.10	990	.21*
WBR	1	1600	1040	.65	140	.09
Right Turn Adjustment			WBR	.53*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.47**

106. Commerce Center & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	280	.10*	500	.17*
SBT	0	0	0		0	
SBR	1	1600	120	.08	200	.13
EBL	2	2880	240	.08	40	.01*
EBT	3	4800	1260	.26*	1010	.21
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	580	.12	1330	.28*
WBR	1	1600	920	.58	400	.25
Right Turn Adjustment			WBR	.32*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .78 .56

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	580	.20*	750	.26*
SBT	0	0	0		0	
SBR	1	1600	160	.10	360	.23
EBL	2	2880	400	.14*	110	.04*
EBT	3	4800	1230	.26	1140	.24
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	710	.15*	1280	.27*
WBR	f		1110		790	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .59 .67

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	700	.24*	900	.31*
SBT	0	0	0		0	
SBR	1	1600	190	.12	430	.27
EBL	2	2880	490	.17*	130	.05*
EBT	3	4800	1200	.25	1170	.24
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	750	.16*	1240	.26*
WBR	f		1280		920	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .72

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	2880	790	.27*	1010	.35*
SBT	0	0	0		0	
SBR	1	1600	190	.12	520	.33
EBL	2	2880	610	.21*	150	.05*
EBT	3	4800	1090	.23	1220	.25
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	4800	760	.16*	1140	.24*
WBR	f		1360		1140	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .74

107. Westridge & Magic Mtn

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		80	.03*	110	.03*
NBT	0	4800	0		0	
NBR	1.5		10	.01	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	400	.08*	640	.13*
EBR	1	1600	20	.01	10	.01
WBL	2	2880	0	.00	10	.00
WBT	3	4800	280	.06	560	.12
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .21 .26

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		540	.17*	180	.06*
NBT	0	4800	0		0	
NBR	1.5		10		10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	430	.09	760	.16*
EBR	1	1600	80	.05	100	.06
WBL	2	2880	0	.00	10	.00
WBT	3	4800	610	.13*	530	.11
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .40 .32

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		670	.21*	320	.10*
NBT	0	4800	0		0	
NBR	1.5		20	.01	10	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	800	.17	1100	.23*
EBR	1	1600	140	.09	150	.09
WBL	2	2880	10	.00	20	.01*
WBT	3	4800	830	.17*	800	.17
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .48 .44

107. Westridge & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		500	.16*	340	.11*
NBT	0	4800	0		0	
NBR	1.5		100	.06	40	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	1380	.29*	1380	.29*
EBR	1	1600	160	.10	130	.08
WBL	2	2880	20	.01*	90	.03*
WBT	3	4800	990	.21	1380	.29
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .56 .53

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		570	.18*	370	.12*
NBT	0	4800	0		0	
NBR	1.5		180	.11	100	.06
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	1630	.34*	1700	.35*
EBR	1	1600	180	.11	190	.12
WBL	2	2880	30	.01*	180	.06*
WBT	3	4800	1250	.26	1700	.35
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .63 .63

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		610	.19*	370	.12*
NBT	0	4800	0		0	
NBR	1.5		200	.13	110	.07
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	1740	.36*	1810	.38*
EBR	1	1600	160	.10	260	.16
WBL	2	2880	30	.01*	200	.07*
WBT	3	4800	1420	.30	1790	.37
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .66 .67

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		650	.20*	380	.12*
NBT	0	4800	0		0	
NBR	1.5		210	.13	120	.08
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	4800	1730	.36*	1800	.38*
EBR	1	1600	150	.09	430	.27
WBL	2	2880	30	.01*	210	.07*
WBT	3	4800	1460	.30	1910	.40
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .67 .67

110. Chiquito Cyn & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	0	.00*	0	.00*
NBR	0	0	1		0	
SBL	1	1600	72	.05*	31	.02*
SBT	0	0	0		0	
SBR	1	1600	12	.01	14	.01
EBL	1	1600	4	.00	21	.01
EBT	2	3200	592	.19	1035	.32*
EBR	0	0	1		1	
WBL	0	0	0		1	
WBT	2	3200	737	.23*	770	.24
WBR	1	1600	25	.02	52	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.44**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02*	70	.04*
NBT	2	3200	20	.01	80	.03
NBR	2	3200	270	.08	480	.15
SBL	2	2880	70	.02	50	.02
SBT	2	3200	60	.03*	40	.02*
SBR	0	0	30		20	
EBL	1	1600	20	.01	30	.02
EBT	2	3200	780	.24*	940	.29*
EBR	1	1600	80	.05	50	.03
WBL	2	2880	500	.17*	280	.10*
WBT	2	3200	680	.21	1000	.31
WBR	1	1600	20	.01	90	.06
Right Turn Adjustment					NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.58**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	30	.02*	70	.04*
NBT	2	3200	20	.01	80	.03
NBR	2	3200	270	.08	490	.15
SBL	2	2880	70	.02	50	.02
SBT	2	3200	60	.03*	40	.02*
SBR	0	0	30		20	
EBL	1	1600	20	.01	40	.03
EBT	2	3200	800	.25*	940	.29*
EBR	1	1600	80	.05	40	.03
WBL	2	2880	510	.18*	290	.10*
WBT	2	3200	720	.23	1030	.32
WBR	1	1600	20	.01	90	.06
Right Turn Adjustment					NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.58**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	40	.03*	80	.05*
NBT	2	3200	30	.01	70	.02
NBR	2	3200	350	.11	490	.15
SBL	2	2880	70	.02	50	.02
SBT	2	3200	50	.03*	40	.02*
SBR	0	0	30		20	
EBL	1	1600	20	.01	30	.02
EBT	2	3200	800	.25*	940	.29*
EBR	1	1600	70	.04	50	.03
WBL	2	2880	480	.17*	280	.10*
WBT	2	3200	700	.22	1020	.32
WBR	1	1600	20	.01	90	.06
Right Turn Adjustment					NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.58**

110. Chiquito Cyn & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	140	.09*	110	.07*
NBT	2	3200	40	.01	80	.03
NBR	2	3200	560	.18	390	.12
SBL	2	2880	80	.03	50	.02
SBT	2	3200	60	.03*	70	.03*
SBR	0	0	30		20	
EBL	1	1600	20	.01	30	.02
EBT	2	3200	820	.26*	910	.28*
EBR	1	1600	100	.06	130	.08
WBL	2	2880	260	.09*	320	.11*
WBT	2	3200	660	.21	1060	.33
WBR	1	1600	20	.01	100	.06
Right Turn Adjustment			NBR	.02*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .59 .59

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	190	.07	170	.06
NBT	2	3200	80	.03*	180	.06*
NBR	2	3200	1190	.37	560	.18
SBL	2	2880	220	.08*	120	.04*
SBT	3	4800	130	.03	160	.03
SBR	1	1600	30	.02	20	.01
EBL	2	2880	20	.01	40	.01
EBT	4	6400	880	.14*	930	.15*
EBR	1	1600	160	.10	200	.13
WBL	2	2880	330	.11*	800	.28*
WBT	3	4800	700	.15	1110	.23
WBR	1	1600	60	.04	240	.15
Right Turn Adjustment			NBR	.23*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .69 .63

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	2880	220	.08	280	.10
NBT	2	3200	320	.10*	340	.11*
NBR	2	3200	1420	.44	640	.20
SBL	2	2880	460	.16*	520	.18*
SBT	3	4800	250	.05	420	.09
SBR	1	1600	40	.03	60	.04
EBL	2	2880	60	.02	50	.02
EBT	4	6400	1100	.17*	1030	.16*
EBR	1	1600	250	.16	280	.18
WBL	2	2880	390	.14*	1000	.35*
WBT	3	4800	760	.16	1350	.28
WBR	1	1600	430	.27	560	.35
Right Turn Adjustment			NBR	.20*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

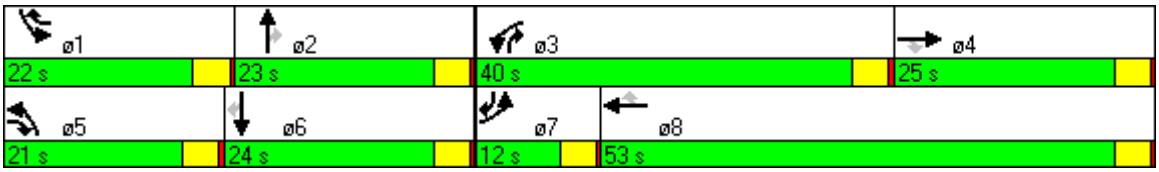
TOTAL CAPACITY UTILIZATION .87 .90

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge
(See HCM delay worksheets on following pages)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	1250	330	440	790	780	260	560	1640	510	290	50
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
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	7
Minimum Initial (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
Minimum Split (s)	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0
Total Split (s)	12.0	25.0	21.0	40.0	53.0	22.0	21.0	23.0	40.0	22.0	24.0	12.0
Total Split (%)	10.9%	22.7%	19.1%	36.4%	48.2%	20.0%	19.1%	20.9%	36.4%	20.0%	21.8%	10.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None
Act Effct Green (s)	7.7	21.0	38.7	36.0	49.3	71.3	13.7	19.0	59.0	18.0	23.3	35.0
Actuated g/C Ratio	0.07	0.19	0.35	0.33	0.45	0.65	0.12	0.17	0.54	0.16	0.21	0.32
v/c Ratio	0.50	1.02	0.50	0.39	0.35	0.75	0.61	0.92	1.09	0.91	0.27	0.09
Control Delay	56.6	75.6	15.5	29.8	20.5	18.1	51.5	66.1	79.1	66.7	37.7	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	75.6	15.5	29.8	20.5	18.1	51.5	66.1	79.1	66.7	37.7	8.5
LOS	E	E	B	C	C	B	D	E	E	E	D	A
Approach Delay		62.6			21.6			73.2			53.4	
Approach LOS		E			C			E			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 53.5	Intersection LOS: D
Analysis Period (min) 15	

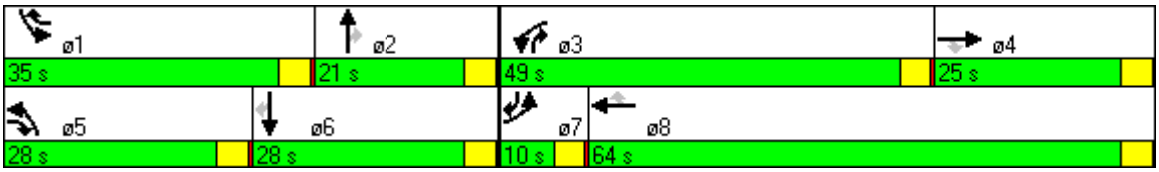
Splits and Phases: 3: SR-126 & Chiquito Canyon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	1080	360	1220	1530	620	400	380	740	820	620	110
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
Detector Phases	7	4	5	3	8	1	5	2	3	1	6	7
Minimum Initial (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
Minimum Split (s)	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0	8.0	20.0	8.0
Total Split (s)	10.0	25.0	28.0	49.0	64.0	35.0	28.0	21.0	49.0	35.0	28.0	10.0
Total Split (%)	7.7%	19.2%	21.5%	37.7%	49.2%	26.9%	21.5%	16.2%	37.7%	26.9%	21.5%	7.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	None
Act Effct Green (s)	6.0	21.0	45.6	45.0	60.0	95.0	20.6	17.0	66.0	31.0	27.4	37.4
Actuated g/C Ratio	0.05	0.16	0.35	0.35	0.46	0.73	0.16	0.13	0.51	0.24	0.21	0.29
v/c Ratio	0.44	1.04	0.64	1.03	0.65	0.53	0.74	0.82	0.52	1.00	0.58	0.23
Control Delay	69.5	92.3	40.0	75.0	28.6	8.8	60.4	70.3	22.7	81.1	49.2	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	92.3	40.0	75.0	28.6	8.8	60.4	70.3	22.7	81.1	49.2	29.4
LOS	E	F	D	E	C	A	E	E	C	F	D	C
Approach Delay		78.8			41.8			44.5			64.7	
Approach LOS		E			D			D			E	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 53.8	Intersection LOS: D
Analysis Period (min) 15	

Splits and Phases: 3: SR-126 & Chiquito Canyon



118. Six Flags & Magic Mtn

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	390	.09*	1200	.28*
SBT	0	0	0		0	
SBR	1	1600	10	.01	50	.03
EBL	2	2880	20	.01	40	.01
EBT	4	6400	380	.06*	590	.09*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	270	.04	520	.08
WBR	f		620		780	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.25**		**.47**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	370	.09*	1140	.26*
SBT	0	0	0		0	
SBR	1	1600	40	.03	110	.07
EBL	2	2880	50	.02*	90	.03
EBT	4	6400	380	.06	630	.10*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	540	.08*	410	.06
WBR	f		600		730	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.29**		**.46**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	370	.09*	1110	.26*
SBT	0	0	0		0	
SBR	1	1600	40	.03	140	.09
EBL	2	2880	70	.02*	100	.03
EBT	4	6400	720	.11	890	.14*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	690	.11*	640	.10
WBR	f		580		700	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.32**		**.50**

118. Six Flags & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	360	.08*	1060	.25*
SBT	0	0	0		0	
SBR	1	1600	50	.03	200	.13
EBL	2	2880	100	.03	140	.05*
EBT	4	6400	1350	.21*	1140	.18
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	800	.13	1200	.19*
WBR	f		560		660	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .39 .59

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	330	.08*	1000	.23*
SBT	0	0	0		0	
SBR	1	1600	80	.05	260	.16
EBL	2	2880	130	.05	180	.06*
EBT	4	6400	1640	.26*	1590	.25
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	1080	.17	1640	.26*
WBR	f		530		640	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .44 .65

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	320	.07*	980	.23*
SBT	0	0	0		0	
SBR	1	1600	90	.06	280	.18
EBL	2	2880	150	.05	180	.06*
EBT	4	6400	1750	.27*	1810	.28
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	1270	.20	1810	.28*
WBR	f		510		620	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .44 .67

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	3	4320	360	.08*	1180	.27*
SBT	0	0	0		0	
SBR	1	1600	100	.06	330	.21
EBL	2	2880	160	.06	220	.08*
EBT	4	6400	1740	.27*	1760	.28
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	6400	1290	.20	1880	.29*
WBR	f		560		810	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .45 .74

APPENDIX C

I-5 FREEWAY MAINLINE V/C CALCULATIONS

V/C Calculations
AM Peak Hour - Northbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2006													
403. I-5 s/o Parker	1,570	4	1,800	1,570	0.22	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	2,170	4	1,950	2,170	0.28	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	3,340	4	1,950	3,340	0.43	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	3,340	4	1,950	3,340	0.43	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	4,490	4	1,950	4,490	0.58	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	5,430	4	1,950	5,430	0.70	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	5,560	4	1,950	5,560	0.71	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	5,620	4	1,950	5,620	0.72	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	5,600	4	1,900	5,600	0.74	-	-	-	-	-	-	-	-
412. I-5 s/o SR-14	7,390	6	2,000	6,651	0.55	-	-	-	-	2	1,300	739	0.28
2011													
403. I-5 s/o Parker	2,989	4	1,800	2,989	0.42	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	4,688	4	1,950	4,688	0.60	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,934	4	1,950	5,934	0.76	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,934	4	1,950	5,934	0.76	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,248	4	1,950	6,248	0.80	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,865	4	1,950	6,865	0.88	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,619	4	1,950	6,619	0.85	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,272	4	1,950	6,272	0.80	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	5,953	4	1,900	5,358	0.70	1	2,000	595	0.30	-	-	-	-
412. I-5 s/o SR-14	8,006	6	2,000	6,325	0.53	1	2,000	801	0.40	2	1,300	881	0.34
2012													
403. I-5 s/o Parker	3,000	4	1,800	3,000	0.42	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	4,558	4	1,950	4,558	0.58	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,452	4	1,950	5,452	0.70	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,452	4	1,950	5,452	0.70	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,088	4	1,950	6,088	0.78	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,803	4	1,950	6,803	0.87	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,757	4	1,950	6,757	0.87	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,402	4	1,950	6,402	0.82	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	6,023	4	1,900	5,421	0.71	1	2,000	602	0.30	-	-	-	-
412. I-5 s/o SR-14	8,006	6	2,000	6,325	0.53	1	2,000	801	0.40	2	1,300	881	0.34
2014													
403. I-5 s/o Parker	3,043	4	1,800	3,043	0.42	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	4,669	4	1,950	4,669	0.60	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,552	4	1,950	5,552	0.71	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,552	4	1,950	5,552	0.71	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,174	4	1,950	6,174	0.79	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,866	4	1,950	6,866	0.88	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,803	4	1,950	6,803	0.87	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,451	4	1,950	6,451	0.83	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	6,073	4	1,900	5,466	0.72	1	2,000	607	0.30	-	-	-	-
412. I-5 s/o SR-14	8,093	6	2,000	6,393	0.53	1	2,000	809	0.40	2	1,300	890	0.34

V/C Calculations
AM Peak Hour - Northbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2018													
403. I-5 s/o Parker	3,334	4	1,800	3,001	0.42	1	2,000	333	0.17	-	-	-	-
404. I-5 s/o Hasley	5,018	4	1,950	4,516	0.58	1	2,000	502	0.25	-	-	-	-
405. I-5 s/o SR-126	5,844	4	1,950	5,260	0.67	1	2,000	584	0.29	-	-	-	-
406. I-5 s/o Rye Cyn	5,844	4	1,950	5,260	0.67	1	2,000	584	0.29	-	-	-	-
407. I-5 s/o Magic Mtn	6,432	4	1,950	5,789	0.74	1	2,000	643	0.32	-	-	-	-
408. I-5 s/o Valencia	7,227	4	1,950	6,504	0.83	1	2,000	723	0.36	-	-	-	-
409. I-5 s/o McBean	7,115	4	1,950	6,404	0.82	1	2,000	712	0.36	-	-	-	-
410. I-5 s/o Lyons	6,622	4	1,950	5,960	0.76	1	2,000	662	0.33	-	-	-	-
411. I-5 s/o Calgrove	6,167	4	2,000	4,872	0.61	1	2,000	617	0.31	1	1,300	678	0.52
412. I-5 s/o SR-14	8,422	6	2,000	6,653	0.55	1	2,000	842	0.42	2	1,300	926	0.36
2022													
403. I-5 s/o Parker	3,615	4	1,800	3,254	0.45	1	2,000	362	0.18	-	-	-	-
404. I-5 s/o Hasley	5,303	4	1,950	4,773	0.61	1	2,000	530	0.27	-	-	-	-
405. I-5 s/o SR-126	5,995	4	1,950	5,276	0.68	1	2,000	719	0.36	-	-	-	-
406. I-5 s/o Rye Cyn	5,995	4	1,950	5,276	0.68	1	2,000	719	0.36	-	-	-	-
407. I-5 s/o Magic Mtn	6,468	4	1,950	5,692	0.73	1	2,000	776	0.39	-	-	-	-
408. I-5 s/o Valencia	7,297	4	1,950	6,421	0.82	1	2,000	876	0.44	-	-	-	-
409. I-5 s/o McBean	7,195	4	1,950	6,332	0.81	1	2,000	863	0.43	-	-	-	-
410. I-5 s/o Lyons	6,696	4	1,950	5,892	0.76	1	2,000	804	0.40	-	-	-	-
411. I-5 s/o Calgrove	6,209	4	2,000	4,781	0.60	1	2,000	745	0.37	1	1,300	683	0.53
412. I-5 s/o SR-14	8,812	6	2,000	6,785	0.57	1	2,000	1,057	0.53	2	1,300	969	0.37
2025													
403. I-5 s/o Parker	3,887	4	1,800	3,498	0.49	1	2,000	389	0.19	-	-	-	-
404. I-5 s/o Hasley	5,597	4	1,950	5,037	0.65	1	2,000	560	0.28	-	-	-	-
405. I-5 s/o SR-126	6,330	4	1,950	5,570	0.71	1	2,000	760	0.38	-	-	-	-
406. I-5 s/o Rye Cyn	6,330	4	1,950	5,570	0.71	1	2,000	760	0.38	-	-	-	-
407. I-5 s/o Magic Mtn	6,825	4	1,950	6,006	0.77	1	2,000	819	0.41	-	-	-	-
408. I-5 s/o Valencia	7,625	4	1,950	6,710	0.86	1	2,000	915	0.46	-	-	-	-
409. I-5 s/o McBean	7,453	4	1,950	6,559	0.84	1	2,000	894	0.45	-	-	-	-
410. I-5 s/o Lyons	6,961	4	1,950	6,126	0.79	1	2,000	835	0.42	-	-	-	-
411. I-5 s/o Calgrove	6,462	4	2,000	4,976	0.62	1	2,000	775	0.39	1	1,300	711	0.55
412. I-5 s/o SR-14	9,156	6	2,000	7,050	0.59	1	2,000	1,099	0.55	2	1,300	1,007	0.39
2030													
403. I-5 s/o Parker	4,382	4	1,800	3,988	0.55	1	2,000	394	0.20	-	-	-	-
404. I-5 s/o Hasley	6,055	4	1,950	5,450	0.70	1	2,000	606	0.30	-	-	-	-
405. I-5 s/o SR-126	6,690	4	1,950	5,887	0.75	1	2,000	803	0.40	-	-	-	-
406. I-5 s/o Rye Cyn	6,690	4	1,950	5,887	0.75	1	2,000	803	0.40	-	-	-	-
407. I-5 s/o Magic Mtn	7,048	4	1,950	6,202	0.80	1	2,000	846	0.42	-	-	-	-
408. I-5 s/o Valencia	7,763	4	1,950	6,831	0.88	1	2,000	932	0.47	-	-	-	-
409. I-5 s/o McBean	7,698	4	1,950	6,774	0.87	1	2,000	924	0.46	-	-	-	-
410. I-5 s/o Lyons	7,181	4	1,950	6,319	0.81	1	2,000	862	0.43	-	-	-	-
411. I-5 s/o Calgrove	6,590	4	2,000	5,074	0.63	1	2,000	791	0.40	1	1,300	725	0.56
412. I-5 s/o SR-14	9,185	6	2,000	6,797	0.57	2	2,000	1,194	0.30	2	1,300	1,194	0.46

V/C Calculations
AM Peak Hour - Southbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2006													
403. I-5 s/o Parker	2,210	4	1,800	2,210	0.31	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	3,110	4	1,950	3,110	0.40	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	3,420	4	1,950	3,420	0.44	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	4,200	4	1,950	4,200	0.54	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	4,490	4	1,950	4,490	0.58	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	5,310	4	1,950	5,310	0.68	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	5,730	4	1,950	5,730	0.73	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,320	4	1,950	6,320	0.81	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	6,610	4	1,900	6,610	0.87	-	-	-	-	-	-	-	-
412. I-5 s/o SR-14	13,270	6	2,000	11,810	0.98	-	-	-	-	2	1,300	1,460	0.56
2011													
403. I-5 s/o Parker	4,591	4	1,800	4,591	0.64	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	5,276	4	1,950	5,276	0.68	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	4,946	4	1,950	4,946	0.63	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	4,910	4	1,950	4,910	0.63	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	4,956	4	1,950	4,956	0.64	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	5,814	4	1,950	5,814	0.75	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	5,778	4	1,950	5,778	0.74	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,448	4	2,000	5,739	0.72	-	-	-	-	1	1,300	709	0.55
411. I-5 s/o Calgrove	6,657	4	2,000	5,925	0.74	-	-	-	-	1	1,300	732	0.56
412. I-5 s/o SR-14	13,907	6	2,000	10,708	0.89	1	2,000	1,669	0.83	2	1,300	1,530	0.59
2012													
403. I-5 s/o Parker	4,615	4	1,800	4,615	0.64	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	5,286	4	1,950	5,286	0.68	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	4,858	4	1,950	4,858	0.62	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	4,959	4	1,950	4,959	0.64	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	4,982	4	1,950	4,982	0.64	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	5,748	4	1,950	5,748	0.74	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	5,787	4	1,950	5,787	0.74	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,474	4	2,000	5,762	0.72	-	-	-	-	1	1,300	712	0.55
411. I-5 s/o Calgrove	6,667	4	2,000	5,934	0.74	-	-	-	-	1	1,300	733	0.56
412. I-5 s/o SR-14	14,034	6	2,000	10,806	0.90	1	2,000	1,684	0.84	2	1,300	1,544	0.59
2014													
403. I-5 s/o Parker	4,639	4	1,800	4,639	0.64	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	5,216	4	1,950	5,216	0.67	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	4,839	4	1,950	4,839	0.62	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	4,979	4	1,950	4,979	0.64	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	5,186	4	1,950	5,186	0.66	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	5,939	4	1,950	5,939	0.76	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	5,806	4	1,950	5,806	0.74	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,525	4	2,000	5,807	0.73	-	-	-	-	1	1,300	718	0.55
411. I-5 s/o Calgrove	6,686	4	2,000	5,951	0.74	-	-	-	-	1	1,300	735	0.57
412. I-5 s/o SR-14	14,236	6	2,000	10,962	0.91	1	2,000	1,708	0.85	2	1,300	1,566	0.60

V/C Calculations
AM Peak Hour - Southbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2018													
403. I-5 s/o Parker	4,910	4	1,800	4,419	0.61	1	2,000	491	0.25	-	-	-	-
404. I-5 s/o Hasley	5,536	4	1,950	4,982	0.64	1	2,000	554	0.28	-	-	-	-
405. I-5 s/o SR-126	5,154	4	1,950	4,639	0.59	1	2,000	515	0.26	-	-	-	-
406. I-5 s/o Rye Cyn	5,517	4	1,950	4,965	0.64	1	2,000	552	0.28	-	-	-	-
407. I-5 s/o Magic Mtn	5,911	4	1,950	5,320	0.68	1	2,000	591	0.30	-	-	-	-
408. I-5 s/o Valencia	6,614	4	1,950	5,953	0.76	1	2,000	661	0.33	-	-	-	-
409. I-5 s/o McBean	6,380	4	1,950	5,742	0.74	1	2,000	638	0.32	-	-	-	-
410. I-5 s/o Lyons	6,628	4	2,000	5,236	0.65	1	2,000	663	0.33	1	1,300	729	0.56
411. I-5 s/o Calgrove	6,724	4	2,000	5,312	0.66	1	2,000	672	0.34	1	1,300	740	0.57
412. I-5 s/o SR-14	15,158	6	2,000	11,672	0.97	1	2,000	1,819	0.91	2	1,300	1,667	0.64
2022													
403. I-5 s/o Parker	5,260	4	1,800	4,734	0.66	1	2,000	526	0.26	-	-	-	-
404. I-5 s/o Hasley	5,914	4	1,950	5,323	0.68	1	2,000	591	0.30	-	-	-	-
405. I-5 s/o SR-126	5,636	4	1,950	4,960	0.64	1	2,000	676	0.34	-	-	-	-
406. I-5 s/o Rye Cyn	6,037	4	1,950	5,313	0.68	1	2,000	724	0.36	-	-	-	-
407. I-5 s/o Magic Mtn	6,430	4	1,950	5,658	0.73	1	2,000	772	0.39	-	-	-	-
408. I-5 s/o Valencia	7,329	4	1,950	6,450	0.83	1	2,000	879	0.44	-	-	-	-
409. I-5 s/o McBean	7,084	4	1,950	6,234	0.80	1	2,000	850	0.43	-	-	-	-
410. I-5 s/o Lyons	6,730	4	2,000	5,182	0.65	1	2,000	808	0.40	1	1,300	740	0.57
411. I-5 s/o Calgrove	6,762	4	2,000	5,207	0.65	1	2,000	811	0.41	1	1,300	744	0.57
412. I-5 s/o SR-14	16,111	6	2,000	11,922	0.99	1	2,000	1,933	0.97	2	1,300	2,256	0.87
2025													
403. I-5 s/o Parker	5,574	4	1,800	5,017	0.70	1	2,000	557	0.28	-	-	-	-
404. I-5 s/o Hasley	6,193	4	1,950	5,574	0.71	1	2,000	619	0.31	-	-	-	-
405. I-5 s/o SR-126	6,072	4	1,950	5,343	0.69	1	2,000	729	0.36	-	-	-	-
406. I-5 s/o Rye Cyn	6,382	4	1,950	5,616	0.72	1	2,000	766	0.38	-	-	-	-
407. I-5 s/o Magic Mtn	6,740	4	1,950	5,931	0.76	1	2,000	809	0.40	-	-	-	-
408. I-5 s/o Valencia	7,633	4	1,950	6,717	0.86	1	2,000	916	0.46	-	-	-	-
409. I-5 s/o McBean	7,320	4	1,950	6,442	0.83	1	2,000	878	0.44	-	-	-	-
410. I-5 s/o Lyons	6,807	4	2,000	5,241	0.66	1	2,000	817	0.41	1	1,300	749	0.58
411. I-5 s/o Calgrove	6,790	4	2,000	5,228	0.65	1	2,000	815	0.41	1	1,300	747	0.57
412. I-5 s/o SR-14	16,597	6	2,000	12,033	1.00	1	2,000	1,992	1.00	2	1,300	2,573	0.99
2030													
403. I-5 s/o Parker	5,845	4	1,800	5,261	0.73	1	2,000	585	0.29	-	-	-	-
404. I-5 s/o Hasley	6,518	4	1,950	5,866	0.75	1	2,000	652	0.33	-	-	-	-
405. I-5 s/o SR-126	6,483	4	1,950	5,705	0.73	1	2,000	778	0.39	-	-	-	-
406. I-5 s/o Rye Cyn	6,884	4	1,950	6,058	0.78	1	2,000	826	0.41	-	-	-	-
407. I-5 s/o Magic Mtn	7,152	4	1,950	6,222	0.80	1	2,000	930	0.46	-	-	-	-
408. I-5 s/o Valencia	8,071	4	1,950	7,022	0.90	1	2,000	1,049	0.52	-	-	-	-
409. I-5 s/o McBean	7,779	4	1,950	6,768	0.87	1	2,000	1,011	0.51	-	-	-	-
410. I-5 s/o Lyons	7,373	4	2,000	5,603	0.70	1	2,000	958	0.48	1	1,300	811	0.62
411. I-5 s/o Calgrove	7,360	4	2,000	5,594	0.70	1	2,000	957	0.48	1	1,300	810	0.62
412. I-5 s/o SR-14	17,608	6	2,000	11,463	0.96	2	2,000	3,768	0.94	2	1,300	2,377	0.91

V/C Calculations
PM Peak Hour - Northbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2006													
403. I-5 s/o Parker	2,790	4	1,800	2,790	0.39	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	3,620	4	1,950	3,620	0.46	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	4,080	4	1,950	4,080	0.52	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	4,080	4	1,950	4,080	0.52	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	5,270	4	1,950	5,270	0.68	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,050	4	1,950	6,050	0.78	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,610	4	1,950	6,610	0.85	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,020	4	1,950	7,020	0.90	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	6,970	4	1,900	6,970	0.92	-	-	-	-	-	-	-	-
412. I-5 s/o SR-14	13,710	6	2,000	11,928	0.99	-	-	-	-	2	1,300	1,782	0.69
2011													
403. I-5 s/o Parker	5,954	4	1,800	5,954	0.83	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,472	4	1,950	6,472	0.83	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,952	4	1,950	5,952	0.76	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,952	4	1,950	5,952	0.76	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,130	4	1,950	6,130	0.79	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,561	4	1,950	6,561	0.84	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,802	4	1,950	6,802	0.87	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,169	4	1,950	7,169	0.92	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	7,108	4	1,900	6,397	0.84	1	2,000	711	0.36	-	-	-	-
412. I-5 s/o SR-14	13,932	6	2,000	11,006	0.92	1	2,000	1,393	0.70	2	1,300	1,533	0.59
2012													
403. I-5 s/o Parker	5,942	4	1,800	5,942	0.83	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,459	4	1,950	6,459	0.83	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,757	4	1,950	5,757	0.74	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,757	4	1,950	5,757	0.74	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,121	4	1,950	6,121	0.78	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,593	4	1,950	6,593	0.85	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,841	4	1,950	6,841	0.88	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,199	4	1,950	7,199	0.92	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	7,135	4	1,900	6,422	0.84	1	2,000	714	0.36	-	-	-	-
412. I-5 s/o SR-14	13,976	6	2,000	11,041	0.92	1	2,000	1,398	0.70	2	1,300	1,537	0.59
2014													
403. I-5 s/o Parker	6,009	4	1,800	6,009	0.83	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,433	4	1,950	6,433	0.82	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	5,757	4	1,950	5,757	0.74	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,757	4	1,950	5,757	0.74	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	6,157	4	1,950	6,157	0.79	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,659	4	1,950	6,659	0.85	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,917	4	1,950	6,917	0.89	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,258	4	1,950	7,258	0.93	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	7,190	4	1,900	6,471	0.85	1	2,000	719	0.36	-	-	-	-
412. I-5 s/o SR-14	14,065	6	2,000	11,111	0.93	1	2,000	1,407	0.70	2	1,300	1,547	0.60

V/C Calculations
PM Peak Hour - Northbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2018													
403. I-5 s/o Parker	6,247	4	1,800	5,622	0.78	1	2,000	625	0.31	-	-	-	-
404. I-5 s/o Hasley	6,796	4	1,950	6,116	0.78	1	2,000	680	0.34	-	-	-	-
405. I-5 s/o SR-126	5,980	4	1,950	5,382	0.69	1	2,000	598	0.30	-	-	-	-
406. I-5 s/o Rye Cyn	5,980	4	1,950	5,382	0.69	1	2,000	598	0.30	-	-	-	-
407. I-5 s/o Magic Mtn	6,517	4	1,950	5,865	0.75	1	2,000	652	0.33	-	-	-	-
408. I-5 s/o Valencia	7,187	4	1,950	6,468	0.83	1	2,000	719	0.36	-	-	-	-
409. I-5 s/o McBean	7,071	4	1,950	6,364	0.82	1	2,000	707	0.35	-	-	-	-
410. I-5 s/o Lyons	7,377	4	1,950	6,639	0.85	1	2,000	738	0.37	-	-	-	-
411. I-5 s/o Calgrove	7,300	4	2,000	6,570	0.82	1	2,000	730	0.37	1	1,300	803	0.62
412. I-5 s/o SR-14	14,242	6	2,000	11,251	0.94	1	2,000	1,424	0.71	2	1,300	1,567	0.60
2022													
403. I-5 s/o Parker	6,733	4	1,800	6,060	0.84	1	2,000	673	0.34	-	-	-	-
404. I-5 s/o Hasley	7,317	4	1,950	6,585	0.84	1	2,000	732	0.37	-	-	-	-
405. I-5 s/o SR-126	6,520	4	1,950	5,738	0.74	1	2,000	782	0.39	-	-	-	-
406. I-5 s/o Rye Cyn	6,520	4	1,950	5,738	0.74	1	2,000	782	0.39	-	-	-	-
407. I-5 s/o Magic Mtn	7,013	4	1,950	6,171	0.79	1	2,000	842	0.42	-	-	-	-
408. I-5 s/o Valencia	7,527	4	1,950	6,624	0.85	1	2,000	903	0.45	-	-	-	-
409. I-5 s/o McBean	7,619	4	1,950	6,705	0.86	1	2,000	914	0.46	-	-	-	-
410. I-5 s/o Lyons	7,496	4	1,950	6,596	0.85	1	2,000	900	0.45	-	-	-	-
411. I-5 s/o Calgrove	7,410	4	2,000	6,521	0.82	1	2,000	889	0.44	1	1,300	815	0.63
412. I-5 s/o SR-14	15,261	6	2,000	11,751	0.98	1	2,000	1,831	0.92	2	1,300	1,679	0.65
2025													
403. I-5 s/o Parker	7,150	4	1,800	6,435	0.89	1	2,000	715	0.36	-	-	-	-
404. I-5 s/o Hasley	7,754	4	1,950	6,979	0.89	1	2,000	775	0.39	-	-	-	-
405. I-5 s/o SR-126	6,997	4	1,950	6,157	0.79	1	2,000	840	0.42	-	-	-	-
406. I-5 s/o Rye Cyn	6,997	4	1,950	6,157	0.79	1	2,000	840	0.42	-	-	-	-
407. I-5 s/o Magic Mtn	7,392	4	1,950	6,505	0.83	1	2,000	887	0.44	-	-	-	-
408. I-5 s/o Valencia	7,825	4	1,950	6,886	0.88	1	2,000	939	0.47	-	-	-	-
409. I-5 s/o McBean	7,933	4	1,950	6,981	0.90	1	2,000	952	0.48	-	-	-	-
410. I-5 s/o Lyons	7,923	4	1,950	6,972	0.89	1	2,000	951	0.48	-	-	-	-
411. I-5 s/o Calgrove	7,797	4	2,000	6,861	0.86	1	2,000	936	0.47	1	1,300	858	0.66
412. I-5 s/o SR-14	15,842	6	2,000	11,882	0.99	1	2,000	1,901	0.95	2	1,300	2,059	0.79
2030													
403. I-5 s/o Parker	7,344	4	1,800	6,463	0.90	1	2,000	881	0.44	-	-	-	-
404. I-5 s/o Hasley	8,050	4	1,950	7,004	0.90	1	2,000	1,047	0.52	-	-	-	-
405. I-5 s/o SR-126	7,365	4	1,950	6,334	0.81	1	2,000	1,031	0.52	-	-	-	-
406. I-5 s/o Rye Cyn	7,365	4	1,950	6,334	0.81	1	2,000	1,031	0.52	-	-	-	-
407. I-5 s/o Magic Mtn	7,787	4	1,950	6,775	0.87	1	2,000	1,012	0.51	-	-	-	-
408. I-5 s/o Valencia	8,235	4	1,950	7,000	0.90	1	2,000	1,235	0.62	-	-	-	-
409. I-5 s/o McBean	8,397	4	1,950	7,053	0.90	1	2,000	1,344	0.67	-	-	-	-
410. I-5 s/o Lyons	8,407	4	1,950	7,020	0.90	1	2,000	1,387	0.69	-	-	-	-
411. I-5 s/o Calgrove	8,269	4	2,000	7,111	0.89	1	2,000	1,158	0.58	1	1,300	910	0.70
412. I-5 s/o SR-14	16,720	6	2,000	11,035	0.92	2	2,000	3,511	0.88	2	1,300	2,174	0.84

V/C Calculations
PM Peak Hour - Southbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2006													
403. I-5 s/o Parker	2,420	4	1,800	2,420	0.34	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	3,010	4	1,950	3,010	0.39	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	4,150	4	1,950	4,150	0.53	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	5,350	4	1,950	5,350	0.69	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	5,600	4	1,950	5,600	0.72	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	6,420	4	1,950	6,420	0.82	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	6,450	4	1,950	6,450	0.83	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,460	4	1,950	6,460	0.83	-	-	-	-	-	-	-	-
411. I-5 s/o Calgrove	6,410	4	1,900	6,410	0.84	-	-	-	-	-	-	-	-
412. I-5 s/o SR-14	9,180	6	2,000	8,262	0.69	-	-	-	-	2	1,300	918	0.35
2011													
403. I-5 s/o Parker	4,575	4	1,800	4,575	0.64	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,130	4	1,950	6,130	0.79	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	6,815	4	1,950	6,815	0.87	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	7,802	4	1,950	7,802	1.00	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	7,336	4	1,950	7,336	0.94	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	7,773	4	1,950	7,773	1.00	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	7,491	4	1,950	7,491	0.96	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	6,937	4	2,000	6,174	0.77	-	-	-	-	1	1,300	763	0.59
411. I-5 s/o Calgrove	7,045	4	2,000	6,270	0.78	-	-	-	-	1	1,300	775	0.60
412. I-5 s/o SR-14	9,483	6	2,000	7,681	0.64	1	2,000	853	0.43	2	1,300	948	0.36
2012													
403. I-5 s/o Parker	4,596	4	1,800	4,596	0.64	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,117	4	1,950	6,117	0.78	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	6,619	4	1,950	6,619	0.85	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	7,705	4	1,950	7,705	0.99	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	7,302	4	1,950	7,302	0.94	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	7,818	4	1,950	7,818	1.00	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	7,674	4	1,950	7,674	0.98	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,162	4	2,000	6,374	0.80	-	-	-	-	1	1,300	788	0.61
411. I-5 s/o Calgrove	7,172	4	2,000	6,383	0.80	-	-	-	-	1	1,300	789	0.61
412. I-5 s/o SR-14	9,544	6	2,000	7,731	0.64	1	2,000	859	0.43	2	1,300	954	0.37
2014													
403. I-5 s/o Parker	4,660	4	1,800	4,660	0.65	-	-	-	-	-	-	-	-
404. I-5 s/o Hasley	6,257	4	1,950	6,257	0.80	-	-	-	-	-	-	-	-
405. I-5 s/o SR-126	6,663	4	1,950	6,663	0.85	-	-	-	-	-	-	-	-
406. I-5 s/o Rye Cyn	7,794	4	1,950	7,794	1.00	-	-	-	-	-	-	-	-
407. I-5 s/o Magic Mtn	7,475	4	1,950	7,475	0.96	-	-	-	-	-	-	-	-
408. I-5 s/o Valencia	7,828	4	1,950	7,828	1.00	-	-	-	-	-	-	-	-
409. I-5 s/o McBean	7,827	4	1,950	7,827	1.00	-	-	-	-	-	-	-	-
410. I-5 s/o Lyons	7,235	4	2,000	6,439	0.80	-	-	-	-	1	1,300	796	0.61
411. I-5 s/o Calgrove	7,280	4	2,000	6,479	0.81	-	-	-	-	1	1,300	801	0.62
412. I-5 s/o SR-14	9,752	6	2,000	7,899	0.66	1	2,000	878	0.44	2	1,300	975	0.38

