Caltrans Active Transportation Program
Cycle 1 Application
May 21, 2014

Los Angeles River Revitalization Corporation (LARRC) North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

ORIGINAL COPY (1 of 1)

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ACTIVE TRANSPORTATION PROGRAM

CYCLE 1

APPLICATION
Part 1
(Includes Sections I, V, VI, VII, VIII & XI)

Please read the Application Instructions at
http://www.dot.ca.gov/hq/LocalPrograms/atp/index.html
prior to filling out this application

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

For Caltrans use only: ____TAP _____STP____RTP ____SRTS ____SRTS-NI ____SHA ____DAC ____Non-DAC ____Plan

I. GENERAL INFORMATION

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

(fill out all of the fields below)

1. APPLICANT (Agency name, address and zip code) Los Angeles River Revitalization Corporation (LARRC) 570 W. Ave. 26, Ste 475 Los Angeles, CA 90065	2. PROJECT FUNDING ATP funds Requested $ 3,660,000.00 Matching Funds (If Applicable) $ 1,036,696.80 Other Project funds $ 4,341,636.00 TOTAL PROJECT COST $ 9,038,332.80
3. APPLICANT CONTACT (Name, title, e-mail, phone #) Jennifer Samson, Project Manager jsamson@larivercorp.com 323-221-7800	
4. APPLICANT CONTACT (Address & zip code) 570 W. Ave. 26, Ste 475 Los Angeles, CA 90065	5. PROJECT COUNTY(IES): Los Angeles County
6. CALTRANS DISTRICT #- Click Drop down menu below District 7	7. Application # 1 of 1 (in order of agency priority)

Area Description:

8. Large Metropolitan Planning Organization (MPO)- Select your" MPO" or "Other" from the drop down menu>	SCAG Southern California Association of Governr
9. If "Other" was selected for #8- select your MPO or RTPA from the drop down menu>	
10. Urbanized Area (UZA) population (pop.)- Select your UZA pop. from drop down menu>	Within a Large MPO (Pop > 200,000)

Master Agreements (MAs):

11. ☐ Yes, the applicant has a FEDERAL MA with Caltrans.
12. ☐ Yes, the applicant has a STATE MA with Caltrans.

13. If the applicant does not have an MA. Do you meet the Master Agreement requirements? Yes ☒ No ☐
The Applicant MUST be able to enter into MAs with Caltrans

Partner Information:

14. Partner Name*: Not Applicable	15. Partner Type
16. Contact Information (Name, phone # & e-mail)	17. Contact Address & zip code

☐ Click here if the project has more than one partner; attach the remaining partner information on a separate page

*If another entity agrees to assume responsibility for the ongoing operations and maintenance of the facility, documentation of the agreement must be submitted with the application, and a copy of the Memorandum of Understanding or Interagency Agreement between the parties must be submitted with the request for allocation.

Project Type: (Select only one)

18. Infrastructure (IF) ☐ 19. Non-Infrastructure (NI) ☐ 20. Combined (IF & NI) ☒

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

I. GENERAL INFORMATION-continued

Sub-Project Type (Select all that apply)

21. ☐ Develop a Plan in a Disadvantaged Community (select the type(s) of plan(s) to be developed)
    ☐ Bicycle Plan ☐ Safe Routes to School Plan ☐ Pedestrian Plan
    ☐ Active Transportation Plan

    (If applying for an Active Transportation Plan- check any of the following plans that your agency already has):
    ☐ Bike plan ☐ Pedestrian plan ☐ Safe Routes to School plan ☐ ATP plan

22. ☒ Bicycle and/or Pedestrian infrastructure
    Bicycle only: ☒ Class I ☐ Class II ☐ Class III
    Ped/Other: ☐ Sidewalk ☐ Crossing Improvement ☒ Multi-use facility

    Other: Bridge deck has one path designated for equestrians, and the other for bike/ped.

23. ☒ Non-Infrastructure (Non SRTS)

24. ☒ Recreational Trails*- ☒ Trail ☐ Acquisition

    ***Please see additional Recreational Trails instructions before proceeding**

25. ☐ Safe routes to school- ☐ Infrastructure ☐ Non-Infrastructure

If SRTS is selected, provide the following information

26. SCHOOL NAME & ADDRESS:
Not applicable
27. SCHOOL DISTRICT NAME & ADDRESS:

28. County-District-School Code (CDS)	29. Total Student Enrollment	30. Percentage of students eligible for free or reduced meal programs **
31. Percentage of students that currently walk or bike to school	32. Approximate # of students living along school route proposed for improvement	33. Project distance from primary or middle school

**Refer to the California Department of Education website: http://www.cde.ca.gov/ds/sh/cw/filesafdc.asp

☐ Click here if the project involves more than one school; attach the remaining school information including school official signature and person to contact, if different, on a separate page

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

V. PROJECT PROGRAMMING REQUEST

Applicant must complete a Project Programming Request (PPR) and attach it as part of this application. The PPR and can be found at http://www.dot.ca.gov/hq/transprog/allocation/ppr_new_projects_9-12-13.xls

PPR Instructions can be found at http://www.dot.ca.gov/hq/transprog/ocip/2012stip.htm

Notes:

- Fund No. 1 must represent ATP funding being requested for program years 2014/2015 and 2015/2016 only.
- Non-infrastructure project funding must be identified as Con and indicated as “Non-infrastructure” in the Notes box of the Proposed Cost and Proposed Funding tables.
- Match funds must be identified as such in the Proposed Funding tables.

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VI. ADDITIONAL INFORMATION

Only fill in those fields that are applicable to your project

FUNDING SUMMARY

ATP Funds being requested by Phase (to the nearest $1000)	**Amount**
PE Phase (includes PA&ED and PS&E)	$
Right-of-Way Phase	$
Construction Phase-Infrastructure	$ 3,635,000
Construction Phase-Non-infrastructure	$ 25,000
Total for ALL Phases	**$** 3,660,000

All Non-ATP fund types on this project* (to the nearest $1000)	**Amount**
11.47% match	$ 1,036,697
Additional match (overmatch)	$ 4,341,636
	$
	$
	$
	$

*Must indicate which funds are matching

Total Project Cost	$ 9,038,333
Project is Fully Funded	Yes

ATP Work Specific Funding Breakdown (to the nearest $1000)	**Amount**
Request for funding a Plan	$
Request for Safe Routes to Schools Infrastructure work	$
Request for Safe Routes to Schools Non-Infrastructure work	$
Request for other Non-Infrastructure work (non-SRTS)	$ 25,000
Request for Recreational Trails work	$ 3,660,000

ALLOCATION/AUTHORIZATION REQUESTS SCHEDULE

	Proposed Allocation Date	**Proposed Authorization (E-76) Date**
PA&ED or E&P		
PS&E		
Right-of-Way		
Construction	02/01/2015	03/01/2015

All project costs MUST be accounted for on this form, including elements of the overall project that will be, or have been funded by other sources.