V/C Calculations
PM Peak Hour - Southbound

	Total	Mixed-Flow Lanes				HOV Lanes				Truck Lanes			
Location	Vol	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C	Lanes	Cap/Ln	Vol	V/C
2018													
403. I-5 s/o Parker	5,013	4	1,800	4,512	0.63	1	2,000	501	0.25	-	-	-	-
404. I-5 s/o Hasley	6,651	4	1,950	5,853	0.75	1	2,000	798	0.40	-	-	-	-
405. I-5 s/o SR-126	7,291	4	1,950	6,124	0.79	1	2,000	1,167	0.58	-	-	-	-
406. I-5 s/o Rye Cyn	8,844	4	1,950	7,429	0.95	1	2,000	1,415	0.71	-	-	-	-
407. I-5 s/o Magic Mtn	8,644	4	1,950	7,261	0.93	1	2,000	1,383	0.69	-	-	-	-
408. I-5 s/o Valencia	9,179	4	1,950	7,710	0.99	1	2,000	1,469	0.73	-	-	-	-
409. I-5 s/o McBean	8,586	4	1,950	7,212	0.92	1	2,000	1,374	0.69	-	-	-	-
410. I-5 s/o Lyons	7,899	4	2,000	5,766	0.72	1	2,000	1,264	0.63	1	1,300	869	0.67
411. I-5 s/o Calgrove	7,658	4	2,000	5,590	0.70	1	2,000	1,225	0.61	1	1,300	842	0.65
412. I-5 s/o SR-14	10,257	6	2,000	8,000	0.67	1	2,000	1,231	0.62	2	1,300	1,026	0.39
2022													
403. I-5 s/o Parker	5,453	4	1,800	4,908	0.68	1	2,000	545	0.27	-	-	-	-
404. I-5 s/o Hasley	7,063	4	1,950	6,215	0.80	1	2,000	848	0.42	-	-	-	-
405. I-5 s/o SR-126	7,500	4	1,950	6,150	0.79	1	2,000	1,350	0.68	-	-	-	-
406. I-5 s/o Rye Cyn	8,956	4	1,950	7,344	0.94	1	2,000	1,612	0.81	-	-	-	-
407. I-5 s/o Magic Mtn	8,773	4	1,950	7,194	0.92	1	2,000	1,579	0.79	-	-	-	-
408. I-5 s/o Valencia	9,358	4	1,950	7,674	0.98	1	2,000	1,684	0.84	-	-	-	-
409. I-5 s/o McBean	8,851	4	1,950	7,258	0.93	1	2,000	1,593	0.80	-	-	-	-
410. I-5 s/o Lyons	8,221	4	2,000	5,919	0.74	1	2,000	1,398	0.70	1	1,300	904	0.70
411. I-5 s/o Calgrove	7,999	4	2,000	5,759	0.72	1	2,000	1,360	0.68	1	1,300	880	0.68
412. I-5 s/o SR-14	10,914	6	2,000	8,404	0.70	1	2,000	1,419	0.71	2	1,300	1,091	0.42
2025													
403. I-5 s/o Parker	5,792	4	1,800	5,213	0.72	1	2,000	579	0.29	-	-	-	-
404. I-5 s/o Hasley	7,419	4	1,950	6,529	0.84	1	2,000	890	0.45	-	-	-	-
405. I-5 s/o SR-126	7,938	4	1,950	6,350	0.81	1	2,000	1,588	0.79	-	-	-	-
406. I-5 s/o Rye Cyn	9,357	4	1,950	7,486	0.96	1	2,000	1,871	0.94	-	-	-	-
407. I-5 s/o Magic Mtn	9,191	4	1,950	7,353	0.94	1	2,000	1,838	0.92	-	-	-	-
408. I-5 s/o Valencia	9,658	4	1,950	7,726	0.99	1	2,000	1,932	0.97	-	-	-	-
409. I-5 s/o McBean	9,045	4	1,950	7,236	0.93	1	2,000	1,809	0.90	-	-	-	-
410. I-5 s/o Lyons	8,439	4	2,000	6,076	0.76	1	2,000	1,435	0.72	1	1,300	928	0.71
411. I-5 s/o Calgrove	8,201	4	2,000	5,905	0.74	1	2,000	1,394	0.70	1	1,300	902	0.69
412. I-5 s/o SR-14	11,384	6	2,000	8,766	0.73	1	2,000	1,480	0.74	2	1,300	1,138	0.44
2030													
403. I-5 s/o Parker	6,733	4	1,800	5,723	0.79	1	2,000	1,010	0.50	-	-	-	-
404. I-5 s/o Hasley	8,227	4	1,950	6,993	0.90	1	2,000	1,234	0.62	-	-	-	-
405. I-5 s/o SR-126	8,703	4	1,950	6,962	0.89	1	2,000	1,741	0.87	-	-	-	-
406. I-5 s/o Rye Cyn	9,828	4	1,950	7,823	1.00	1	2,000	2,005	1.00	-	-	-	-
407. I-5 s/o Magic Mtn	9,723	4	1,950	7,740	0.99	1	2,000	1,983	0.99	-	-	-	-
408. I-5 s/o Valencia	9,832	4	1,950	7,826	1.00	1	2,000	2,006	1.00	-	-	-	-
409. I-5 s/o McBean	9,519	4	1,950	7,615	0.98	1	2,000	1,904	0.95	-	-	-	-
410. I-5 s/o Lyons	8,877	4	2,000	6,081	0.76	1	2,000	1,775	0.89	1	1,300	1,021	0.79
411. I-5 s/o Calgrove	8,794	4	2,000	6,024	0.75	1	2,000	1,759	0.88	1	1,300	1,011	0.78
412. I-5 s/o SR-14	11,623	6	2,000	7,787	0.65	2	2,000	2,325	0.58	2	1,300	1,511	0.58

APPENDIX D

NEWHALL RANCH SPECIFIC PLAN – TRAFFIC MITIGATION MEASURES

SP 4.8-1 The applicants for future subdivision maps which permit construction shall be responsible for funding and constructing all on-site traffic improvements except as otherwise provided below. The obligation to construct improvements shall not preclude the applicants' ability to seek local, state, or federal funding for these facilities.

SP 4.8-2 Prior to the approval of each subdivision map which permits construction, the applicant for that map shall prepare a transportation performance evaluation which shall indicate the specific improvements for all on-site roadways which are necessary to provide adequate roadway and intersection capacity as well as adequate right-of-way for the subdivision and other expected traffic. Transportation performance evaluations shall be approved by Los Angeles County Department of Public Works according to standards and policies in effect at that time. The transportation performance evaluation shall form the basis for specific conditions of approval for the subdivision.

SP 4.8-3 The applicants for future subdivisions shall provide the traffic signals at the 15 locations labeled B through P in Figure 4.8-17 [of the Newhall Ranch Specific Plan Final EIR] as well as any additional signals warranted by future subdivision design. Signal warrants shall be prepared as part of the transportation performance evaluations noted in Mitigation 4.8-2 [of the Newhall Ranch Specific Plan Final EIR].

SP 4.8-4 All development within the Specific Plan shall conform to the requirements of the Los Angeles County Transportation Demand Management (TDM) Ordinance.

SP 4.8-5 The applicants for all future subdivision maps which permit construction shall consult with the local transit provider regarding the need for, and locations of, bus pull-ins on highways within the Specific Plan area. All bus pull-in locations shall be approved by the Department of Public Works, and approved bus pull-ins shall be constructed by the applicant.

SP 4.8-6 Prior to the recordation of the first subdivision map which permits construction, the applicant for that map shall prepare a transportation performance evaluation which shall determine the specific needed improvements of each off-site arterial and related costs in order to provide adequate roadway and intersection capacity for the expected Specific Plan and General Plan buildout traffic trips. The transportation performance evaluation

shall be based on the Master Plan of Highways in effect at that time and shall be approved by the Los Angeles County Department of Public Works. The applicant shall be required to fund its fair share of improvements to these arterials, as stated on Table 4.8-18 of the Newhall Ranch Specific Plan Final EIR. The applicants total funding obligation shall be equitably distributed over the housing units and non-residential building square footage (i.e., Business Park, Visitor-Serving, Mixed-Use, and Commercial) in the Specific Plan, and shall be a fee to be paid to the County and/or the City at each building permit. For off-site areas within the County unincorporated area, the applicant may construct improvements for credit against or in lieu of paying the fee.

(3) I-5 and SR-126 in Los Angeles County

SP 4.8-7 Each future performance evaluation which shows that a future subdivision map will create significant impacts on SR-126 shall analyze the need for additional travel lanes on SR-126. If adequate lane capacity is not available at the time of subdivision, the applicant of the subdivision shall fund or construct the improvements necessary to serve the proposed increment of development. Construction or funding of any required facilities shall not preclude the applicant's ability to seek state, federal, or local funding for these facilities.

SP 4.8-8 Project-specific environmental analysis for future subdivision maps which allow construction shall comply with the requirements of the *Congestion Management Program* in effect at the time that subdivision map is filed.

SP 4.8-9 Prior to the recordation of the first subdivision map which permits construction, the applicant for that map shall prepare a transportation evaluation including all of the Specific Plan land uses which shall determine the specific improvements needed to the following intersections with SR-126 in the City of Fillmore and community of Piru in Ventura County: A, B, C, D and E Streets, Old Telegraph, Olive, Central, Santa Clara, Mountain View, El Dorado Road, and Pole Creek (Fillmore), and Main/Torrey and Center (Piru). The related costs of those intersection improvements and the project's fair share shall be estimated based upon the expected Specific Plan traffic volumes. The transportation performance evaluation shall be based on the Los Angeles *County Master Plan of Highways* in effect at that time and shall be approved by the Los Angeles County Department of Public Works. The applicant's total funding obligation shall be equitably distributed over the housing units and non-residential building square footage (i.e.,

Business Park, Visitor Center, Mixed Use, and Commercial) in the Specific Plan, and shall be a fee to be paid to the City of Fillmore and the County of Ventura at each building permit.

SP 4.8-10 The Specific Plan is responsible to construct or fund its fair-share of the intersections and interchange improvements indicated on Table 4.8-18 of the Newhall Ranch Specific Plan Final EIR. Each future transportation performance evaluation required by Mitigation 4.8-2 of the Newhall Ranch Specific Plan Final EIR which identifies a significant impact at these locations due to subdivision map-generated traffic shall address the need for additional capacity at each of these locations. If adequate capacity is not available at the time of subdivision map recordation, the performance evaluation shall determine the improvements necessary to carry Specific Plan generated traffic, as well as the fair share cost to construct such improvements. If the future subdivision is conditioned to construct a phase of improvements which results in an overpayment of the fair-share cost of the improvement, then an appropriate adjustment (offset) to the fees paid to Los Angeles County and/or City of Santa Clarita pursuant to Mitigation Measure 4.8-6 above shall be made.

SP 4.8-11 The applicant of the Newhall Ranch Specific Plan shall participate in an I-5 developer fee program, if adopted by the Board of Supervisors for the Santa Clarita Valley.

SP 4.8-12 The applicant of the Newhall Ranch Specific Plan shall participate in a transit fee program, if adopted for the entire Santa Clarita Valley by Los Angeles County and City of Santa Clarita.

SP 4.8-13 Prior to the approval of each subdivision map which permits construction, the applicant for that map shall prepare a traffic analysis approved by the Los Angeles County Department of Public Works. The analysis will assess project and cumulative development (including an existing plus cumulative development scenario under the County's Traffic Impact Analysis Report Guidelines (TIA) and its Development Monitoring System (DMS)). In response to the traffic analysis, the applicant may construct off-site traffic improvements for credit against, or in lieu of paying, the mitigation fees described in Mitigation Measure 4.8-6 of the Newhall Ranch Specific Plan Final EIR. If future subdivision maps are developed in phases, a traffic study for each phase of the subdivision map may be submitted to determine the improvements needed to be constructed with that phase of development.

WESTSIDE SANTA CLARITA VALLEY

Phasing Analysis for the City of Santa Clarita

July 2006

AUSTIN-FOUST ASSOCIATES, INC.

WESTSIDE SANTA CLARITA VALLEY
Phasing Analysis for the City of Santa Clarita

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July 10, 2006

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WESTSIDE SANTA CLARITA VALLEY
Phasing Analysis for the City of Santa Clarita

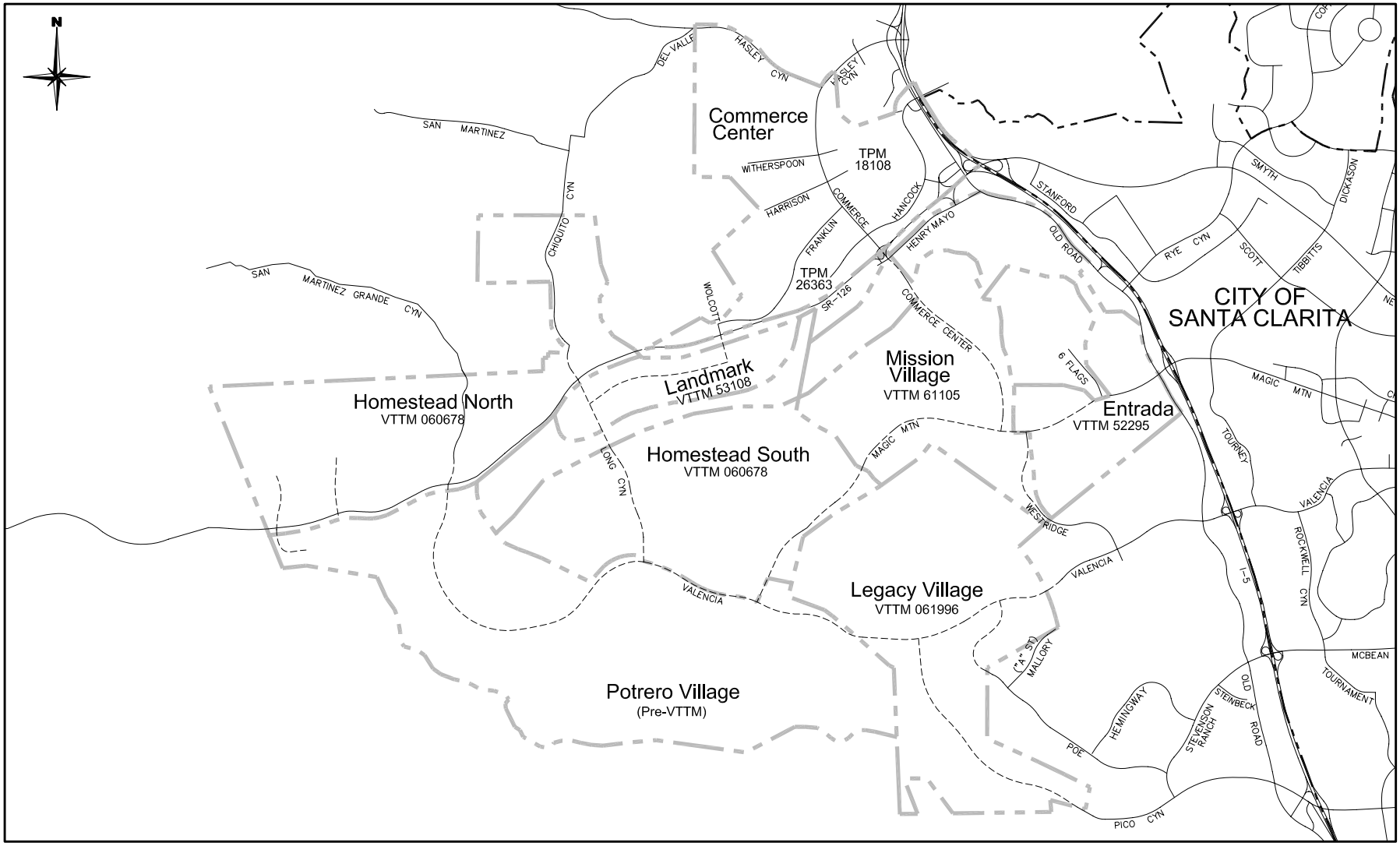
The purpose of this analysis is to outline the phased construction of new roadways within the Westside area of the Santa Clarita Valley (unincorporated Los Angeles County) and to identify needed roadway and intersection improvements within the City of Santa Clarita. Traffic volume forecasts are presented and are utilized to evaluate the proposed phasing plan, evaluate the performance of City intersections, and to calculate fair-share percentages on City roadways for the Westside projects.

1.0 BACKGROUND

The Westside of the Santa Clarita Valley is defined for the purpose of this analysis as the general area west of the Interstate 5 freeway, north of the existing Stevenson Ranch area, south of the Hasley Canyon/Val Verde area, and east of the Ventura County line, as depicted in Figure 1. It includes the Newhall Ranch Specific Plan area and the entire area is generally under a single ownership. The Newhall Ranch Specific Plan along with Entrada, Legacy Village and the buildout of the Commerce Center represent all the projects that will build out this area over the next 25 years. In this portion of the valley, the I-5 freeway represents the jurisdictional boundary between the unincorporated Westside area and The City of Santa Clarita.

As the land development occurs, new roadway infrastructure will be constructed to serve the Westside area. New highways, which include three bridge crossings of the Santa Clara River, as well as extensions of existing highways such as Magic Mountain Parkway, Valencia Boulevard, Pico Canyon Road, and Commerce Center Drive, will provide the backbone highway system for the Westside.

As development occurs on the Westside, the City of Santa Clarita will likewise be experiencing growth within its boundaries. Multiple future roadways are planned to be constructed as identified in the City's General Plan Circulation Element. These roadways, which are listed in Table 1, have previously been identified as needed to accommodate the buildout of the Santa Clarita Valley, including the planned development in the Westside area.



Legend

- Westside Planning Area Boundaries
- Existing Roadway
- Future Roadway
- City Boundary

Figure 1

WESTSIDE PROJECT AREA

Table 1: Future Roadways within the City of Santa Clarita

Roadway	Location	Interim Year	Long-Range Buildout
Cross Valley Connector (Newhall Ranch Road)	1) Between I-5 and Rye Canyon Road 2) Between Bouquet Canyon Road and Soledad Canyon Rd	X X	X X
Golden Valley Road	Between Newhall Ranch Road and Plum Canyon Road	X	X
Santa Clarita Parkway	Between Bouquet Canyon Road and Sierra Highway		X
Via Princessa	Between Claibourne Lane and Sheldon Avenue	X	X
Magic Mountain Parkway	Between Bouquet Canyon Road and Via Princessa	X	X
Dockweiler Drive	Between San Fernando Road and Valle Del Oro	X	X
Avenue Tibbitts	Between Avenue Hopkins and Magic Mountain Parkway (including a bridge over the Santa Clara River)		X

Sources: City of Santa Clarita General Plan Circulation Element (Long-Range Buildout)
SCVCTM Interim Year Model (Interim Year)

Table includes all future City roadways within five to six miles of the Westside area.
See Section 2.0 for definitions of Interim Year and Long-range Buildout.

2.0 METHODOLOGY

The timing and order of roadway construction within the Westside is primarily based on the land development of the areas served by the roads. A draft master land use phasing plan has been prepared by the land owner for use with this analysis, and the plan provides the basis for the trip generation characteristics (amount and location) within the area being studied.

Several milestone years are modeled using versions of the Santa Clarita Valley Consolidated Traffic Model (SCVCTM) specially prepared for this analysis. These horizon years start around 2011 and continue through 2030. Detailed land use projections for the Westside area are utilized for the trip generation estimates for each of the horizon years. Outside the Westside area, including the entirety of the City of Santa Clarita, trip generation estimates are interpolated using the SCVCTM Interim Year setting and Long-range Buildout/Cumulative setting as the basis for the interpolation.

The SCVCTM, which is the City's primary tool for evaluating future traffic conditions, has a detailed land use and roadway database for two future year scenarios. The first of these, referred to as the Interim Year setting, includes all approved and proposed/pending land development projects. It also

includes new roadway construction to the extent of what has been identified as necessary to support the land development projects included in the Interim Year setting. The Interim Year is generally considered a year 2015 horizon based on conservative development scenarios. The Long-range Buildout/Cumulative scenario represents buildout of the City as envisioned by the current General Plan as well as pending General Plan amendments.

As noted above, the phasing analysis for the Westside areas starts with a 2011 horizon year and continues through buildout. For the Westside area, detailed land use databases were prepared for all horizon years, including 2011, 2012 and 2014, which occur before the model's Interim Year horizon. Since the timing of development projects within the City is less certain, a conservative approach was applied in which the Interim Year database was utilized for each of these first three horizon years for the non-Westside areas. Beginning with the 2018 horizon year, trip generation for areas outside of the Westside was interpolated between the Interim Year model and the Long-range Buildout/Cumulative model.

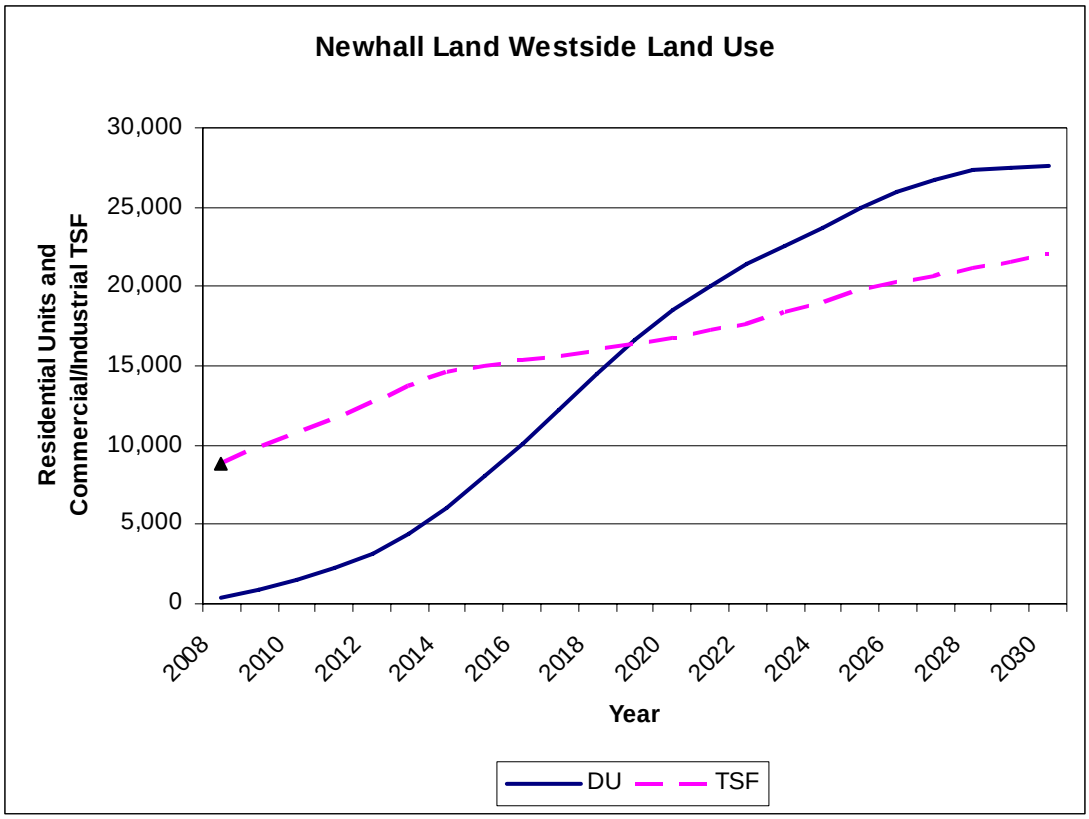
Figure 2 illustrates how the land use for the Westside area is projected to increase over time. Also shown in the figure is the corresponding trip generation for the same time period. Note that the Westside area as used in this analysis includes the Commerce Center, which accounts for the majority of the non-residential development of the initial years of the land use plan.

Figure 3 provides the corresponding information for the non-Westside portion of the Santa Clarita Valley. Details of the land use projections for the Westside area are provided in the following section.

3.0 WESTSIDE LAND USE

With the exception of the Commerce Center area, the existing condition of the Westside area is largely undeveloped. A summary of the Westside land use by development area is provided in Table 2, which shows the estimated dates for first occupancy and buildout.

Table 3 provides a summary of occupancy projections for the Westside area. Detailed land use and trip generation estimates for each planning area are provided in Appendix A for each of the horizon years selected for analysis.



▲Initial 9 MSF includes the existing Commerce Center plus estimated Commerce Center occupancies through 2008.

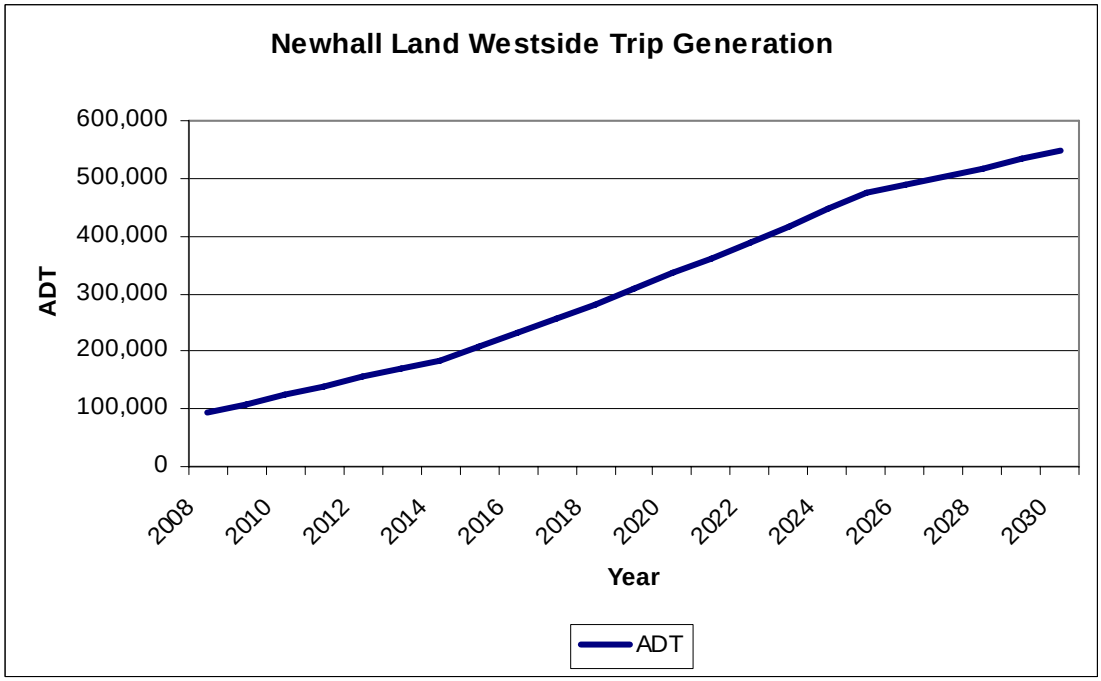
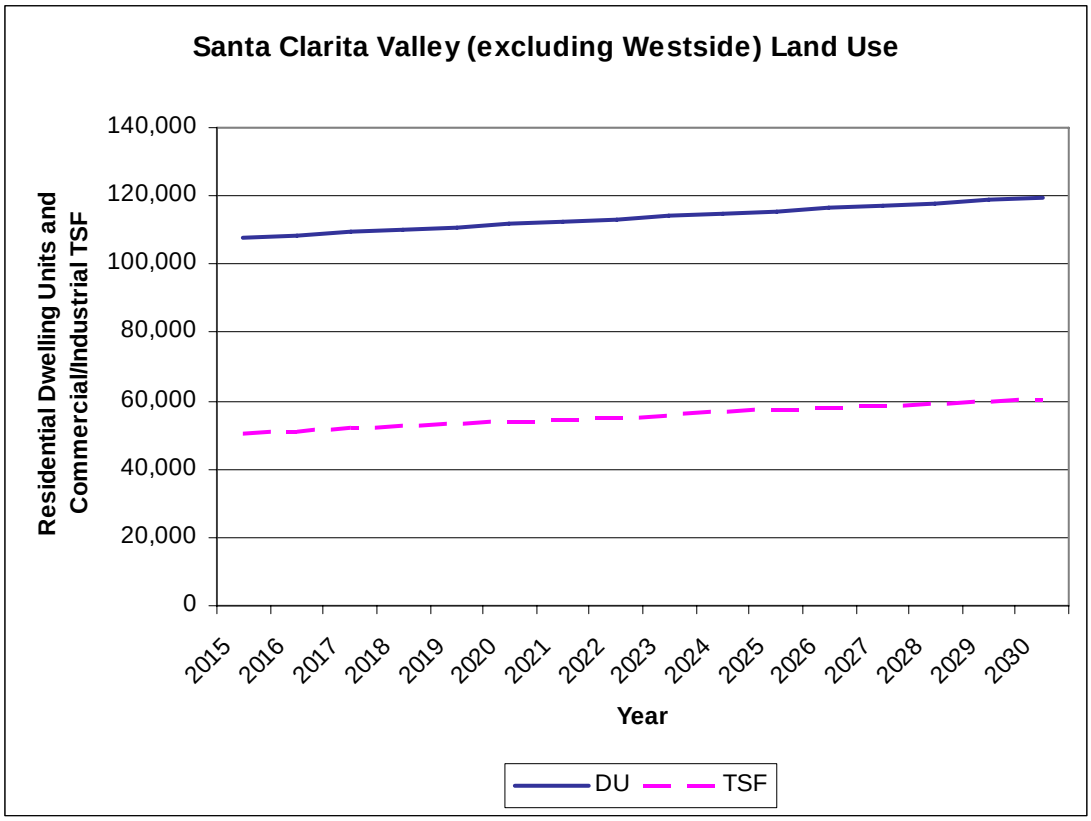


Figure 2: Westside Land Use and ADT Growth Trends



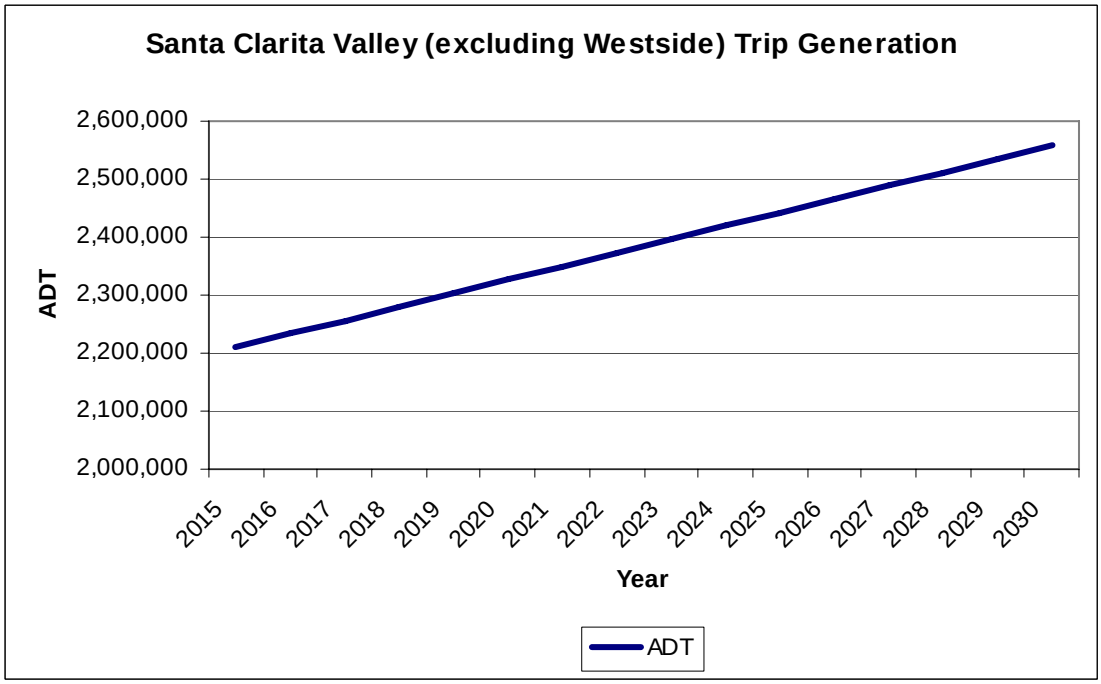


Figure 3: Santa Clarita Valley (excluding Westside) Growth Trends

Table 2: Westside Land Use by Development Area

Area/Land Use	Amount	First Occupancy	Buildout
LANDMARK VILLAGE (NEWHALL RANCH)			
Residential	1,444 DU	2008	2011
Commercial	1,033 TSF	2008	2011
MISSION VILLAGE (NEWHALL RANCH)			
Residential	5,331 DU	2009	2023
Commercial	1,299 TSF	2009	2023
HOMESTEAD (NEWHALL RANCH)			
Residential	5,686 DU	2011	2025
Commercial	1,330 TSF	2023	2030
ENTRADA			
Residential	3,230 DU	2011	2019
Commercial	3,285 TSF[1]	2008	2030
Hotel	300 Room	2023	2023
LEGACY VILLAGE (STEVENSON RANCH)			
Residential	3,500 DU	2012	2020
Commercial	375 TSF	2019	2022
POTRERO VILLAGE (NEWHALL RANCH)			
Residential	8,424 DU	2013	2030
Commercial	1,257 TSF[2]	2019	2030
COMMERCE CENTER			
Commercial	13,100 TSF[3,4]	existing	2014
TOTAL			
Residential	27,615 DU	2008	2030
Commercial	21,679 TSF	existing	2030
Hotel	300 Room	2023	2023

[1]VTTM 52295 only. Excludes other development by others that is part of the same traffic analysis zone.
[2]Excludes water reclamation plant.
[3]Includes existing development in the Commerce Center.
[4]Sterling Project (approximately 1.3 MSF) is not included in the above total but traffic forecasts include full occupancy of the Sterling site by 2014.

Table 3: Westside Area Occupancy Projections

	2008-2011		2012		2013-2014		2015-2018		2019-2022		2023-2025		2026-2030	
Location	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***	**DU**	***MSF***
Landmark Village	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*	1,444	*1.03*
Mission Village	531	*.29*	932	*.29*	1,874	*.31*	3,930	*.64*	5,297	*.96*	5,331	*1.30*	5,331	*1.30*
Homestead (No.)	--	--	--	--	--	--	--	--	479	--	1,779	*.60*	1,779	*1.33*
Homestead (So.)	112	--	312	--	851	--	2,289	--	3,907	--	3,907	--	3,907	--
Potrero Village	--	--	--	--	114	--	1,169	--	3,516	*.50*	5,810	*.90*	8,424	*1.36*
Legacy Village	--	--	97	--	597	--	2,586	--	3,500	*.38*	3,500	*.38*	3,500	*.38*
Entrada	150	*.43*[1]	391	*.43*	1,186	*.43*	3,097	*1.23*	3,230	*1.68*	3,230	*2.47*	3,230	*3.58*
Commerce Center	--	*10.46*[2]	--	*11.42*	--	*13.10*	--	*13.10*	--	*13.10*	--	*13.10*	--	*13.10*
Total	2,237	*12.21*	3,176	*13.17*	6,066	*14.87*	14,515	*16.00*	21,373	*17.65*	25,001	*19.78*	27,615	*22.08*
Net Increase from Previous Period	--	--	939	*.96*	2,890	*1.70*	8,449	*1.13*	6,858	*1.65*	3,628	*2.13*	2,614	*2.30*

[1]Includes existing Castaic Junction area development and anticipated occupancies between existing and 2011.
[2]Includes existing Commerce Center development and anticipated occupancies between existing and 2011.

4.0 WESTSIDE ROADWAY PHASING PLAN

A master phasing plan for Westside area roadways has been developed to serve the areas listed in the previous section. A total of seven distinct stages have been identified and are illustrated in Figure 4 through Figure 10.

The figures are organized such that roadway construction is identified by the years in which the construction needs to take place, which will tie in with the issuance of Certificates of Occupancy.

Completing the roadway construction by the years indicated will serve the land use plan as currently envisioned for that year and the years immediately following, after which additional infrastructure will be needed to serve additional development. Therefore, the infrastructure shown in each stage of construction will accommodate the land use development that will be occurring while the next stage of new roadways are being constructed. A description of each roadway construction stage, the estimated completion dates for the construction, and the amount of development that can be supported by that stage, is provided in Table 4.

The following section presents traffic model forecasts for the key stages of the phasing plan.

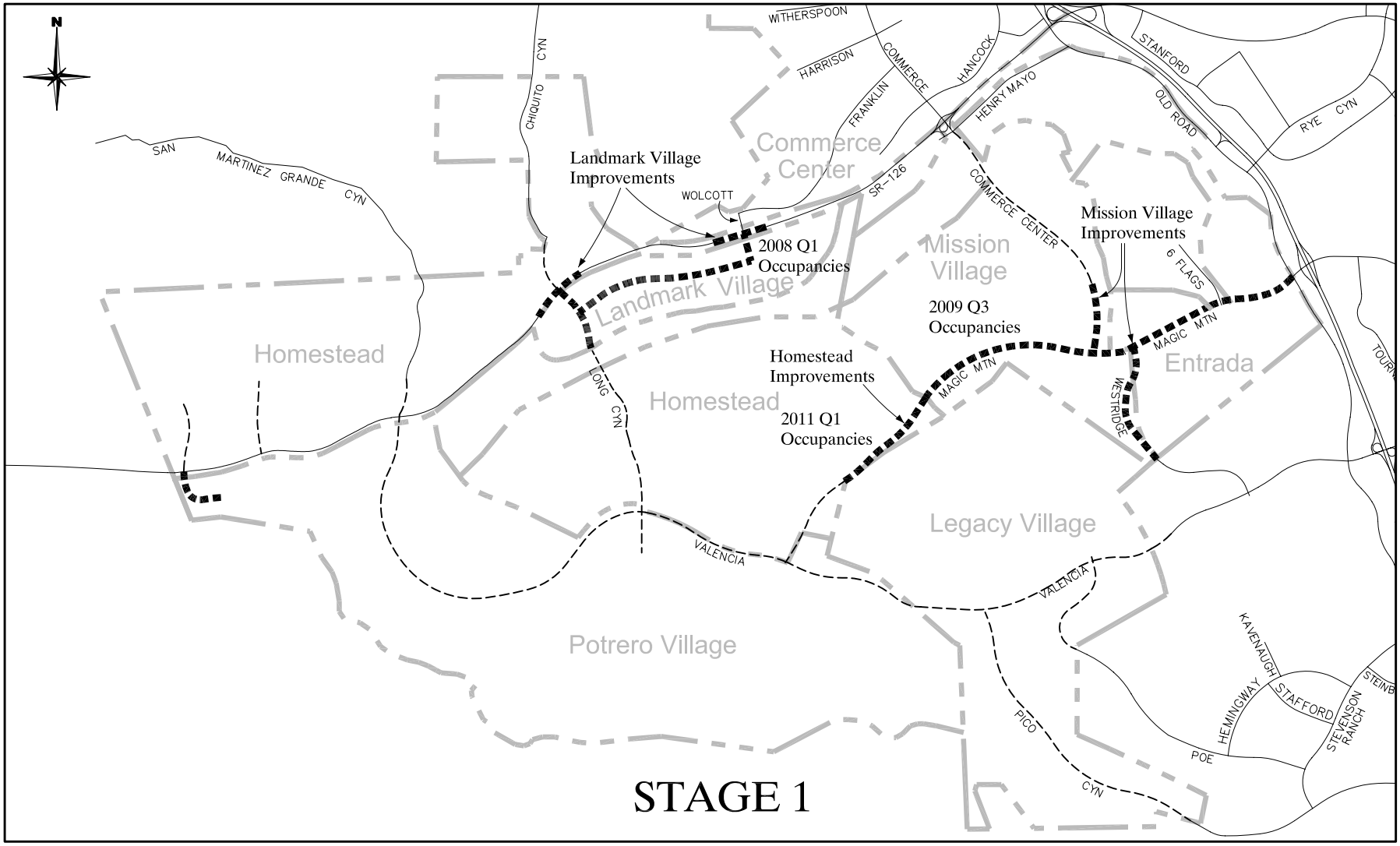
5.0 TRAFFIC FORECASTS BY PHASE

Key roadway construction stages have been modeled using the corresponding amount of land use development to be supported by the new roadways. Figures illustrate the Average Daily Traffic (ADT) volumes and the corresponding amounts of Westside land use development for each of the following scenarios:

- Year 2011 with Stage 1 Roadways (Figure 11 & Figure 12)
- Year 2012 with Stage 2 Roadways (Figure 13 & Figure 14)
- Year 2014 with Stage 3 Roadways (Figure 15 & Figure 16)
- Year 2018 with Stage 4 Roadways (Figure 17 & Figure 18)
- Year 2022 with Stage 5 Roadways (Figure 19 & Figure 20)
- Year 2025 with Stage 6 Roadways (Figure 21 & Figure 22)
- Year 2030 with Stage 6[1] Roadways (Figure 23 & Figure 24)

text continued on Page 32

[1] Year 2030 with Stage 7 Roadways (buildout conditions) was evaluated as part of the Newhall Ranch Specific Plan EIR.