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VII. NON-INFRASTRUCTURE SCHEDULE INFORMATION

Start Date	End Date	Task/Deliverables
03/01/2015	03/01/2015	Assume FHWA Authorization Date 3/1/15 Attachment 3 has sched/cost detail
04/01/2015	09/30/2016	Education/outreach campaign to prepare for bridge construction and opening

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VIII. APPLICATION SIGNATURES

Applicant: The undersigned affirms that the statements contained in the application package are true and complete to the best of their knowledge.

Signature: Omar Brownson Date: May 19, 2014
Name: Omar Brownson Phone: 323-221-7800
Title: Executive Director, LARRC e-mail: obrownson@larivercorp.com

Local Agency Official (City Engineer or Public Works Director): The undersigned affirms that the statements contained in the application package are true and complete to the best of their knowledge.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

School Official: The undersigned affirms that the school(s) benefited by this application is not on a school closure list.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

Person to contact for questions:

Name: Phone: _____
Title: e-mail: _____

Caltrans District Traffic Operations Office Approval*
If the application's project proposes improvements on a freeway or state highway that affects the safety or operations of the facility, it is required that the proposed improvements be reviewed by the district traffic operations office and either a letter of support or acknowledgement from the traffic operations office be attached (_) or the signature of the traffic personnel be secured below.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

*Contact the District Local Assistance Engineer (DLAE) for the project to get Caltrans Traffic Ops contact information. DLAE contact information can be found at http://www.dot.ca.gov/hq/LocalPrograms/dlae.htm

Project name:
North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VIII. ADDITIONAL APPLICATION ATTACHMENTS

Check all attachments included with this application.

- ☒ Vicinity/Location Map- **REQUIRED for all IF Projects**
  - ☒ North Arrow
  - ☒ Label street names and highway route numbers
  - ☒ Scale
- ☒ Photos and/or Video of Existing Location- **REQUIRED for all IF Projects**
  - ☒ Minimum of one labeled color photo of the existing project location
  - ☒ Minimum photo size 3 x 5 inches
  - ☐ Optional video and/or time-lapse
- ☒ Preliminary Plans- **REQUIRED for Construction phase only**
  - ☒ Must include a north arrow
  - ☒ Label the scale of the drawing
  - ☒ Typical Cross sections where applicable with property or right-of-way lines
  - ☒ Label street names, highway route numbers and easements
- ☒ Detailed Engineer's Estimate- **REQUIRED for Construction phase only**
  - ☒ Estimate must be true and accurate. Applicant is responsible for verifying costs prior to submittal
  - ☒ Must show a breakdown of all bid items by unit and cost. Lump Sum may only be used per industry standards
  - ☒ Must identify all items that ATP will be funding
  - ☒ Contingency is limited to 10% of funds being requested
  - ☒ Evaluation required under the ATP guidelines is not a reimbursable item
- ☒ Documentation of the partnering maintenance agreement- Required with the application if an entity, other than the applicant, is going to assume responsibility for the operation and maintenance of the facility
- ☐ Documentation of the partnering implementation agreement-Required with the application if an entity, other than the applicant, is going to implement the project.
- ☐ Letters of Support from Caltrans (Required for projects on the State Highway System(SHS))
- ☒ Digital copy of or an online link to an approved plan (bicycle, pedestrian, safe routes to school, active transportation, general, recreation, trails, city/county or regional master plan(s), technical studies, and/or environmental studies (with environmental commitment record or list of mitigation measures), if applicable. Include/highlight portions that are applicable to the proposed project.
- ☒ Documentation of the public participation process (required)
- ☐ Letter of Support from impacted school- when the school isn't the applicant or partner on the application (required)
- ☒ Additional documentation, letters of support, etc (optional)

ACTIVE TRANSPORTATION PROGRAM

CYCLE 1

APPLICATION
Part 2
(Includes Narrative Sections II, III & IV)

II. PROJECT INFORMATION

1. **Project Location**

The North Atwater Non-Motorized Multimodal Bridge (a.k.a "La Kretz Crossing") will be located in the Atwater Village neighborhood of the City of Los Angeles Council District 4 and District 13, in central Los Angeles County. The crossing will connect the Northeast Los Angeles Community Plan (adjacent to existing equestrian facilities) on the Los Angeles River's eastern bank to an existing 7.1-mile stretch of the LA River Bikeway on the River's western bank, approximately 0.7 miles upstream (north) of where Los Feliz Blvd crosses the LA River, and south of Chevy Chase Drive. The I-5 Freeway is located west of the project site and separates the LA River from Griffith Park (approximately 200 feet). An existing access tunnel (Tunnel #1) is located under the I-5 Freeway alignment which connects the bikeway to the proceeding Griffith Park trails to the west of the freeway.

The project is south of North Atwater Park and north of the Los Feliz Golf Course. The bridge project crosses land that falls within the jurisdiction of the City of Los Angeles, Los Angeles County Flood Control District, and the U.S. Army Corps of Engineers (USACE). LA Police Department's Metropolitan Division mounted police stables and private stables are located east of the project site. LA River Greenway Trail and LA River Bike Path run parallel to the LA River past the project site, and would be closed during construction, with detours provided and signed.

2. **Project Coordinates** Latitude 34.130500 (Decimal degrees) Longitude -118.273400 (Decimal degrees)

3. **Project Description**

The Los Angeles River Revitalization Corporation (LARRC) proposes to construct a bridge over the LA River in the North Atwater Village area. La Kretz Crossing is a non-motorized multimodal bridge project providing safe, year-round access from the North Atwater community to pedestrian hiking and equestrian bridle paths in Griffith Park (a 4,200-acre recreational facility), (and to the Los Angeles River Bike Path (the bridge creates new access point to the regional bicycle network for bicyclists and

pedestrians). The iconic, cable-stayed pre-fabricated bridge will span approximately 390 feet across the LA River. The bridge deck is approximately 325 feet long and 36 feet wide, with two separate paths: one designated for equestrian use, and the other shared by pedestrians and bicyclists.

The bridge is a Class 1 Bikeway, and is eligible to receive funding from the Recreational Trail Program non-motorized funding. The bridge will provide important access to a bicycle network used by bicycle commuters as well. In short, this project is an important step in connecting communities to a Class 1 bike path adjacent to the LA River that will ultimately extend 51 continuous miles.

4. Project Status

CEQA: A Notice of Determination for a Mitigated Negative Declaration was prepared for the North Atwater Multimodal Bridge over the Los Angeles River, and filed on September 19, 2013 by the City of Los Angles Environmental Affairs Officer. The Los Angeles Dept. of Public Works, Bureau of Engineering was the lead City department involved in securing this CEQA clearance. (Attachment 9)

NEPA: LARRC expects a FONSI (Finding of No Significant Impact) from the United States Army Corps of Engineers by August 2014. Upon award, LARRC will complete a Preliminary Environmental Study and work with Caltrans on FHWA NEPA clearance, expected to be minimal. (Attachment 10)

III. SCREENING CRITERIA

1. Demonstrated Needs of the Applicant
Describe the need for the project and/or funding

NEED FOR THIS PROJECT: Over the past 16 years, several actions by the L.A. City Council have reiterated, through votes and plan adoptions, the importance of and support for a non-motorized multimodal (pedestrian/bicycle/equestrian) bridge over the L.A. River in the North Atwater Village area (approximately 3,100 feet north of Los Feliz Boulevard). The bridge is a Class 1 Bikeway, and serves to provide a new off-road trail connection between the L.A. Greenway Trail (used by equestrians), Griffith Park bridle paths and stables to the east, as well as connecting the community of Atwater to the LA River Bike Path. The bridge serves major safety and recreational purposes, although the facility will

provide important access to a regional bicycle network used by bicycle commuters as well. The safe crossing will reduce or eliminate the dangerous practice of horse riders attempting to access Griffith Park by negotiating the slippery and sometimes fast-moving L.A. River bed. This project is another important step toward connecting communities to a Class 1 bike path adjacent to the L.A. River.

NEED FOR ATP GRANT FUNDING: The Equestrian Trust Fund initially financed the project's preliminary planning and design work. However, the L.A. City Bureau of Engineering and Recreation and Parks (RAP) reported that additional financial resources to construct the bridge were not available. In 2009, the City Council and the Mayor established the L.A. River Revitalization Corporation (LARRC) as a 501(C) 3 non-profit, which subsequently worked to secure funding from a private donor to design and construct the North Atwater Crossing/Multi-Modal Bridge over the L.A. River. Based on a total project cost of $9,013,333, LARRC has raised donations for the required local match of $1,036,000 and additional funding of $4,341,636. However, the ATP grant funding is essential to build the project.

2. **Consistency with Regional Transportation Plan (100 words or less)**
   Explain how this project is consistent with your Regional Transportation Plan (if applicable). Include adoption date of the plan.

La Kretz Crossing, a proposed non-motorized bridge over the L.A. River, will provide disadvantaged communities and others with new, safe connections between regionally significant active transportation facilities and Griffith Park hiking/equestrian trails. The bridge will close a gap in a regional bikeway network. It will also improve bicycle/pedestrian friendliness. By increasing non-motorized travel options for recreation and commuting, the bridge reduces GHG emissions and aligns with the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) climate goals (adopted April 2012).

IV. NARRATIVE QUESTIONS

1. **POTENTIAL FOR INCREASED WALKING AND BICYCLING, ESPECIALLY AMONG STUDENTS, INCLUDING THE IDENTIFICATION OF WALKING AND BICYCLING ROUTES TO AND FROM SCHOOLS, TRANSIT FACILITIES, COMMUNITY CENTERS, EMPLOYMENT CENTERS, AND OTHER DESTINATIONS; AND INCLUDING INCREASING AND IMPROVING CONNECTIVITY AND MOBILITY OF NON-MOTORIZED USERS.** *(0-30 POINTS)*

A. Describe how your project encourages increased walking and bicycling, especially among students.

A Quality Connection Attracts New Users: It is well established that improvements in user convenience, comfort and accessibility of bicycle and pedestrian amenities will increase walking and cycling. The new high level of access for cyclists, pedestrians and equestrians offered by the trail bridge connection between the Atwater Village community, the L.A. Greenway/Bike Path and Griffith Park is expected to encourage more frequent use of off-roadway facilities by both current and new users, including less confident bicyclists, pedestrians and equestrians in the area Griffith Park's numerous family-oriented hiking trails and loops, equestrian bridle paths and other venues (the Observatory, Zoo, Botanical Gardens and many acres of wilderness) are strong attractors for all modes of active transportation. In addition, removal of the obstacle (and hazard) presented by the L.A. River is a significant improvement in connectivity between existing and planned active transportation facilities. Maps in Attachment 4 provide a visual perspective on these opportunities.

Atwater Community Pedestrians Gain Walkable Trail Access: The new pedestrian/bicycle access is located in the middle of an otherwise inaccessible 1.4-mile segment of the L.A. River Bike Path—opening up an entire new target market for the facility, especially for neighborhood pedestrians within ½ mile of the new bridge.

The Attraction of Safer Class 1 Bike Paths: La Kretz Crossing creates a new multimodal (pedestrian/equestrian/bicycle) connection between regional Class 1 Bicycle Paths, linking cyclists not only to miles of recreational hiking, equestrian and cycling opportunities, but it also routes cyclists onto a safe Class 1 facility that extends 7.1 miles into the northern part of the City of Los Angeles. This is likely to be very attractive to bicycle commuters.

Synergy between Griffith Park, LA River Bike Path & Nearby Schools: A school district and numerous school sites are located within two miles of the project, listed in order of proximity, include: Glenfeliz Blvd. Elementary School, Glendale Unified School District, Thomas Edison Elementary School,

Jewel City Community Day School, Holy Trinity School, and several equestrian riding schools and clubs. Additional elementary and middle school sites are located within a 1.5-mile radius: Theodore Roosevelt Middle School, Horace Mann Elementary School, Cerritos Elementary School and the Cool School Los Angeles. LARRC currently works with the community to sponsor River-related activities and events that bring school children and their families onto the L.A. River Greenway/Bike Path. LARRC will also conduct an outreach/education campaign to alert schools and families about the benefits of the new facility. Griffith Park offers activities and recreational amenities designed to be inviting and comfortable for family hiking, horseback riding and bicycling.

Horses Helping Girls at Risk: In addition, the non-profit organization "Taking the Reins," offers at-risk girls the opportunity to work with horses and learn to ride. Their facility is located immediately east of the L.A. River, and the organization fully intends to use the new bridge as they continue their work with the girls in the community.

B. Describe the number and type of possible users and their destinations, and the anticipated percentage increase in users upon completion of your project. Data collection methods should be described.

Build It! They will Come! The analysis conducted to determine net project benefits (Attachment 13) forecasts an increase of 83.2% in active transportation miles per year (2025), after factoring out population growth, compared to existing conditions. This figure includes a 70% increase in pedestrian miles, and a 120% increase in bicycle miles. (Attachment 13.) Net new daily walkers (324/day) and cyclists (30/day) are part of this increase, but all cyclists and pedestrians also make longer trips because of improved facilities and better connectivity.

This is possible because, in the project area, the bridge closes a gap between a highly bike/ped/horse mode-amenable community, and an extensive regional network of trails and bike paths, along the L.A. River and in Griffith Park. This is not just "any" improvement; it is high-quality access, strategically located. As our response to Question 1A indicates, recreational use by school

children and their families, is only one key market for increased active transportation facility use. Other facility users are anticipated to be hikers, cyclists, horseback riders, park enthusiasts, bird watchers, and nature lovers from the immediate area and from other areas. Non-recreational bicycle commuters are highly likely to use this direct route to a concentrated employment center, approximately seven safe-riding miles south to downtown Los Angeles. New community access will allow for short neighborhood walks or rides north and south, connecting to destinations on Los Feliz Blvd. (south) and Colorado Blvd. (north) without risking accidents from vehicle traffic on San Fernando Rd. or other north/south roadways.