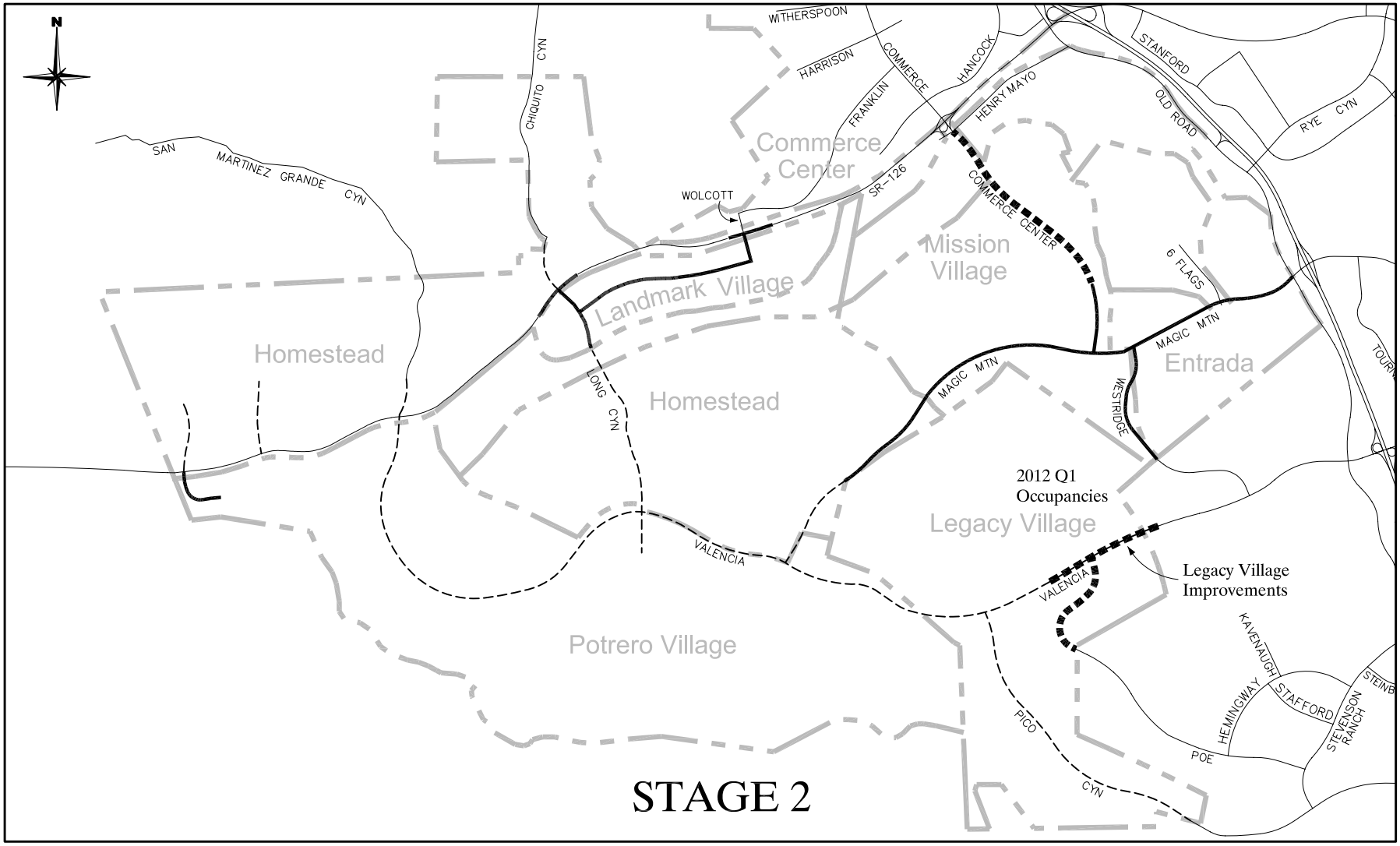


Legend

Construction This Stage
Planned Roadway (Future Stage)

Figure 4

STAGE 1 ROADWAY CONSTRUCTION (2007-2010) - FOR OCCUPANCIES THROUGH 2,240 DU/12.2 MSF (2011)

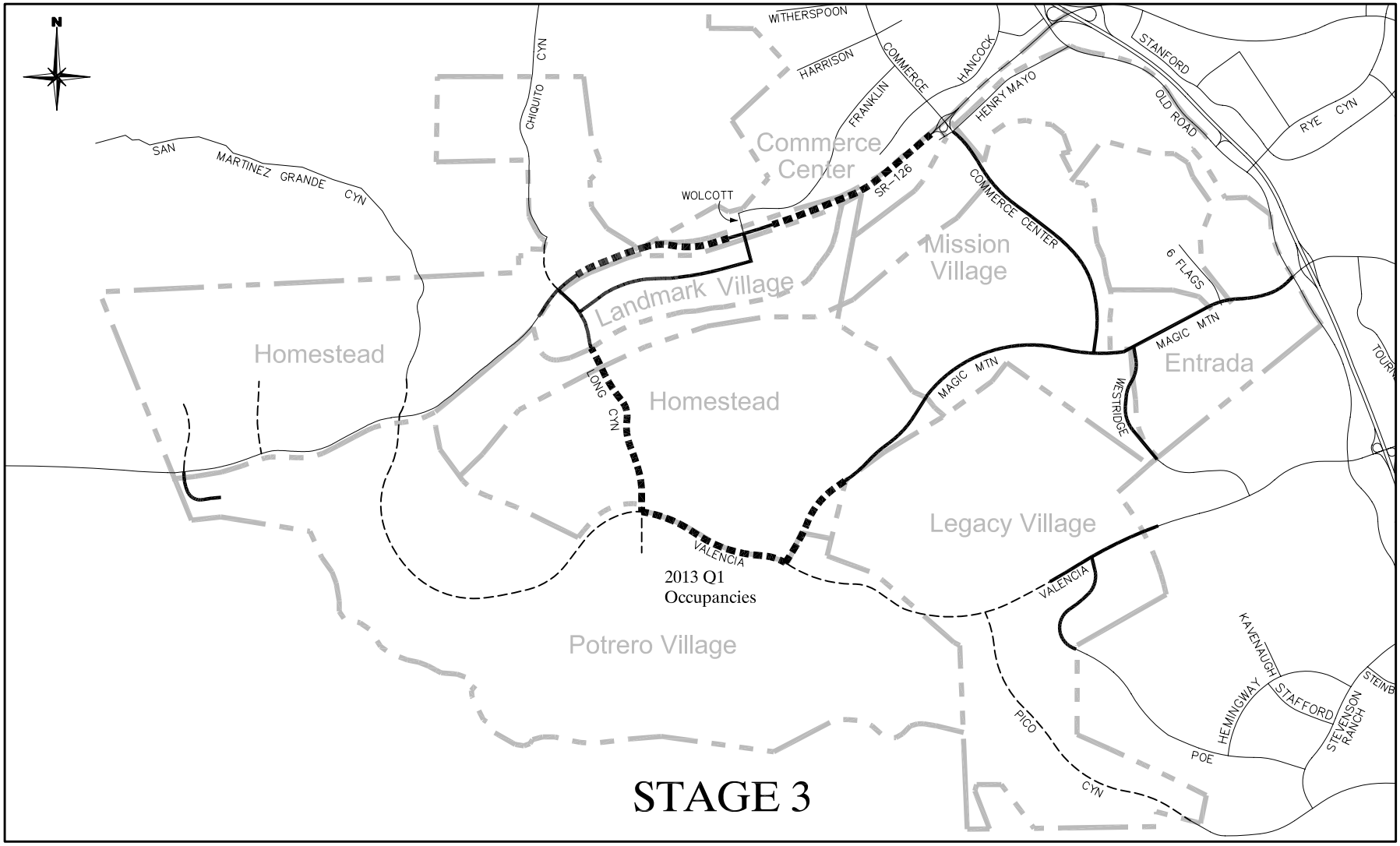


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 5

STAGE 2 ROADWAY CONSTRUCTION (2010-2011) - FOR OCCUPANCIES THROUGH 3,180 DU/13.2 MSF (2012)

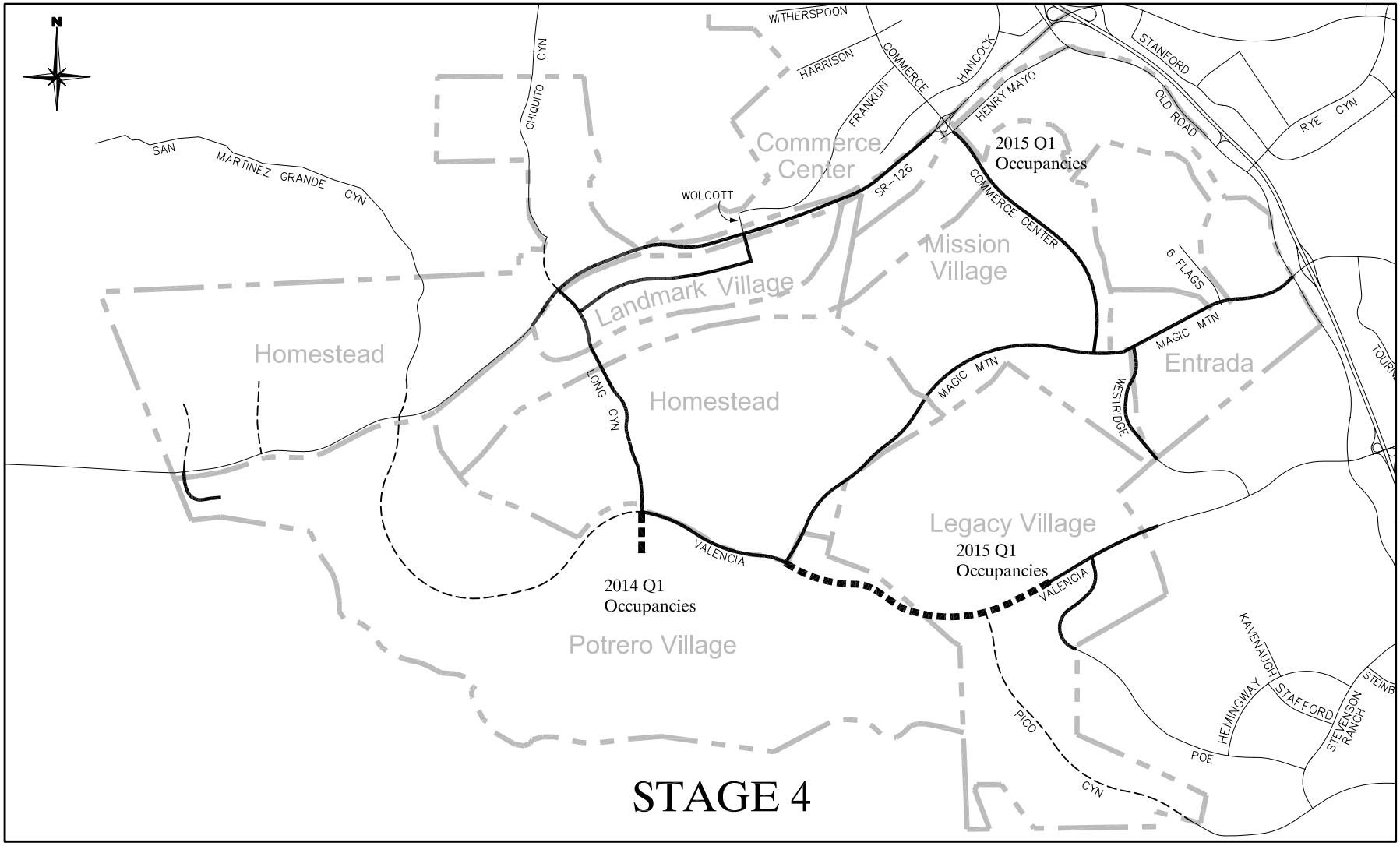


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 6

STAGE 3 ROADWAY CONSTRUCTION (2012) - FOR OCCUPANCIES THROUGH 6,070 DU/14.9 MSF (2014)

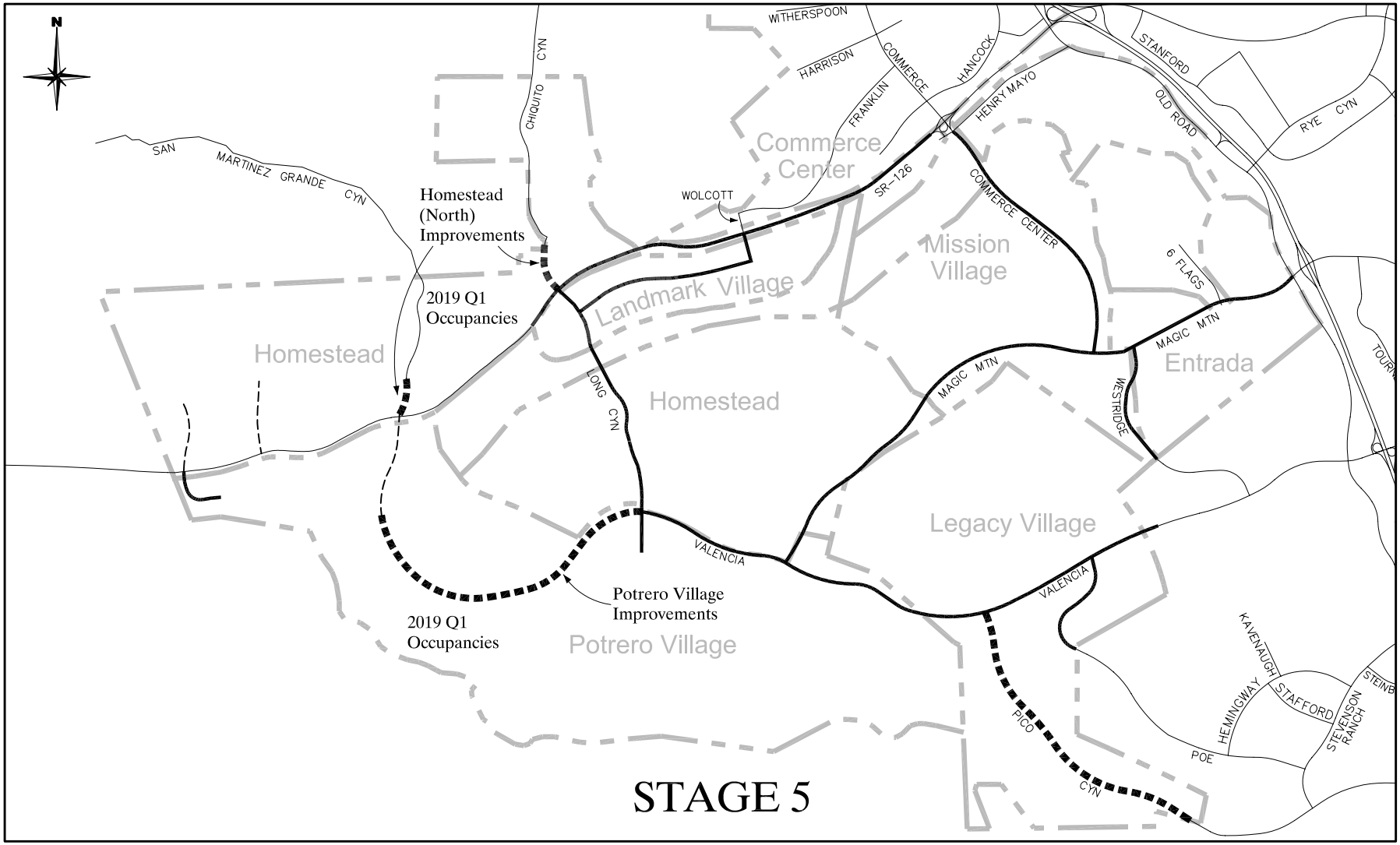


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 7

STAGE 4 ROADWAY CONSTRUCTION (2013-2014) - FOR OCCUPANCIES THROUGH 14,520 DU/16.0 MSF (2018)

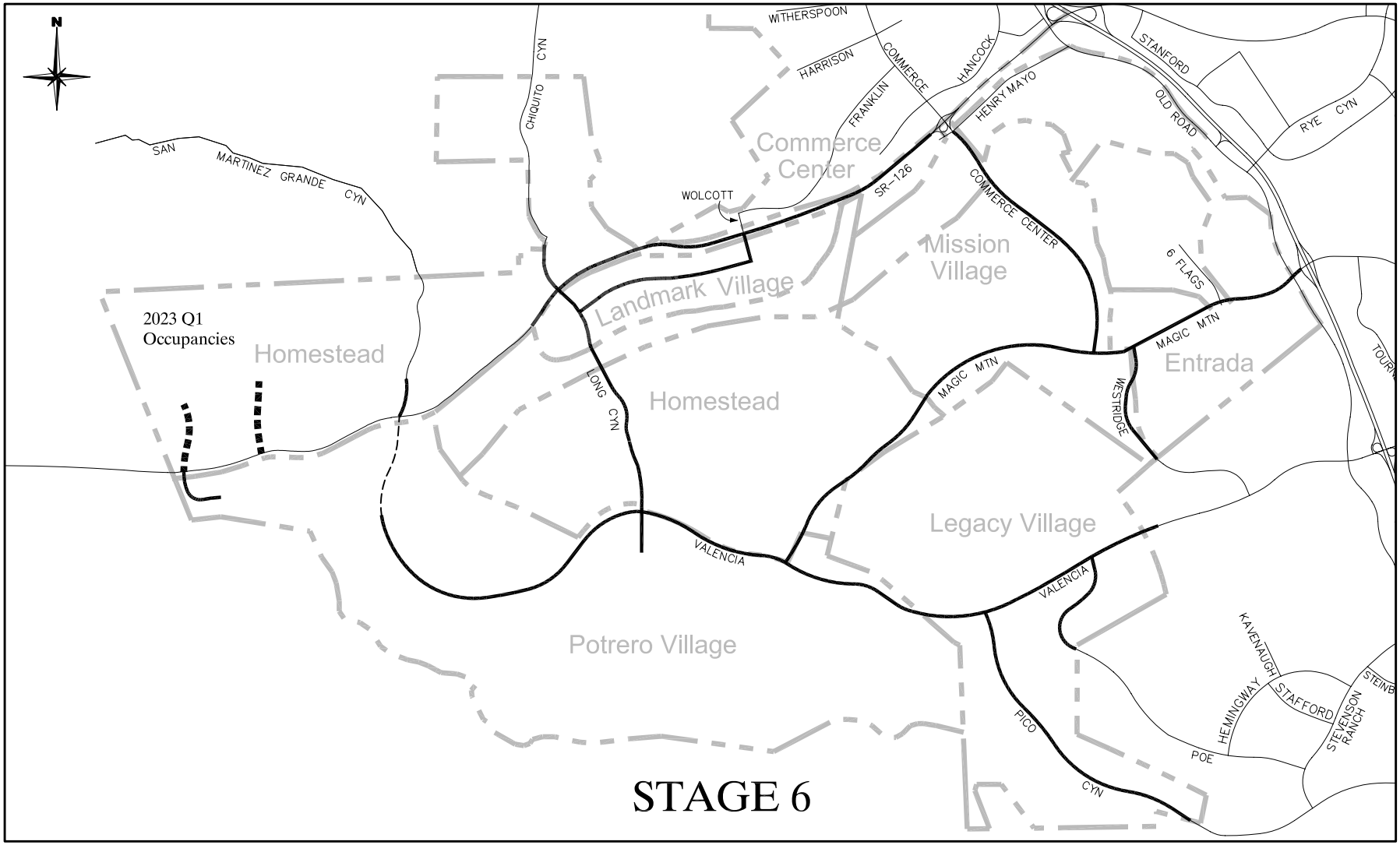


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 8

STAGE 5 ROADWAY CONSTRUCTION (2015-2018) - FOR OCCUPANCIES THROUGH 21,380 DU/17.7 MSF (2022)

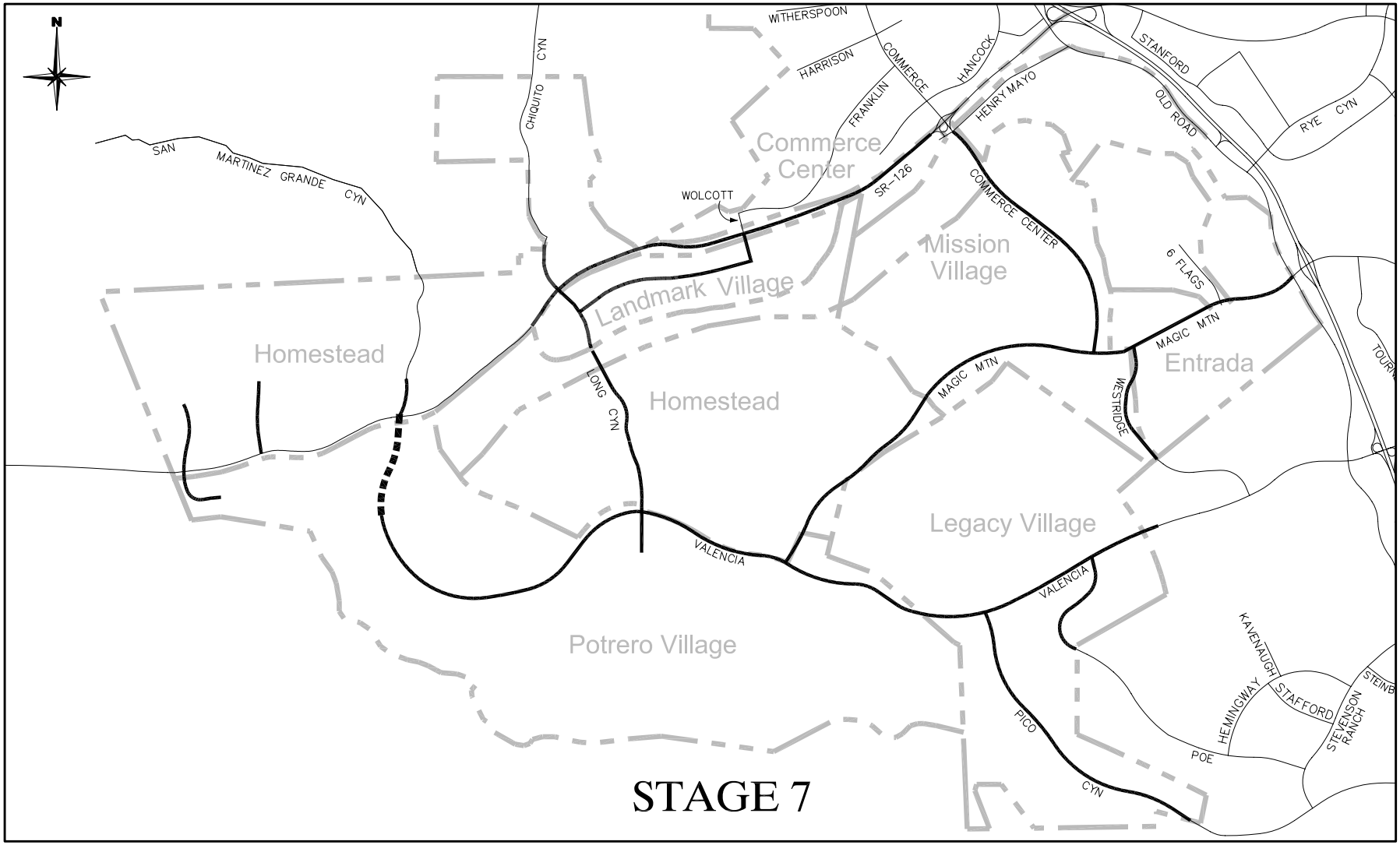


Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 9

STAGE 6 ROADWAY CONSTRUCTION (2019 - 2022) - FOR OCCUPANCIES THROUGH 25,000 DU/19.8 MSF (2025)



Legend

- Construction This Stage
- Constructed Previous Stage
- Planned Roadway (Future Stage)

Figure 10

STAGE 7 ROADWAY CONSTRUCTION (2023-2030) - FOR OCCUPANCIES THROUGH 27,620 DU/22.1 MSF (PROJECT BUILDOUT)

Table 4: Westside Roadway Construction Stages

Stage	Description	Completion Date	Max DU	Max MSF
1	Construct access to Landmark Village from SR-126 Construct access to Water Treatment Plant from SR-126 Extend Magic Mountain Parkway into Mission Village Extend Westridge Parkway to Magic Mountain Parkway Extend Magic Mountain Parkway into Homestead	End of 2007 End of 2007 Mid 2009 Mid 2009 End of 2010	2,237	12.21
2	Construct Commerce Center Drive Bridge/connect Mission Village to SR-126 Extend Valencia Boulevard into Legacy Village Extend Poe Parkway to Valencia Boulevard	End of 2011 End of 2011 End of 2011	3,176	13.17
3	Extend Magic Mountain Parkway into Potrero Village Construct segments of Potrero Canyon Road & Long Canyon Road Construct Long Canyon Road Bridge/connect Homestead (South) to SR-126 Widen SR-126 to 8-lanes between Commerce Center Drive and Long Canyon Road	End of 2012 End of 2012 End of 2012 End of 2012	6,066	14.87
4	Extend Valencia Boulevard to Potrero Village/Magic Mountain Parkway	End of 2014	14,515	16.00
5	Construct Potrero Canyon Road west of Long Canyon Road Construct access to Homestead (North) from SR-126 at Long Canyon Road and at San Martinez Grande Canyon Road Extend Pico Canyon Road to Valencia Boulevard	End of 2018 End of 2018 End of 2018	21,373	17.65
6	Construct access to Homestead (North) from SR-126 at County Line	End of 2022	25,001	19.78
7	Construct Potrero Canyon Road Bridge	2030	27,615	22.08

DU = Dwelling Units
MSF = Million Square Feet (non-residential uses)
Max = Maximum amount of land use to be supported by Stage

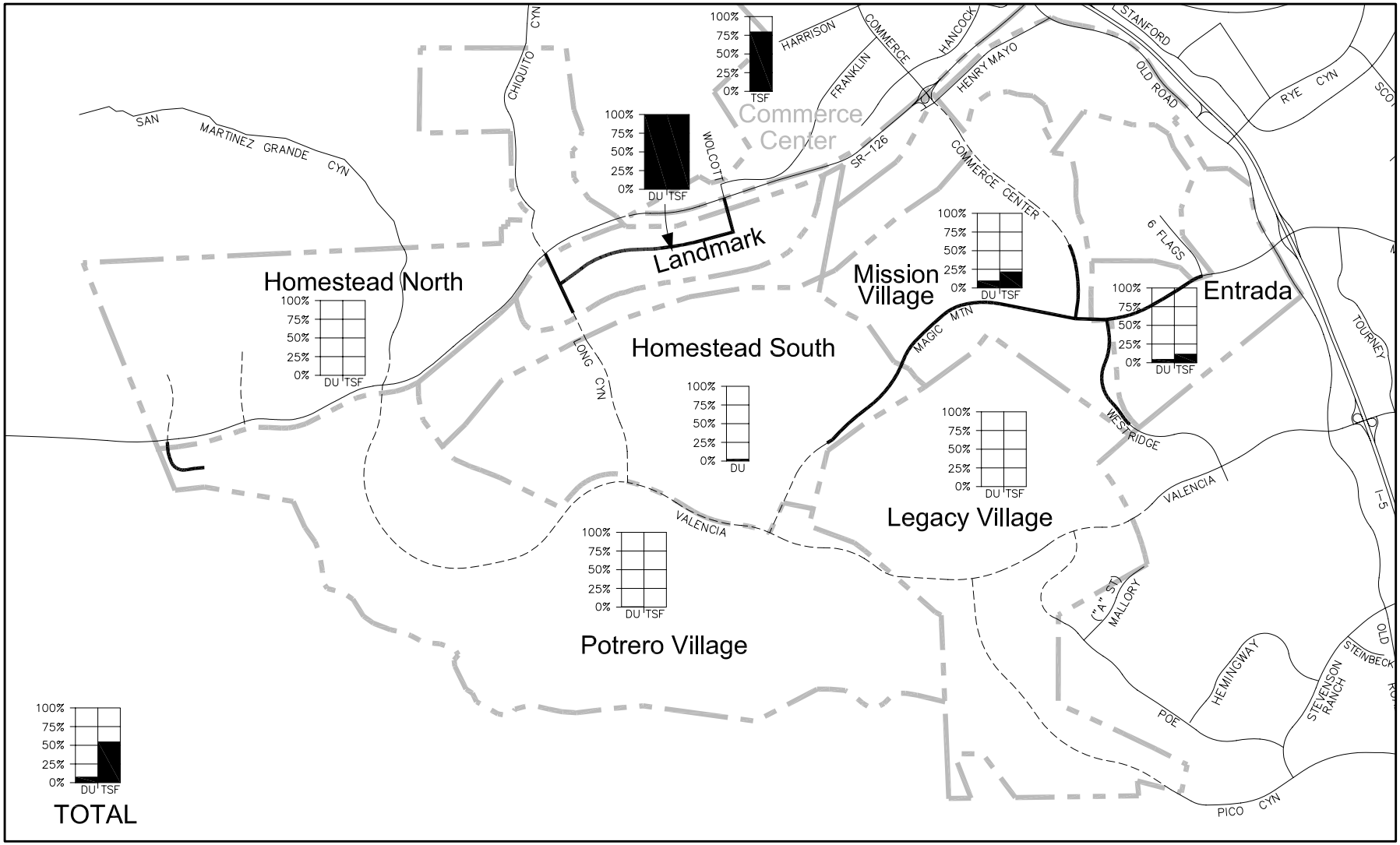
Legend

New Westside Roadway

Future Westside Roadway

Figure 11

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2011



Legend

Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 12

PROJECT DEVELOPMENT BY PLANNING AREA -2011

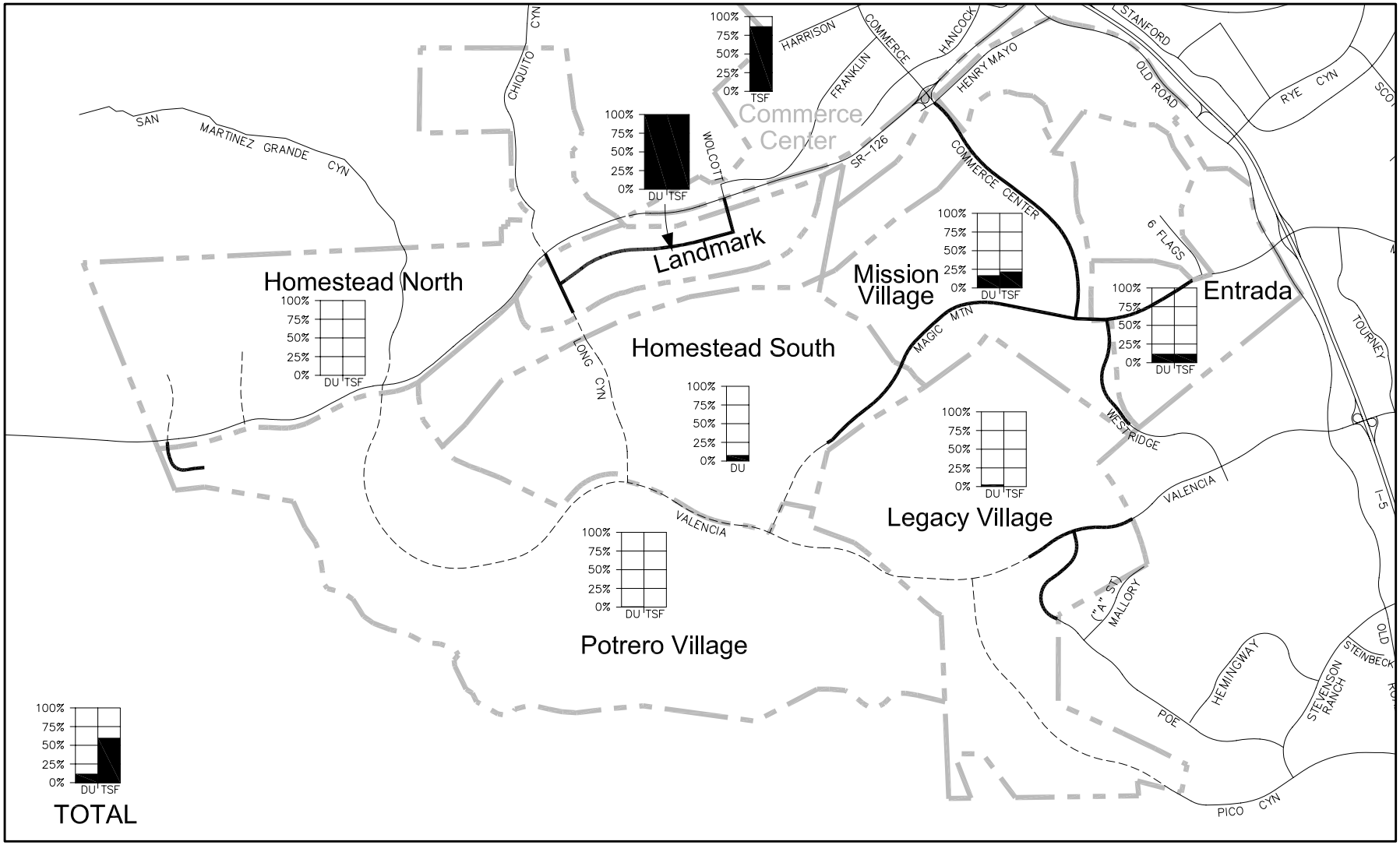
Legend

New Westside Roadway

Future Westside Roadway

Figure 13

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2012



Legend

Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 14

PROJECT DEVELOPMENT BY PLANNING AREA -2012

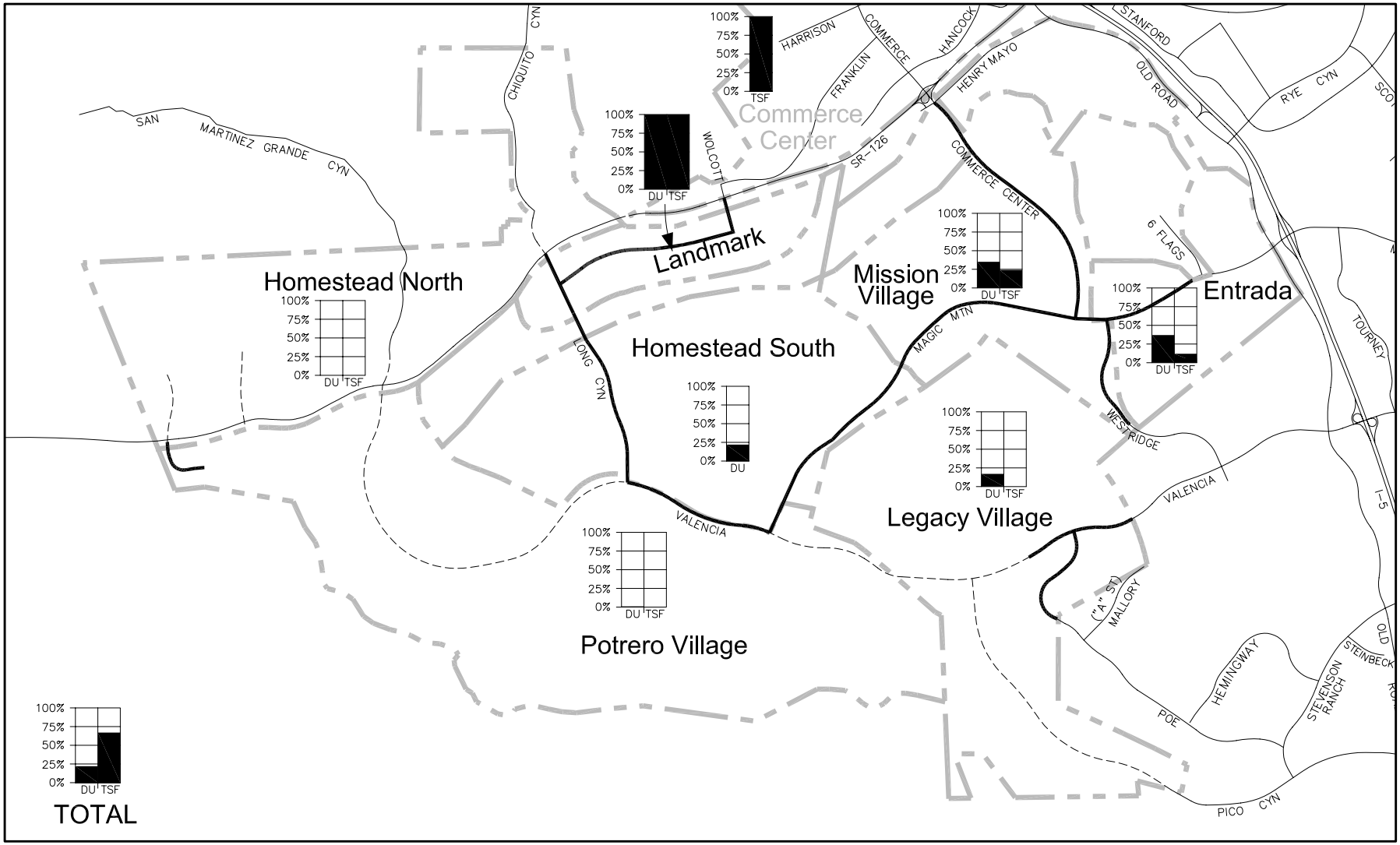
Legend

New Westside Roadway

Future Westside Roadway

Figure 15

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2014



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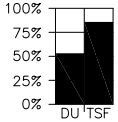


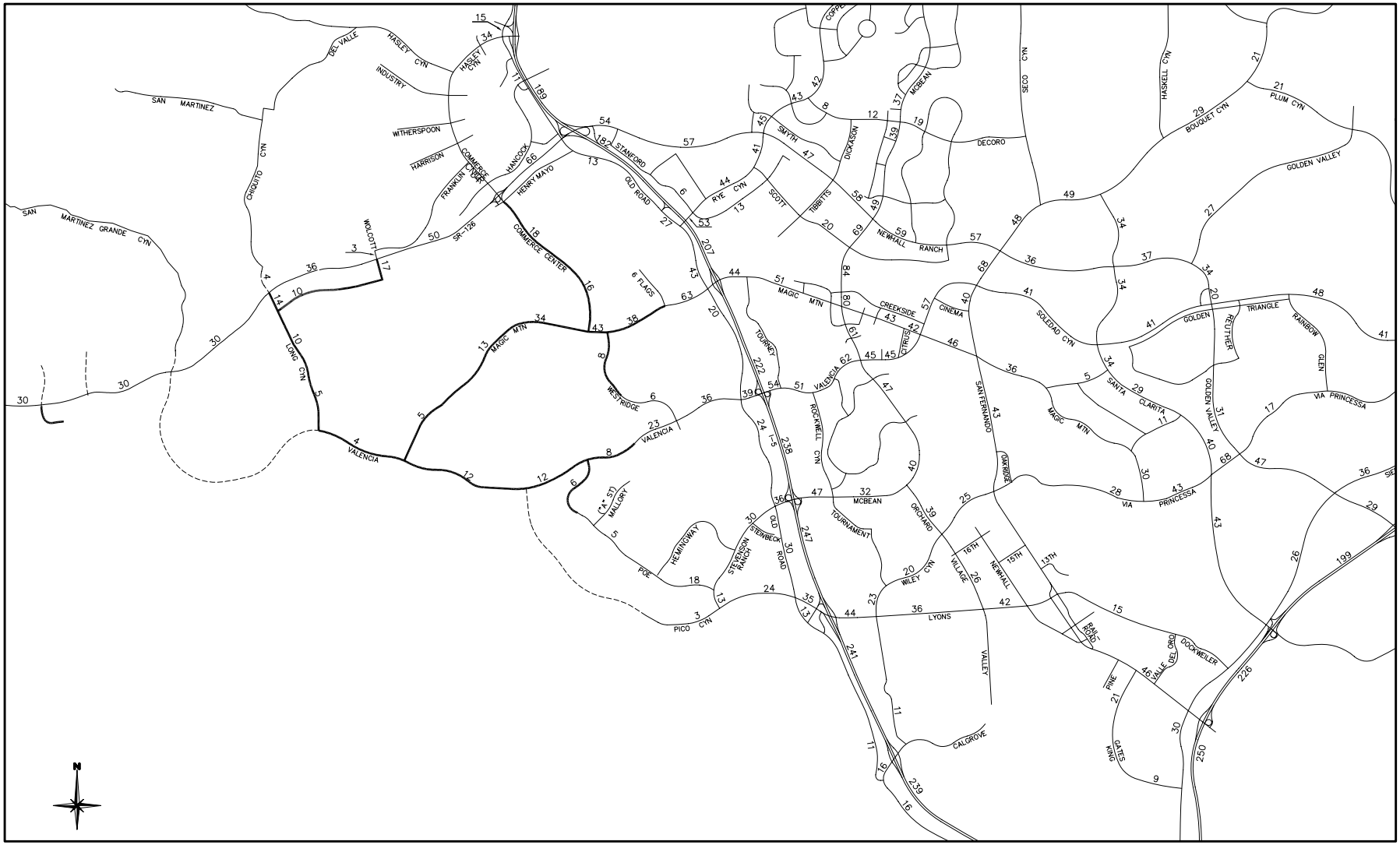
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 16