Establishing Robust Count Procedures: Comprehensive, site-relevant and consistent data for active transportation analysis is notoriously sparse. Thus, this project includes procurement and installation of counting devices at five strategic locations to allow for pre- and post-construction counts conducted for equestrian, pedestrian and bicycle travelers in the project area. As necessary, manual counts will be conducted prior to installation of automatic counters.

Weekday Bicycle Counts: Manual bicycle counts were conducted by Los Angeles County Bicycle Coalition (LACBC) in 2013, south of the project site along the Los Angeles River Bike Path at the following locations: at Steelhead Park, just north of downtown L.A.; at a site just south of the project between Los Feliz Blvd. and Sunnynook Park; and in 2011 at Los Feliz Blvd. SCAG/Metro Bike Count Data Clearinghouse data is online at www.bikecounts.luskin.ucla/edu. The 2-hour morning period average volumes ranged from 13 to 20 cyclists per hour (southbound) and from 18-31 cyclists per hour (northbound). Two-hour afternoon period average volumes ranged from 26 to 39 cyclists per hour (southbound) and 36-47 cyclists per hour (northbound).

Saturday Bicycle Counts: Saturday counts, also conducted for two hours at each location, show average hourly counts ranging from 32-35 cyclists per hour (southbound) and 32-45 cyclists per hour

(northbound). (Attachment 12 shows more count locations; Attachment 13 extrapolates from this count data to a yearly figure.)

Support for Bicycle Commuters Can Draw Riders from Parallel Routes/Cars: La Kretz Crossing provides new access to the L.A. River Bike Path, which parallels north/south commute vehicle patterns and provides a 7.1 mile Class I separated bike path into downtown Los Angeles employment centers. Low-income residents (and others) within 2 miles east of the project are expected to use the new access for bicycle commute purposes as well as for recreation. It is anticipated that bicycle commuters currently riding on Riverside Drive (parallel to I-5 on the east), San Fernando Road (parallel to I-5 on the west) to Los Angeles for work, or driving on the heavily congested I-5 (all three roadways run parallel to the L.A. River Bike Path which is accessed by the new bridge) will now have the option to choose this safer and more pleasant Class I Bike Path as a route to jobs in or near downtown Los Angeles. This project will encourage on-road cycle commuters to divert to the safer L.A. River Bike Path, and will entice some motorists onto their bikes for the relatively short journey to downtown LA.

C. Describe how this project improves walking and bicycling routes to and from, connects to, or is part of a school or school facility, transit facility, community center, employment center, state or national trail system, points of interest, and/or park.

Closing Gaps, Connecting Stars: (i.e., Griffith Observatory!) The La Kretz Crossing over the L.A. River will encourage growth in active transportation trips (equestrian, cyclist and pedestrian) by overcoming current hazards, barriers to access and gaps in regionally significant trails and bikeways, through construction of a well-designed multimodal bridge that connects communities of need to wonderful regional attractions: popular 4,200-acre Griffith Park (Zoo, Gardens, Observatory), the revitalizing L.A. River and its many events, and downtown Los Angeles work and cultural opportunities. Connections to specific destinations by likely users was also discussed in Sections A. and B. above.

Everyone Loves Recreational Trails: The bridge is a Class 1 Bikeway, and is eligible for Recreational Trail funding. The bridge also provides important access to a bicycle network used by

bicycle commuters as well. L.A. River Greenway Trail and L.A. River Bike Path run parallel to the L.A. River past the project site, making this project another essential step toward connecting communities to a Class 1 river-side bike path that will ultimately extend 51 continuous miles.

New Access at Strategic Spot: The new pedestrian/bicycle access is located in the middle of an otherwise inaccessible 1.4-mile segment of the L.A. River Bike Path. La Kretz Crossing is designed to eliminate a gap in an extensive system of recreational trails. The bridge eliminates equestrian trail gaps from the existing horse stables east of the LA River and connects bridle paths and equestrian amenities in Griffith Park on the west side of the River. The bridge will provide important new access from activity centers in North Atwood Village to the Los Angeles River Bikeway, and for pedestrians, into Griffith Park's extensive network of hiking trails. Attachment 4 includes map of destinations.

D. Describe how this project increases and/or improves connectivity, removes a barrier to mobility and/or closes a gap in a non-motorized facility.

Eliminating equestrian hazards at in-River crossing: Currently, there is no access over the L.A. River near the project location to connect L.A. Police Department's Metropolitan Division mounted police stables and several private stables, located east of the project site which use the regional bridle paths and equestrian amenities that lie west, across the hazardous L.A. River, in Griffith Park.

New Pedestrian/bicycle access in center of 1.4 mile unbroken L.A. River Bike Path segment: Existing access for pedestrians to the L.A. River Bike Path on the east side of the L.A. River in the area near the project site is at Colorado Boulevard to the north, and Los Feliz Boulevard to the south. These access points are approximately 1.4 miles apart, along the L.A. River Bike Path. Community network access (i.e., walking or cycling on available streets) would put these access points even farther apart, well beyond accepted comfortable walking distance. The new bridge, located at approximately the center of this lengthy segment, provides convenient access to an underserved and disadvantaged community. (Question 6 response).

2. POTENTIAL FOR REDUCING THE NUMBER AND/OR RATE OF PEDESTRIAN AND BICYCLIST FATALITIES AND INJURIES, INCLUDING THE IDENTIFICATION OF SAFETY HAZARDS FOR PEDESTRIANS AND BICYCLISTS. *(0-25 POINTS)*

A. Describe the potential of the project to reduce pedestrian and/or bicycle injuries or fatalities.

By attracting existing on-street bicyclists to the off-road Class I Bicycle Path, and by encouraging use of the safer off-road facility by new cyclists to a safer facility—especially those less confident and experienced— there will be a reduction in both injury- and fatality-crashes involving bicycles and motor vehicles. Estimates of accidents and fatalities avoided are detailed in Response 2C, below and in Attachment 13. In addition, physical separation of horses from cyclists and pedestrians ensures safe sharing of the bridge.

Equestrian Hazards Eliminated: Currently, an equestrian crossing exists at the project site, which traverses through the L.A. River bed. The existing crossing poses a hazard when equestrians try to cross the River when waters are fast moving. In addition, the slippery cement and algae-lined floor of the River poses a hazard to equestrians. Implementation of the proposed project would enable safe, year-round passage into Griffith Park under the I-5 Freeway, via an existing tunnel. The project is expected to result in an increase in the number of people who use the shared bicycle/pedestrian path and the equestrian trail along the River by providing safe multimodal connections, but certainly the project will entirely eliminate equestrian hazards. Within the past 15 years, at least one horse-rescue operation was required near the project site, with minor injuries to horse and rider. Over 20 years, we estimate one horse fatality and two injuries to horses and riders. The benefit of avoiding this is not included in the benefit-cost ratio.

The design of the crossing and its connections to regional facilities will ensure safety for all non-motorized modes going forward. Equestrians will do their riding on the east bank of the L.A. River on the Greenway trail and merely cross over the bike path to enter Griffith Park.

B. Describe if/how your project will achieve any or all of the following:

- Reduces speed or volume of motor vehicles:

No motorized vehicles would be permitted on the bridge, effectively eliminating motor vehicle accidents. Bollards would be placed to keep all vehicles off the walking and riding surfaces.

- Improves sight distance and visibility

Visibility for roadway speeds is not an issue, since this is a trail project. The bridge is designed to AASHTO ADA standards, and will allow ingress and egress for three non-motorized modes: bicyclists, pedestrians and horses. Physical separation of horses from cyclists and pedestrians ensures safe sharing of the bridge.

- Improves compliance with local traffic laws

Not applicable to this off-road bridge project.

- Eliminates behaviors that lead to collisions

The bridge design segregates the equestrian users from pedestrians and bicyclists for safety. A continuous structural beam will separate pathways from bank to bank. The project includes a horse-optimized fence to keep horses on their designated pathway. In addition, education, outreach and signage will be provided to educate pedestrian and bicycle users on how to share facilities with horses.

- Addresses inadequate traffic control devices

Not applicable to this off-road bridge project.

- Addresses inadequate bicycle facilities, crosswalks or sidewalks

The bridge will provide important new access to the only existing Class I Bike Path in the area, and, in fact the only bike facility of any kind currently in operation in the North Atwater area, although Class 2 and 3 are proposed in the project area for future construction. (Attachment 4 map of SCAG Regional AT Network.) The bridge permits cyclists and pedestrians to access safe off-road bicycle and pedestrian facilities they cannot currently reach without significant out-of-direction travel.

C. Describe the location's history of events and the source(s) of data used (e.g. collision reports, community observation, surveys, audits) if data is not available include a description of safety hazard(s) and photos.

The bridge addresses safety in two ways. First, the bridge will create community

connections to recreational activities, including an extensive off-road network of horse trails, pedestrian and bicycle pathways that will not be subject to vehicle-related incidents and accidents. Second, it eliminates hazardous horse crossing in-river, with its risk of accidents. Attachment 5 shows photographs of this area.

Reducing Pedestrian/Bicycle Fatalities and Injuries:

Five-year SWITRS data (2008-2012) for bicycle-involved collisions within approximately 2 miles of the project site shows 140 total collisions (Attachment 14). Of these 140 serious accidents, 7 were severe, 80 showed visible injury, and 53 complained of pain. Many of these injuries occurred on Class 2 and Class 3 bikeways.

Based on the nature of parallel bicycle routes, the job and recreation access afforded by this bridge, and the attractiveness of a separated Class I Bike Path for longer trips and recreational trips, a conservative assumption would be that 10% of the five-year bicycle accidents (i.e., 14 injury accidents) would move onto the bridge and be avoided. The life of this bridge is expected to be 100 years; however taking a conservative 20-year project life, and assuming (again, conservatively) that bicycle mode share would rise 76% by 2025, the bridge could result in 112 fewer injury accidents for cyclists over 20 years.

Five-year SWITRS data (2008-2012) for pedestrian-involved collisions within 1.15 miles of the project site shows 47 total collisions (Attachment 15), resulting in 2 deaths, 6 severe injuries, 25 visible injuries, and 14 complaints of pain. A calculation for pedestrians is similar to that for bicycles, but uses a more conservative 5% diversion to the L.A. River Bike Path, in recognition of the range of pedestrian destinations on-street, would still reduce pedestrian injuries by 18. It is conservatively estimated that of these avoided bicycle and pedestrian accidents, four of them would have been fatalities.

3. PUBLIC PARTICIPATION and PLANNING *(0-15 POINTS)*

A. Describe the community based public participation process that culminated in the project proposal or plan, such as noticed meetings/public hearings, consultation with stakeholders, etc.

The L.A. River Revitalization Corporation (LARRC) was created by the City of Los Angeles to implement the projects listed in L.A. River Revitalization Master Plan (LARRMP). The LARRMP was the result of a two-year community engagement process that worked with over 20 public agencies and more than 130 community based organizations. As a result, the LARRMP calls for over 240 community-determined projects, one of which is project #147 described as the "Los Feliz Equestrian/Non-Motorized Bridge". (Attachment 20 provides a selected documentation from an extensive 15-year history of community-driven efforts to build this bridge, some of which pre-date the LARRC's creation.)

In 1998, the Los Angeles City Council (Council File 98-1729) recognized the need for an equestrian bridge across the L.A. River in North Atwater Village, to eliminate hazards to horses and to eliminate bacterial contamination to the River from horse feces. The proposed crossing would also accommodate cyclists and pedestrians.

In 2007, the City Council (C.F. 07-1342) adopted the long-range L.A. River Revitalization Master Plan, which recommended: "Continue development of non-motorized transportation and recreation elements including bike and pedestrian paths and multi-use trails in the River and tributary rights of way; connect neighborhoods to the river with "Equestrian Loops" along and across the River; enhance river identity with non-motorized bridges: "Commission 'signature' non-motorized bridges that express a design or artistic sensibility and become landmarks for the river," "Bridges should always safely accommodate both pedestrians and bicycle traffic," and "Light for safety, and design lighting features to highlight the bridge." The Plan lists "Los Feliz Equestrian/Non-motorized Bridge" as its Project No. 147.

The project is also supported by LA n Sync, a partnership that brings together the broad diversity of Greater Los Angeles—uniting academic, civic, nonprofit, business and philanthropic sectors to pursue and win major funding opportunities. LA n Sync has been instrumental as a partner with LARRC, providing resources for writing this grant application and other assistance.

B. Describe the local participation process that resulted in the identification and prioritization of the project:

LARRC selected project #147 (the bridge) as its starting point because of a generous philanthropic gift from its namesake donor, Morton La Kretz and because of continued support from the local community to solve problems along the River (see Answer 3A). Starting in March 2011, LARRC began meeting with key stakeholders including the L.A. Equestrian Center, Friends of the Los Angeles River, Friends of Griffith Park, L.A. County Bicycle Coalition, North East Trees, the Army Corps of Engineers and the Equine Advisory Committee. LARRC has ensured that the history of public engagement that began with the LARRMP has continued through every step of the way as the project developed from concept through permitting. LARRC even moved the original location of the bridge further downstream due to feedback from its partners in the Los Angeles Police Department Mounted Unit and local equestrians. Further, suggestions from stakeholders regarding safely accommodating both equestrians and cyclists resulted in the two-track design, one solely for equestrians and the other for cyclists and pedestrians. At every step of the process, LARRC has looked to its community partners for input and guidance.

Issues long-identified by local agencies and community desires for safe, sustainable new pedestrian/cyclist/equestrian connections, improved ecosystem and riparian health, context-sensitivity and aesthetics, uninterrupted delivery of needed project benefits over a long bridge life, and the potential for River revitalization that a bridge designed with a “wow” factor, all contributed to the development and selection of specific bridge options and technical design specifications.

Bridge types were evaluated for performance, time of erosion, visual impact, and multi-modal functionality. Based on these factors, double arch span bridge and truss designs were eliminated from further evaluation due to technical constraints and higher requirements for environmental mitigation.