PROJECT DEVELOPMENT BY PLANNING AREA -2014



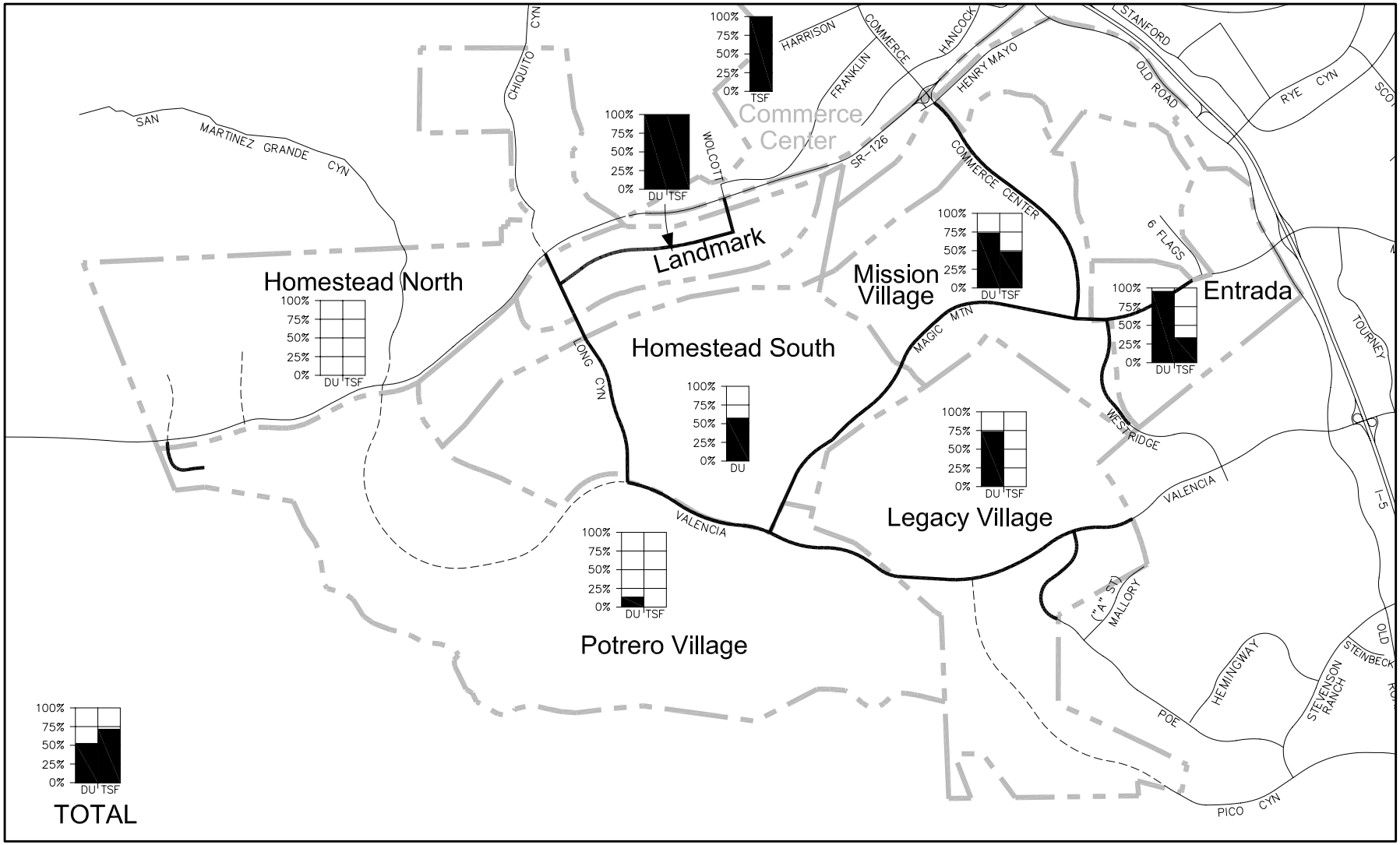
Legend

New Westside Roadway

Future Westside Roadway

Figure 17

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2018



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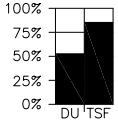


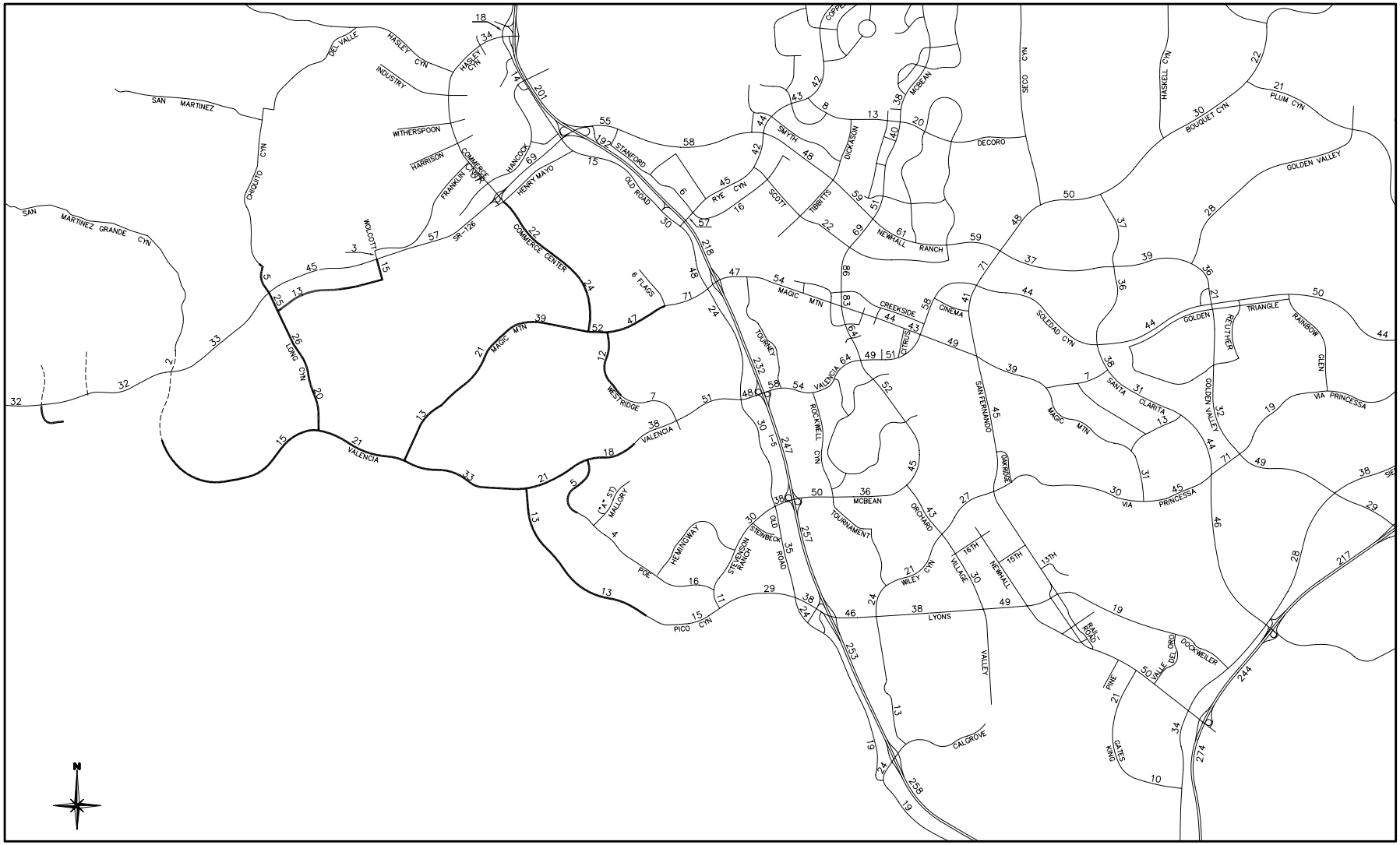
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 18

PROJECT DEVELOPMENT BY PLANNING AREA -2018

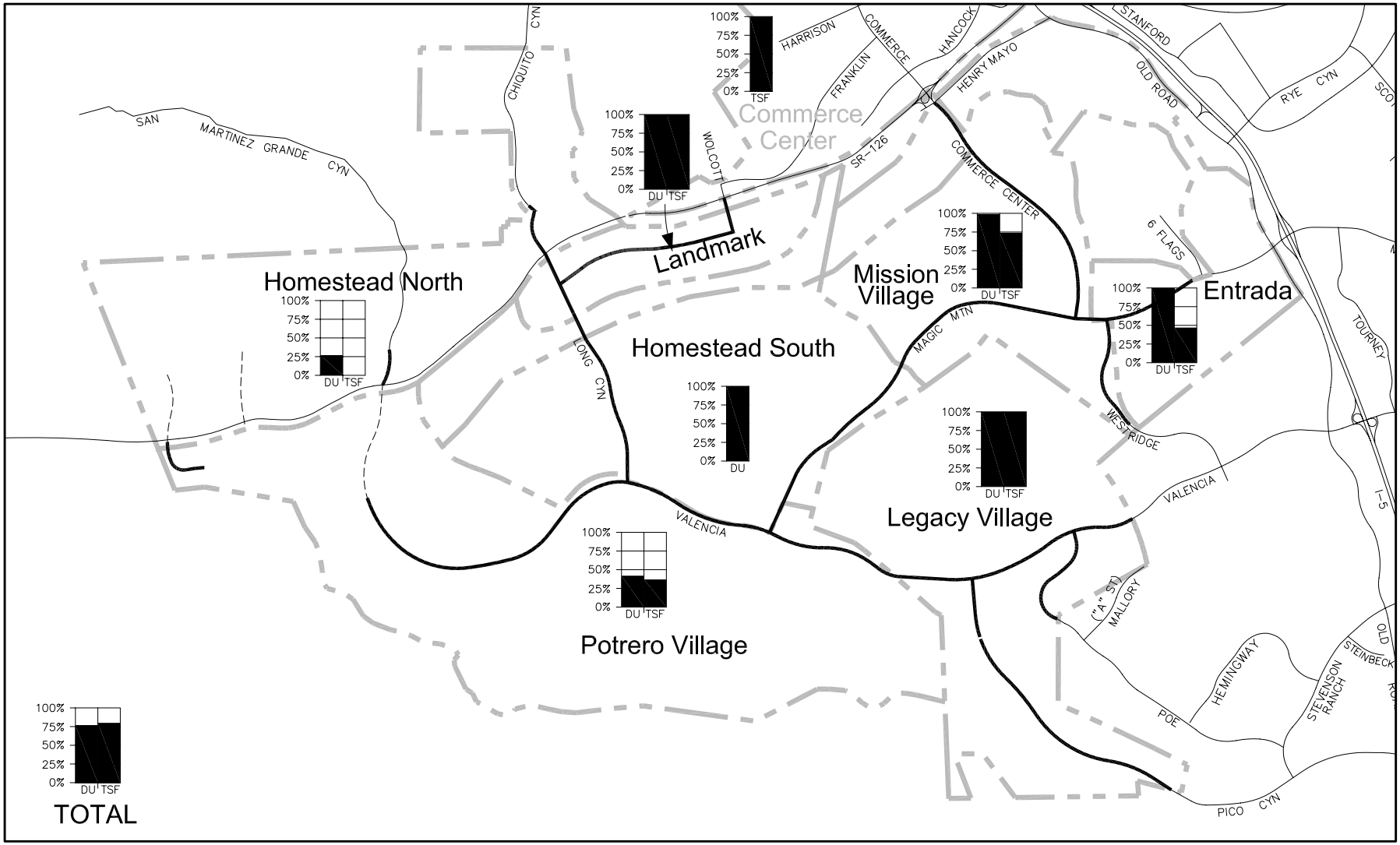


Legend

New Westside Roadway
Future Westside Roadway

Figure 19

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2022



Legend

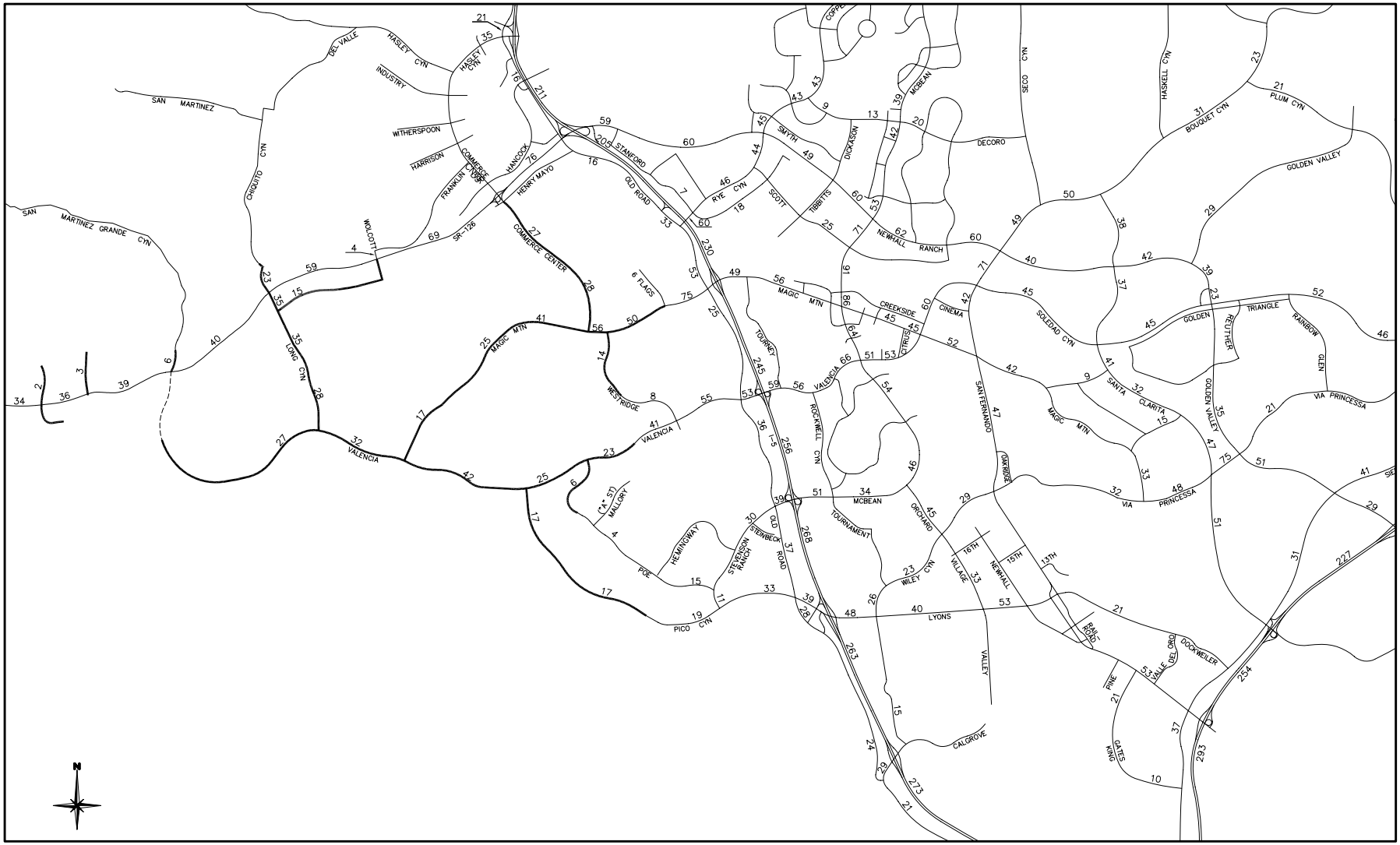
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 20

PROJECT DEVELOPMENT BY PLANNING AREA -2022



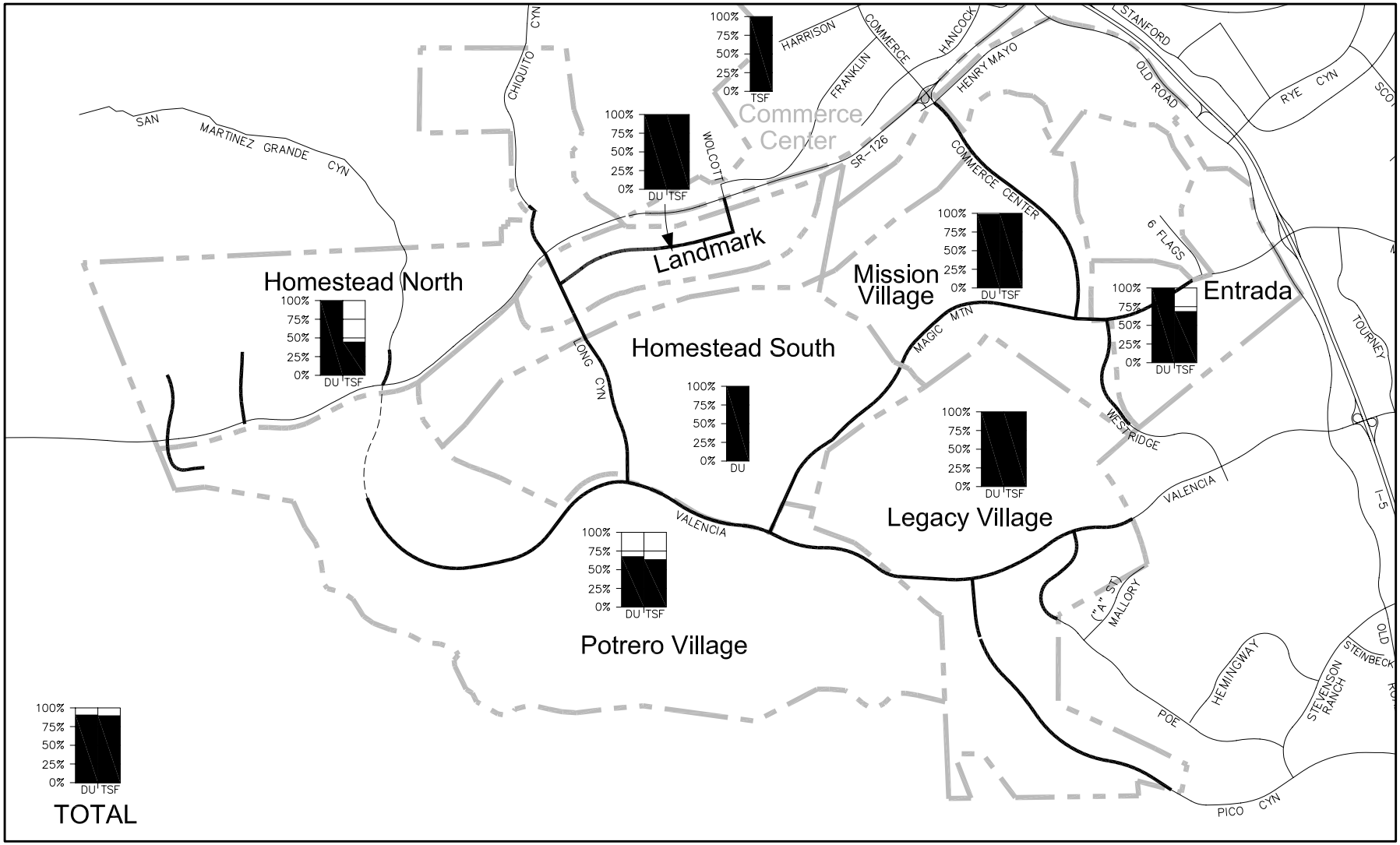
Legend

New Westside Roadway

Future Westside Roadway

Figure 21

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2025



Legend

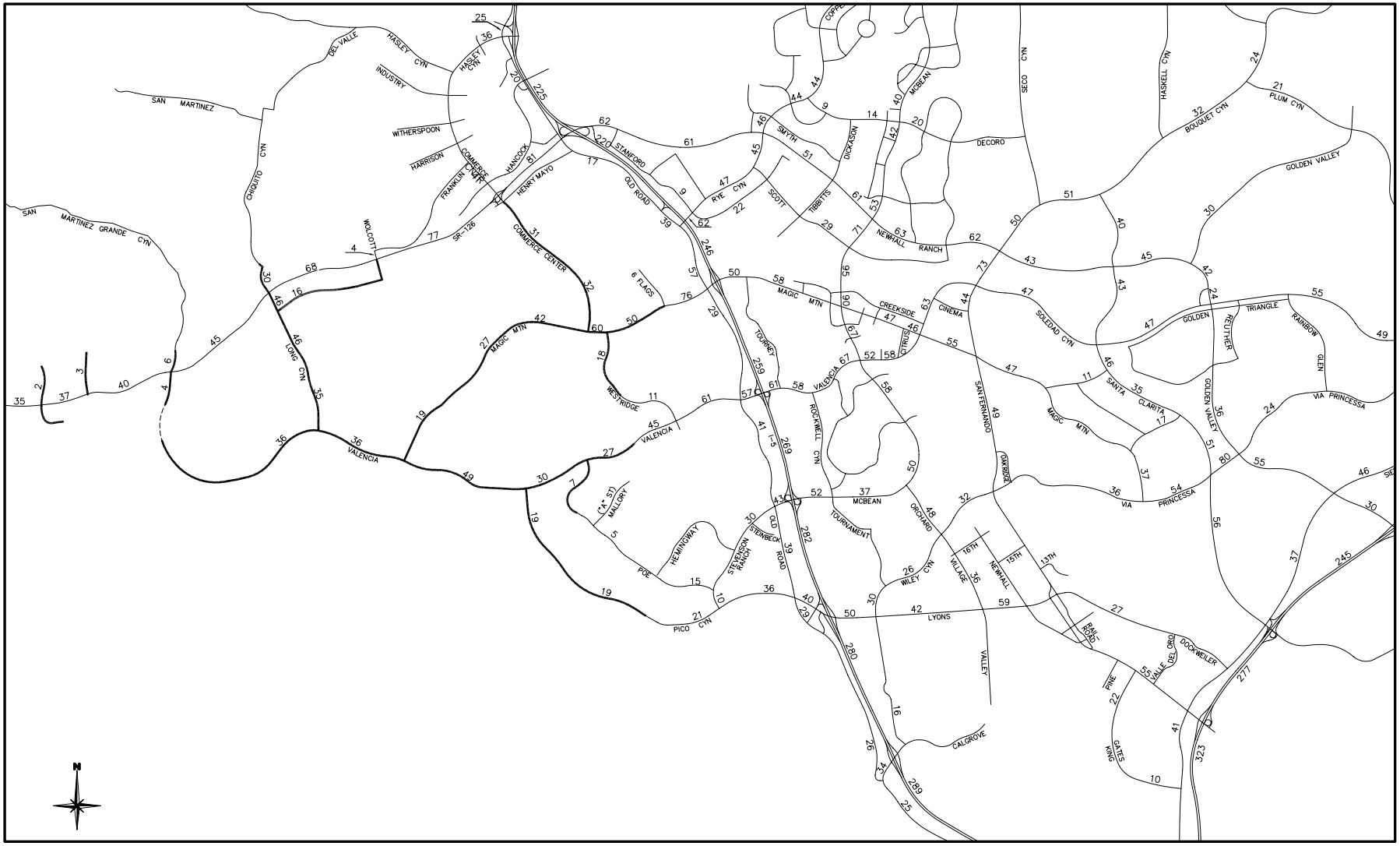
Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 22

PROJECT DEVELOPMENT BY PLANNING AREA -2025



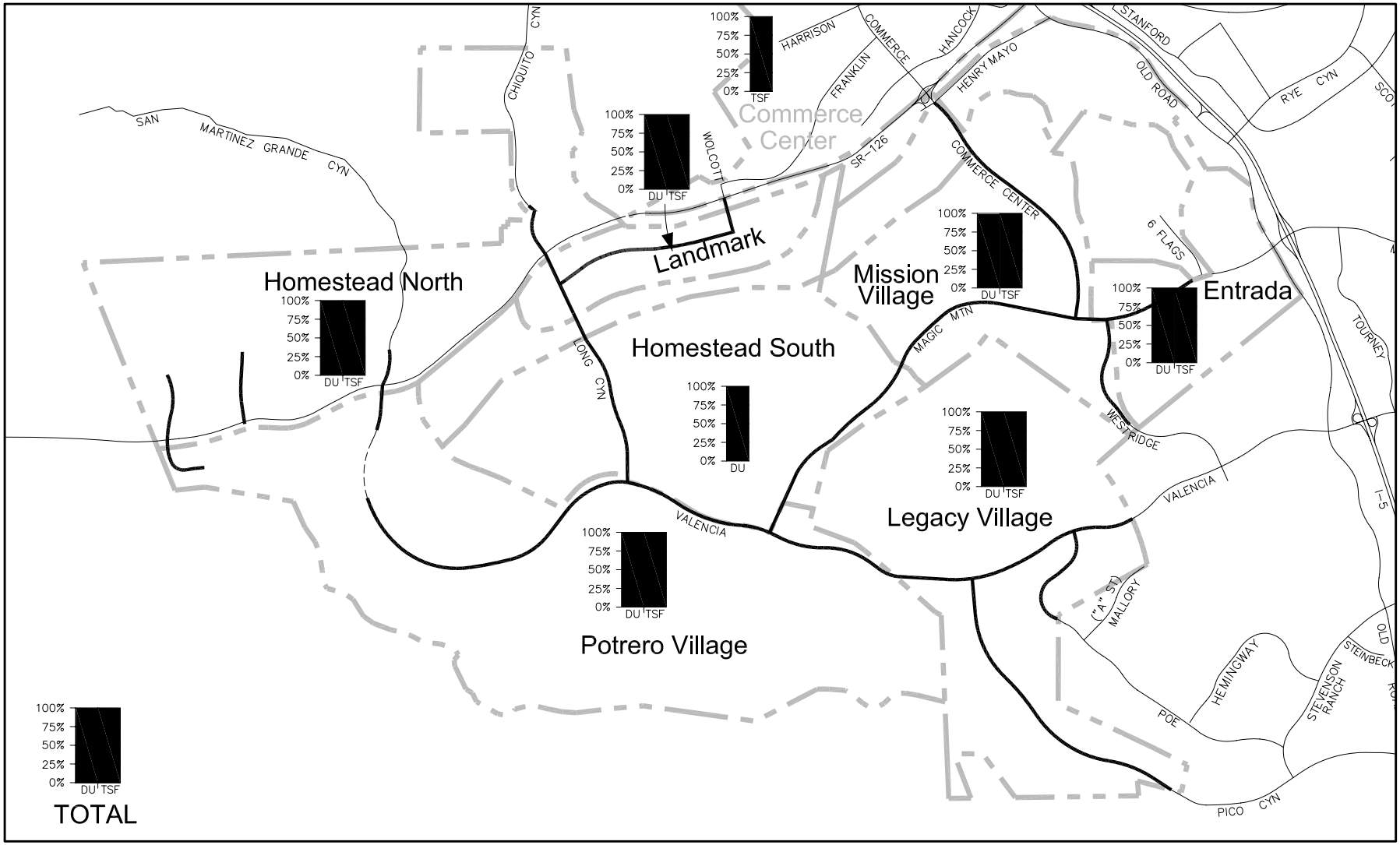
Legend

New Westside Roadway

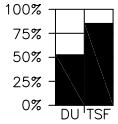
Future Westside Roadway

Figure 23

AVERAGE DAILY TRAFFIC VOLUMES (000s)
-2030



Legend



Percent Completion of Dwelling Units & Non-Res. Square Footage

Constructed Roadway

Future Roadway

Figure 24

PROJECT DEVELOPMENT BY PLANNING AREA -2030

As noted earlier, the roadways shown for each phase will be adequate to support the land development up to that year. Roadway construction from the next stage will then need to be in place to accommodate the additional development of subsequent years.

Within the City of Santa Clarita, the anticipated timing of new roadway construction is based on the SCVCTM Interim Year and Long-range Buildout scenarios. As previously noted in Section 2.0, the 2011 through 2014 horizon years are based on the Interim Year land uses within the City. Subsequently, the Interim Year roadway network within the City has also been utilized for each of these horizon years leading up to the Interim Year setting. After the Interim Year, buildout of the City's roadway network has been assumed for the purpose of this analysis to occur as follows:

- Santa Clarita Parkway – by 2018
- Avenue Tibbitts (including bridge) – post 2030

In addition to the roadway improvements outlined above, various intersection specific improvements will be required as part of each stage. Table 5 lists the intersection improvements needed to maintain acceptable levels of service through buildout of the area. Constructing these intersection improvements as part of the indicated stages will result in the Intersection Capacity Utilization (ICU) values shown in Table 6 and the corresponding Levels of Service (LOS) shown in Table 7 for the AM peak hour and in Table 8 for the PM peak hour. Detailed ICU worksheets are provided in Appendix B.

In all cases, levels of service are maintained at LOS D or better up to and including buildout of the Westside area, as well as buildout of the City.

6.0 TRAFFIC SHARES

The amount of Westside traffic that will utilize the City's roadway system varies greatly depending on location. To gauge the amount of new traffic within the City that can be attributed to the development of the Westside area, traffic shares have been calculated for select roadway segments.

text continued on Page 38

Table 5: Intersection Improvements by Stage (City Locations)

Stage	Intersection	Improvements
1	7. I-5 SB Ramps & SR-126	Add 4th WBT
	10. I-5 SB Ramps & Magic Mountain Pkwy	Add shared SBL/SBR, 3rd EBT, 2nd EBR, 2nd WBL, and 4th WBT (part of the Magic Mountain Interchange Phase 2 project)
	11. I-5 NB Ramps & Magic Mountain Pkwy	Add shared NBL/NBR, 2nd EBL, 3rd EBT and convert 4th WBT to shared WBT/WBR (part of the Magic Mountain Interchange Phase 2 project)
	33. Rye Canyon Rd/Copper Hill Road & Newhall Ranch Road	Add 1st & 2nd NBL, 2nd SBL, 1st & 2nd SBR, 1st & 2nd EBL, 1st, 2nd & 3rd EBT, 1st EBR, 1st, 2nd & 3rd WBT (part of the Cross Valley Connector project)
	45. McBean Pkwy & Magic Mountain	Add 4th NBT, 3rd EBT and 3rd WBT
	48. McBean Pkwy & Newhall Ranch	Add 4th EBT and 4th WBT
	54. Orchard Village & Wiley Canyon	Add 1st NBR and 2nd SBL
	55. Orchard Village & McBean Pkwy	Add 1st EBR
	57. Valencia Blvd & Magic Mountain	Add 1st NBR, 3rd EBT, 2nd WBL and convert WBR to 3rd WBT
	65. Bouquet Canyon Road & Soledad Canyon Road	Add 4th NBT
	66. Bouquet Canyon Road & Newhall Ranch Road	Add 2nd SBL, 3rd & 4th EBT and 4th WBT
4	55. Orchard Village & McBean	Add 1st SBL, shared SBL/SBT (part of the Henry Mayo Hospital Master Plan Phase 2 project)
5	12. I-5 SB Ramps & Valencia Blvd	Convert 2nd WBR to a shared WBT/WBR
6a	14. I-5 SB Ramps & McBean Pkwy	Add 2nd SBL
	17. I-5 NB Ramps & Lyons Ave	Add 1st free-flow WBR
	30. Ave Stanford & Rye Canyon Rd	Add de-facto SBR
	33. Rye Canyon Rd/Copper Hill Rd & Newhall Ranch Road	Add 4th EBT

(Continued)

Table 5: Intersection Improvements by Stage (City Locations) (Continued)

Stage	Intersection	Improvements
6a (cont.)	44. McBean Pkwy & Valencia Blvd	Add 4th WBT
	51. Wiley & Lyons	Convert EBR to 3rd EBT
	54. Orchard Village & Wiley	Convert 2nd EBL to 3rd EBT
6b	18. I-5 SB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT
	19. I-5 NB Ramps & Calgrove Blvd	Add 2nd EBT and 2nd WBT
	53. Valley & Lyons	Convert WBR to 3rd WBT
	57. Valencia Blvd & Magic Mountain	Add 1st WBR

NB = Northbound	NBL = NB Left-turn Lane	NBT = NB Through Lane	NBR = NB Right-turn Lane
SB = Southbound	SBL = SB Left-turn Lane	SBT = SB Through Lane	SBR = SB Right-turn Lane
EB = Eastbound	EBL = EB Left-turn Lane	EBT = EB Through Lane	EBR = EB Right-turn Lane
WB = Westbound	WBL = WB Left-turn Lane	WBT = WB Through Lane	WBR = WB Right-turn Lane

See Figure B-1 for intersection locations.

Table 6: Intersection Capacity Utilization Summary

	Exist.		2011		2012		2014		2018		2022		2025		2030	
Intersection	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
7. I-5 SB Ramps & SR-126	.42	.35	.78	.60	.77	.66	.78	.66	.75	.65	.73	.69	.75	.73	.77	.77
8. I-5 NB Ramps & SR-126	.37	.29	.64	.59	.63	.61	.63	.63	.60	.61	.58	.64	.63	.69	.69	.77
9. Old Road & I-5 SB Ramps (at Rye Canyon)	.73	.92	.47	.60	.42	.66	.42	.68	.47	.65	.49	.68	.54	.74	.60	.82
10. I-5 SB Ramps & Magic Mountain	.58	.59	.50	.57	.53	.57	.54	.59	.54	.69	.56	.73	.61	.74	.64	.77
11. I-5 NB Ramps & Magic Mountain	.63	.70	.54	.67	.56	.66	.58	.69	.65	.79	.69	.82	.72	.84	.75	.88
12. I-5 SB Ramps & Valencia	.47	.42	.57	.62	.56	.60	.57	.67	.64	.86	.58	.78	.59	.83	.60	.85
13. I-5 NB Ramps & Valencia	.53	.51	.59	.66	.58	.67	.59	.67	.64	.67	.69	.69	.70	.71	.73	.73
14. I-5 SB Ramps & McBean	.56	.66	.56	.77	.53	.77	.54	.77	.57	.80	.60	.85	.52	.80	.52	.81
15. I-5 NB Ramps & McBean	.41	.66	.53	.71	.53	.70	.54	.71	.56	.72	.58	.76	.61	.81	.63	.83
16. I-5 SB On-Loop & Lyons	.55	.60	.57	.77	.57	.75	.57	.78	.57	.76	.58	.81	.60	.87	.60	.89
17. I-5 NB Ramps & Lyons	.53	.68	.52	.83	.48	.82	.48	.84	.48	.87	.49	.89	.51	.86	.53	.88
18. I-5 SB Ramps & Calgrove	.49	.64	.68	.70	.68	.70	.68	.70	.70	.74	.74	.82	.77	.89	.58	.64
19. I-5 NB Ramps & Calgrove	.64	.52	.80	.52	.80	.52	.80	.52	.82	.56	.85	.64	.88	.71	.64	.63
20. I-5 SB Ramp & Lyons	.44	.46	.43	.59	.42	.59	.43	.60	.46	.60	.50	.62	.51	.66	.53	.69
30. Stanford & Rye Cyn	.66	.72	.60	.78	.58	.71	.60	.73	.67	.79	.70	.85	.70	.80	.73	.88
32. Ave Scott & Rye	.70	.71	.67	.69	.65	.65	.68	.66	.70	.67	.72	.68	.73	.71	.73	.79
33. Copper Hill & Newhall Ranch	.59	.58	.69	.74	.77	.84	.82	.86	.79	.89	.81	.88	.82	.83	.81	.84
36. Tourney & Valencia	.40	.46	.57	.58	.56	.57	.56	.59	.56	.63	.58	.67	.60	.69	.64	.73
37. Tourney & Magic Mtn	.44	.51	.39	.63	.38	.63	.40	.65	.45	.67	.49	.71	.50	.73	.53	.77
44. McBean & Valencia	.62	.72	.86	.89	.86	.89	.85	.89	.85	.90	.88	.90	.84	.87	.85	.86
45. McBean & Magic Mtn	.58	.75	.78	.89	.76	.87	.75	.87	.80	.88	.81	.89	.79	.90	.77	.90
47. McBean & Scott	.67	.64	.87	.84	.86	.86	.86	.87	.85	.85	.84	.85	.85	.88	.89	.88
48. McBean & Newhall Ranch	.64	.71	.89	.87	.86	.88	.86	.90	.86	.84	.88	.84	.87	.89	.87	.90
51. Wiley & Lyons	.49	.74	.55	.78	.56	.78	.56	.80	.56	.83	.59	.87	.58	.81	.60	.87
53. Valley & Lyons	.49	.60	.51	.77	.51	.77	.51	.78	.52	.78	.56	.83	.58	.86	.58	.85
54. Orchard Village & Wiley	.46	.76	.60	.79	.60	.80	.60	.79	.58	.80	.61	.88	.64	.86	.68	.90
55. Orchard Village & McBean	.58	.79	.65	.84	.64	.84	.65	.85	.65	.80	.68	.83	.71	.86	.72	.90
57. Valencia & Magic Mtn	.52	.82	.80	.85	.82	.84	.81	.84	.83	.87	.85	.89	.88	.88	.90	.90
65. Bouquet & Soledad	.78	.94	.78	.88	.79	.89	.79	.88	.74	.80	.78	.81	.79	.82	.81	.88
66. Bouquet & Newhall Ranch	.76	.76	.88	.86	.88	.86	.88	.85	.88	.79	.89	.83	.89	.84	.86	.88

Table 7: AM Peak Hour Level of Service Summary

Intersection	Exist.	2011	2012	2014	2018	2022	2025	2030
7. I-5 SB Ramps & SR-126	A	C	C	C	C	C	C	C
8. I-5 NB Ramps & SR-126	A	B	B	B	A	A	B	B
9. Old Road & I-5 SB Ramps (at Rye Canyon)	C	A	A	A	A	A	A	A
10. I-5 SB Ramps & Magic Mountain	A	A	A	A	A	A	B	B
11. I-5 NB Ramps & Magic Mountain	B	A	A	A	B	B	C	C
12. I-5 SB Ramps & Valencia	A	A	A	A	B	A	A	A
13. I-5 NB Ramps & Valencia	A	A	A	A	B	B	B	C
14. I-5 SB Ramps & McBean	A	A	A	A	A	A	A	A
15. I-5 NB Ramps & McBean	A	A	A	A	A	A	B	B
16. I-5 SB On-Loop & Lyons	A	A	A	A	A	A	A	A
17. I-5 NB Ramps & Lyons	A	A	A	A	A	A	A	A
18. I-5 SB Ramps & Calgrove	A	B	B	B	B	C	C	A
19. I-5 NB Ramps & Calgrove	B	C	C	C	D	D	D	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	A	A	A
30. Stanford & Rye Cyn	B	A	A	A	B	B	B	C
32. Ave Scott & Rye	B	B	B	B	B	C	C	C
33. Copper Hill & Newhall Ranch	A	B	C	D	C	D	D	D
36. Tourney & Valencia	A	A	A	A	A	A	A	B
37. Tourney & Magic Mtn	A	A	A	A	A	A	A	A
44. McBean & Valencia	B	D	D	D	D	D	D	D
45. McBean & Magic Mtn	A	C	C	C	C	D	C	C
47. McBean & Scott	B	D	D	D	D	D	D	D
48. McBean & Newhall Ranch	B	D	D	D	D	D	D	D
51. Wiley & Lyons	A	A	A	A	A	A	A	A
53. Valley & Lyons	A	A	A	A	A	A	A	A
54. Orchard Village & Wiley	A	A	A	A	A	B	B	B
55. Orchard Village & McBean	A	B	B	B	B	B	C	C
57. Valencia & Magic Mtn	A	C	D	D	D	D	D	D
65. Bouquet & Soledad	C	C	C	C	C	C	C	D
66. Bouquet & Newhall Ranch	C	D	D	D	D	D	D	D

See Figure B-1 for intersection locations.

Table 8: PM Peak Hour Level of Service Summary

Intersection	Exist.	2011	2012	2014	2018	2022	2025	2030
7. I-5 SB Ramps & SR-126	A	A	B	B	B	B	C	C
8. I-5 NB Ramps & SR-126	A	A	B	B	B	B	B	C
9. Old Road & I-5 SB Ramps (at Rye Canyon)	E	A	B	B	B	B	C	D
10. I-5 SB Ramps & Magic Mountain	A	A	A	A	B	C	C	C
11. I-5 NB Ramps & Magic Mountain	B	B	B	B	C	D	D	D
12. I-5 SB Ramps & Valencia	A	B	A	B	D	C	D	D
13. I-5 NB Ramps & Valencia	A	B	B	B	B	B	C	C
14. I-5 SB Ramps & McBean	B	C	C	C	C	D	C	D
15. I-5 NB Ramps & McBean	B	C	B	C	C	C	D	D
16. I-5 SB On-Loop & Lyons	A	C	C	C	C	D	D	D
17. I-5 NB Ramps & Lyons	B	D	D	D	D	D	D	D
18. I-5 SB Ramps & Calgrove	B	B	B	B	C	D	D	B
19. I-5 NB Ramps & Calgrove	A	A	A	A	A	B	C	B
20. I-5 SB Ramp & Lyons	A	A	A	A	A	B	B	B
30. Stanford & Rye Cyn	C	C	C	C	C	D	C	D
32. Ave Scott & Rye	C	B	B	B	B	B	C	C
33. Copper Hill & Newhall Ranch	A	C	D	D	D	D	D	D
36. Tourney & Valencia	A	A	A	A	B	B	B	C
37. Tourney & Magic Mtn	A	B	B	B	B	C	C	C
44. McBean & Valencia	C	D	D	D	D	D	D	D
45. McBean & Magic Mtn	C	D	D	D	D	D	D	D
47. McBean & Scott	B	D	D	D	D	D	D	D
48. McBean & Newhall Ranch	C	D	D	D	D	D	D	D
51. Wiley & Lyons	C	C	C	C	D	D	D	D
53. Valley & Lyons	A	C	C	C	C	D	D	D
54. Orchard Village & Wiley	C	C	C	C	C	D	D	D
55. Orchard Village & McBean	C	D	D	D	C	D	D	D
57. Valencia & Magic Mtn	D	D	D	D	D	D	D	D
65. Bouquet & Soledad	E	D	D	D	C	D	D	D
66. Bouquet & Newhall Ranch	C	D	D	D	C	D	D	D

See Figure B-1 for intersection locations.

In Table 9, traffic shares are summarized for 16 roadway segments within the City (8 existing roadway segments and 8 future roadway segments). The share percentages in the table show the percent of new traffic that can be attributed to the various Westside projects. For the purpose of this summary, existing trips have been excluded from the calculation. In this way, the percentages reflect only those trips related to future development.

The shares have been calculated for three horizon years, 2014, 2018 and 2030, and show that traffic increases related to the Westside developments range from a low of one percent (Santa Clarita Parkway) to around 50 percent (Magic Mountain Parkway just east of the I-5).

7.0 CONCLUSIONS

The previous sections outlined the roadway and intersection improvements being recommended to maintain the desired levels of service within the City of Santa Clarita as the Valley builds out over the next 25 years. Various mechanisms to fund these improvements are used by the City, such as the collection of Bridge and Thoroughfare (B&T) District fees from new development.

Within the Westside area itself, the construction stages outlined in this report will provide for the access needs of the Westside area by ensuring that the necessary roadway infrastructure is developed together with the phased land use development. These improvements will be funded wholly by the developer of the individual Westside projects or by a B&T District if one is formed for this area.

Within the areas falling under the jurisdiction of the City of Santa Clarita, the established B&T Districts have been developed as full mitigation districts that have accounted for the traffic coming from outside of the districts. Being full mitigation districts, the improvements necessary for completing the roadway network as envisioned by the City's Circulation Element are funded by the B&T Districts themselves. Each of the specific improvements outlined in this report are consistent with the current Circulation Element and would be funded by the appropriate B&T District. To ensure that the improvements within the City are in place when needed, the Westside projects will advance the funding for the improvements if the necessary funding is not available from the B&T District at the needed time. The Westside projects would then be reimbursed at a later date by the B&T District when the funding is available.

Table 9: Westside Traffic Shares in the City of Santa Clarita

	Percent Share of New Trips[1]								
	Landmark Village	Mission Village	Homestead	Potrero Village	Commerce Center	Entrada	Legacy Village	Sub-total Westside	Others
Existing Roadways									
1. McBean w/o Rockwell									
2014 Share	2.4%	2.7%	0.4%	0.2%	4.9%	2.6%	1.0%	14.2%	85.8%
2018 Share	2.0%	4.6%	1.2%	1.0%	4.1%	6.4%	2.8%	22.1%	77.8%
2030 Share	1.0%	4.8%	2.4%	3.8%	2.2%	8.9%	3.9%	27.0%	73.2%
2. Newhall Ranch e/o I-5									
2014 Share	12.7%	0.8%	0.2%	0.0%	17.8%	0.0%	0.0%	31.5%	68.4%
2018 Share	11.3%	2.3%	0.6%	0.2%	16.7%	0.1%	0.1%	31.3%	68.9%
2030 Share	6.9%	3.7%	7.4%	5.0%	11.5%	0.1%	0.1%	34.7%	65.1%
5. Rye e/o Old Road									
2014 Share	0.0%	6.1%	1.1%	0.2%	4.1%	8.5%	0.6%	20.6%	79.3%
2018 Share	0.0%	6.9%	2.1%	1.1%	3.2%	17.9%	1.9%	33.1%	67.0%
2030 Share	0.0%	5.5%	1.9%	1.9%	2.4%	25.0%	2.2%	38.9%	61.1%
6. Bouquet Cyn s/o Newhall									
2014 Share	1.5%	0.3%	0.0%	0.0%	2.2%	0.2%	0.4%	4.6%	95.4%
2018 Share	1.5%	0.6%	0.1%	0.4%	2.6%	1.1%	1.2%	7.5%	92.5%
2030 Share	0.9%	0.8%	1.2%	1.9%	1.7%	2.3%	1.4%	10.2%	89.7%
7. Magic Mtn e/o I-5									
2014 Share	3.6%	13.4%	2.3%	0.5%	8.1%	10.8%	0.0%	38.7%	61.3%
2018 Share	2.1%	16.2%	4.7%	0.1%	4.9%	20.5%	0.1%	48.6%	51.4%
2030 Share	1.2%	13.1%	5.4%	1.3%	3.1%	26.5%	0.1%	50.7%	49.4%
9. Valencia e/o I-5 NB Ramps									
2014 Share	1.7%	2.6%	0.5%	0.2%	2.8%	1.7%	4.4%	13.9%	86.1%
2018 Share	1.5%	3.1%	1.1%	4.8%	2.0%	3.5%	12.0%	28.0%	72.1%
2030 Share	0.7%	2.8%	2.3%	14.6%	1.5%	3.9%	14.4%	40.2%	59.8%
11. Lyons e/o I-5 NB Ramps									
2014 Share	3.0%	4.0%	0.7%	0.2%	6.4%	3.4%	1.0%	18.7%	81.3%
2018 Share	2.5%	4.6%	1.5%	1.5%	4.7%	7.0%	3.0%	24.8%	75.1%
2030 Share	1.2%	3.0%	2.9%	7.5%	2.4%	6.7%	3.5%	27.2%	72.8%

(Continued)

Table 9: Westside Traffic Shares in the City of Santa Clarita (Continued)

	Percent Share of New Trips[1]								
	Landmark Village	Mission Village	Homestead	Potrero Village	Commerce Center	Entrada	Legacy Village	Sub-total Westside	Others
Existing Roadways (Cont.)									
16. McBean s/o Ave Scott									
2014 Share	0.9%	2.6%	0.4%	0.1%	0.5%	1.3%	0.4%	6.2%	93.9%
2018 Share	0.8%	3.5%	1.1%	0.3%	1.1%	3.6%	1.0%	11.4%	88.7%
2030 Share	0.8%	2.8%	1.5%	1.2%	1.3%	6.3%	1.5%	15.4%	84.7%
Future Roadways									
3. Newhall Ranch w/o Rye									
2014 Share	9.2%	0.6%	0.1%	0.0%	13.9%	0.6%	0.1%	24.5%	75.6%
2018 Share	7.9%	1.4%	0.2%	0.1%	12.8%	1.5%	0.3%	24.2%	75.8%
2030 Share	5.0%	2.4%	5.0%	2.9%	9.3%	1.8%	0.3%	26.7%	73.3%
4. Newhall Ranch e/o Bouquet									
2014 Share	2.1%	0.6%	0.1%	0.0%	4.3%	0.8%	0.1%	8.0%	92.0%
2018 Share	2.2%	1.0%	0.2%	0.1%	4.5%	2.0%	0.2%	10.2%	89.7%
2030 Share	1.4%	1.7%	1.9%	0.7%	3.5%	4.2%	0.3%	13.7%	86.2%
8. Magic Mtn e/o San Fernando									
2014 Share	0.8%	2.1%	0.4%	0.1%	2.7%	1.4%	0.5%	8.0%	92.0%
2018 Share	0.8%	3.1%	1.0%	0.6%	2.4%	4.0%	1.2%	13.1%	87.0%
2030 Share	0.5%	2.7%	1.5%	2.4%	1.6%	5.1%	1.3%	15.1%	84.8%
10. Via Princessa w/o Magic Mtn									
2014 Share	0.2%	0.2%	0.0%	0.0%	0.7%	0.2%	0.1%	1.4%	98.6%
2018 Share	0.2%	0.4%	0.1%	0.0%	0.8%	0.8%	0.3%	2.6%	97.5%
2030 Share	0.1%	0.4%	0.3%	1.1%	0.6%	1.1%	0.7%	4.3%	95.7%
12. Dockweiler e/o San Fernando									
2014 Share	0.3%	0.4%	0.0%	0.0%	0.8%	0.6%	0.2%	2.3%	97.7%
2018 Share	0.6%	0.5%	0.3%	0.3%	0.4%	0.6%	0.4%	3.1%	97.0%
2030 Share	0.3%	0.5%	0.6%	1.9%	0.5%	1.2%	0.6%	5.6%	94.5%

(Continued)

Table 9: Westside Traffic Shares in the City of Santa Clarita (Continued)

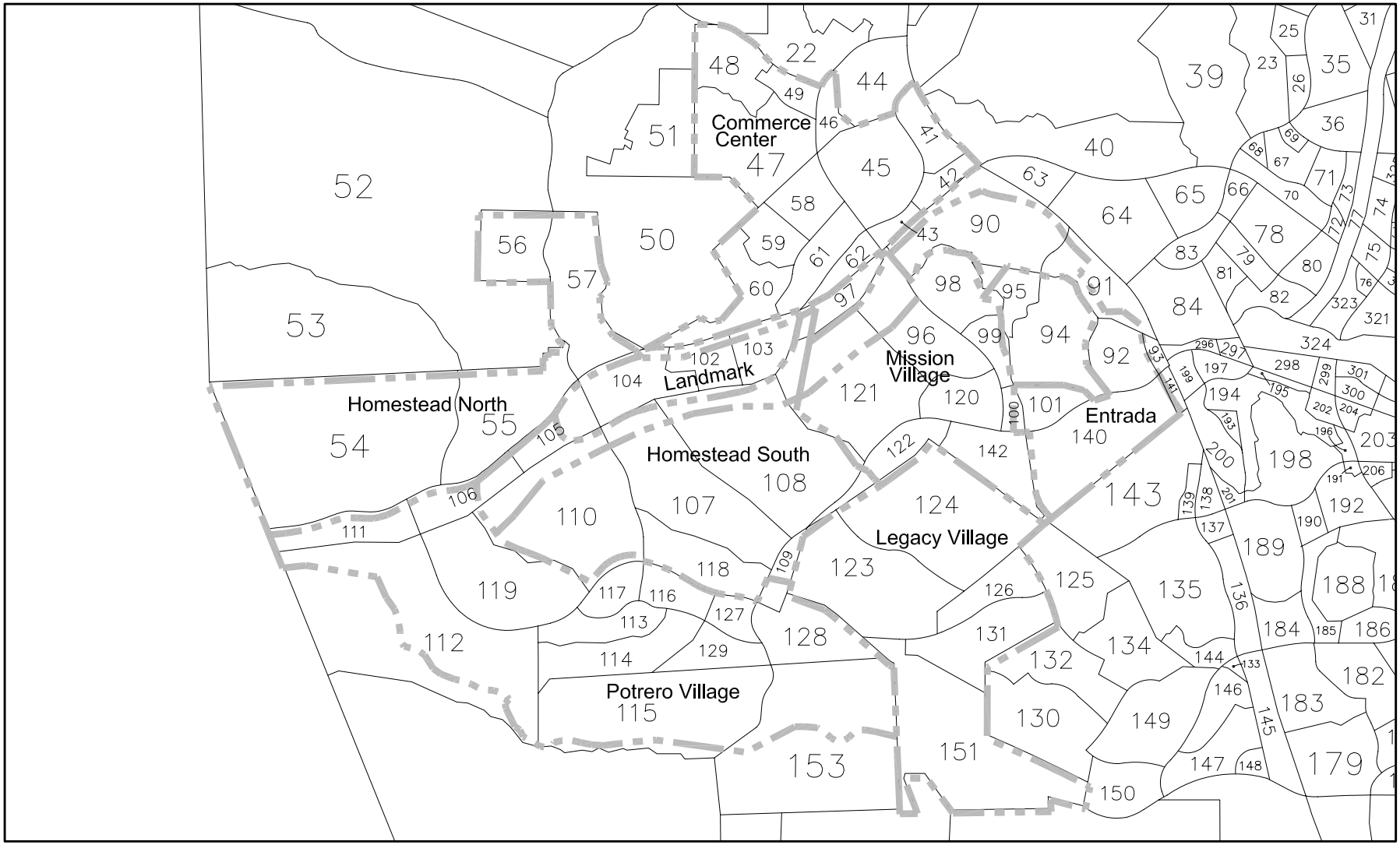
	Percent Share of New Trips[1]								
	Landmark Village	**Mission Village**	**Homestead**	**Potrero Village**	**Commerce Center**	**Entrada**	**Legacy Village**	**Sub-total Westside**	**Others**
Future Roadways (Cont.)									
13. Newhall Ranch n/o Soledad									
2014 Share	1.5%	0.1%	0.0%	0.0%	2.5%	0.4%	0.0%	4.5%	95.4%
2018 Share	1.1%	0.2%	0.1%	0.0%	1.8%	0.7%	0.0%	3.9%	96.1%
2030 Share	0.9%	0.8%	1.1%	0.3%	1.8%	1.9%	0.0%	6.8%	93.1%
14. Santa Clarita s/o Newhall									
2014 Share	0.1%	0.2%	0.0%	0.0%	0.9%	0.3%	0.0%	1.5%	98.4%
2018 Share	1.0%	0.1%	0.0%	0.0%	1.3%	0.2%	0.0%	2.6%	97.4%
2030 Share	0.3%	0.1%	0.4%	0.1%	0.6%	0.5%	0.0%	2.0%	98.0%
15. Santa Clarita s/o Soledad									
2014 Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2018 Share	0.8%	0.0%	0.0%	0.0%	0.8%	0.1%	0.0%	1.7%	98.3%
2030 Share	0.2%	0.0%	0.2%	0.1%	0.3%	0.2%	0.0%	1.0%	99.0%

[1]Only future (i.e., new) trips are included in share calculation. Existing trips are not part of the calculation.
Future trips between two areas are counted as one half trip for each area. Trips between an existing use and a future use are counted as half existing and half new.

APPENDIX A

LAND USE AND TRIP GENERATION BY PLANNING AREA

a. Traffic Analysis Zone (TAZ) Map



Legend

Planning Area Boundary
TAZ Boundary
XX TAZ Number

Figure A-1

SCVCTM TAZ MAP
- WESTSIDE PROJECT AREA

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

b. Year 2011

LANDMARK VILLAGE (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
120	4.	Condominium/Townhouse	531.00 DU	53	255	308	250	138	388	4248
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	400.00 STU	104	80	184	32	36	68	580
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		431	451	882	803	816	1619	17122

MISSION VILLAGE (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	531.00 DU	53	255	308	250	138	388	4248
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	400.00 STU	104	80	184	32	36	68	580
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		431	451	882	803	816	1619	17122

HOMESTEAD S/O RIVER (2011) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4. Condominium/Townhouse	112.00 DU	11	54	65	53	29	82	896
	51. Developed Park	8.70 AC	0	0	0	0	0	0	23
	SUB-TOTAL		11	54	65	53	29	82	919

HOMESTEAD S/O RIVER (2011) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	112.00 DU	11	54	65	53	29	82	896
51. Developed Park	8.70 AC	0	0	0	0	0	0	23
TOTAL		11	54	65	53	29	82	919

ENTRADA (2011) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	150.00 DU	29	84	113	96	56	152	1485
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		60	104	164	191	159	350	3907

ENTRADA (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	150.00 DU	29	84	113	96	56	152	1485
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		504	211	715	562	798	1360	13900

COMMERCE CENTER (2011) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	660.20 TSF	363	66	429	86	343	429	3961
	SUB-TOTAL		363	66	429	86	343	429	3961
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	3254.10 TSF	1790	325	2115	423	1692	2115	19525
	SUB-TOTAL		1790	325	2115	423	1692	2115	19525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	287.30 TSF	158	29	187	37	149	186	1724
	SUB-TOTAL		158	29	187	37	149	186	1724

COMMERCE CENTER (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	9618.60 TSF	5290	961	6251	1252	5000	6252	57712
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		5498	1113	6611	1506	5254	6760	64386

TOTAL (2011) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	458.00 DU	87	256	343	293	170	463	4533
4.	Condominium/Townhouse	1328.00 DU	133	637	770	624	345	969	10624
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00 TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	104.57 TSF	114	73	187	348	378	726	8895
13.	Commercial Shops	102.50 TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1150.00 STU	299	230	529	92	104	196	1668
30.	Industrial Park	9682.48 TSF	5325	967	6292	1260	5033	6293	58095
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40 TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20 AC	0	0	0	0	1	1	87
	TOTAL		8155	2981	11136	4703	9192	13895	137585

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

c. Year 2012

LANDMARK VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
120	4.	Condominium/Townhouse	932.00 DU	93	447	540	438	242	680	7456
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		523	683	1206	1007	938	1945	20620

MISSION VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	932.00 DU	93	447	540	438	242	680	7456
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		523	683	1206	1007	938	1945	20620

HOMESTEAD S/O RIVER (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4. Condominium/Townhouse	312.00 DU	31	150	181	147	81	228	2496
	51. Developed Park	8.70 AC	0	0	0	0	0	0	23
	SUB-TOTAL		31	150	181	147	81	228	2519

HOMESTEAD S/O RIVER (2012) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	312.00 DU	31	150	181	147	81	228	2496
51. Developed Park	8.70 AC	0	0	0	0	0	0	23
TOTAL		31	150	181	147	81	228	2519

ENTRADA (2012) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	391.00 DU	74	219	293	250	145	395	3871
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		105	239	344	345	248	593	6293

ENTRADA (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	391.00 DU	74	219	293	250	145	395	3871
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		549	346	895	716	887	1603	16286

LEGACY VILLAGE (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
126	4. Condominium/Townhouse	97.00 DU	10	47	57	46	25	71	776
	SUB-TOTAL		10	47	57	46	25	71	776

LEGACY VILLAGE (2012) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	97.00 DU	10	47	57	46	25	71	776
TOTAL		10	47	57	46	25	71	776

COMMERCE CENTER (2012) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	980.20 TSF	539	98	637	127	510	637	5881
	SUB-TOTAL		539	98	637	127	510	637	5881
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	3574.10 TSF	1966	357	2323	465	1859	2324	21445
	SUB-TOTAL		1966	357	2323	465	1859	2324	21445
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	607.30 TSF	334	61	395	79	316	395	3644
	SUB-TOTAL		334	61	395	79	316	395	3644

COMMERCE CENTER (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	10578.60 TSF	5818	1057	6875	1377	5501	6878	63472
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6026	1209	7235	1631	5755	7386	70146

TOTAL (2012) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	699.00 DU	132	391	523	447	259	706	6919
4.	Condominium/Townhouse	2026.00 DU	203	972	1175	952	526	1478	16208
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00 TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	104.57 TSF	114	73	187	348	378	726	8895
13.	Commercial Shops	102.50 TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1350.00 STU	351	270	621	108	122	230	1958
30.	Industrial Park	10642.48 TSF	5853	1063	6916	1385	5534	6919	63855
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40 TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20 AC	0	0	0	0	1	1	87
	TOTAL		8850	3587	12437	5326	9981	15307	151605

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

d. Year 2014

LANDMARK VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
		SUB-TOTAL		25	16	41	76	83	159	1956
120	4.	Condominium/Townhouse	1874.00 DU	187	900	1087	881	487	1368	14992
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		695	1196	1891	1474	1210	2684	28591

MISSION VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	1874.00 DU	187	900	1087	881	487	1368	14992
11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
	TOTAL		720	1212	1932	1550	1293	2843	30547

HOMESTEAD S/O RIVER (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
108	4.	Condominium/Townhouse	851.00 DU	85	408	493	400	221	621	6808
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		85	408	493	400	221	621	6831

HOMESTEAD S/O RIVER (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4.	Condominium/Townhouse	851.00 DU	85	408	493	400	221	621	6808
51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
	TOTAL		85	408	493	400	221	621	6831

POTRERO VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
128	3. Single Family (6-10du/ac)	114.00 DU	22	64	86	73	42	115	1129
	SUB-TOTAL		22	64	86	73	42	115	1129

POTRERO VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	114.00 DU	22	64	86	73	42	115	1129
TOTAL		22	64	86	73	42	115	1129

ENTRADA (2014) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
90	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
		SUB-TOTAL		134	69	203	329	381	710	7681
92	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		310	38	348	42	258	300	2312
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	614.00 DU	61	295	356	289	160	449	4912
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		201	635	836	750	475	1225	12997

ENTRADA (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	614.00 DU	61	295	356	289	160	449	4912
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
	TOTAL		645	742	1387	1121	1114	2235	22990

LEGACY VILLAGE (2014) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
126	4. Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	SUB-TOTAL		59	281	340	275	152	427	4680
131	4. Condominium/Townhouse	12.00 DU	1	6	7	6	3	9	96
	SUB-TOTAL		1	6	7	6	3	9	96

LEGACY VILLAGE (2014) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	597.00 DU	60	287	347	281	155	436	4776
TOTAL		60	287	347	281	155	436	4776

COMMERCE CENTER (2014) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2014) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3.	Single Family (6-10du/ac)	994.00 DU	189	556	745	636	368	1004	9840
4.	Condominium/Townhouse	4621.00 DU	462	2218	2680	2172	1201	3373	36968
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	587.00 TSF	429	275	704	1397	1514	2911	31733
12.	Commercial Center (<10ac)	127.57 TSF	139	89	228	424	461	885	10851
13.	Commercial Shops	102.50 TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	1650.00 STU	429	330	759	132	149	281	2393
30.	Industrial Park	12322.48 TSF	6777	1231	8008	1604	6406	8010	73935
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
40.	Commercial Office	970.40 TSF	1505	184	1689	204	1252	1456	11218
51.	Developed Park	33.20 AC	0	0	0	0	1	1	87
	TOTAL		10193	5242	15435	7054	11747	18801	187757

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

e. Year 2018

LANDMARK VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	855.00 DU	86	410	496	402	222	624	6840
		SUB-TOTAL		109	479	588	481	268	749	8058
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	250.00 TSF	300	58	358	75	248	323	2550
		SUB-TOTAL		307	62	369	96	270	366	3077
99	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		0	0	0	1	1	2	53
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
		SUB-TOTAL		25	16	41	76	83	159	1956
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	351.00 DU	35	168	203	165	91	256	2808
		SUB-TOTAL		35	168	203	165	91	256	2808

MISSION VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
4.	Condominium/Townhouse	3807.00 DU	382	1826	2208	1790	990	2780	30456
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	250.00 TSF	300	58	358	75	248	323	2550
40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		1294	2301	3595	2795	2287	5082	53997

HOMESTEAD S/O RIVER (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
		SUB-TOTAL		88	258	346	295	171	466	4564
108	4.	Condominium/Townhouse	1828.00 DU	183	877	1060	859	475	1334	14624
	20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		339	997	1336	907	529	1436	15517

HOMESTEAD S/O RIVER (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
4.	Condominium/Townhouse	1828.00 DU	183	877	1060	859	475	1334	14624
20.	Elementary/Middle School	600.00 STU	156	120	276	48	54	102	870
51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
	TOTAL		427	1255	1682	1202	700	1902	20081

POTRERO VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
127	4. Condominium/Townhouse	542.00 DU	54	260	314	255	141	396	4336
	SUB-TOTAL		54	260	314	255	141	396	4336
128	3. Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
	SUB-TOTAL		86	252	338	288	167	455	4455
129	3. Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
	SUB-TOTAL		34	99	133	113	65	178	1752

POTRERO VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	627.00 DU	120	351	471	401	232	633	6207
4. Condominium/Townhouse	542.00 DU	54	260	314	255	141	396	4336
TOTAL		174	611	785	656	373	1029	10543

ENTRADA (2018) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	40.	Commercial Office	200.00 TSF	310	38	348	42	258	300	2312
		SUB-TOTAL		477	282	759	538	725	1263	12808
92	4.	Condominium/Townhouse	867.00 DU	87	416	503	407	225	632	6936
	10.	Commercial Center (>30ac)	350.00 TSF	165	105	270	574	623	1197	14021
	40.	Commercial Office	250.00 TSF	388	48	436	53	323	376	2890
		SUB-TOTAL		640	569	1209	1034	1171	2205	23847
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2117.00 DU	212	1016	1228	995	550	1545	16936
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	350.00 TSF	165	105	270	574	623	1197	14021
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	450.00 TSF	698	86	784	95	581	676	5202
	TOTAL		1382	1791	3173	2621	2536	5157	54740

LEGACY VILLAGE (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
124	7. Senior (Active)	801.00 DU	64	96	160	128	80	208	2972
	SUB-TOTAL		64	96	160	128	80	208	2972
126	4. Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	SUB-TOTAL		59	281	340	275	152	427	4680
131	4. Condominium/Townhouse	1200.00 DU	120	576	696	564	312	876	9600
	20. Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	SUB-TOTAL		354	756	1110	636	393	1029	10905

LEGACY VILLAGE (2018) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
4. Condominium/Townhouse	1785.00 DU	179	857	1036	839	464	1303	14280
7. Senior (Active)	801.00 DU	64	96	160	128	80	208	2972
20. Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
TOTAL		477	1133	1610	1039	625	1664	18557

COMMERCE CENTER (2018) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2018) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	584.00	DU	111	327	438	374	217	591	5782
3.	Single Family (6-10du/ac)	1507.00	DU	287	843	1130	964	558	1522	14918
4.	Condominium/Townhouse	10764.00	DU	1079	5164	6243	5059	2798	7857	86112
5.	Apartment	859.00	DU	69	369	438	352	181	533	5928
7.	Senior (Active)	801.00	DU	64	96	160	128	80	208	2972
10.	Commercial Center (>30ac)	350.00	TSF	165	105	270	574	623	1197	14021
11.	Commercial Center(10-30a)	654.30	TSF	478	307	785	1557	1688	3245	35371
12.	Commercial Center (<10ac)	133.77	TSF	146	93	239	445	483	928	11378
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	3150.00	STU	819	630	1449	252	284	536	4568
30.	Industrial Park	12322.48	TSF	6777	1231	8008	1604	6406	8010	73935
31.	Business Park	250.00	TSF	300	58	358	75	248	323	2550
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	1220.40	TSF	1893	232	2125	257	1575	1832	14108
51.	Developed Park	53.40	AC	0	0	0	1	2	3	140
	TOTAL			12415	9620	22035	11942	15443	27385	279402

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

f. Year 2022

LANDMARK VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	350.00 TSF	420	81	501	105	347	452	3570
		SUB-TOTAL		427	85	512	126	369	495	4097
99	4.	Condominium/Townhouse	436.00 DU	44	209	253	205	113	318	3488
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		44	209	253	206	114	320	3541
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5006.00 DU	502	2403	2905	2353	1302	3655	40048
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	350.00 TSF	420	81	501	105	347	452	3570
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		1907	3037	4944	3542	3044	6586	68815

HOMESTEAD S/O RIVER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00 DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	700.00 STU	182	140	322	56	63	119	1015
	21.	High School	1300.00 STU	416	182	598	78	117	195	2327
	51.	Developed Park	20.50 AC	0	0	0	1	1	2	53
		SUB-TOTAL		719	736	1455	583	437	1020	10567
108	4.	Condominium/Townhouse	2189.00 DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
		SUB-TOTAL		7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00 DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00 DU	55	263	318	258	142	400	4384
	51.	Developed Park	9.40 AC	0	0	0	0	0	0	24
		SUB-TOTAL		90	366	456	376	210	586	6230
118	4.	Condominium/Townhouse	161.00 DU	16	77	93	76	42	118	1288
		SUB-TOTAL		16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	645.00 DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00 DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	1600.00 STU	416	320	736	128	144	272	2320
21.	High School	1300.00 STU	416	182	598	78	117	195	2327
51.	Developed Park	38.60 AC	0	0	0	1	1	2	100
	TOTAL		1285	2431	3716	2160	1353	3513	37301

HOMESTEAD N/O RIVER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
55	3. Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4. Condominium/Townhouse	315.00 DU	32	151	183	148	82	230	2520
	SUB-TOTAL		63	243	306	253	143	396	4144

HOMESTEAD N/O RIVER (2022) LAND USE AND TRIP GENERATION SUMMARY

Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
3. Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
4. Condominium/Townhouse	315.00 DU	32	151	183	148	82	230	2520
TOTAL		63	243	306	253	143	396	4144

POTRERO VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
115	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198
116	4.	Condominium/Townhouse	400.00 DU	40	192	232	188	104	292	3200
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
		SUB-TOTAL		186	286	472	664	620	1284	14012
117	4.	Condominium/Townhouse	400.00 DU	40	192	232	188	104	292	3200
	11.	Commercial Center(10-30a)	200.00 TSF	146	94	240	476	516	992	10812
		SUB-TOTAL		186	286	472	664	620	1284	14012
119	5.	Apartment	531.00 DU	42	228	270	218	112	330	3664
		SUB-TOTAL		42	228	270	218	112	330	3664
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752

POTRERO VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1207.00 DU	231	675	906	772	447	1219	11949
4.	Condominium/Townhouse	1688.00 DU	169	810	979	793	439	1232	13504
5.	Apartment	531.00 DU	42	228	270	218	112	330	3664
11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		778	1962	2740	2811	2099	4910	53303

ENTRADA (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	200.00 TSF	94	60	154	328	356	684	8012
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
	40.	Commercial Office	300.00 TSF	465	57	522	63	387	450	3468
		SUB-TOTAL		726	361	1087	887	1210	2097	21976
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	400.00 TSF	188	120	308	656	712	1368	16024
	40.	Commercial Office	250.00 TSF	388	48	436	53	323	376	2890
		SUB-TOTAL		676	648	1324	1179	1295	2474	26914
101	10.	Commercial Center (>30ac)	200.00 TSF	94	60	154	328	356	684	8012
		SUB-TOTAL		94	60	154	328	356	684	8012
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	800.00 TSF	376	240	616	1312	1424	2736	32048
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
30.	Industrial Park	63.88 TSF	35	6	41	8	33	41	383
40.	Commercial Office	550.00 TSF	853	105	958	116	710	826	6358
	TOTAL		1761	2009	3770	3443	3501	6944	74987

LEGACY VILLAGE (2022) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2022) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2022) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1101.00	DU	209	616	825	706	408	1114	10901
3.	Single Family (6-10du/ac)	2729.00	DU	520	1526	2046	1746	1011	2757	27016
4.	Condominium/Townhouse	15153.00	DU	1519	7272	8791	7122	3940	11062	121224
5.	Apartment	1390.00	DU	111	597	708	570	293	863	9592
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	800.00	TSF	376	240	616	1312	1424	2736	32048
11.	Commercial Center(10-30a)	1204.30	TSF	880	566	1446	2866	3107	5973	65104
12.	Commercial Center (<10ac)	133.77	TSF	146	93	239	445	483	928	11378
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
20.	Elementary/Middle School	4150.00	STU	1079	830	1909	332	374	706	6018
21.	High School	1300.00	STU	416	182	598	78	117	195	2327
30.	Industrial Park	12322.48	TSF	6777	1231	8008	1604	6406	8010	73935
31.	Business Park	350.00	TSF	420	81	501	105	347	452	3570
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	1765.40	TSF	2738	336	3074	371	2278	2649	20408
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	83.30	AC	0	0	0	2	3	5	217
	TOTAL			15525	13866	29391	17737	20627	38364	396738

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

g. Year 2025

LANDMARK VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
		SUB-TOTAL		837	163	1000	228	707	935	7580
99	4.	Condominium/Townhouse	470.00 DU	47	226	273	221	122	343	3760
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		47	226	273	222	123	345	3813
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5040.00 DU	505	2420	2925	2369	1311	3680	40320
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		2320	3132	5452	3660	3391	7051	72570

HOMESTEAD S/O RIVER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00 DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	1000.00 STU	260	200	460	80	90	170	1450
	21.	High School	2000.00 STU	640	280	920	120	180	300	3580
	51.	Developed Park	20.50 AC	0	0	0	1	1	2	53
		SUB-TOTAL		1021	894	1915	649	527	1176	12255
108	4.	Condominium/Townhouse	2189.00 DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
		SUB-TOTAL		7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00 DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00 DU	55	263	318	258	142	400	4384
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	9.40 AC	0	0	0	0	0	0	24
		SUB-TOTAL		324	546	870	448	291	739	7535
118	4.	Condominium/Townhouse	161.00 DU	16	77	93	76	42	118	1288
		SUB-TOTAL		16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
2.	Single Family (1-5du/ac)	645.00 DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00 DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	2800.00 STU	728	560	1288	224	252	476	4060
21.	High School	2000.00 STU	640	280	920	120	180	300	3580
51.	Developed Park	38.60 AC	0	0	0	1	1	2	100
	TOTAL		1821	2769	4590	2298	1524	3822	40294

HOMESTEAD N/O RIVER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
54	3.	Single Family (6-10du/ac)	62.00 DU	12	35	47	40	23	63	614
	4.	Condominium/Townhouse	589.00 DU	59	283	342	277	153	430	4712
		SUB-TOTAL		71	318	389	317	176	493	5326
55	3.	Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4.	Condominium/Townhouse	922.00 DU	92	443	535	433	240	673	7376
	51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
		SUB-TOTAL		123	535	658	538	301	839	9015
56	2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
	4.	Condominium/Townhouse	23.00 DU	2	11	13	11	6	17	184
		SUB-TOTAL		6	22	28	23	13	36	372
57	12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
	31.	Business Park	439.60 TSF	528	101	629	132	435	567	4484
	40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
		SUB-TOTAL		751	159	910	338	769	1107	10410

HOMESTEAD N/O RIVER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
3.	Single Family (6-10du/ac)	226.00 DU	43	127	170	145	84	229	2238
4.	Condominium/Townhouse	1534.00 DU	153	737	890	721	399	1120	12272
12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
31.	Business Park	439.60 TSF	528	101	629	132	435	567	4484
40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
	TOTAL		951	1034	1985	1216	1259	2475	25123

POTRERO VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
115	3.	Single Family (6-10du/ac)	603.00 DU	115	338	453	386	223	609	5970
		SUB-TOTAL		115	338	453	386	223	609	5970
116	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
		SUB-TOTAL		392	668	1060	1422	1292	2714	29624
117	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	11.	Commercial Center(10-30a)	400.00 TSF	292	188	480	952	1032	1984	21624
		SUB-TOTAL		392	668	1060	1422	1292	2714	29624
119	5.	Apartment	1022.00 DU	82	439	521	419	215	634	7052
		SUB-TOTAL		82	439	521	419	215	634	7052
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752
153	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198

POTRERO VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1810.00 DU	346	1013	1359	1158	670	1828	17919
4.	Condominium/Townhouse	2888.00 DU	289	1386	1675	1357	751	2108	23104
5.	Apartment	1022.00 DU	82	439	521	419	215	634	7052
11.	Commercial Center(10-30a)	800.00 TSF	584	376	960	1904	2064	3968	43248
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		1345	3275	4620	4914	3769	8683	93885

ENTRADA (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	300.00 TSF	141	90	231	492	534	1026	12018
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	263.88 TSF	145	26	171	34	137	171	1583
	40.	Commercial Office	400.00 TSF	620	76	696	84	516	600	4624
		SUB-TOTAL		1038	430	1468	1098	1621	2719	28338
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	550.00 TSF	259	165	424	902	979	1881	22033
	14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
	40.	Commercial Office	300.00 TSF	465	57	522	63	387	450	3468
		SUB-TOTAL		926	768	1694	1531	1713	3244	35970
101	10.	Commercial Center (>30ac)	388.30 TSF	183	116	299	637	691	1328	15555
		SUB-TOTAL		183	116	299	637	691	1328	15555
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	1238.30 TSF	583	371	954	2031	2204	4235	49606
11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
30.	Industrial Park	263.88 TSF	145	26	171	34	137	171	1583
40.	Commercial Office	700.00 TSF	1085	133	1218	147	903	1050	8092
	TOTAL		2412	2254	4666	4315	4665	8980	97948

LEGACY VILLAGE (2025) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2025) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2025) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1120.00	DU	213	627	840	718	415	1133	11089
3.	Single Family (6-10du/ac)	3394.00	DU	647	1899	2546	2172	1257	3429	33600
4.	Condominium/Townhouse	17606.00	DU	1763	8451	10214	8275	4578	12853	140848
5.	Apartment	1881.00	DU	151	808	959	771	396	1167	12980
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	1238.30	TSF	583	371	954	2031	2204	4235	49606
11.	Commercial Center(10-30a)	1604.30	TSF	1172	754	1926	3818	4139	7957	86728
12.	Commercial Center (<10ac)	189.18	TSF	206	131	337	629	682	1311	16090
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
14.	Hotel	300.00	ROOM	102	66	168	96	87	183	2469
20.	Elementary/Middle School	5350.00	STU	1391	1070	2461	428	482	910	7758
21.	High School	2000.00	STU	640	280	920	120	180	300	3580
30.	Industrial Park	12522.48	TSF	6887	1251	8138	1630	6510	8140	75135
31.	Business Park	1131.10	TSF	1358	260	1618	339	1120	1459	11537
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	2020.40	TSF	3133	384	3517	424	2606	3030	23356
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	89.10	AC	0	0	0	2	3	5	232
	TOTAL			18580	16648	35228	21931	25095	47026	488008

APPENDIX A (Cont.)