The cable-stayed bridge, however, would only require one pier in the River. With minimal foundations required at each bank, this solution would have less impact on the waterway. As a lighter bridge, it consumes fewer natural resources, which is consistent with community environmental values. In line with the less-is-more philosophy, a cable-stayed bridge also requires less maintenance and renovation over its lifetime. Other bridge typologies experience structural fatigue much earlier (having only a 50 year useful life compared to a 100 year useful life for a cable-stayed bridge) and require more extensive renovation and consumption of raw materials to complete those renovations. The main component being maintained in a cable-stayed bridge is the steel cable. These cables are "off-the-shelf" and result in less downtime for maintenance, enabling the bridge to remain open as an amenity and resource for the community for more time over its lifespan, compared to other bridge designs. Therefore, the cable-stayed bridge is the preferred bridge type and all of the three build alternatives evaluated further would be a cable-stayed bridge.

C. Is the project cost over $1 Million? Y/N Yes

If Yes- is the project Prioritized in an adopted city or county bicycle transportation plan, pedestrian plan, safe routes to school plan, active transportation plan, trail plan, circulation element of a general plan, or other publicly approved plan that incorporated elements of an active transportation plan? Y/N Yes

La Kretz Crossing will result in much more than mere implementation of a listed project in a plan (listed as Project #147 in the LA River Revitalization Master Plan) or mere compliance with numerous local and regional plan goals. This multimodal non-motorized bridge is a fine example of how a project can embody the full intention of a plan, and inspire continued plan implementation, gain public attention and support, and leverage public and private funding resources.

The project supports SCAG's 2012 RTP/SCS GHG emissions reduction goals and Active Transportation goals by increasing access to a regional network of non-motorized, multi-modal recreational trails and pathways. The project increases safety by removing risks created by vehicle/active transportation conflicts. Finally, by moving equestrian crossing activities out of the L.A. River and onto a safe bridge structure, risks of injury or fatality to horses and riders are eliminated.

Greenhouse Gas Emission Reduction:

The annual reduction in GHG emissions attributable to project-related decreases in VMT is 1,162 metric tons, or 23,249 metric tons over the 20-year life of the project. (Attachment 13)

4. COST EFFECTIVENESS *(0-10 POINTS)*

A. Describe the alternatives that were considered. Discuss the relative costs and benefits of all the alternatives and explain why the nominated one was chosen.

A bridge over the Los Angeles River to solve long-identified problems of equestrian safety and bicycle/pedestrian access to the LA River Bike Path and Griffith Park has been discussed since 1998. The project location was determined in large part by the proximity of stables on the east side of the L.A. River, and the tunnel under the I-5 Freeway that provides equestrian and pedestrian access to Griffith Park. Successive confirmations by the L.A. City Council (2007, 2008) and inclusion of the bridge project within the L.A. River Revitalization Master Plan (2008, Project # 147) demonstrate support for a bridge solution. The type of bridge was determined based on environmental mitigation requirements, life-cycle cost and sustainability factors described in our response to 3B, above. Cost was one factor that steered designers to the cable-stayed bridge, but it was also driven by community concerns.

B. Calculate the ratio of the benefits of the project relative to both the total project cost and funds requested (i.e., $\frac{Benefit*}{Total\ Project\ Cost}$ and $\frac{Benefit*}{Program\ Funds\ Requested}$).

The total cost associated with the construction this bridge project is $9,038,333. Based on the monetary value of a range of project benefits attributable to the bridge La Kretz Crossing will provide

$2,801,035 worth of annual benefits over a 20-year project life, for a total of $66,595,335. This results in a substantial positive **Benefit-to-Total Project Cost ratio of 7.37**, meaning that for every one dollar of investment, $7.37 in benefits is realized. Based on the ATP grant request of $3,660,000, the **Benefit-to-Program Funds Requested ratio is 18.2**, meaning that for every one dollar of Caltrans investment, there is a return of $18.20.

Annualized project benefits derive from the following categories directly relevant to the goals of the Active Transportation Program: Mobility benefits for bicyclists using new access to the L.A. River Bike Path ($171,000); decreased injury and fatalities by shifting some AT trips onto a safer route ($576,000); increased health outcomes related to increased physical activity ($1,985,854); reductions in GHG ($54,636); and reductions in criteria pollutants ($12,880). One hundred percent of these benefits accrue to disadvantaged communities, though others also enjoy the benefits.

The methodology for calculating benefits is included as Attachment 13 of this application.

*Benefits must directly relate to the goals of the Active Transportation Program.

5. IMPROVED PUBLIC HEALTH *(0-10 points)*

A. Describe how the project will improve public health, i.e. through the targeting of populations who have a high risk factor for obesity, physical inactivity, asthma, or other health issues.

Direct Benefits to Public Health and Fitness: La Kretz Crossing provides new opportunities for safe and healthy recreation, physical activity, and access to the largest urban wilderness area (in Griffith Park) in any large American city for disadvantaged populations in the greatest need. Residents in the communities within walking (1/2 mile) and bicycling (up to 2 miles) distance of the bridge project live within CalEnvironScreen's highest percentile (91-100%) designation for environmental burdens. Much of the adjacent population earns less than 80% of the state's median household income.

The very nature of the River Revitalization Master Plan, in which this bridge project is listed as #147, provides a major opportunity to advance public health and fitness along the River. With 32+

miles of connected trails, designed family walking “loops” and recommended connections to all possible trails, parks, and schools, the revitalized River network can result in significant health benefits and creates a transportation system that supports daily activity.

LARRC, in partnership with other agencies and foundations that focus on public health issues and fitness, will call attention to the health problems within the Los Angeles community today, such as the inactivity of youth, the difficult access to various sports activities, the rise of obesity and diabetes, and inactive lifestyles. As part of the Outreach/Education Campaign included in this grant request, LARRC will create activities, develop recreational and health-based partnerships, and attract funding partners to programs that engage youth, teens and families into River-related recreation that will elevate the awareness of public health issues and increase opportunities for healthy living along the River and throughout the region.

Benefits to Public Health from Improved LA River Ecosystem: The existing ramps that are presently used for equestrian access to cross the L.A. River would be restored to their original condition and use, providing maintenance access to the River bottom. The bridge’s long-term operation is expected to result in benefits to the River’s habitat quality by reducing the use of the riverbed itself by horses and reducing associated wastes from the LA River. Further, in LARRC’s green approach to project design, and by improving the ecosystem, the natural attractiveness of the riverside Greenway and Bike Path facilities is increased, thus bringing more people into an active lifestyle.

For those Los Angeles residents who can once again obtain permits to fish in the L.A. River Recreation Zone (downstream from the project) and who eat those fish, there are additional health benefits related to reducing the hazard of bacteriological contamination to food.

Public Safety: Reduced accident risk due to less opportunity for vehicle conflicts with pedestrians and cyclists is calculated to produce. Details provided in response to Question 2C, above.