LAND USE AND TRIP GENERATION BY PLANNING AREA

h. Year 2030 (Buildout)

LANDMARK VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
102	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
	4.	Condominium/Townhouse	305.00 DU	31	146	177	143	79	222	2440
	5.	Apartment	155.00 DU	12	67	79	64	33	97	1070
	12.	Commercial Center (<10ac)	10.50 TSF	11	7	18	35	38	73	893
	40.	Commercial Office	9.50 TSF	15	2	17	2	12	14	110
		SUB-TOTAL		76	243	319	268	176	444	4889
103	3.	Single Family (6-10du/ac)	95.00 DU	18	53	71	61	35	96	940
	4.	Condominium/Townhouse	169.00 DU	17	81	98	79	44	123	1352
	12.	Commercial Center (<10ac)	38.50 TSF	42	27	69	128	139	267	3275
	13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
	20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
		SUB-TOTAL		279	316	595	345	304	649	7049
104	3.	Single Family (6-10du/ac)	175.00 DU	33	98	131	112	65	177	1732
	4.	Condominium/Townhouse	211.00 DU	21	101	122	99	55	154	1688
	5.	Apartment	152.00 DU	12	65	77	62	32	94	1049
	11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
	40.	Commercial Office	370.00 TSF	574	70	644	78	477	555	4277
		SUB-TOTAL		824	452	1276	951	1279	2230	22369
105	5.	Apartment	144.00 DU	12	62	74	59	30	89	994
	12.	Commercial Center (<10ac)	27.10 TSF	30	19	49	90	98	188	2305
	40.	Commercial Office	315.90 TSF	490	60	550	66	408	474	3652
		SUB-TOTAL		532	141	673	215	536	751	6951

LANDMARK VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	308.00 DU	58	172	230	197	114	311	3048
4.	Condominium/Townhouse	685.00 DU	69	328	397	321	178	499	5480
5.	Apartment	451.00 DU	36	194	230	185	95	280	3113
11.	Commercial Center(10-30a)	252.00 TSF	184	118	302	600	650	1250	13623
12.	Commercial Center (<10ac)	76.10 TSF	83	53	136	253	275	528	6473
13.	Commercial Shops	9.50 TSF	7	5	12	17	17	34	352
20.	Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
40.	Commercial Office	695.40 TSF	1079	132	1211	146	897	1043	8039
51.	Developed Park	16.10 AC	0	0	0	0	1	1	42
	TOTAL		1711	1152	2863	1779	2295	4074	41258

MISSION VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
96	2.	Single Family (1-5du/ac)	123.00 DU	23	69	92	79	46	125	1218
	4.	Condominium/Townhouse	881.00 DU	88	423	511	414	229	643	7048
		SUB-TOTAL		111	492	603	493	275	768	8266
98	12.	Commercial Center (<10ac)	6.20 TSF	7	4	11	21	22	43	527
	31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
		SUB-TOTAL		837	163	1000	228	707	935	7580
99	4.	Condominium/Townhouse	470.00 DU	47	226	273	221	122	343	3760
	51.	Developed Park	20.20 AC	0	0	0	1	1	2	53
		SUB-TOTAL		47	226	273	222	123	345	3813
100	12.	Commercial Center (<10ac)	23.00 TSF	25	16	41	76	83	159	1956
	40.	Commercial Office	220.00 TSF	341	42	383	46	284	330	2543
		SUB-TOTAL		366	58	424	122	367	489	4499
120	4.	Condominium/Townhouse	2425.00 DU	243	1164	1407	1140	631	1771	19400
	11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
	13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	40.	Commercial Office	75.00 TSF	116	14	130	16	97	113	867
	51.	Developed Park	8.40 AC	0	0	0	0	0	0	22
		SUB-TOTAL		800	1492	2292	1893	1528	3421	36637
121	2.	Single Family (1-5du/ac)	168.00 DU	32	94	126	108	62	170	1663
	4.	Condominium/Townhouse	418.00 DU	42	201	243	196	109	305	3344
		SUB-TOTAL		74	295	369	304	171	475	5007
122	4.	Condominium/Townhouse	176.00 DU	18	84	102	83	46	129	1408
		SUB-TOTAL		18	84	102	83	46	129	1408
142	4.	Condominium/Townhouse	670.00 DU	67	322	389	315	174	489	5360
		SUB-TOTAL		67	322	389	315	174	489	5360

MISSION VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	291.00 DU	55	163	218	187	108	295	2881
4.	Condominium/Townhouse	5040.00 DU	505	2420	2925	2369	1311	3680	40320
11.	Commercial Center(10-30a)	267.30 TSF	195	126	321	636	690	1326	14450
12.	Commercial Center (<10ac)	29.20 TSF	32	20	52	97	105	202	2483
13.	Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
31.	Business Park	691.50 TSF	830	159	989	207	685	892	7053
40.	Commercial Office	295.00 TSF	457	56	513	62	381	443	3410
51.	Developed Park	28.60 AC	0	0	0	1	1	2	75
	TOTAL		2320	3132	5452	3660	3391	7051	72570

HOMESTEAD S/O RIVER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
107	2.	Single Family (1-5du/ac)	461.00 DU	88	258	346	295	171	466	4564
	4.	Condominium/Townhouse	326.00 DU	33	156	189	153	85	238	2608
	20.	Elementary/Middle School	1200.00 STU	312	240	552	96	108	204	1740
	21.	High School	2400.00 STU	768	336	1104	144	216	360	4296
	51.	Developed Park	20.50 AC	0	0	0	1	1	2	53
		SUB-TOTAL		1201	990	2191	689	581	1270	13261
108	4.	Condominium/Townhouse	2189.00 DU	219	1051	1270	1029	569	1598	17512
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	8.70 AC	0	0	0	0	0	0	23
		SUB-TOTAL		453	1231	1684	1101	650	1751	18840
109	3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
		SUB-TOTAL		7	21	28	24	14	38	376
110	2.	Single Family (1-5du/ac)	184.00 DU	35	103	138	118	68	186	1822
	4.	Condominium/Townhouse	548.00 DU	55	263	318	258	142	400	4384
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
	51.	Developed Park	9.40 AC	0	0	0	0	0	0	24
		SUB-TOTAL		324	546	870	448	291	739	7535
118	4.	Condominium/Townhouse	161.00 DU	16	77	93	76	42	118	1288
		SUB-TOTAL		16	77	93	76	42	118	1288

HOMESTEAD S/O RIVER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	645.00 DU	123	361	484	413	239	652	6386
3.	Single Family (6-10du/ac)	38.00 DU	7	21	28	24	14	38	376
4.	Condominium/Townhouse	3224.00 DU	323	1547	1870	1516	838	2354	25792
20.	Elementary/Middle School	3000.00 STU	780	600	1380	240	270	510	4350
21.	High School	2400.00 STU	768	336	1104	144	216	360	4296
51.	Developed Park	38.60 AC	0	0	0	1	1	2	100
	TOTAL		2001	2865	4866	2338	1578	3916	41300

HOMESTEAD N/O RIVER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
54	3.	Single Family (6-10du/ac)	62.00 DU	12	35	47	40	23	63	614
	4.	Condominium/Townhouse	589.00 DU	59	283	342	277	153	430	4712
		SUB-TOTAL		71	318	389	317	176	493	5326
55	3.	Single Family (6-10du/ac)	164.00 DU	31	92	123	105	61	166	1624
	4.	Condominium/Townhouse	922.00 DU	92	443	535	433	240	673	7376
	51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
		SUB-TOTAL		123	535	658	538	301	839	9015
56	2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
	4.	Condominium/Townhouse	23.00 DU	2	11	13	11	6	17	184
		SUB-TOTAL		6	22	28	23	13	36	372
57	12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
	31.	Business Park	1169.60 TSF	1404	269	1673	351	1158	1509	11930
	40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
		SUB-TOTAL		1627	327	1954	557	1492	2049	17856

HOMESTEAD N/O RIVER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
3.	Single Family (6-10du/ac)	226.00 DU	43	127	170	145	84	229	2238
4.	Condominium/Townhouse	1534.00 DU	153	737	890	721	399	1120	12272
12.	Commercial Center (<10ac)	55.40 TSF	60	38	98	184	199	383	4712
31.	Business Park	1169.60 TSF	1404	269	1673	351	1158	1509	11930
40.	Commercial Office	105.00 TSF	163	20	183	22	135	157	1214
51.	Developed Park	5.80 AC	0	0	0	0	0	0	15
	TOTAL		1827	1202	3029	1435	1982	3417	32569

POTRERO VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
106	5.	Apartment	520.00 DU	42	224	266	213	109	322	3588
		SUB-TOTAL		42	224	266	213	109	322	3588
111	34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
		SUB-TOTAL		0	0	0	0	0	0	238
112	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
	3.	Single Family (6-10du/ac)	156.00 DU	30	87	117	100	58	158	1544
	50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
		SUB-TOTAL		74	148	222	176	127	303	3868
113	4.	Condominium/Townhouse	354.00 DU	35	170	205	166	92	258	2832
		SUB-TOTAL		35	170	205	166	92	258	2832
114	4.	Condominium/Townhouse	560.00 DU	56	269	325	263	146	409	4480
		SUB-TOTAL		56	269	325	263	146	409	4480
115	3.	Single Family (6-10du/ac)	603.00 DU	115	338	453	386	223	609	5970
		SUB-TOTAL		115	338	453	386	223	609	5970
116	4.	Condominium/Townhouse	1262.00 DU	126	606	732	593	328	921	10096
	11.	Commercial Center(10-30a)	628.50 TSF	459	295	754	1496	1622	3118	33977
		SUB-TOTAL		585	901	1486	2089	1950	4039	44073
117	4.	Condominium/Townhouse	1261.00 DU	126	605	731	593	328	921	10088
	11.	Commercial Center(10-30a)	628.50 TSF	459	295	754	1496	1622	3118	33977
		SUB-TOTAL		585	900	1485	2089	1950	4039	44065
119	5.	Apartment	1679.00 DU	134	722	856	688	353	1041	11585
		SUB-TOTAL		134	722	856	688	353	1041	11585
127	4.	Condominium/Townhouse	888.00 DU	89	426	515	417	231	648	7104
		SUB-TOTAL		89	426	515	417	231	648	7104
128	3.	Single Family (6-10du/ac)	450.00 DU	86	252	338	288	167	455	4455
		SUB-TOTAL		86	252	338	288	167	455	4455
129	3.	Single Family (6-10du/ac)	177.00 DU	34	99	133	113	65	178	1752
		SUB-TOTAL		34	99	133	113	65	178	1752
153	3.	Single Family (6-10du/ac)	424.00 DU	81	237	318	271	157	428	4198
		SUB-TOTAL		81	237	318	271	157	428	4198

POTRERO VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	33	91	891
3.	Single Family (6-10du/ac)	1810.00 DU	346	1013	1359	1158	670	1828	17919
4.	Condominium/Townhouse	4325.00 DU	432	2076	2508	2032	1125	3157	34600
5.	Apartment	2199.00 DU	176	946	1122	901	462	1363	15173
11.	Commercial Center(10-30a)	1257.00 TSF	918	590	1508	2992	3244	6236	67954
34.	Utilities	100.00 TSF	0	0	0	0	0	0	238
50.	Golf Course	180.00 AC	27	11	38	18	36	54	1433
	TOTAL		1916	4686	6602	7159	5570	12729	138208

ENTRADA (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
90	5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
	10.	Commercial Center (>30ac)	400.00 TSF	188	120	308	656	712	1368	16024
	11.	Commercial Center(10-30a)	135.00 TSF	99	63	162	321	348	669	7298
	30.	Industrial Park	543.88 TSF	299	54	353	71	283	354	3263
	40.	Commercial Office	773.02 TSF	1198	147	1345	162	997	1159	8936
		SUB-TOTAL		1817	559	2376	1377	2426	3803	38336
92	4.	Condominium/Townhouse	1000.00 DU	100	480	580	470	260	730	8000
	10.	Commercial Center (>30ac)	800.00 TSF	376	240	616	1312	1424	2736	32048
	14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
	40.	Commercial Office	400.00 TSF	620	76	696	84	516	600	4624
		SUB-TOTAL		1198	862	2060	1962	2287	4249	47141
95	11.	Commercial Center(10-30a)	115.21 TSF	84	54	138	274	297	571	6228
		SUB-TOTAL		84	54	138	274	297	571	6228
101	10.	Commercial Center (>30ac)	388.30 TSF	183	116	299	637	691	1328	15555
		SUB-TOTAL		183	116	299	637	691	1328	15555
140	3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
	4.	Condominium/Townhouse	1250.00 DU	125	600	725	588	325	913	10000
	12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
		SUB-TOTAL		265	940	1205	1049	640	1689	18085

ENTRADA (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	ADT
3.	Single Family (6-10du/ac)	572.00 DU	109	320	429	366	212	578	5663
4.	Condominium/Townhouse	2250.00 DU	225	1080	1305	1058	585	1643	18000
5.	Apartment	408.00 DU	33	175	208	167	86	253	2815
10.	Commercial Center (>30ac)	1588.30 TSF	747	476	1223	2605	2827	5432	63627
11.	Commercial Center(10-30a)	250.21 TSF	183	117	300	595	645	1240	13526
12.	Commercial Center (<10ac)	28.48 TSF	31	20	51	95	103	198	2422
14.	Hotel	300.00 ROOM	102	66	168	96	87	183	2469
30.	Industrial Park	543.88 TSF	299	54	353	71	283	354	3263
40.	Commercial Office	1173.02 TSF	1818	223	2041	246	1513	1759	13560
	TOTAL		3547	2531	6078	5299	6341	11640	125345

LEGACY VILLAGE (2030) ZONAL LAND USE AND TRIP GENERATION

Zone		Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
123	3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
		SUB-TOTAL		84	246	330	282	163	445	4356
124	7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
		SUB-TOTAL		80	120	200	160	100	260	3710
126	4.	Condominium/Townhouse	585.00 DU	59	281	340	275	152	427	4680
	11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
		SUB-TOTAL		518	395	913	679	829	1508	15390
131	4.	Condominium/Townhouse	1400.00 DU	140	672	812	658	364	1022	11200
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		374	852	1226	730	445	1175	12505
151	2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
		SUB-TOTAL		14	42	56	48	28	76	743

LEGACY VILLAGE (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	75.00 DU	14	42	56	48	28	76	743
3.	Single Family (6-10du/ac)	440.00 DU	84	246	330	282	163	445	4356
4.	Condominium/Townhouse	1985.00 DU	199	953	1152	933	516	1449	15880
7.	Senior (Active)	1000.00 DU	80	120	200	160	100	260	3710
11.	Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
40.	Commercial Office	225.00 TSF	349	43	392	47	290	337	2601
	TOTAL		1070	1655	2725	1899	1565	3464	36704

COMMERCE CENTER (2030) ZONAL LAND USE AND TRIP GENERATION

Zone	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
41	30. Industrial Park	730.00 TSF	402	73	475	95	380	475	4380
	SUB-TOTAL		402	73	475	95	380	475	4380
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	445.80 TSF	245	45	290	58	232	290	2675
	SUB-TOTAL		300	82	382	197	371	568	5529
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
58	30. Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
	SUB-TOTAL		578	105	683	137	547	684	6309
59	35. Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	SUB-TOTAL		153	115	268	115	115	230	3820
60	30. Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
	SUB-TOTAL		226	41	267	54	214	268	2470
61	30. Industrial Park	744.90 TSF	410	74	484	97	387	484	4469
	SUB-TOTAL		410	74	484	97	387	484	4469
62	30. Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
	SUB-TOTAL		345	63	408	82	326	408	3764

COMMERCE CENTER (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units	-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
13.	Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
30.	Industrial Park	12258.60 TSF	6742	1225	7967	1596	6373	7969	73552
35.	Regional Post Office	764.00 TSF	153	115	268	115	115	230	3820
	TOTAL		6950	1377	8327	1850	6627	8477	80226

TOTAL (2030) LAND USE AND TRIP GENERATION SUMMARY

	Land Use Type	Units		-- AM Peak Hour -- In	Out	Total	-- PM Peak Hour -- In	Out	Total	ADT
2.	Single Family (1-5du/ac)	1120.00	DU	213	627	840	718	415	1133	11089
3.	Single Family (6-10du/ac)	3394.00	DU	647	1899	2546	2172	1257	3429	33600
4.	Condominium/Townhouse	19043.00	DU	1906	9141	11047	8950	4952	13902	152344
5.	Apartment	3058.00	DU	245	1315	1560	1253	643	1896	21101
7.	Senior (Active)	1000.00	DU	80	120	200	160	100	260	3710
10.	Commercial Center (>30ac)	1588.30	TSF	747	476	1223	2605	2827	5432	63627
11.	Commercial Center(10-30a)	2176.51	TSF	1590	1022	2612	5180	5616	10796	117662
12.	Commercial Center (<10ac)	189.18	TSF	206	131	337	629	682	1311	16090
13.	Commercial Shops	102.50	TSF	74	50	124	185	185	370	3799
14.	Hotel	300.00	ROOM	102	66	168	96	87	183	2469
20.	Elementary/Middle School	5550.00	STU	1443	1110	2553	444	500	944	8048
21.	High School	2400.00	STU	768	336	1104	144	216	360	4296
30.	Industrial Park	12802.48	TSF	7041	1279	8320	1667	6656	8323	76815
31.	Business Park	1861.10	TSF	2234	428	2662	558	1843	2401	18983
34.	Utilities	100.00	TSF	0	0	0	0	0	0	238
35.	Regional Post Office	764.00	TSF	153	115	268	115	115	230	3820
40.	Commercial Office	2493.42	TSF	3866	474	4340	523	3216	3739	28824
50.	Golf Course	180.00	AC	27	11	38	18	36	54	1433
51.	Developed Park	89.10	AC	0	0	0	2	3	5	232
	TOTAL			21342	18600	39942	25419	29349	54768	568180

APPENDIX B

INTERSECTION CAPACITY UTILIZATION WORKSHEETS

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure B-1.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

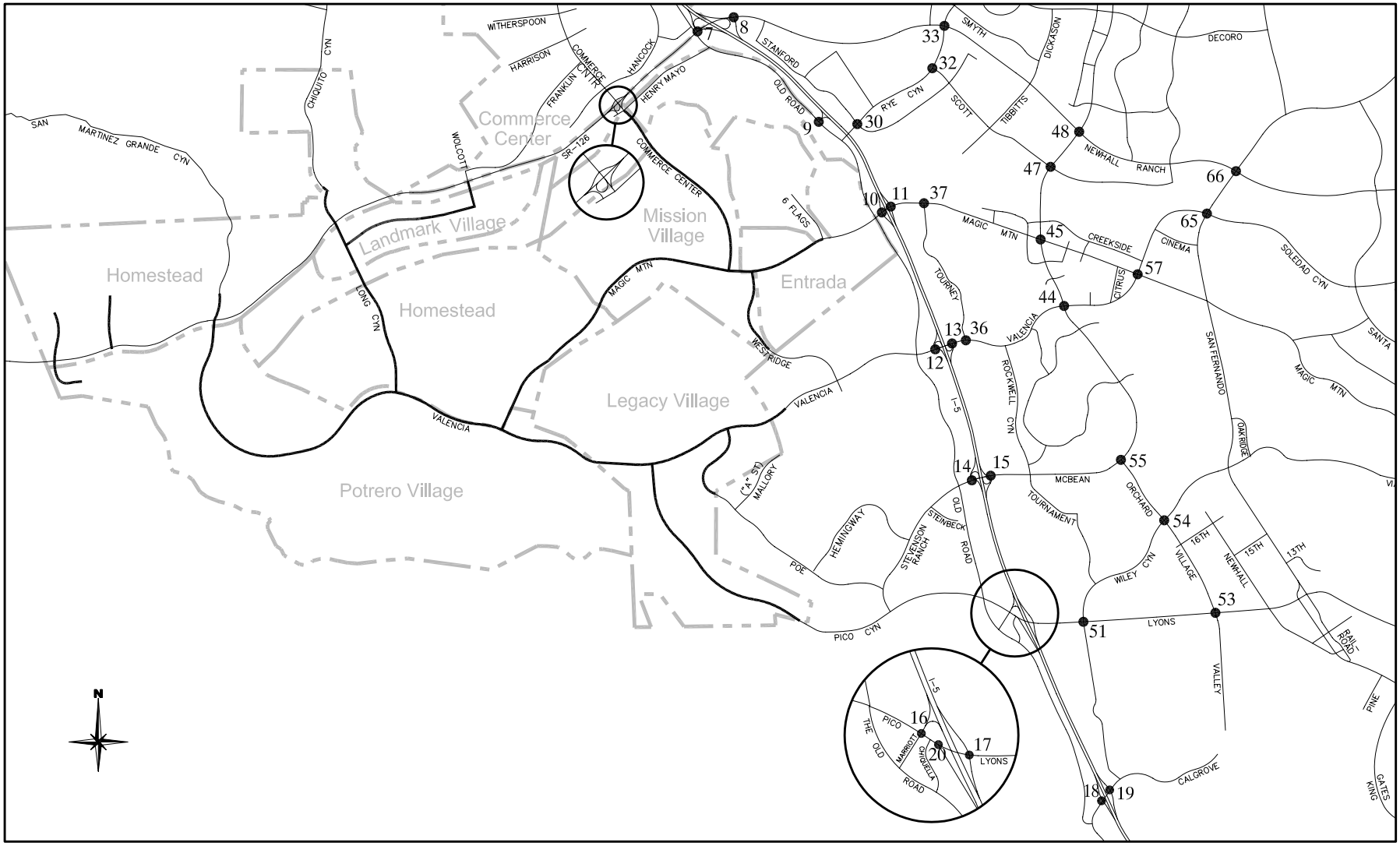
Example of Right-turn Capacity Utilization For Northbound Right

<u>1. Right-Turn-On-Green (RTOG)</u>

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

<u>2. Right-Turn-On-Red (RTOR)</u>

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)



Legend

Intersection Location
New Westside Roadway

Figure B-1

INTERSECTION STUDY LOCATIONS

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (typically 75%)

5. Right-turn Adjustment for ICU Calculation

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example of Shared Lane Utilization for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}.$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}.$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}.$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}.$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}.$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}.$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}.$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

$$\text{V/C (Left)} = \text{V/C (Through)}$$

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}.$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

7. I-5 SB Ramps & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	219	.06*	80	.02*
SBT	0	0	0		0	
SBR	2	3500	153	.04	185	.05
EBL	0	0	0		0	
EBT	4	7000	281	.04	532	.08
EBR	f		617		1260	
WBL	0	0	0		0	
WBT	3	5250	1343	.26*	848	.16*
WBR	f		10		196	
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.42**		**.31**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	970	.28*	640	.18*
SBT	0	0	0		0	
SBR	2	3500	400	.11	220	.06
EBL	0	0	0		0	
EBT	4	7000	630	.09	1750	.25
EBR	f		1140		1480	
WBL	0	0	0		0	
WBT	4	7000	2810	.40*	1890	.27*
WBR	f		20		330	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.78**		**.55**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	990	.28*	880	.25*
SBT	0	0	0		0	
SBR	2	3500	440	.13	260	.07
EBL	0	0	0		0	
EBT	4	7000	700	.10	1900	.27
EBR	f		1070		1410	
WBL	0	0	0		0	
WBT	4	7000	2730	.39*	1870	.27*
WBR	f		20		300	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.62**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	980	.28*	850	.24*
SBT	0	0	0		0	
SBR	2	3500	430	.12	280	.08
EBL	0	0	0		0	
EBT	4	7000	750	.11	2030	.29*
EBR	f		1100		1400	
WBL	0	0	0		0	
WBT	4	7000	2750	.39*	1910	.27
WBR	f		20		310	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.63**

7. I-5 SB Ramps & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	980	.28*	850	.24*
SBT	0	0	0		0	
SBR	2	3500	460	.13	340	.10
EBL	0	0	0		0	
EBT	4	7000	930	.13	2070	.30*
EBR	f		1100		1300	
WBL	0	0	0		0	
WBT	4	7000	2570	.37*	1860	.27
WBR	f		20		300	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .75 .64

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	950	.27*	860	.25*
SBT	0	0	0		0	
SBR	2	3500	510	.15	450	.13
EBL	0	0	0		0	
EBT	4	7000	1290	.18	2200	.31*
EBR	f		1240		1240	
WBL	0	0	0		0	
WBT	4	7000	2500	.36*	2110	.30
WBR	f		20		280	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .73 .66

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	890	.25*	830	.24*
SBT	0	0	0		0	
SBR	2	3500	590	.17	510	.15
EBL	0	0	0		0	
EBT	4	7000	1510	.22	2500	.36*
EBR	f		1420		1360	
WBL	0	0	0		0	
WBT	4	7000	2750	.39*	2480	.35
WBR	f		30		260	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .70

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	840	.24*	890	.25*
SBT	0	0	0		0	
SBR	2	3500	660	.19	530	.15
EBL	0	0	0		0	
EBT	4	7000	1630	.23	2820	.40*
EBR	f		1550		1390	
WBL	0	0	0		0	
WBT	4	7000	3010	.43*	2710	.39
WBR	f		30		260	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .77 .75

8. I-5 NB Ramps & SR-126

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1061	.20*	638	.12*
NBT	0	0	0		0	
NBR	1	1750	231	.13	50	.03
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	425	.06	514	.07*
EBR	f		73		189	
WBL	0	0	0		0	
WBT	3	5250	363	.07*	311	.06
WBR	f		145		334	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.37**		**.29**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1270	.24*	1270	.24*
NBT	0	0	0		0	
NBR	1	1750	40	.02	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1280	.18	1740	.25*
EBR	f		150		470	
WBL	0	0	0		0	
WBT	3	5250	1560	.30*	940	.18
WBR	f		290		660	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.59**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1030	.20*	1180	.22*
NBT	0	0	0		0	
NBR	1	1750	60	.03	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1320	.19	2050	.29*
EBR	f		170		510	
WBL	0	0	0		0	
WBT	3	5250	1730	.33*	980	.19
WBR	f		310		690	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.61**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1020	.19*	1200	.23*
NBT	0	0	0		0	
NBR	1	1750	60	.03	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1350	.19	2110	.30*
EBR	f		190		520	
WBL	0	0	0		0	
WBT	3	5250	1760	.34*	1000	.19
WBR	f		310		690	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.63**

8. I-5 NB Ramps & SR-126

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	940	.18*	1090	.21*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1440	.21	2130	.30*
EBR	f		250		560	
WBL	0	0	0		0	
WBT	3	5250	1660	.32*	1050	.20
WBR	f		330		700	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .61

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	910	.17*	1200	.23*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1650	.24	2180	.31*
EBR	f		330		640	
WBL	0	0	0		0	
WBT	3	5250	1630	.31*	1170	.22
WBR	f		350		700	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .58 .64

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1000	.19*	1380	.26*
NBT	0	0	0		0	
NBR	1	1750	90	.05	10	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1740	.25	2330	.33*
EBR	f		400		750	
WBL	0	0	0		0	
WBT	3	5250	1800	.34*	1330	.25
WBR	f		360		700	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .63 .69

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	3	5250	1040	.20*	1500	.29*
NBT	0	0	0		0	
NBR	1	1750	120	.07	20	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	4	7000	1760	.25	2640	.38*
EBR	f		450		800	
WBL	0	0	0		0	
WBT	3	5250	2030	.39*	1440	.27
WBR	f		370		710	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .69 .77

9. Rye/Old Rd & I-5 SB Ramps

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	43	.02	22	.01*
NBT	2	3500	675	.19*	425	.12
NBR	1	1750	1013	.58	1325	.76
SBL	1	1750	51	.03*	83	.05
SBT	2	3500	598	.17	699	.20*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		294		164	
WBT	0	3500	0	.08*	0	.05*
WBR	0.5		2		2	
Right Turn Adjustment			NBR	.33*	NBR	.56*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.92**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	820	.23*	790	.23*
NBR	2	3500	750	.21	990	.28
SBL	2	3500	110	.03*	750	.21*
SBT	3	5250	130	.02	540	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	390	.11*	210	.06*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.47**		**.60**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	610	.17*	660	.19*
NBR	2	3500	880	.25	1100	.31
SBL	2	3500	130	.04*	870	.25*
SBT	3	5250	100	.02	340	.06
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	370	.11*	90	.03*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Right Turn Adjustment					NBR	.09*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.42**		**.66**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	670	.19*	640	.18*
NBR	2	3500	830	.24	1070	.31
SBL	2	3500	120	.03*	940	.27*
SBT	3	5250	90	.02	370	.07
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	350	.10*	110	.03*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Right Turn Adjustment					NBR	.10*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for NBR						
TOTAL CAPACITY UTILIZATION				**.42**		**.68**

9. Rye/Old Rd & I-5 SB Ramps

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	760	.22*	740	.21*
NBR	2	3500	830	.24	1050	.30
SBL	2	3500	180	.05*	880	.25*
SBT	3	5250	170	.03	440	.08
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	360	.10*	160	.05*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .47 .65

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	800	.23*	900	.26*
NBR	2	3500	840	.24	1000	.29
SBL	2	3500	210	.06*	900	.26*
SBT	3	5250	200	.04	510	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	360	.10*	210	.06*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .49 .68

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	870	.25*	1010	.29*
NBR	2	3500	790	.23	1030	.29
SBL	2	3500	230	.07*	950	.27*
SBT	3	5250	250	.05	580	.11
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	420	.12*	290	.08*
WBT	0	0	0		0	
WBR	1	1750	10	.01	10	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .54 .74

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	30	.02
NBT	2	3500	1030	.29*	1130	.32*
NBR	2	3500	730	.21	1020	.29
SBL	2	3500	280	.08*	1030	.29*
SBT	3	5250	310	.06	660	.13
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	470	.13*	380	.11*
WBT	0	0	0		0	
WBR	1	1750	10	.01	20	.01
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .60 .82

10. I-5 SB Ramps & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		432		358	
SBT	0.5	3500	0	.12*	0	.10*
SBR	1	1750	32	.02	57	.03
EBL	0	0	0		0	
EBT	2	3500	291	.08*	439	.13*
EBR	f		104		251	
WBL	1	1750	498	.28*	454	.26*
WBT	3	5250	1442	.27	1267	.24
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.59**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		700	.13*	1260	.24*
SBT	0	7000	0		0	
SBR	1.5		160	.09	60	.03
EBL	0	0	0		0	
EBT	3	5250	360	.07	920	.18
EBR	2	3500	530	.15	900	.26
WBL	2	3500	60	.02	60	.02
WBT	4	7000	1910	.27*	1590	.23*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.57**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		670	.13*	1230	.23*
SBT	0	7000	0		0	
SBR	1.5		110	.06	70	.04
EBL	0	0	0		0	
EBT	3	5250	410	.08	820	.16
EBR	2	3500	490	.14	850	.24
WBL	2	3500	60	.02	60	.02
WBT	4	7000	2110	.30*	1670	.24*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.57**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		650	.12*	1230	.23*
SBT	0	7000	0		0	
SBR	1.5		120	.07	60	.03
EBL	0	0	0		0	
EBT	3	5250	570	.11	910	.17
EBR	2	3500	780	.22	910	.26
WBL	2	3500	60	.02	50	.01
WBT	4	7000	2230	.32*	1830	.26*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.59**

10. I-5 SB Ramps & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		680	.13*	1250	.24*
SBT	0	7000	0		0	
SBR	1.5		100	.06	60	.03
EBL	0	0	0		0	
EBT	3	5250	950	.18	1200	.23
EBR	2	3500	1120	.32	1070	.31
WBL	2	3500	50	.01	40	.01
WBT	4	7000	2180	.31*	2460	.35*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .54 .69

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		750	.14*	1240	.24*
SBT	0	7000	0		0	
SBR	1.5		100	.06	80	.05
EBL	0	0	0		0	
EBT	3	5250	1100	.21	1350	.26
EBR	2	3500	1200	.34	1100	.31
WBL	2	3500	40	.01	30	.01
WBT	4	7000	2250	.32*	2720	.39*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .56 .73

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		820	.16*	1270	.24*
SBT	0	7000	0		0	
SBR	1.5		90	.05	80	.05
EBL	0	0	0		0	
EBT	3	5250	1160	.22	1480	.28
EBR	2	3500	1230	.35	1160	.33
WBL	2	3500	30	.01	30	.01
WBT	4	7000	2420	.35*	2830	.40*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .74

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2.5		920	.18*	1310	.25*
SBT	0	7000	0		0	
SBR	1.5		60	.03	90	.05
EBL	0	0	0		0	
EBT	3	5250	1220	.23	1630	.31
EBR	2	3500	1270	.36	1190	.34
WBL	2	3500	20	.01	20	.01
WBT	4	7000	2530	.36*	2950	.42*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .64 .77

11. I-5 NB Ramps & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		1147	{.33}*	1181	{.34}*
NBT	0.5	3500	2	.33	7	.34
NBR	1	1750	363	.21	695	.40
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	21	.01	39	.02
EBT	2	3500	703	.20*	698	.20*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	793	.11	578	.08
WBR	f		279		413	
Right Turn Adjustment					NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.70**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1330	.25*	1030	.20*
NBT	0	7000	0		0	
NBR	1.5		110	.06	290	.17
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	60	.02	270	.08
EBT	3	5250	1000	.19*	1920	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	650	.12	620	.12
WBR	1.5		890	.25	810	.23
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.67**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1340	.26*	1060	.20*
NBT	0	7000	0		0	
NBR	1.5		110	.06	290	.17
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	50	.01	140	.04
EBT	3	5250	1030	.20*	1910	.36*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	830	{.13}	660	.13
WBR	1.5		680		760	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.66**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1390	.26*	1100	.21*
NBT	0	7000	0		0	
NBR	1.5		100	.06	280	.16
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	60	.02	150	.04
EBT	3	5250	1160	.22*	1990	.38*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	900	{.14}	780	{.14}
WBR	1.5		670		750	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.69**

11. I-5 NB Ramps & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1350	.26*	1340	.26*
NBT	0	7000	0		0	
NBR	1.5		90	.05	110	.06
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	90	.03	180	.05
EBT	3	5250	1540	.29*	2270	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	870	{.15}	1160	{.18}
WBR	1.5		770		740	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.65**		**.79**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1350	.26*	1370	.26*
NBT	0	7000	0		0	
NBR	1.5		100	.06	100	.06
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	100	.03	200	.06
EBT	3	5250	1750	.33*	2390	.46*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	940	{.17}	1380	{.21}
WBR	1.5		880		780	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.82**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1370	.26*	1390	.26*
NBT	0	7000	0		0	
NBR	1.5		90	.05	90	.05
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	100	.03	230	.07
EBT	3	5250	1870	.36*	2520	.48*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1090	{.18}	1470	{.23}
WBR	1.5		860		850	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.84**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2.5		1400	.27*	1400	.27*
NBT	0	7000	0		0	
NBR	1.5		90	.05	80	.05
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	130	.04	280	.08
EBT	3	5250	2020	.38*	2660	.51*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3.5	8750	1150	{.19}	1580	{.24}
WBR	1.5		900		860	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.75**		**.88**

12. I-5 SB Ramps & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	209	.06*	236	.07*
SBT	0	0	0		0	
SBR	1	1750	262	.15	54	.03
EBL	0	0	0		0	
EBT	3	5250	586	.11	498	.09
EBR	f		407		127	
WBL	0	0	0		0	
WBT	2	3500	760	.22*	878	.25*
WBR	f		844		1029	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.42**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	330	.09*	440	.13*
SBT	0	0	0		0	
SBR	1	1750	270	.15	360	.21
EBL	0	0	0		0	
EBT	3	5250	430	.08	540	.10
EBR	f		480		450	
WBL	0	0	0		0	
WBT	2	3500	1110	.32*	1080	.31*
WBR	f		1440		1230	
Right Turn Adjustment			SBR	.06*	SBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.62**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	410	.12*
SBT	0	0	0		0	
SBR	1	1750	240	.14	310	.18
EBL	0	0	0		0	
EBT	3	5250	420	.08	510	.10
EBR	f		480		450	
WBL	0	0	0		0	
WBT	2	3500	1120	.32*	1120	.32*
WBR	f		1410		1190	
Right Turn Adjustment			SBR	.04*	SBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.60**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	380	.11*	450	.13*
SBT	0	0	0		0	
SBR	1	1750	240	.14	340	.19
EBL	0	0	0		0	
EBT	3	5250	480	.09	580	.11
EBR	f		510		460	
WBL	0	0	0		0	
WBT	2	3500	1160	.33*	1330	.38*
WBR	f		1410		1160	
Right Turn Adjustment			SBR	.03*	SBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.67**

12. I-5 SB Ramps & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	370	.11*	420	.12*
SBT	0	0	0		0	
SBR	1	1750	270	.15	410	.23
EBL	0	0	0		0	
EBT	3	5250	820	.16	790	.15
EBR	f		690		570	
WBL	0	0	0		0	
WBT	2	3500	1360	.39*	1850	.53*
WBR	f		1180		990	
Right Turn Adjustment			SBR	.04*	SBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.86**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	390	.11*
SBT	0	0	0		0	
SBR	1	1750	320	.18	470	.27
EBL	0	0	0		0	
EBT	3	5250	1080	.21	1080	.21
EBR	f		920		740	
WBL	0	0	0		0	
WBT	3	5250	1580	.30*	2140	.41*
WBR	f		1170		920	
Right Turn Adjustment			SBR	.08*	SBR	.16*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.78**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	370	.11*	440	.13*
SBT	0	0	0		0	
SBR	1	1750	320	.18	550	.31
EBL	0	0	0		0	
EBT	3	5250	1110	.21	1240	.24
EBR	f		970		790	
WBL	0	0	0		0	
WBT	3	5250	1620	.31*	2220	.42*
WBR	f		1140		870	
Right Turn Adjustment			SBR	.07*	SBR	.18*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.83**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	630	.18*
SBT	0	0	0		0	
SBR	1	1750	340	.19	550	.31
EBL	0	0	0		0	
EBT	3	5250	1190	.23	1280	.24
EBR	f		910		780	
WBL	0	0	0		0	
WBT	3	5250	1650	.31*	2300	.44*
WBR	f		1190		910	
Right Turn Adjustment			SBR	.09*	SBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.85**

13. I-5 NB Ramps & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	291	.08*	273	.08*
NBT	0	0	0		0	
NBR	2	3500	945	.27	876	.25
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	697	.16	668	.14
EBR	0	0	157		79	
WBL	2	3500	80	.02	147	.04
WBT	4	7000	1266	.18*	1645	.24*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.17*	NBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.51**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	530	.15*	210	.06*
NBT	0	0	0		0	
NBR	2	3500	1070	.31	1190	.34
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	680	.15	830	.19
EBR	0	0	100		160	
WBL	2	3500	280	.08	300	.09
WBT	4	7000	2050	.29*	2110	.30*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.05*	NBR	.20*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.66**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	520	.15*	220	.06*
NBT	0	0	0		0	
NBR	2	3500	1060	.30	1250	.36
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	710	.15	770	.18
EBR	0	0	70		150	
WBL	2	3500	260	.07	300	.09
WBT	4	7000	2040	.29*	2100	.30*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.04*	NBR	.21*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.67**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	560	.16*	310	.09*
NBT	0	0	0		0	
NBR	2	3500	1060	.30	1180	.34
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	790	.16	890	.20
EBR	0	0	70		150	
WBL	2	3500	270	.08	280	.08
WBT	4	7000	2050	.29*	2190	.31*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.04*	NBR	.17*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.67**

13. I-5 NB Ramps & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	610	.17*	470	.13*
NBT	0	0	0		0	
NBR	2	3500	1030	.29	1100	.31
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1120	.23*	1060	.23
EBR	0	0	100		160	
WBL	2	3500	270	.08*	270	.08
WBT	4	7000	1990	.28	2380	.34*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.06*	NBR	.10*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.67**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	710	.20*	460	.13*
NBT	0	0	0		0	
NBR	2	3500	1010	.29	980	.28
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1360	.28*	1320	.29
EBR	0	0	110		180	
WBL	2	3500	290	.08*	270	.08
WBT	4	7000	2120	.30	2620	.37*
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.03*	NBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.69**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	700	.20*	480	.14*
NBT	0	0	0		0	
NBR	2	3500	1020	.29	920	.26
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1430	.29*	1510	.33*
EBR	0	0	110		200	
WBL	2	3500	310	.09*	270	.08*
WBT	4	7000	2160	.31	2650	.38
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.02*	NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.71**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	670	.19*	500	.14*
NBT	0	0	0		0	
NBR	2	3500	1050	.30	850	.24
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1460	.30*	1750	.37*
EBR	0	0	120		210	
WBL	2	3500	440	.13*	300	.09*
WBT	4	7000	2260	.32	2760	.39
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.01*	NBR	.03*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.73**

14. I-5 SB Ramps & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	144	.08*	406	.23*
SBT	0	0	0		0	
SBR	1	1750	57	.03	451	.26
EBL	0	0	0		0	
EBT	2	3500	627	.18	950	.27
EBR	1	1750	374	.21	93	.05
WBL	0	0	0		0	
WBT	2	3500	1326	.38*	1043	.30*
WBR	1	1750	215	.12	480	.27
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .56 .66

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	220	.13*	410	.23*
SBT	0	0	0		0	
SBR	1	1750	290	.17	440	.25
EBL	0	0	0		0	
EBT	2	3500	1140	.33*	1340	.38
EBR	1	1750	370	.21	170	.10
WBL	0	0	0		0	
WBT	2	3500	500	.14	1460	.42*
WBR	1	1750	450	.26	270	.15
Right Turn Adjustment					SBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .56 .77

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	230	.13*	420	.24*
SBT	0	0	0		0	
SBR	1	1750	290	.17	430	.25
EBL	0	0	0		0	
EBT	2	3500	1040	.30*	1370	.39
EBR	1	1750	380	.22	170	.10
WBL	0	0	0		0	
WBT	2	3500	560	.16	1470	.42*
WBR	1	1750	440	.25	270	.15
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .53 .77

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	250	.14*	420	.24*
SBT	0	0	0		0	
SBR	1	1750	290	.17	420	.24
EBL	0	0	0		0	
EBT	2	3500	1040	.30*	1340	.38
EBR	1	1750	390	.22	170	.10
WBL	0	0	0		0	
WBT	2	3500	550	.16	1490	.43*
WBR	1	1750	440	.25	280	.16
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .54 .77

14. I-5 SB Ramps & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	290	.17*	460	.26*
SBT	0	0	0		0	
SBR	1	1750	310	.18	390	.22
EBL	0	0	0		0	
EBT	2	3500	1060	.30*	1340	.38
EBR	1	1750	390	.22	160	.09
WBL	0	0	0		0	
WBT	2	3500	580	.17	1550	.44*
WBR	1	1750	440	.25	310	.18
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .57 .80

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	330	.19*	450	.26*
SBT	0	0	0		0	
SBR	1	1750	270	.15	360	.21
EBL	0	0	0		0	
EBT	2	3500	1080	.31*	1360	.39
EBR	1	1750	380	.22	190	.11
WBL	0	0	0		0	
WBT	2	3500	670	.19	1730	.49*
WBR	1	1750	450	.26	320	.18
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .60 .85

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	380	.11*	550	.16*
SBT	0	0	0		0	
SBR	1	1750	260	.15	340	.19
EBL	0	0	0		0	
EBT	2	3500	1070	.31*	1310	.37
EBR	1	1750	370	.21	180	.10
WBL	0	0	0		0	
WBT	2	3500	710	.20	1790	.51*
WBR	1	1750	440	.25	310	.18
Right Turn Adjustment					SBR	.03*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .80

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	420	.12*	440	.13*
SBT	0	0	0		0	
SBR	1	1750	250	.14	350	.20
EBL	0	0	0		0	
EBT	2	3500	1060	.30*	1380	.39
EBR	1	1750	360	.21	180	.10
WBL	0	0	0		0	
WBT	2	3500	800	.23	1800	.51*
WBR	1	1750	430	.25	300	.17
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .52 .81

15. I-5 NB Ramps & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	135	.04*	338	.10*
NBT	0	0	0		0	
NBR	2	3500	284	.08	742	.21
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	633	.18	1213	.35*
EBR	1	1750	133	.08	142	.08
WBL	0	0	0		0	
WBT	3	5250	1406	.27*	1185	.23
WBR	1	1750	101	.06	122	.07
Right Turn Adjustment					NBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.41**		**.66**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	90	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	560	.16	700	.20
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	950	.27*	1420	.41*
EBR	1	1750	410	.23	320	.18
WBL	0	0	0		0	
WBT	3	5250	870	.17	1270	.24
WBR	1	1750	140	.08	170	.10
Right Turn Adjustment			NBR	.13*	NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.71**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	100	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	530	.15	630	.18
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	980	.28*	1460	.42*
EBR	1	1750	310	.18	320	.18
WBL	0	0	0		0	
WBT	3	5250	900	.17	1280	.24
WBR	1	1750	120	.07	170	.10
Right Turn Adjustment			NBR	.12*	NBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.70**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	90	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	530	.15	700	.20
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1000	.29*	1440	.41*
EBR	1	1750	310	.18	310	.18
WBL	0	0	0		0	
WBT	3	5250	910	.17	1300	.25
WBR	1	1750	130	.07	170	.10
Right Turn Adjustment			NBR	.12*	NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.71**

15. I-5 NB Ramps & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	100	.03*	430	.12*
NBT	0	0	0		0	
NBR	2	3500	520	.15	670	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1090	.31*	1510	.43*
EBR	1	1750	280	.16	290	.17
WBL	0	0	0		0	
WBT	3	5250	930	.18	1390	.26
WBR	1	1750	120	.07	190	.11
Right Turn Adjustment			NBR	.12*	NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.72**

SCVCTM 4.1 2022 with Stage 5 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	120	.03*	530	.15*
NBT	0	0	0		0	
NBR	2	3500	530	.15	820	.23
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1160	.33*	1520	.43*
EBR	1	1750	270	.15	290	.17
WBL	0	0	0		0	
WBT	3	5250	1020	.19	1480	.28
WBR	1	1750	130	.07	210	.12
Right Turn Adjustment			NBR	.12*	NBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.76**

SCVCTM 4.1 2025 with Stage 6a Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	90	.03*	470	.13*
NBT	0	0	0		0	
NBR	2	3500	560	.16	890	.25
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1210	.35*	1600	.46*
EBR	1	1750	250	.14	270	.15
WBL	0	0	0		0	
WBT	3	5250	1080	.21	1600	.30
WBR	1	1750	160	.09	230	.13
Right Turn Adjustment			NBR	.13*	NBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.81**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	100	.03*	480	.14*
NBT	0	0	0		0	
NBR	2	3500	640	.18	970	.28
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1220	.35*	1560	.45*
EBR	1	1750	250	.14	260	.15
WBL	0	0	0		0	
WBT	3	5250	1150	.22	1590	.30
WBR	1	1750	170	.10	270	.15
Right Turn Adjustment			NBR	.15*	NBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.83**

16. I-5 SB Loop & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	67	.04	68	.04
SBL	1.5		332		375	
SBT	0.5	3500	136	.13*	71	.13*
SBR	1	1750	45	.03	118	.07
EBL	0	0	0		0	
EBT	2	3500	895	.27*	873	.27
EBR	0	0	56		58	
WBL	1	1750	48	.03*	53	.03
WBT	2	3500	612	.17	1281	.37*
WBR	1	1750	427	.24	282	.16
Right Turn Adjustment			NBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.60**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		490		540	
SBT	0.5	3500	10	.14*	360	.26*
SBR	1	1750	430	.25	20	.01
EBL	0	0	0		0	
EBT	2	3500	600	.18	1120	.34*
EBR	0	0	30		60	
WBL	1	1750	30	.02	120	.07*
WBT	2	3500	740	.21*	1280	.37
WBR	1	1750	290	.17	130	.07
Right Turn Adjustment			Multi	.12*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.77**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		500		540	
SBT	0.5	3500	10	.15*	350	.25*
SBR	1	1750	450	.26	20	.01
EBL	0	0	0		0	
EBT	2	3500	520	.16	1110	.33*
EBR	0	0	30		60	
WBL	1	1750	30	.02	120	.07*
WBT	2	3500	720	.21*	1260	.36
WBR	1	1750	280	.16	130	.07
Right Turn Adjustment			SBR	.11*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.75**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		540		560	
SBT	0.5	3500	10	.16*	350	.26*
SBR	1	1750	450	.26	10	.01
EBL	0	0	0		0	
EBT	2	3500	520	.16	1120	.34*
EBR	0	0	30		60	
WBL	1	1750	30	.02	140	.08*
WBT	2	3500	730	.21*	1240	.35
WBR	1	1750	290	.17	130	.07
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.78**

16. I-5 SB Loop & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		660		560	
SBT	0.5	3500	10	.19*	330	.25*
SBR	1	1750	440	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	560	.17	1090	.33*
EBR	0	0	30		50	
WBL	1	1750	30	.02	140	.08*
WBT	2	3500	760	.22*	1260	.36
WBR	1	1750	260	.15	110	.06
Right Turn Adjustment			SBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.76**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	60	.03	70	.04
SBL	1.5		720		540	
SBT	0.5	3500	10	.21*	320	.25*
SBR	1	1750	430	.25	10	.01
EBL	0	0	0		0	
EBT	2	3500	620	.19	1260	.37*
EBR	0	0	30		50	
WBL	1	1750	30	.02	150	.09*
WBT	2	3500	800	.23*	1480	.42
WBR	1	1750	260	.15	110	.06
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.81**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	70	.04	70	.04
SBL	1.5		710		580	
SBT	0.5	3500	10	.21*	300	.25*
SBR	1	1750	420	.24	10	.01
EBL	0	0	0		0	
EBT	2	3500	740	.22*	1410	.42*
EBR	0	0	30		50	
WBL	1	1750	30	.02*	170	.10*
WBT	2	3500	850	.24	1610	.46
WBR	1	1750	250	.14	110	.06
Right Turn Adjustment			Multi	.05*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.87**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	1	1750	70	.04	70	.04
SBL	1.5		770		610	
SBT	0.5	3500	10	.22*	300	.26*
SBR	1	1750	400	.23	10	.01
EBL	0	0	0		0	
EBT	2	3500	820	.24*	1440	.43*
EBR	0	0	30		50	
WBL	1	1750	30	.02*	170	.10*
WBT	2	3500	890	.25	1710	.49
WBR	1	1750	250	.14	110	.06
Right Turn Adjustment			NBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.89**

17. I-5 NB Ramps & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		251	{.07}*	685	{.20}*
NBT	0.5	3500	1	.07	0	.20
NBR	f		334		645	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	158	.09*	183	.10*
EBT	2	3500	719	.21	1081	.31
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1066	.27*	1017	.28*
WBR	0	0	326		445	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.68**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		120	{.04}*	620	{.18}*
NBT	0.5	3500	10	.04	0	.18
NBR	f		170		350	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	150	.09*	210	.12
EBT	2	3500	990	.28	1520	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	940	.27*	870	.25
WBR	0	0	500	.29	750	.43
Right Turn Adjustment			WBR	.02*	WBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.83**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		110	{.03}*	610	{.17}*
NBT	0.5	3500	10	.03	0	.17
NBR	f		170		350	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06*	210	.12
EBT	2	3500	970	.28	1510	.43*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	930	.27*	870	.25
WBR	0	0	500	.29	760	.43
Right Turn Adjustment			WBR	.02*	WBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.82**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		110	{.03}*	610	{.17}*
NBT	0.5	3500	10	.03	0	.17
NBR	f		170		350	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06*	210	.12
EBT	2	3500	1010	.29	1550	.44*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	940	.27*	870	.25
WBR	0	0	510	.29	790	.45
Right Turn Adjustment			WBR	.02*	WBR	.13*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.84**

17. I-5 NB Ramps & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	580	{.17}*
NBT	0.5	3500	10	.03	0	.17
NBR	f		170		320	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06*	170	.10
EBT	2	3500	1130	.32	1600	.46*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	950	.27*	910	.26
WBR	0	0	510	.29	870	.50
Right Turn Adjustment			WBR	.02*	WBR	.14*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.87**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		100	{.03}*	660	{.19}*
NBT	0.5	3500	10	.03	0	.19
NBR	f		160		340	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	150	.09
EBT	2	3500	1270	.36*	1690	.48*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	990	.28	1100	.31
WBR	0	0	500	.29	890	.51
Right Turn Adjustment					WBR	.12*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.89**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		130	{.04}*	790	{.23}*
NBT	0.5	3500	10	.04	0	.23
NBR	f		160		340	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	140	.08
EBT	2	3500	1300	.37*	1850	.53*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1010	.19	1140	.22
WBR	f		510		910	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.86**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		120	{.04}*	760	{.22}*
NBT	0.5	3500	10	.04	0	.22
NBR	f		160		370	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	110	.06	120	.07
EBT	2	3500	1380	.39*	1960	.56*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1090	.21	1280	.24
WBR	f		530		950	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.88**

18. I-5 SB Ramps & Calgrove

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		21		91	
SBT	0.5	1750	1	.01*	3	.05*
SBR	1	1750	255	.15	135	.08
EBL	0	0	0		0	
EBT	1	1750	110	.11*	657	.42*
EBR	0	0	74		70	
WBL	1	1750	466	.27*	123	.07*
WBT	1	1750	350	.20	212	.12
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.64**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		140	
SBT	0.5	1750	10	.02*	10	.09*
SBR	1	1750	280	.16	360	.21
EBL	0	0	0		0	
EBT	1	1750	380	.33*	690	.45*
EBR	0	0	200		90	
WBL	1	1750	400	.23*	100	.06*
WBT	1	1750	450	.26	130	.07
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.70**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		140	
SBT	0.5	1750	10	.02*	10	.09*
SBR	1	1750	280	.16	370	.21
EBL	0	0	0		0	
EBT	1	1750	380	.33*	700	.45*
EBR	0	0	200		90	
WBL	1	1750	400	.23*	100	.06*
WBT	1	1750	450	.26	130	.07
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.70**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		140	
SBT	0.5	1750	10	.02*	10	.09*
SBR	1	1750	300	.17	370	.21
EBL	0	0	0		0	
EBT	1	1750	380	.33*	690	.45*
EBR	0	0	200		90	
WBL	1	1750	400	.23*	100	.06*
WBT	1	1750	450	.26	130	.07
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.70**

18. I-5 SB Ramps & Calgrove

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		30		160	
SBT	0.5	1750	10	.02*	10	.10*
SBR	1	1750	350	.20	380	.22
EBL	0	0	0		0	
EBT	1	1750	410	.35*	740	.47*
EBR	0	0	210		80	
WBL	1	1750	400	.23*	120	.07*
WBT	1	1750	450	.26	160	.09
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .70 .74

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		40		180	
SBT	0.5	1750	10	.03*	10	.11*
SBR	1	1750	380	.22	380	.22
EBL	0	0	0		0	
EBT	1	1750	440	.38*	830	.53*
EBR	0	0	230		90	
WBL	1	1750	400	.23*	140	.08*
WBT	1	1750	470	.27	260	.15
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .74 .82

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		50		210	
SBT	0.5	1750	10	.03*	10	.13*
SBR	1	1750	410	.23	390	.22
EBL	0	0	0		0	
EBT	1	1750	480	.41*	900	.57*
EBR	0	0	240		90	
WBL	1	1750	400	.23*	160	.09*
WBT	1	1750	500	.29	280	.16
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .77 .89

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0.5		50		230	
SBT	0.5	1750	10	.03*	10	.14*
SBR	1	1750	450	.26	450	.26
EBL	0	0	0		0	
EBT	2	3500	550	.24*	1020	.33*
EBR	0	0	290		140	
WBL	1	1750	400	.23*	190	.11*
WBT	2	3500	530	.15	360	.10
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .68

19. I-5 NB Ramps & Calgrove

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		45	{.03}*	123	{.07}*
NBT	0.5	1750	4	.03	0	.07
NBR	1	1750	70	.04	264	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	70	.04*	304	.17*
EBT	1	1750	60	.03	444	.25
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	771	.47*	212	.16*
WBR	0	0	55		61	
Right Turn Adjustment					NBR	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.52**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	60	{.03}*
NBT	0.5	1750	0	.07	0	.03
NBR	1	1750	40	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	300	.17*	320	.18*
EBT	1	1750	90	.05	510	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	150	.14*
WBR	0	0	70		90	
Right Turn Adjustment					NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.52**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	60	{.03}*
NBT	0.5	1750	0	.07	0	.03
NBR	1	1750	40	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	300	.17*	320	.18*
EBT	1	1750	90	.05	520	.30
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	160	.14*
WBR	0	0	70		80	
Right Turn Adjustment					NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.52**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	60	{.03}*
NBT	0.5	1750	0	.07	0	.03
NBR	1	1750	40	.02	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	300	.17*	320	.18*
EBT	1	1750	90	.05	520	.30
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	740	.46*	150	.14*
WBR	0	0	70		90	
Right Turn Adjustment					NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.80**		**.52**

19. I-5 NB Ramps & Calgrove

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	80	{.05}*
NBT	0.5	1750	0	.07	0	.05
NBR	1	1750	40	.02	230	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	310	.18*	340	.19*
EBT	1	1750	110	.06	560	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	760	.47*	200	.18*
WBR	0	0	70		110	
Right Turn Adjustment					NBR	.04*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .82 .56

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		130	{.07}*	140	{.08}*
NBT	0.5	1750	0	.07	0	.08
NBR	1	1750	50	.03	270	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	330	.19*	400	.23*
EBT	1	1750	120	.07	610	.35
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	780	.49*	250	.23*
WBR	0	0	80		150	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .85 .64

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		140	{.08}*	160	{.09}*
NBT	0.5	1750	0	.08	0	.09
NBR	1	1750	60	.03	290	.17
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	350	.20*	440	.25*
EBT	1	1750	150	.09	670	.38
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1750	790	.50*	290	.27*
WBR	0	0	90		180	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .88 .71

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0.5		160	{.09}*	190	{.11}*
NBT	0.5	1750	0	.09	0	.11
NBR	1	1750	70	.04	330	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	390	.22*	510	.29*
EBT	2	3500	180	.05	750	.21
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	820	.26*	360	.17*
WBR	0	0	100		220	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .67

20. I-5 SB Ramp & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	877	.25	1264	.36*
EBR	1	1750	591	.34	332	.19
WBL	0	0	0		0	
WBT	3	5250	1317	.25*	1702	.32
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.09*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .44 .46

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1170	.33*	1720	.49*
EBR	1	1750	370	.21	230	.13
WBL	0	0	0		0	
WBT	3	5250	1060	.20	1490	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .43 .59

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1110	.32*	1710	.49*
EBR	1	1750	370	.21	230	.13
WBL	0	0	0		0	
WBT	3	5250	1040	.20	1480	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .42 .59

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1150	.33*	1740	.50*
EBR	1	1750	380	.22	220	.13
WBL	0	0	0		0	
WBT	3	5250	1050	.20	1480	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .43 .60

20. I-5 SB Ramp & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1270	.36*	1760	.50*
EBR	1	1750	380	.22	210	.12
WBL	0	0	0		0	
WBT	3	5250	1050	.20	1490	.28
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .46 .60

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1410	.40*	1830	.52*
EBR	1	1750	370	.21	230	.13
WBL	0	0	0		0	
WBT	3	5250	1090	.21	1760	.34
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .50 .62

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1440	.41*	1970	.56*
EBR	1	1750	450	.26	260	.15
WBL	0	0	0		0	
WBT	3	5250	1130	.22	1920	.37
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .51 .66

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1520	.43*	2060	.59*
EBR	1	1750	530	.30	250	.14
WBL	0	0	0		0	
WBT	3	5250	1200	.23	2040	.39
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .53 .69

30. Stanford & Rye Cyn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	67	.02	298	.09*
NBT	1	1750	95	.10*	173	.13
NBR	0	0	75		58	
SBL	1	1750	89	.05*	264	.15
SBT	2	3500	99	.05	338	.19*
SBR	0	0	63		381	.22
EBL	1	1750	279	.16*	115	.07*
EBT	3	5250	1327	.34	1323	.27
EBR	0	0	439		73	
WBL	1	1750	36	.02	24	.01
WBT	3	5250	1288	.25*	1082	.27*
WBR	0	0	36		345	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.66**		**.72**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	450	.13*	230	.07*
NBT	1	1750	120	.10	150	.11
NBR	0	0	60		50	
SBL	1	1750	30	.02	160	.09
SBT	2	3500	50	.03*	590	.26*
SBR	0	0	80	.05	330	
EBL	1	1750	190	.11*	120	.07*
EBT	3	5250	1430	.30	1490	.32
EBR	0	0	160		170	
WBL	1	1750	20	.01	20	.01
WBT	3	5250	1180	.23*	1420	.28*
WBR	0	0	10		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.78**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	450	.13*	230	.07*
NBT	1	1750	20	.04	110	.09
NBR	0	0	50		50	
SBL	1	1750	20	.01	100	.06
SBT	2	3500	50	.03*	340	.19*
SBR	0	0	90	.05	330	
EBL	1	1750	150	.09*	110	.06*
EBT	3	5250	1440	.31	1390	.29
EBR	0	0	180		150	
WBL	1	1750	20	.01	20	.01
WBT	3	5250	1180	.23*	1450	.29*
WBR	0	0	10		60	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.71**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	470	.13*	260	.07*
NBT	1	1750	30	.05	110	.10
NBR	0	0	50		60	
SBL	1	1750	30	.02	110	.06
SBT	2	3500	50	.03*	370	.20*
SBR	0	0	90	.05	330	
EBL	1	1750	160	.09	110	.06*
EBT	3	5250	1480	.33*	1470	.30
EBR	0	0	250		130	
WBL	1	1750	20	.01*	30	.02
WBT	3	5250	1260	.24	1510	.30*
WBR	0	0	10		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.73**

30. Stanford & Rye Cyn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	540	.15*	330	.09*
NBT	1	1750	10	.03	110	.09
NBR	0	0	50		50	
SBL	1	1750	20	.01	100	.06
SBT	2	3500	50	.03*	370	.20*
SBR	0	0	90	.05	340	
EBL	1	1750	150	.09	120	.07*
EBT	3	5250	1690	.38*	1550	.33
EBR	0	0	300		160	
WBL	1	1750	20	.01*	20	.01
WBT	3	5250	1300	.25	1700	.33*
WBR	0	0	10		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.79**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	630	.18*	390	.11*
NBT	1	1750	10	.03	110	.09
NBR	0	0	50		50	
SBL	1	1750	40	.02	90	.05
SBT	2	3500	60	.03*	440	.22*
SBR	0	0	90	.05	340	
EBL	1	1750	150	.09	120	.07*
EBT	3	5250	1680	.38*	1620	.36
EBR	0	0	330		270	
WBL	1	1750	20	.01*	20	.01
WBT	3	5250	1380	.26	1780	.35*
WBR	0	0	10		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.85**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	640	.18*	420	.12*
NBT	1	1750	20	.04	120	.10
NBR	0	0	50		50	
SBL	1	1750	40	.02	100	.06
SBT	2	3500	70	.02*	520	.15*
SBR	d	1750	90	.05	350	.20
EBL	1	1750	160	.09	120	.07*
EBT	3	5250	1700	.39*	1780	.40
EBR	0	0	360		300	
WBL	1	1750	20	.01*	20	.01
WBT	3	5250	1410	.27	1830	.36*
WBR	0	0	10		50	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.70**		**.80**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	730	.21*	450	.13*
NBT	1	1750	70	.07	160	.12
NBR	0	0	60		50	
SBL	1	1750	50	.03	170	.10
SBT	2	3500	70	.02*	750	.21*
SBR	d	1750	90	.05	350	.20
EBL	1	1750	190	.11*	120	.07
EBT	3	5250	1690	.39	2020	.43*
EBR	0	0	340		260	
WBL	1	1750	20	.01	20	.01*
WBT	3	5250	1500	.29*	1890	.37
WBR	0	0	10		60	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.73**		**.88**

32. Ave Scott & Rye

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		233	{.07}*	241	{.07}*
NBT	0.5	3500	2	.07	4	.07
NBR	2	3500	79	.02	157	.04
SBL	0	0	1		12	
SBT	1	1750	7	.00*	7	.01*
SBR	0	0	0		2	
EBL	1	1750	13	.01	2	.00
EBT	2	3500	1200	.34*	1720	.49*
EBR	1	1750	151	.09	228	.13
WBL	1	1750	326	.19*	63	.04*
WBT	3	5250	1697	.32	806	.15
WBR	0	0	1		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .70 .71

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		370	{.11}*	280	{.08}*
NBT	0.5	3500	10	.11	10	.08
NBR	2	3500	90	.03	270	.08
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1170	.33*	1560	.45*
EBR	1	1750	400	.23	560	.32
WBL	1	1750	210	.12*	70	.04*
WBT	3	5250	1590	.30	1140	.22
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .69

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		320	{.09}*	270	{.08}*
NBT	0.5	3500	10	.09	10	.08
NBR	2	3500	90	.03	270	.08
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1190	.34*	1440	.41*
EBR	1	1750	410	.23	520	.30
WBL	1	1750	200	.11*	70	.04*
WBT	3	5250	1610	.31	1160	.22
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .65 .65

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		330	{.10}*	290	{.09}*
NBT	0.5	3500	10	.10	10	.09
NBR	2	3500	90	.03	280	.08
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1260	.36*	1460	.42*
EBR	1	1750	360	.21	560	.32
WBL	1	1750	200	.11*	60	.03*
WBT	3	5250	1660	.32	1220	.23
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .68 .66

32. Ave Scott & Rye

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		320	{.09}*	290	{.09}*
NBT	0.5	3500	10	.09	10	.09
NBR	2	3500	90	.03	240	.07
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1360	.39*	1490	.43*
EBR	1	1750	410	.23	560	.32
WBL	1	1750	200	.11*	60	.03*
WBT	3	5250	1650	.32	1360	.26
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .70 .67

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		300	{.09}*	300	{.09}*
NBT	0.5	3500	10	.09	10	.09
NBR	2	3500	90	.03	250	.07
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1350	.39*	1540	.44*
EBR	1	1750	400	.23	530	.30
WBL	1	1750	220	.13*	60	.03*
WBT	3	5250	1720	.33	1380	.26
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .72 .68

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		320	{.09}*	300	{.09}*
NBT	0.5	3500	10	.09	10	.09
NBR	2	3500	90	.03	280	.08
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1390	.40*	1660	.47*
EBR	1	1750	390	.22	540	.31
WBL	1	1750	220	.13*	60	.03*
WBT	3	5250	1730	.33	1420	.27
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .73 .71

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		310	{.09}*	300	{.09}*
NBT	0.5	3500	10	.09	10	.09
NBR	2	3500	100	.03	290	.08
SBL	0	0	10		10	
SBT	1	1750	10	.01*	10	.02*
SBR	0	0	0		10	
EBL	1	1750	10	.01	10	.01
EBT	2	3500	1390	.40*	1920	.55*
EBR	1	1750	390	.22	540	.31
WBL	1	1750	230	.13*	60	.03*
WBT	3	5250	1790	.34	1470	.28
WBR	0	0	10		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .73 .79

33. Copper Hill & Newhall Ranch

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	3	5250	1191	.23	1526	.29*
NBR	1	1750	83	.05	238	.14
SBL	1	1750	82	.05	165	.09*
SBT	3	5250	1823	.35*	837	.16
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3500	476	.14*	344	.10*
WBT	0	0	0		0	
WBR	1	1750	185	.11	98	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.58**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	140	.04*	350	.10*
NBT	3	5250	1100	.21	1200	.23
NBR	f		50		180	
SBL	2	3500	140	.04	200	.06
SBT	3	5250	1430	.27*	1120	.21*
SBR	2	3500	800	.23	540	.15
EBL	2	3500	390	.11*	590	.17
EBT	3	5250	510	.10	1100	.21*
EBR	1	1750	160	.09	120	.07
WBL	2	3500	470	.13	410	.12*
WBT	3	5250	870	.17*	590	.11
WBR	f		330		270	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.74**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	250	.07*	390	.11*
NBT	3	5250	1010	.19	1050	.20
NBR	f		50		200	
SBL	2	3500	130	.04	210	.06
SBT	3	5250	1380	.26*	1050	.20*
SBR	2	3500	830	.24	550	.16
EBL	2	3500	390	.11*	730	.21
EBT	3	5250	550	.10	1610	.31*
EBR	1	1750	170	.10	220	.13
WBL	2	3500	540	.15	410	.12*
WBT	3	5250	1210	.23*	690	.13
WBR	f		450		270	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.77**		**.84**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	270	.08*	400	.11*
NBT	3	5250	1050	.20	1060	.20
NBR	f		60		190	
SBL	2	3500	130	.04	200	.06
SBT	3	5250	1460	.28*	1090	.21*
SBR	2	3500	760	.22	550	.16
EBL	2	3500	390	.11*	740	.21
EBT	3	5250	550	.10	1630	.31*
EBR	1	1750	170	.10	190	.11
WBL	2	3500	490	.14	460	.13*
WBT	3	5250	1300	.25*	690	.13
WBR	f		440		270	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.86**

33. Copper Hill & Newhall Ranch

SCVCTM 4.1 2018 with Stage 4 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	290	.08*	390	.11*
NBT	3	5250	1100	.21	1040	.20
NBR	f		80		210	
SBL	2	3500	130	.04	200	.06
SBT	3	5250	1380	.26*	1140	.22*
SBR	2	3500	820	.23	570	.16
EBL	2	3500	410	.12*	720	.21
EBT	3	5250	590	.11	1660	.32*
EBR	1	1750	170	.10	250	.14
WBL	2	3500	560	.16	480	.14*
WBT	3	5250	1210	.23*	740	.14
WBR	f		430		260	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.79**		**.89**

SCVCTM 4.1 2022 with Stage 5 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	290	.08*	400	.11*
NBT	3	5250	1070	.20	1070	.20
NBR	f		90		230	
SBL	2	3500	130	.04	200	.06
SBT	3	5250	1400	.27*	1150	.22*
SBR	2	3500	820	.23	600	.17
EBL	2	3500	460	.13*	720	.21
EBT	3	5250	630	.12	1660	.32*
EBR	1	1750	210	.12	280	.16
WBL	2	3500	590	.17	470	.13*
WBT	3	5250	1220	.23*	770	.15
WBR	f		430		260	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**.88**

SCVCTM 4.1 2025 with Stage 6a Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	230	.07*	420	.12*
NBT	3	5250	1160	.22	1140	.22
NBR	f		110		270	
SBL	2	3500	130	.04	190	.05
SBT	3	5250	1400	.27*	1160	.22*
SBR	2	3500	870	.25	650	.19
EBL	2	3500	460	.13*	720	.21
EBT	4	7000	660	.09	1730	.25*
EBR	1	1750	230	.13	280	.16
WBL	2	3500	590	.17	490	.14*
WBT	3	5250	1330	.25*	850	.16
WBR	f		360		280	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.82**		**.83**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	160	.05*	420	.12*
NBT	3	5250	1220	.23	1260	.24
NBR	f		130		400	
SBL	2	3500	130	.04	200	.06
SBT	3	5250	1380	.26*	1220	.23*
SBR	2	3500	930	.27	640	.18
EBL	2	3500	450	.13*	730	.21*
EBT	4	7000	650	.09	1770	.25
EBR	1	1750	250	.14	270	.15
WBL	2	3500	640	.18	500	.14
WBT	3	5250	1440	.27*	940	.18*
WBR	f		350		280	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.81**		**.84**

36. Tourney & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	68	.02*	165	.05*
SBT	0	0	0		0	
SBR	1	1750	65	.04	234	.13
EBL	2	3500	278	.08*	97	.03*
EBT	4	7000	1515	.22	1459	.21
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	1240	.20*	1490	.22*
WBR	0	0	194		70	
Right Turn Adjustment					SBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.40**		**.46**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	310	.09*
SBT	0	0	0		0	
SBR	1	1750	100	.06	270	.15
EBL	2	3500	290	.08*	110	.03*
EBT	4	7000	1450	.21	1920	.27
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2210	.36*	2120	.32*
WBR	0	0	280		90	
Right Turn Adjustment					SBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.57**		**.58**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	300	.09*
SBT	0	0	0		0	
SBR	1	1750	100	.06	270	.15
EBL	2	3500	280	.08*	110	.03*
EBT	4	7000	1480	.21	1920	.27
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2190	.35*	2100	.31*
WBR	0	0	280		80	
Right Turn Adjustment					SBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.57**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	300	.09*
SBT	0	0	0		0	
SBR	1	1750	100	.06	280	.16
EBL	2	3500	280	.08*	110	.03*
EBT	4	7000	1560	.22	1970	.28
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2190	.35*	2160	.32*
WBR	0	0	280		90	
Right Turn Adjustment					SBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.59**

36. Tourney & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	330	.09*
SBT	0	0	0		0	
SBR	1	1750	130	.07	310	.18
EBL	2	3500	310	.09*	110	.03*
EBT	4	7000	1840	.26	2060	.29
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2080	.34*	2300	.34*
WBR	0	0	280		110	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.63**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	330	.09*
SBT	0	0	0		0	
SBR	1	1750	140	.08	340	.19
EBL	2	3500	330	.09*	150	.04*
EBT	4	7000	2030	.29	2170	.31
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2200	.36*	2490	.37*
WBR	0	0	310		120	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.67**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	110	.03*	340	.10*
SBT	0	0	0		0	
SBR	1	1750	140	.08	350	.20
EBL	2	3500	350	.10*	150	.04*
EBT	4	7000	2090	.30	2290	.33
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2260	.37*	2500	.38*
WBR	0	0	330		150	
Right Turn Adjustment					SBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.69**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	120	.03*	350	.10*
SBT	0	0	0		0	
SBR	1	1750	160	.09	390	.22
EBL	2	3500	390	.11*	160	.05*
EBT	4	7000	2110	.30	2460	.35
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	4	7000	2460	.40*	2610	.40*
WBR	0	0	340		170	
Right Turn Adjustment					SBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.73**

37. Tourney & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	29	.01*	128	.04*
NBT	0	0	0		0	
NBR	1	1750	61	.03	260	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	841	.16*	1302	.25*
EBR	1	1750	132	.08	45	.03
WBL	1	1750	289	.17*	81	.05*
WBT	3	5250	944	.18	810	.15
WBR	0	0	0		0	
Right Turn Adjustment					NBR	.07*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.44**		**.51**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	70	.02*	280	.08*
NBT	0	0	0		0	
NBR	1	1750	60	.03	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	790	.15	2030	.39*
EBR	1	1750	240	.14	60	.03
WBL	1	1750	170	.10	110	.06*
WBT	3	5250	1430	.27*	940	.18
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.39**		**.63**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	70	.02*	280	.08*
NBT	0	0	0		0	
NBR	1	1750	60	.03	200	.11
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	810	.15	2030	.39*
EBR	1	1750	250	.14	60	.03
WBL	1	1750	170	.10	100	.06*
WBT	3	5250	1390	.26*	930	.18
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.38**		**.63**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	70	.02*	300	.09*
NBT	0	0	0		0	
NBR	1	1750	60	.03	200	.11
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	920	.18	2090	.40*
EBR	1	1750	260	.15	70	.04
WBL	1	1750	160	.09	110	.06*
WBT	3	5250	1460	.28*	1010	.19
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.40**		**.65**

37. Tourney & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	60	.02*	330	.09*
NBT	0	0	0		0	
NBR	1	1750	70	.04	180	.10
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1240	.24*	2200	.42*
EBR	1	1750	290	.17	70	.04
WBL	1	1750	160	.09*	100	.06*
WBT	3	5250	1530	.29	1310	.25
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .45 .67

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	60	.02*	360	.10*
NBT	0	0	0		0	
NBR	1	1750	70	.04	180	.10
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1420	.27*	2300	.44*
EBR	1	1750	320	.18	70	.04
WBL	1	1750	170	.10*	120	.07*
WBT	3	5250	1710	.33	1530	.29
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .49 .71

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	70	.02*	400	.11*
NBT	0	0	0		0	
NBR	1	1750	70	.04	190	.11
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1520	.29*	2410	.46*
EBR	1	1750	330	.19	80	.05
WBL	1	1750	160	.09*	110	.06*
WBT	3	5250	1830	.35	1630	.31
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .50 .73

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	60	.02*	420	.12*
NBT	0	0	0		0	
NBR	1	1750	80	.05	190	.11
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1650	.31*	2530	.48*
EBR	1	1750	340	.19	80	.05
WBL	1	1750	170	.10*	120	.07*
WBT	3	5250	1940	.37	1720	.33
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .53 .77

44. McBean & Valencia

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	152	.04*	128	.04
NBT	3	5250	848	.16	1032	.20*
NBR	2	3500	336	.10	415	.12
SBL	2	3500	94	.03	189	.05*
SBT	3	5250	831	.16*	1021	.19
SBR	2	3500	787	.22	683	.20
EBL	2	3500	443	.13*	668	.19*
EBT	3	5250	717	.14	1274	.24
EBR	1	1750	40	.02	127	.07
WBL	2	3500	278	.08	446	.13
WBT	3	5250	989	.19*	926	.18*
WBR	1	1750	215	.12	43	.02
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.62**		**.72**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	310	.09*	180	.05
NBT	3	5250	920	.18	1390	.26*
NBR	2	3500	310	.09	830	.24
SBL	2	3500	90	.03	270	.08*
SBT	3	5250	890	.17*	1270	.24
SBR	2	3500	1260	.36	1140	.33
EBL	2	3500	810	.23*	890	.25*
EBT	3	5250	650	.12	1270	.24
EBR	1	1750	10	.01	290	.17
WBL	2	3500	430	.12	450	.13
WBT	3	5250	1320	.25*	1030	.20*
WBR	1	1750	250	.14	240	.14
Right Turn Adjustment			SBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.89**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	320	.09*	190	.05
NBT	3	5250	910	.17	1330	.25*
NBR	2	3500	300	.09	850	.24
SBL	2	3500	80	.02	290	.08*
SBT	3	5250	890	.17*	1260	.24
SBR	2	3500	1250	.36	1130	.32
EBL	2	3500	800	.23*	930	.27*
EBT	3	5250	650	.12	1220	.23
EBR	1	1750	10	.01	290	.17
WBL	2	3500	440	.13	460	.13
WBT	3	5250	1290	.25*	1010	.19*
WBR	1	1750	300	.17	240	.14
Right Turn Adjustment			SBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.89**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	320	.09*	190	.05
NBT	3	5250	900	.17	1380	.26*
NBR	2	3500	290	.08	830	.24
SBL	2	3500	90	.03	280	.08*
SBT	3	5250	880	.17*	1260	.24
SBR	2	3500	1260	.36	1150	.33
EBL	2	3500	820	.23*	880	.25*
EBT	3	5250	660	.13	1260	.24
EBR	1	1750	10	.01	290	.17
WBL	2	3500	440	.13	450	.13
WBT	3	5250	1270	.24*	1030	.20*
WBR	1	1750	320	.18	240	.14
Right Turn Adjustment			SBR	.02*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.89**

44. McBean & Valencia

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	330	.09*	210	.06
NBT	3	5250	850	.16	1330	.25*
NBR	2	3500	300	.09	840	.24
SBL	2	3500	90	.03	300	.09*
SBT	3	5250	790	.15*	1150	.22
SBR	2	3500	1040	.30	1130	.32
EBL	2	3500	870	.25*	860	.25*
EBT	3	5250	790	.15	1220	.23
EBR	1	1750	20	.01	330	.19
WBL	2	3500	440	.13	420	.12
WBT	3	5250	1370	.26*	1100	.21*
WBR	1	1750	240	.14	240	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.90**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	340	.10*	210	.06
NBT	3	5250	840	.16	1430	.27*
NBR	2	3500	310	.09	830	.24
SBL	2	3500	80	.02	260	.07*
SBT	3	5250	860	.16*	1180	.22
SBR	2	3500	1050	.30	1170	.33
EBL	2	3500	870	.25*	850	.24*
EBT	3	5250	890	.17	1340	.26
EBR	1	1750	20	.01	330	.19
WBL	2	3500	430	.12	490	.14
WBT	3	5250	1430	.27*	1150	.22*
WBR	1	1750	260	.15	240	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**.90**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	340	.10*	210	.06
NBT	3	5250	840	.16	1540	.29*
NBR	2	3500	320	.09	840	.24
SBL	2	3500	80	.02	250	.07*
SBT	3	5250	890	.17*	1220	.23
SBR	2	3500	1040	.30	1170	.33
EBL	2	3500	870	.25*	830	.24
EBT	3	5250	940	.18	1400	.27*
EBR	1	1750	20	.01	330	.19
WBL	2	3500	470	.13	500	.14*
WBT	4	7000	1510	.22*	1200	.17
WBR	1	1750	330	.19	250	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.87**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	350	.10*	220	.06
NBT	3	5250	900	.17	1380	.26*
NBR	2	3500	310	.09	1040	.30
SBL	2	3500	80	.02	220	.06*
SBT	3	5250	930	.18*	1250	.24
SBR	2	3500	1050	.30	1120	.32
EBL	2	3500	820	.23*	940	.27*
EBT	3	5250	990	.19	1390	.26
EBR	1	1750	20	.01	310	.18
WBL	2	3500	470	.13	540	.15
WBT	4	7000	1670	.24*	1220	.17*
WBR	1	1750	230	.13	260	.15
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.86**

45. McBean & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	71	.02	88	.03
NBT	3	5250	1131	.22*	1523	.29*
NBR	f		35		74	
SBL	2	3500	252	.07*	305	.09*
SBT	4	7000	1772	.25	1602	.23
SBR	f		502		325	
EBL	2	3500	310	.09*	535	.15*
EBT	2	3500	457	.13	712	.20
EBR	1	1750	75	.04	86	.05
WBL	2	3500	71	.02	202	.06
WBT	2	3500	343	.10*	388	.11*
WBR	1	1750	202	.12	327	.19
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.75**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	90	.03*	160	.05
NBT	4	7000	1610	.23	2560	.37*
NBR	f		50		250	
SBL	2	3500	380	.11	300	.09*
SBT	4	7000	2260	.32*	2560	.37
SBR	f		760		280	
EBL	2	3500	370	.11*	640	.18*
EBT	3	5250	740	.14	1380	.26
EBR	1	1750	70	.04	180	.10
WBL	2	3500	70	.02	180	.05
WBT	3	5250	650	.12*	790	.15*
WBR	1	1750	590	.34	390	.22
Right Turn Adjustment			WBR	.10*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for WBR						
TOTAL CAPACITY UTILIZATION				**.78**		**.89**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	140	.04*	170	.05
NBT	4	7000	1610	.23	2550	.36*
NBR	f		50		250	
SBL	2	3500	360	.10	280	.08*
SBT	4	7000	2230	.32*	2580	.37
SBR	f		640		270	
EBL	2	3500	350	.10*	610	.17
EBT	3	5250	770	.15	1450	.28*
EBR	1	1750	80	.05	160	.09
WBL	2	3500	70	.02	180	.05*
WBT	3	5250	690	.13*	770	.15
WBR	1	1750	560	.32	400	.23
Right Turn Adjustment			WBR	.07*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for WBR						
TOTAL CAPACITY UTILIZATION				**.76**		**.87**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	130	.04*	190	.05
NBT	4	7000	1650	.24	2530	.36*
NBR	f		40		250	
SBL	2	3500	350	.10	280	.08*
SBT	4	7000	2250	.32*	2590	.37
SBR	f		640		290	
EBL	2	3500	370	.11*	620	.18*
EBT	3	5250	840	.16	1470	.28
EBR	1	1750	90	.05	160	.09
WBL	2	3500	70	.02	180	.05
WBT	3	5250	720	.14*	810	.15*
WBR	1	1750	530	.30	410	.23
Right Turn Adjustment			WBR	.04*		
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for WBR						
TOTAL CAPACITY UTILIZATION				**.75**		**.87**

45. McBean & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	100	.03	210	.06
NBT	4	7000	1590	.23*	2420	.35*
NBR	f		40		260	
SBL	2	3500	330	.09*	270	.08*
SBT	4	7000	1960	.28	2490	.36
SBR	f		770		370	
EBL	2	3500	490	.14*	560	.16
EBT	3	5250	1020	.19	1580	.30*
EBR	1	1750	120	.07	150	.09
WBL	2	3500	70	.02	160	.05*
WBT	3	5250	690	.13*	920	.18
WBR	1	1750	580	.33	440	.25
Right Turn Adjustment			WBR	.11*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .80 .88