6. **BENEFIT TO DISADVANTAGED COMMUNITIES** *(0-10 points)*

A. I. Is the project located in a disadvantaged community? Y/N Y*

The bridge site is on public property, in Zip Code 90039, which meets the standard for environmentally disadvantaged community. It is adjacent to Zip Code 90027, and within a ½ mile from Zip Code 91204 each of which meet both of the first two criteria below.

II. Does the project significantly benefit a disadvantaged community? Y/N Y

a. Which criteria does the project meet? (Answer all that apply)

- Median household income for the community benefited by the project:

The median household income for Zip Code 91204 (Population 16,032) is $39, 850 - 64.9% of state median household income—far below the 80% threshold for disadvantaged community. Zip Code 90027 (population 47,702) median household income is $47,210, or 76.8% of statewide median.

- California Communities Environmental Health Screen Tool

The CalEnvironScreen score for the community benefited by the project: 91-100% (Highest Scores, representing most environmental burden.

- For projects that benefit public school students, percentage of students eligible for the Free or Reduced Price Meals Programs: _____ %

b. Should the community benefitting from the project be considered disadvantaged based on criteria not specified in the program guidelines? If so, provide data for all criteria above and a quantitative assessment of why the community should be considered disadvantaged.

Not Applicable. This project meets other disadvantaged communities thresholds/criteria as noted above.

B. Describe how the project demonstrates a clear benefit to a disadvantaged community and what percentage of the project funding will benefit that community, for projects using the school based criteria describe specifically the school students and community will benefit.

One hundred percent of the project will benefit disadvantaged communities. Others will also enjoy project benefits due to the regional draw of the L.A. River Greenway, Bike Path and Griffith Park.

Los Angeles zip code 90039 is immediately adjacent to the east of the La Kretz Crossing site, just north of Los Feliz Blvd. in the community of North Atwater. Glendale zip code 91204, which lies east of

zip code 90039, is within a half mile of the bridge site. Both zip codes score in the CalEnviroScreen at the 91-100th percentile—representing the highest percentile for environmental burden carried by residents. The opportunity for safe and convenient access to the regional park (Griffith Park) and the extensive L.A. River Greenway/Bike Path offers people a way to increase physical activity and health.

In addition, zip code 91204 residents earn only 64.9% of the state median household income.

7. USE OF CALIFORNIA CONSERVATION CORPS (CCC) OR A CERTIFIED COMMUNITY CONSERVATION CORPS *(0 to -5 points)*

A. The applicant has coordinated with the CCC to identify how a state conservation corps can be a partner of the project. Y/N Y

a. Name, e-mail, and phone # of the person contacted and the date the information was submitted to them

B. The applicant has coordinated with a representative from the California Association of Local Conservation Corps (CALCC) to identify how a certified community conservation corps can be a partner of the project. Y/N Y

a. Name, e-mail, and phone # of the person contacted and the date the information was submitted to them

C. The applicant intends to utilize the CCC or a certified community conservation corps on all items where participation is indicated? Y/N Y

I have coordinated with a representative of the CCC; and the following are project items that they are qualified to partner on:

PLEASE REFER TO ATTACHMENT 19a

I have coordinated with a representative of the CALCC; and the following are project items that they are qualified to partner on:

PLEASE REFER TO ATTACHMENTS 8 and 19b

8. **APPLICANT'S PERFORMANCE ON PAST GRANTS** *(0 to -10 points)*

A. Describe any of your agency's ATP type grant failures during the past 5 years, and what changes your agency will take in order to deliver this project.

LARRC has had no previous grants with Caltrans, so no failure. LARRC is currently administering a State Proposition 84 grant successfully.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

General Instructions

☒ New Project	Date:	5/20/14

District	EA	Project ID	PPNO	MPO ID	TCRP No.
07					

County	Route/Corridor	PM Bk	PM Ahd	Project Sponsor/Lead Agency	
LA				LARRC	
				MPO	**Element**
				SCAG	Local Assistance

Project Manager/Contact	Phone	E-mail Address
Jennifer Samson	323-221-7800	jsamson@larivercorp.com

Project Title

North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Location, Project Limits, Description, Scope of Work ☐ See page 2

Located in northeast Los Angeles County, La Kretz Crossing crosses the LA River approximately one-half mile north of Los Feliz Boulevard in the North Atwater Village neighborhood of the City of Los Angeles. The crossing connects North Atwater Village, near existing equestrian facilities on the Los Angeles River's eastern bank, to an existing stretch of LA River Bikeway on the River's western bank, enabling safe, year-round passage for pedestrians and equestrians into Griffith Park, and connecting bike/ped travelers from Atwater to the LA River Bikeway. Project includes construction, outreach/education & data count equip installation.

☒ Includes ADA Improvements ☒ Includes Bike/Ped Improvements

Component	Implementing Agency
PA&ED	
PS&E	
Right of Way	
Construction	Los Angeles River Revitalization Corp (LARRC)

Purpose and Need ☐ See page 2

The bridge provides safe, year-round, multi-modal crossing of the LA River between Atwater Village and Griffith Park for pedestrians/equestrians, and between Atwater Village and the LA River Bike Path for pedestrians/bicyclists. The project meets LA City Council priorities for recreational, cultural, access, and water quality benefits, and is a step toward implementing the City Council-adopted LA River Revitalization Master Plan. The project is included in the Plan's priority list as No. 147. The project meets SCAG goals of increasing active recreational opportunities, especially in income- and environmentally disadvantaged communities and closes gaps in regionally significant facilities in the regional active transportation network.

Project Benefits ☒ See page 2

Direct connections to Griffith Park hiking/park amentities increase public health and commute options for economically disadvantaged and environmentally burdened communities as does bicycle commute option facilitated by connection to the LA River Greenway/Bike Path. GHG emissions reduction attributable to project-related decreases in VMT of 5M per year, is 1,162 metric tons, or 23,249 metric tons over the 20-year life of the project.

☒ Supports Sustainable Communities Strategy (SCS) Goals ☒ Reduces Greenhouse Gas Emissions

Project Milestone			Proposed
Project Study Report Approved			
Begin Environmental (PA&ED) Phase			
Circulate Draft Environmental Document	**Document Type**		
Draft Project Report			
End Environmental Phase (PA&ED Milestone)			
Begin Design (PS&E) Phase			
End Design Phase (Ready to List for Advertisement Milestone)			
Begin Right of Way Phase			
End Right of Way Phase (Right of Way Certification Milestone)			
Begin Construction Phase (Contract Award Milestone)			03/01/15
End Construction Phase (Construction Contract Acceptance Milestone)			08/31/16
Begin Closeout Phase			
End Closeout Phase (Closeout Report)			

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STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised May 2013)

General Instructions

☒ New Project	Date:	5/20/14

District	EA	Project ID	PPNO	MPO ID	TCRP No.
07					

Project Title

North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Additional Information

The total cost associated with the construction this bridge project is $9,038,333. Based on the monetary value of a range of project benefits attributable to the bridge La Kretz Crossing will provide $2,801,035 worth of annual benefits over a 20-year project life, for a total of $66,595,335. This results in a substantial positive Benefit-to-Total Project Cost ratio of 7.37, meaning that for every one dollar of investment, $7.37 in benefits is realized. Based on the ATP grant request of $3,660,000, the Benefit-to-Program Funds Requested ratio is 18.2, meaning that for every one dollar of Caltrans investment, there is a return of $18.20.