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	110	.03	250	.07*
NBT	4	7000	1600	.23*	2440	.35
NBR	f		40		260	
SBL	2	3500	330	.09*	220	.06
SBT	4	7000	2040	.29	2520	.36*
SBR	f		940		420	
EBL	2	3500	540	.15*	510	.15
EBT	3	5250	1130	.22	1680	.32*
EBR	1	1750	120	.07	160	.09
WBL	2	3500	70	.02	150	.04*
WBT	3	5250	650	.12*	1040	.20
WBR	1	1750	570	.33	470	.27
Right Turn Adjustment			WBR	.12*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .81 .89

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	110	.03	230	.07*
NBT	4	7000	1660	.24*	2510	.36
NBR	f		40		250	
SBL	2	3500	340	.10*	240	.07
SBT	4	7000	2040	.29	2550	.36*
SBR	f		940		430	
EBL	2	3500	520	.15*	500	.14
EBT	3	5250	1230	.23	1740	.33*
EBR	1	1750	130	.07	170	.10
WBL	2	3500	70	.02	150	.04*
WBT	3	5250	760	.14*	1130	.22
WBR	1	1750	520	.30	470	.27
Right Turn Adjustment			WBR	.06*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .79 .90

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	80	.02*	300	.09
NBT	4	7000	1640	.23	2460	.35*
NBR	f		40		230	
SBL	2	3500	330	.09	320	.09*
SBT	4	7000	2100	.30*	2380	.34
SBR	f		890		550	
EBL	2	3500	530	.15*	530	.15
EBT	3	5250	1340	.26	1570	.30*
EBR	1	1750	140	.08	280	.16
WBL	2	3500	70	.02	210	.06*
WBT	3	5250	930	.18*	990	.19
WBR	1	1750	510	.29	470	.27
Right Turn Adjustment			WBR	.02*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for WBR

TOTAL CAPACITY UTILIZATION .77 .90

47. McBean & Scott

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	637	.18*	216	.06
NBT	4	7000	985	.14	2434	.35*
NBR	1	1750	89	.05	89	.05
SBL	1	1750	20	.01	18	.01*
SBT	4	7000	2339	.33*	1464	.21
SBR	1	1750	295	.17	40	.02
EBL	2	3500	34	.01	208	.06*
EBT	1	1750	32	.02*	38	.02
EBR	2	3500	398	.11	949	.27
WBL	2	3500	151	.04*	54	.02
WBT	2	3500	49	.03	13	.01*
WBR	0	0	39		17	.01
Right Turn Adjustment					EBR	.11*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.67**		**.64**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1100	.31*	590	.17*
NBT	4	7000	1280	.18	3310	.47
NBR	1	1750	50	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2940	.42*	2340	.33*
SBR	1	1750	350	.20	50	.03
EBL	2	3500	40	.01	590	.17*
EBT	1	1750	30	.02*	10	.01
EBR	2	3500	630	.18	1270	.36
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.06*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.87**		**.84**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1170	.33*	540	.15*
NBT	4	7000	1180	.17	3270	.47
NBR	1	1750	50	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2810	.40*	2280	.33*
SBR	1	1750	340	.19	50	.03
EBL	2	3500	40	.01	640	.18*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	610	.17	1320	.38
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.86**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1150	.33*	550	.16*
NBT	4	7000	1250	.18	3260	.47
NBR	1	1750	50	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2810	.40*	2290	.33*
SBR	1	1750	360	.21	50	.03
EBL	2	3500	50	.01	650	.19*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	620	.18	1360	.39
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.87**

47. McBean & Scott

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1190	.34*	510	.15*
NBT	4	7000	1280	.18	3080	.44
NBR	1	1750	50	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2630	.38*	2310	.33*
SBR	1	1750	330	.19	50	.03
EBL	2	3500	50	.01	720	.21*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	550	.16	1290	.37
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.85**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1150	.33*	550	.16*
NBT	4	7000	1270	.18	3060	.44
NBR	1	1750	50	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2690	.38*	2310	.33*
SBR	1	1750	350	.20	50	.03
EBL	2	3500	50	.01	740	.21*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	560	.16	1300	.37
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.04*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.84**		**.85**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1170	.33*	590	.17*
NBT	4	7000	1270	.18	3120	.45
NBR	1	1750	60	.03	70	.04
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2720	.39*	2310	.33*
SBR	1	1750	360	.21	50	.03
EBL	2	3500	50	.01	770	.22*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	600	.17	1400	.40
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.05*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.85**		**.88**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	1250	.36*	640	.18*
NBT	4	7000	1280	.18	3250	.46
NBR	1	1750	60	.03	60	.03
SBL	1	1750	10	.01	10	.01
SBT	4	7000	2820	.40*	2410	.34*
SBR	1	1750	310	.18	50	.03
EBL	2	3500	50	.01	690	.20*
EBT	1	1750	20	.01*	10	.01
EBR	2	3500	620	.18	1510	.43
WBL	2	3500	80	.02*	30	.01
WBT	2	3500	10	.01	10	.01*
WBR	0	0	10		10	
Right Turn Adjustment					EBR	.05*
Clearance Interval				.10*		.10*
Note: Assumes Right-Turn Overlap for EBR						
TOTAL CAPACITY UTILIZATION				**.89**		**.88**

48. McBean & Newhall Ranch

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	296	.08*	221	.06
NBT	3	5250	545	.10	1688	.32*
NBR	2	3500	251	.07	750	.21
SBL	2	3500	163	.05	98	.03*
SBT	4	7000	1468	.21*	793	.11
SBR	f		53		23	
EBL	2	3500	97	.03	99	.03
EBT	3	5250	311	.06*	744	.14*
EBR	1	1750	97	.06	257	.15
WBL	2	3500	674	.19*	417	.12*
WBT	3	5250	961	.18	330	.06
WBR	1	1750	94	.05	138	.08
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.71**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	380	.11*	380	.11
NBT	3	5250	870	.17	2150	.41*
NBR	2	3500	80	.02	1240	.35
SBL	2	3500	440	.13	210	.06*
SBT	4	7000	1900	.27*	1320	.19
SBR	f		450		80	
EBL	2	3500	150	.04	460	.13*
EBT	4	7000	630	.09*	1230	.18
EBR	1	1750	360	.21	720	.41
WBL	2	3500	990	.28*	330	.09
WBT	4	7000	1440	.21	1020	.15*
WBR	1	1750	80	.05	360	.21
Right Turn Adjustment			EBR	.04*	Multi	.02*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.89**		**.87**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	310	.09*	430	.12
NBT	3	5250	850	.16	2120	.40*
NBR	2	3500	70	.02	1250	.36
SBL	2	3500	430	.12	240	.07*
SBT	4	7000	1810	.26*	1300	.19
SBR	f		530		90	
EBL	2	3500	170	.05	550	.16*
EBT	4	7000	640	.09*	1220	.17
EBR	1	1750	360	.21	690	.39
WBL	2	3500	930	.27*	330	.09
WBT	4	7000	1510	.22	1080	.15*
WBR	1	1750	80	.05	340	.19
Right Turn Adjustment			EBR	.05*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.88**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	350	.10*	420	.12
NBT	3	5250	870	.17	2100	.40*
NBR	2	3500	80	.02	1270	.36
SBL	2	3500	430	.12	240	.07*
SBT	4	7000	1800	.26*	1320	.19
SBR	f		540		100	
EBL	2	3500	180	.05	580	.17*
EBT	4	7000	640	.09*	1190	.17
EBR	1	1750	360	.21	690	.39
WBL	2	3500	940	.27*	330	.09
WBT	4	7000	1510	.22	1100	.16*
WBR	1	1750	80	.05	340	.19
Right Turn Adjustment			EBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.90**

48. McBean & Newhall Ranch

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	320	.09*	440	.13
NBT	3	5250	900	.17	1980	.38*
NBR	2	3500	110	.03	1250	.36
SBL	2	3500	500	.14	140	.04*
SBT	4	7000	1520	.22*	1290	.18
SBR	f		560		100	
EBL	2	3500	170	.05	510	.15*
EBT	4	7000	680	.10*	1250	.18
EBR	1	1750	430	.25	700	.40
WBL	2	3500	940	.27*	360	.10
WBT	4	7000	1510	.22	1160	.17*
WBR	1	1750	60	.03	350	.20
Right Turn Adjustment			EBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.86**		**.84**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	270	.08	440	.13
NBT	3	5250	920	.18*	2000	.38*
NBR	2	3500	120	.03	1240	.35
SBL	2	3500	520	.15*	150	.04*
SBT	4	7000	1570	.22	1310	.19
SBR	f		550		90	
EBL	2	3500	170	.05	530	.15*
EBT	4	7000	700	.10*	1310	.19
EBR	1	1750	430	.25	650	.37
WBL	2	3500	990	.28*	390	.11
WBT	4	7000	1550	.22	1200	.17*
WBR	1	1750	50	.03	350	.20
Right Turn Adjustment			EBR	.07*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.88**		**.84**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	290	.08	420	.12
NBT	3	5250	920	.18*	2090	.40*
NBR	2	3500	130	.04	1250	.36
SBL	2	3500	480	.14*	160	.05*
SBT	4	7000	1610	.23	1300	.19
SBR	f		580		110	
EBL	2	3500	170	.05	570	.16*
EBT	4	7000	730	.10*	1340	.19
EBR	1	1750	400	.23	620	.35
WBL	2	3500	1020	.29*	420	.12
WBT	4	7000	1540	.22	1290	.18*
WBR	1	1750	50	.03	300	.17
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.87**		**.89**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	270	.08*	410	.12
NBT	3	5250	940	.18	2150	.41*
NBR	2	3500	120	.03	1250	.36
SBL	2	3500	490	.14	160	.05*
SBT	4	7000	1720	.25*	1310	.19
SBR	f		570		120	
EBL	2	3500	170	.05	490	.14
EBT	4	7000	710	.10*	1480	.21*
EBR	1	1750	380	.22	670	.38
WBL	2	3500	970	.28*	470	.13*
WBT	4	7000	1660	.24	1310	.19
WBR	1	1750	50	.03	400	.23
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.87**		**.90**

51. Wiley & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	83	.05*	152	.09
NBT	2	3500	123	.04	363	.10*
NBR	1	1750	104	.06	225	.13
SBL	1	1750	121	.07	190	.11*
SBT	2	3500	233	.07*	339	.10
SBR	1	1750	356	.20	288	.16
EBL	2	3500	112	.03	441	.13
EBT	2	3500	534	.15*	1112	.32*
EBR	1	1750	43	.02	114	.07
WBL	1	1750	111	.06*	191	.11*
WBT	3	5250	567	.12	878	.19
WBR	0	0	45		141	
Right Turn Adjustment			SBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.74**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	110	.06*	230	.13*
NBT	2	3500	80	.02	360	.10
NBR	1	1750	110	.06	220	.13
SBL	1	1750	120	.07	200	.11
SBT	2	3500	230	.07*	360	.10*
SBR	1	1750	440	.25	330	.19
EBL	2	3500	140	.04	440	.13
EBT	2	3500	650	.19*	1230	.35*
EBR	1	1750	60	.03	120	.07
WBL	1	1750	90	.05*	180	.10*
WBT	3	5250	540	.11	910	.20
WBR	0	0	20		160	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.78**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	120	.07*	230	.13*
NBT	2	3500	70	.02	360	.10
NBR	1	1750	110	.06	220	.13
SBL	1	1750	120	.07	200	.11
SBT	2	3500	230	.07*	350	.10*
SBR	1	1750	430	.25	330	.19
EBL	2	3500	140	.04	440	.13
EBT	2	3500	640	.18*	1240	.35*
EBR	1	1750	60	.03	110	.06
WBL	1	1750	90	.05*	180	.10*
WBT	3	5250	540	.11	910	.20
WBR	0	0	20		160	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.78**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	120	.07*	240	.14*
NBT	2	3500	70	.02	360	.10
NBR	1	1750	110	.06	220	.13
SBL	1	1750	120	.07	210	.12
SBT	2	3500	230	.07*	350	.10*
SBR	1	1750	440	.25	330	.19
EBL	2	3500	140	.04	450	.13
EBT	2	3500	670	.19*	1260	.36*
EBR	1	1750	60	.03	110	.06
WBL	1	1750	90	.05*	180	.10*
WBT	3	5250	550	.11	940	.21
WBR	0	0	20		160	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.80**

51. Wiley & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	120	.07*	250	.14*
NBT	2	3500	80	.02	390	.11
NBR	1	1750	110	.06	230	.13
SBL	1	1750	110	.06	190	.11
SBT	2	3500	250	.07*	380	.11*
SBR	1	1750	420	.24	360	.21
EBL	2	3500	150	.04	440	.13
EBT	2	3500	760	.22*	1290	.37*
EBR	1	1750	70	.04	110	.06
WBL	1	1750	90	.05*	190	.11*
WBT	3	5250	560	.11	1000	.22
WBR	0	0	20		140	
Right Turn Adjustment			SBR	.05*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.83**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	120	.07*	260	.15*
NBT	2	3500	90	.03	430	.12
NBR	1	1750	120	.07	250	.14
SBL	1	1750	120	.07	210	.12
SBT	2	3500	270	.08*	410	.12*
SBR	1	1750	450	.26	380	.22
EBL	2	3500	160	.05	520	.15
EBT	2	3500	870	.25*	1340	.38*
EBR	1	1750	70	.04	100	.06
WBL	1	1750	100	.06*	210	.12*
WBT	3	5250	570	.11	1160	.25
WBR	0	0	20		150	
Right Turn Adjustment			SBR	.03*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.87**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	120	.07*	280	.16*
NBT	2	3500	100	.03	460	.13
NBR	1	1750	120	.07	260	.15
SBL	1	1750	110	.06	180	.10
SBT	2	3500	280	.08*	420	.12*
SBR	1	1750	450	.26	400	.23
EBL	2	3500	170	.05	600	.17*
EBT	3	5250	890	.18*	1410	.29
EBR	0	0	70		100	
WBL	1	1750	100	.06*	220	.13
WBT	3	5250	590	.12	1210	.26*
WBR	0	0	20		160	
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.81**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	130	.07*	290	.17*
NBT	2	3500	110	.03	520	.15
NBR	1	1750	130	.07	280	.16
SBL	1	1750	110	.06	200	.11
SBT	2	3500	320	.09*	450	.13*
SBR	1	1750	470	.27	430	.25
EBL	2	3500	170	.05	640	.18*
EBT	3	5250	950	.20*	1510	.30
EBR	0	0	80		90	
WBL	1	1750	110	.06*	240	.14
WBT	3	5250	660	.13	1330	.29*
WBR	0	0	20		170	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.87**

53. Valley & Lyons

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	99	.06*	119	.07*
NBT	2	3500	89	.03	135	.04
NBR	1	1750	65	.04	116	.07
SBL	2	3500	249	.07	363	.10
SBT	1	1750	99	.06*	128	.07*
SBR	1	1750	153	.09	226	.13
EBL	2	3500	151	.04*	366	.10*
EBT	2	3500	546	.16	913	.26
EBR	1	1750	62	.04	127	.07
WBL	1	1750	100	.06	104	.06
WBT	2	3500	798	.23*	921	.26*
WBR	1	1750	205	.12	238	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.49**		**.60**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	110	.03*	160	.05*
NBR	1	1750	100	.06	140	.08
SBL	2	3500	430	.12*	520	.15*
SBT	1	1750	120	.07	160	.09
SBR	1	1750	160	.09	210	.12
EBL	2	3500	130	.04*	490	.14*
EBT	2	3500	720	.21	930	.27
EBR	1	1750	50	.03	80	.05
WBL	1	1750	80	.05	130	.07
WBT	2	3500	760	.22*	1160	.33*
WBR	1	1750	260	.15	380	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.77**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	110	.03*	160	.05*
NBR	1	1750	100	.06	150	.09
SBL	2	3500	420	.12*	510	.15*
SBT	1	1750	120	.07	170	.10
SBR	1	1750	160	.09	210	.12
EBL	2	3500	130	.04*	490	.14*
EBT	2	3500	710	.20	910	.26
EBR	1	1750	60	.03	90	.05
WBL	1	1750	80	.05	130	.07
WBT	2	3500	760	.22*	1160	.33*
WBR	1	1750	260	.15	380	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.77**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	110	.03*	160	.05*
NBR	1	1750	100	.06	140	.08
SBL	2	3500	420	.12*	520	.15*
SBT	1	1750	120	.07	170	.10
SBR	1	1750	160	.09	210	.12
EBL	2	3500	130	.04*	490	.14*
EBT	2	3500	740	.21	940	.27
EBR	1	1750	50	.03	90	.05
WBL	1	1750	80	.05	130	.07
WBT	2	3500	760	.22*	1190	.34*
WBR	1	1750	260	.15	380	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.51**		**.78**

53. Valley & Lyons

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	100	.03*	160	.05*
NBR	1	1750	100	.06	140	.08
SBL	2	3500	350	.10*	490	.14*
SBT	1	1750	110	.06	160	.09
SBR	1	1750	160	.09	210	.12
EBL	2	3500	140	.04	490	.14*
EBT	2	3500	830	.24*	980	.28
EBR	1	1750	50	.03	90	.05
WBL	1	1750	80	.05*	130	.07
WBT	2	3500	780	.22	1240	.35*
WBR	1	1750	210	.12	360	.21
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.78**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	100	.03*	160	.05*
NBR	1	1750	100	.06	130	.07
SBL	2	3500	370	.11*	490	.14*
SBT	1	1750	110	.06	160	.09
SBR	1	1750	160	.09	220	.13
EBL	2	3500	140	.04	490	.14*
EBT	2	3500	940	.27*	1030	.29
EBR	1	1750	50	.03	90	.05
WBL	1	1750	90	.05*	130	.07
WBT	2	3500	800	.23	1410	.40*
WBR	1	1750	230	.13	370	.21
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.83**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	100	.03*	160	.05*
NBR	1	1750	100	.06	140	.08
SBL	2	3500	370	.11*	520	.15*
SBT	1	1750	100	.06	160	.09
SBR	1	1750	160	.09	210	.12
EBL	2	3500	150	.04	500	.14*
EBT	2	3500	970	.28*	1070	.31
EBR	1	1750	50	.03	90	.05
WBL	1	1750	100	.06*	130	.07
WBT	2	3500	840	.24	1480	.42*
WBR	1	1750	210	.12	380	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.86**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	90	.05	100	.06
NBT	2	3500	100	.03*	160	.05*
NBR	1	1750	90	.05	130	.07
SBL	2	3500	390	.11*	580	.17*
SBT	1	1750	100	.06	160	.09
SBR	1	1750	160	.09	210	.12
EBL	2	3500	150	.04	510	.15*
EBT	2	3500	1030	.29*	1170	.33
EBR	1	1750	40	.02	100	.06
WBL	1	1750	90	.05*	140	.08
WBT	3	5250	900	.22	1620	.38*
WBR	0	0	250		400	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.85**

54. Orchard Village & Wiley

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	131	.07	207	.12
NBT	2	3500	567	.19*	811	.29*
NBR	0	0	82		216	
SBL	1	1750	82	.05*	179	.10*
SBT	2	3500	405	.12	849	.24
SBR	1	1750	252	.14	333	.19
EBL	2	3500	144	.04*	345	.10
EBT	2	3500	97	.05	447	.17*
EBR	0	0	84		163	
WBL	1	1750	76	.04	176	.10*
WBT	2	3500	275	.08*	285	.08
WBR	1	1750	75	.04	94	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.76**

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	60	.03
NBT	2	3500	680	.19*	880	.25*
NBR	1	1750	190	.11	380	.22
SBL	2	3500	270	.08*	450	.13*
SBT	2	3500	550	.16	800	.23
SBR	d	1750	220	.13	90	.05
EBL	2	3500	130	.04	220	.06
EBT	2	3500	190	.07*	500	.18*
EBR	0	0	50		130	
WBL	1	1750	280	.16*	230	.13*
WBT	2	3500	390	.11	320	.09
WBR	1	1750	290	.17	330	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.79**

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	60	.03
NBT	2	3500	680	.19*	890	.25*
NBR	1	1750	190	.11	390	.22
SBL	2	3500	270	.08*	450	.13*
SBT	2	3500	570	.16	810	.23
SBR	d	1750	230	.13	90	.05
EBL	2	3500	130	.04	220	.06
EBT	2	3500	190	.07*	490	.18*
EBR	0	0	60		140	
WBL	1	1750	280	.16*	240	.14*
WBT	2	3500	380	.11	320	.09
WBR	1	1750	280	.16	330	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.80**

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	60	.03
NBT	2	3500	680	.19*	890	.25*
NBR	1	1750	190	.11	380	.22
SBL	2	3500	270	.08*	460	.13*
SBT	2	3500	570	.16	810	.23
SBR	d	1750	220	.13	90	.05
EBL	2	3500	130	.04	220	.06
EBT	2	3500	190	.07*	500	.18*
EBR	0	0	50		140	
WBL	1	1750	280	.16*	230	.13*
WBT	2	3500	390	.11	320	.09
WBR	1	1750	290	.17	320	.18
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.79**

54. Orchard Village & Wiley

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	60	.03
NBT	2	3500	630	.18*	860	.25*
NBR	1	1750	190	.11	390	.22
SBL	2	3500	280	.08*	460	.13*
SBT	2	3500	540	.15	770	.22
SBR	d	1750	220	.13	90	.05
EBL	2	3500	140	.04	210	.06
EBT	2	3500	200	.07*	540	.19*
EBR	0	0	60		130	
WBL	1	1750	260	.15*	230	.13*
WBT	2	3500	400	.11	370	.11
WBR	1	1750	330	.19	340	.19
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.58**		**.80**

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	30	.02	70	.04
NBT	2	3500	640	.18*	900	.26*
NBR	1	1750	180	.10	420	.24
SBL	2	3500	300	.09*	530	.15*
SBT	2	3500	590	.17	750	.21
SBR	d	1750	220	.13	90	.05
EBL	2	3500	140	.04	230	.07
EBT	2	3500	210	.08*	630	.23*
EBR	0	0	60		160	
WBL	1	1750	280	.16*	240	.14*
WBT	2	3500	450	.13	400	.11
WBR	1	1750	400	.23	350	.20
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.88**

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	40	.02	70	.04
NBT	2	3500	620	.18*	950	.27*
NBR	1	1750	190	.11	410	.23
SBL	2	3500	290	.08*	520	.15*
SBT	2	3500	640	.18	800	.23
SBR	d	1750	220	.13	100	.06
EBL	1	1750	140	.08*	250	.14
EBT	3	5250	220	.06	870	.20*
EBR	0	0	70		160	
WBL	1	1750	270	.15	250	.14*
WBT	2	3500	490	.14*	420	.12
WBR	1	1750	460	.26	350	.20
Right Turn Adjustment			WBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.64**		**.86**

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	60	.03	90	.05
NBT	2	3500	630	.18*	980	.28*
NBR	1	1750	190	.11	420	.24
SBL	2	3500	300	.09*	520	.15*
SBT	2	3500	680	.19	850	.24
SBR	d	1750	240	.14	110	.06
EBL	1	1750	140	.08*	250	.14
EBT	3	5250	230	.06	1000	.22*
EBR	0	0	80		180	
WBL	1	1750	300	.17	270	.15*
WBT	2	3500	550	.16*	460	.13
WBR	1	1750	520	.30	390	.22
Right Turn Adjustment			WBR	.07*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.68**		**.90**

55. Orchard Village & McBean

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		421		351	
NBT	0.5	3500	55	.14*	21	.11*
NBR	2	3500	603	.17	868	.25
SBL	0	0	19		74	
SBT	1	1750	20	.02*	57	.07*
SBR	d	1750	14	.01	45	.03
EBL	1	1750	14	.01	25	.01
EBT	3	5250	454	.13*	871	.25*
EBR	0	0	323	.18	420	
WBL	2	3500	669	.19*	896	.26*
WBT	3	5250	664	.14	797	.16
WBR	0	0	58		22	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .58 .79

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		700		540	
NBT	0.5	3500	60	.22*	60	.17*
NBR	2	3500	750	.21	1030	.29
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	420	.08*	1170	.22*
EBR	1	1750	480	.27	680	.39
WBL	2	3500	800	.23*	990	.28*
WBT	3	5250	640	.13	680	.13
WBR	0	0	30		20	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .65 .84

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		680		550	
NBT	0.5	3500	60	.21*	60	.17*
NBR	2	3500	750	.21	1040	.30
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	410	.08*	1110	.21*
EBR	1	1750	500	.29	690	.39
WBL	2	3500	790	.23*	990	.28*
WBT	3	5250	650	.13	670	.13
WBR	0	0	30		20	
Right Turn Adjustment					EBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .64 .84

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		700		550	
NBT	0.5	3500	60	.22*	60	.17*
NBR	2	3500	750	.21	1030	.29
SBL	0	0	10		60	
SBT	1	1750	20	.02*	70	.07*
SBR	d	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	400	.08*	1150	.22*
EBR	1	1750	510	.29	700	.40
WBL	2	3500	790	.23*	990	.28*
WBT	3	5250	640	.13	680	.13
WBR	0	0	30		20	
Right Turn Adjustment					EBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .65 .85

55. Orchard Village & McBean

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		730		600	
NBT	0.5	3500	60	.23*	60	.19*
NBR	2	3500	710	.20	950	.27
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	390	.07*	1190	.23*
EBR	1	1750	570	.33	740	.42
WBL	2	3500	720	.21*	910	.26*
WBT	3	5250	600	.12	660	.13
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .65 .80

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		820		640	
NBT	0.5	3500	60	.25*	70	.20*
NBR	2	3500	710	.20	980	.28
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	420	.08*	1290	.25*
EBR	1	1750	630	.36	780	.45
WBL	2	3500	740	.21*	920	.26*
WBT	3	5250	680	.14	730	.14
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .68 .83

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		890		680	
NBT	0.5	3500	60	.27*	70	.21*
NBR	2	3500	700	.20	1020	.29
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	420	.08*	1350	.26*
EBR	1	1750	660	.38	810	.46
WBL	2	3500	760	.22*	950	.27*
WBT	3	5250	710	.14	770	.15
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.03*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .71 .86

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		950		730	
NBT	0.5	3500	60	.29*	70	.23*
NBR	2	3500	700	.20	1050	.30
SBL	1.5		10	.01	60	
SBT	1.5	5250	20	.01*	70	.02*
SBR	1	1750	10	.01	30	.02
EBL	1	1750	50	.03	40	.02
EBT	3	5250	490	.09*	1420	.27*
EBR	1	1750	690	.39	860	.49
WBL	2	3500	780	.22*	970	.28*
WBT	3	5250	740	.15	810	.16
WBR	0	0	30		20	
Right Turn Adjustment			EBR	.01*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .72 .90

57. Valencia & Magic Mtn

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	43	.02*	103	.06
NBT	3	5250	709	.15	1592	.36*
NBR	0	0	92		321	
SBL	1	1750	28	.02	100	.06*
SBT	3	5250	1294	.25*	1064	.20
SBR	2	3500	543	.16	408	.12
EBL	2	3500	227	.06*	676	.19*
EBT	2	3500	186	.07	484	.14
EBR	0	0	45		22	
WBL	1	1750	127	.07	228	.13
WBT	2	3500	326	.09*	386	.11*
WBR	1	1750	33	.02	83	.05
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .82

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	100	.06
NBT	3	5250	590	.11	1450	.28*
NBR	1	1750	200	.11	750	.43
SBL	1	1750	40	.02	120	.07*
SBT	3	5250	1810	.34*	1080	.21
SBR	2	3500	620	.18	620	.18
EBL	2	3500	250	.07*	770	.22*
EBT	3	5250	530	.11	1090	.21
EBR	0	0	30		30	
WBL	2	3500	480	.14	210	.06
WBT	3	5250	1200	.24*	650	.18*
WBR	0	0	80		270	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .80 .85

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	100	.06
NBT	3	5250	590	.11	1430	.27*
NBR	1	1750	200	.11	740	.42
SBL	1	1750	40	.02	110	.06*
SBT	3	5250	1830	.35*	1070	.20
SBR	2	3500	590	.17	600	.17
EBL	2	3500	260	.07*	790	.23*
EBT	3	5250	540	.11	1110	.22
EBR	0	0	30		30	
WBL	2	3500	480	.14	210	.06
WBT	3	5250	1220	.25*	660	.18*
WBR	0	0	80		260	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .82 .84

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	80	.05*	100	.06
NBT	3	5250	610	.12	1430	.27*
NBR	1	1750	200	.11	750	.43
SBL	1	1750	40	.02	110	.06*
SBT	3	5250	1790	.34*	1080	.21
SBR	2	3500	620	.18	610	.17
EBL	2	3500	280	.08*	810	.23*
EBT	3	5250	560	.11	1110	.22
EBR	0	0	40		30	
WBL	2	3500	510	.15	220	.06
WBT	3	5250	1200	.24*	660	.18*
WBR	0	0	70		270	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .81 .84

57. Valencia & Magic Mtn

SCVCTM 4.1 2018 with Stage 4 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	80	.05*	100	.06
NBT	3	5250	670	.13	1470	.28*
NBR	1	1750	250	.14	730	.42
SBL	1	1750	40	.02	120	.07*
SBT	3	5250	1750	.33*	1120	.21
SBR	2	3500	590	.17	610	.17
EBL	2	3500	320	.09*	880	.25*
EBT	3	5250	660	.13	1120	.22
EBR	0	0	40		30	
WBL	2	3500	560	.16	250	.07
WBT	3	5250	1260	.26*	760	.17*
WBR	0	0	80		120	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .83 .87

SCVCTM 4.1 2022 with Stage 5 Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	90	.05*	110	.06
NBT	3	5250	720	.14	1570	.30*
NBR	1	1750	310	.18	720	.41
SBL	1	1750	40	.02	120	.07*
SBT	3	5250	1770	.34*	1200	.23
SBR	2	3500	500	.14	630	.18
EBL	2	3500	350	.10*	820	.23*
EBT	3	5250	730	.15	1200	.23
EBR	0	0	40		30	
WBL	2	3500	600	.17	290	.08
WBT	3	5250	1320	.26*	860	.19*
WBR	0	0	70		130	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .85 .89

SCVCTM 4.1 2025 with Stage 6a Improvements

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	90	.05*	110	.06
NBT	3	5250	750	.14	1600	.30*
NBR	1	1750	330	.19	770	.44
SBL	1	1750	40	.02	120	.07*
SBT	3	5250	1890	.36*	1240	.24
SBR	2	3500	550	.16	640	.18
EBL	2	3500	360	.10*	770	.22*
EBT	3	5250	810	.16	1250	.24
EBR	0	0	40		30	
WBL	2	3500	660	.19	340	.10
WBT	3	5250	1330	.27*	870	.19*
WBR	0	0	70		140	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .88 .88

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	90	.05*	110	.06
NBT	3	5250	760	.14	1750	.33*
NBR	1	1750	380	.22	700	.40
SBL	1	1750	40	.02	120	.07*
SBT	3	5250	1900	.36*	1320	.25
SBR	2	3500	670	.19	540	.15
EBL	2	3500	420	.12*	780	.22*
EBT	3	5250	860	.17	1390	.27
EBR	0	0	40		30	
WBL	2	3500	730	.21	310	.09
WBT	3	5250	1410	.27*	930	.18*
WBR	1	1750	70	.04	130	.07
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .90 .90

65. Bouquet & Soledad

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	27	.02	27	.02
NBT	3	5250	512	.10*	1251	.24*
NBR	1	1750	260	.15	420	.24
SBL	2	3500	718	.21*	673	.19*
SBT	3	5250	1266	.24	987	.19
SBR	2	3500	752	.21	664	.19
EBL	2	3500	225	.06*	748	.21*
EBT	2.5	5250	633	.12	1501	.29
EBR	0.5		5		19	
WBL	2	3500	372	.11	328	.09
WBT	2.5	7000	1608	{.31}*	929	{.20}*
WBR	1.5		688	{.24}	686	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .78 .94

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	790	.11	1890	.27*
NBR	1	1750	80	.05	330	.19
SBL	2	3500	330	.09	280	.08*
SBT	3	5250	1990	.38*	1280	.24
SBR	2	3500	1490	.43	1040	.30
EBL	3	5250	360	.07*	1300	.25*
EBT	3	5250	560	.13	1560	.30
EBR	0	0	120		30	
WBL	2	3500	130	.04	270	.08
WBT	2.5	7000	1160	.22*	870	{.18}*
WBR	1.5		400	{.02}	510	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .78 .88

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	790	.11	1880	.27*
NBR	1	1750	80	.05	330	.19
SBL	2	3500	330	.09	330	.09*
SBT	3	5250	2000	.38*	1290	.25
SBR	2	3500	1480	.42	1030	.29
EBL	3	5250	360	.07*	1300	.25*
EBT	3	5250	570	.13	1530	.30
EBR	0	0	120		30	
WBL	2	3500	130	.04	270	.08
WBT	2.5	7000	1200	.23*	830	{.18}*
WBR	1.5		370		530	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .89

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	790	.11	1880	.27*
NBR	1	1750	80	.05	330	.19
SBL	2	3500	330	.09	290	.08*
SBT	3	5250	2000	.38*	1290	.25
SBR	2	3500	1460	.42	1020	.29
EBL	3	5250	360	.07*	1300	.25*
EBT	3	5250	590	.14	1580	.31
EBR	0	0	120		30	
WBL	2	3500	130	.04	270	.08
WBT	2.5	7000	1220	.23*	840	{.18}*
WBR	1.5		370		520	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .88

65. Bouquet & Soledad

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	520	.07	1520	.22*
NBR	1	1750	80	.05	410	.23
SBL	2	3500	300	.09	160	.05*
SBT	3	5250	1670	.32*	1000	.19
SBR	2	3500	1370	.39	940	.27
EBL	3	5250	380	.07*	1250	.24*
EBT	3	5250	660	.15	1510	.29
EBR	0	0	120		30	
WBL	2	3500	170	.05	280	.08
WBT	2.5	7000	1240	.24*	910	{.19}*
WBR	1.5		330		460	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .74 .80

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	530	.08	1530	.22*
NBR	1	1750	100	.06	410	.23
SBL	2	3500	360	.10	170	.05*
SBT	3	5250	1810	.34*	1020	.19
SBR	2	3500	1340	.38	950	.27
EBL	3	5250	410	.08*	1280	.24*
EBT	3	5250	720	.16	1520	.30
EBR	0	0	120		30	
WBL	2	3500	170	.05	310	.09
WBT	2.5	7000	1310	.25*	970	{.20}*
WBR	1.5		370	.21	510	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .78 .81

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06*
NBT	4	7000	530	.08	1560	.22
NBR	1	1750	110	.06	420	.24
SBL	2	3500	360	.10	150	.04
SBT	3	5250	1830	.35*	1050	.20*
SBR	2	3500	1370	.39	920	.26
EBL	3	5250	390	.07*	1250	.24*
EBT	3	5250	770	.17	1650	.32
EBR	0	0	120		40	
WBL	2	3500	200	.06	320	.09
WBT	2.5	7000	1390	.26*	1030	{.22}*
WBR	1.5		280		560	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .82

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1750	20	.01*	100	.06
NBT	4	7000	540	.08	1580	.23*
NBR	1	1750	120	.07	460	.26
SBL	2	3500	260	.07	220	.06*
SBT	3	5250	1860	.35*	1100	.21
SBR	2	3500	1420	.41	970	.28
EBL	3	5250	400	.08*	1400	.27*
EBT	3	5250	830	.18	1620	.31
EBR	0	0	130		30	
WBL	2	3500	210	.06	350	.10
WBT	2.5	7000	1410	.27*	1020	{.22}*
WBR	1.5		270		570	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .81 .88

66. Bouquet & Newhall Ranch

Existing Count

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	612	.17*	624	.18*
NBT	4	7000	655	.09	1993	.28
NBR	1	1750	46	.03	160	.09
SBL	1	1750	10	.01	55	.03
SBT	4	7000	2237	.32*	1238	.18*
SBR	1	1750	818	.47	362	.21
EBL	2	3500	249	.07*	953	.27*
EBT	2	3500	63	.02	315	.09
EBR	2	3500	505	.14	515	.15
WBL	2	3500	26	.01	89	.03
WBT	3	5250	94	.02*	181	.03*
WBR	1	1750	4	.00	164	.09
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .76 .76

SCVCTM 4.1 2011 with Stage 1 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	640	.18*	720	.21*
NBT	4	7000	810	.12	2550	.36
NBR	1	1750	250	.14	550	.31
SBL	2	3500	350	.10	210	.06
SBT	4	7000	2310	.33*	1830	.26*
SBR	1	1750	610	.35	420	.24
EBL	2	3500	270	.08*	620	.18
EBT	4	7000	510	.07	1760	.25*
EBR	2	3500	970	.28	580	.17
WBL	2	3500	570	.16	140	.04*
WBT	4	7000	1310	.19*	610	.09
WBR	1	1750	250	.14	250	.14
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .88 .86

SCVCTM 4.1 2012 with Stage 2 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	600	.17*	720	.21*
NBT	4	7000	820	.12	2550	.36
NBR	1	1750	260	.15	570	.33
SBL	2	3500	340	.10	210	.06
SBT	4	7000	2300	.33*	1810	.26*
SBR	1	1750	630	.36	430	.25
EBL	2	3500	270	.08*	620	.18
EBT	4	7000	510	.07	1730	.25*
EBR	2	3500	970	.28	660	.19
WBL	2	3500	580	.17	140	.04*
WBT	4	7000	1340	.19*	630	.09
WBR	1	1750	240	.14	250	.14
Right Turn Adjustment			EBR	.01*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .88 .86

SCVCTM 4.1 2014 with Stage 3 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	590	.17*	710	.20*
NBT	4	7000	820	.12	2540	.36
NBR	1	1750	260	.15	560	.32
SBL	2	3500	350	.10	210	.06
SBT	4	7000	2280	.33*	1820	.26*
SBR	1	1750	650	.37	440	.25
EBL	2	3500	270	.08*	640	.18
EBT	4	7000	530	.08	1750	.25*
EBR	2	3500	970	.28	610	.17
WBL	2	3500	580	.17	130	.04*
WBT	4	7000	1330	.19*	640	.09
WBR	1	1750	240	.14	250	.14
Right Turn Adjustment			EBR	.01*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .88 .85

66. Bouquet & Newhall Ranch

SCVCTM 4.1 2018 with Stage 4 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	600	.17*	680	.19*
NBT	4	7000	510	.07	2040	.29
NBR	1	1750	260	.15	650	.37
SBL	2	3500	100	.03	100	.03
SBT	4	7000	1680	.24*	1400	.20*
SBR	1	1750	680	.39	430	.25
EBL	2	3500	310	.09*	600	.17
EBT	4	7000	540	.08	1850	.26*
EBR	2	3500	1010	.29	550	.16
WBL	2	3500	670	.19	150	.04*
WBT	4	7000	1320	.19*	670	.10
WBR	1	1750	80	.05	110	.06
Right Turn Adjustment			Multi	.09*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .88 .79

SCVCTM 4.1 2022 with Stage 5 Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	660	.19*	730	.21*
NBT	4	7000	520	.07	1990	.28
NBR	1	1750	260	.15	750	.43
SBL	2	3500	90	.03	110	.03
SBT	4	7000	1750	.25*	1410	.20*
SBR	1	1750	640	.37	430	.25
EBL	2	3500	310	.09*	640	.18
EBT	4	7000	540	.08	1830	.26*
EBR	2	3500	1080	.31	580	.17
WBL	2	3500	700	.20	150	.04*
WBT	4	7000	1370	.20*	700	.10
WBR	1	1750	70	.04	120	.07
Right Turn Adjustment			Multi	.06*	NBR	.02*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .89 .83

SCVCTM 4.1 2025 with Stage 6a Improvements

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	550	.16*	760	.22*
NBT	4	7000	530	.08	2040	.29
NBR	1	1750	250	.14	700	.40
SBL	2	3500	90	.03	110	.03
SBT	4	7000	1790	.26*	1420	.20*
SBR	1	1750	640	.37	430	.25
EBL	2	3500	310	.09*	680	.19
EBT	4	7000	590	.08	1930	.28*
EBR	2	3500	1060	.30	550	.16
WBL	2	3500	720	.21	140	.04*
WBT	4	7000	1510	.22*	760	.11
WBR	1	1750	80	.05	120	.07
Right Turn Adjustment			Multi	.06*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .89 .84

SCVCTM 4.1 2030 with 6b Imp./no Potrero Bridge

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	550	.16*	810	.23*
NBT	4	7000	520	.07	2090	.30
NBR	1	1750	250	.14	800	.46
SBL	2	3500	90	.03	100	.03
SBT	4	7000	1880	.27*	1460	.21*
SBR	1	1750	610	.35	440	.25
EBL	2	3500	300	.09*	720	.21*
EBT	4	7000	750	.11	1940	.28
EBR	2	3500	930	.27	680	.19
WBL	2	3500	730	.21	130	.04
WBT	4	7000	1650	.24*	880	.13*
WBR	1	1750	70	.04	110	.06
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR EBR

TOTAL CAPACITY UTILIZATION .86 .88