Annualized project benefits derive from the following categories directly relevant to the goals of the Active Transportation Program: Mobility benefits for bicyclists using new access to the L.A. River Bike Path ($171,000); decreased injury and fatalities by shifting some AT trips onto a safer route ($576,000); increased health outcomes related to increased physical activity ($1,985,854); reductions in GHG ($54,636); and reductions in criteria pollutants ($12,880). One hundred percent of these benefits accrue to disadvantaged communities, though others also enjoy the benefits.

The bridge avoids future equestrian accidents from horses attempting to negotiate the slippery LA River bottom to access Griffith Park

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STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					

Project Title: North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Proposed Total Project Cost ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		9,038						9,038
TOTAL		9,038						9,038

Notes

"Con" component consists of Bridge construction and "Non-Infrastructure" elements eligible for ATP funding: Outreach/Education to support safe use of facility.

Fund No. 1: **Active Transportation Program (ATP) Funding**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		3,660						3,660
TOTAL		3,660						3,660

Program Code

20.30.720

Funding Agency

State

"Con" component consists of Bridge construction, installation of ped/bike/horse count devices and "Non-Infrastructure" elements eligible for ATP funding: Outreach/Education to support safe use of facility.

Fund No. 2: **Match**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		1,037						1,037
TOTAL		1,037						1,037

Program Code

Funding Agency

Match funds come from the donor for whom the equestrian/pedestrian/bicycle bridge is named.

Fund No. 3: **Additional Donations**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		4,341						4,341
TOTAL		4,341						4,341

Program Code

Funding Agency

LARRC has worked to leverage private donations to help fund La Kretz Crossing.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					
Project Title:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")					

Fund No. 4:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 5:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 6:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 7:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					
Project Title:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")					

Fund No. 8:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 9:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 10:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VI. ADDITIONAL INFORMATION

Only fill in those fields that are applicable to your project

FUNDING SUMMARY

ATP Funds being requested by Phase (to the nearest $1000)	**Amount**
PE Phase (includes PA&ED and PS&E)	$
Right-of-Way Phase	$
Construction Phase-Infrastructure	$ 3,635,000
Construction Phase-Non-infrastructure	$ 25,000
Total for ALL Phases	**$** 3,660,000

All Non-ATP fund types on this project* (to the nearest $1000)	**Amount**
11.47% match	$ 1,036,697
Additional match (overmatch)	$ 4,341,636
	$
	$
	$
	$

*Must indicate which funds are matching

Total Project Cost	$ 9,038,333
Project is Fully Funded	Yes

ATP Work Specific Funding Breakdown (to the nearest $1000)	**Amount**
Request for funding a Plan	$
Request for Safe Routes to Schools Infrastructure work	$
Request for Safe Routes to Schools Non-Infrastructure work	$
Request for other Non-Infrastructure work (non-SRTS)	$ 25,000
Request for Recreational Trails work	$ 3,660,660

ALLOCATION/AUTHORIZATION REQUESTS SCHEDULE

	Proposed Allocation Date	**Proposed Authorization (E-76) Date**
PA&ED or E&P		
PS&E		
Right-of-Way		
Construction	02/01/2015	03/01/2015

All project costs MUST be accounted for on this form, including elements of the overall project that will be, or have been funded by other sources.

LARRC La Kretz Crossing

Project name:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

VIII. APPLICATION SIGNATURES

Applicant: The undersigned affirms that the statements contained in the application package are true and complete to the best of their knowledge.

Signature: _____ Date: _____
Name: Omar Brownson Phone: 323-221-7800
Title: Executive Director, LARRC e-mail: obrownson@larivercorp.com

Local Agency Official (City Engineer or Public Works Director): The undersigned affirms that the statements contained in the application package are true and complete to the best of their knowledge.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

School Official: The undersigned affirms that the school(s) benefited by this application is not on a school closure list.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

Person to contact for questions:

Name: Phone: _____
Title: e-mail: _____

Caltrans District Traffic Operations Office Approval*
If the application's project proposes improvements on a freeway or state highway that affects the safety or operations of the facility, it is required that the proposed improvements be reviewed by the district traffic operations office and either a letter of support or acknowledgement from the traffic operations office be attached (_) or the signature of the traffic personnel be secured below.

Signature: _____ Date: _____
Name: _____ Phone: _____
Title: _____ e-mail: _____

*Contact the District Local Assistance Engineer (DLAE) for the project to get Caltrans Traffic Ops contact information. DLAE contact information can be found at http://www.dot.ca.gov/hq/LocalPrograms/dlae.htm

ATTACHMENT 1: List of Attachments to LARRC's Application for Active Transportation Program Funding

The following attachments are included as part of the Los Angeles River Revitalization Corporation (LARRC) Caltrans Active Transportation Grant Program application for funding to construct a non-motorized, multimodal pedestrian, bicycle and equestrian bridge over the Los Angeles River, known as "La Kretz Crossing.:. They are presented in the order mentioned in the application materials, parts 1 and 2, following this list.

1. Attachment 1: LARRC List of Attachments for ATP Grant
2. Attachment 2: Project Programming Request
3. Attachment 3: Project Tasks, Costs and Schedule
4. Attachment 4: Maps
    a. Vicinity/Location Map of Project Area and Impacts
    b. Area destinations (stables)
    c. SCAG Regional Active Transportation Network in Project Area
5. Attachment 5: Photos of Existing Location
6. Attachment 6: Preliminary Plans, showing typical cross section, property right-of-way lines and streets names and easements
7. Attachment 7: Detailed Engineer's Estimate
8. Attachment 8: 2011 Bridge/Trail maintenance agreement with Los Angeles Conservation Corp
9. Attachment 9: CEQA
    a. MND
    b. NOD
    c. Council Adoption
    d. Link to full online access (http://eng.lacity.org/techdocs/emg/north_atwater.htm)
10. Attachment 10: NEPA Documents (summary from current EA and estimated FONSI issue date)
11. Attachment 11: Letters of Support
    a. LA County Bike Coalition
    b. Metro
    c. City of Los Angeles, LA River Project Office
    d. LAnSync
    e. LA Equine Advisory Committee
    f. Mountains Recreation Conservation Authority
12. Attachment 12: L.A. River Bike Path Bicycle Count Data
13. Attachment 13: Benefit-Cost Methodology
14. Attachment 14: SWITRS/TIMS Map of Bicycle Collisions
15. Attachment 15: SWITRS/TIMS Map of Pedestrian Collisions
16. Attachment 16: Los Angeles River Revitalization Master Plan (2008) Project List Highlighting the La Kretz Crossing as Project #147

17. Attachment 17: List of Relevant Plans with Links to On-line Access
    a. Metro Bicycle Transportation Strategic Plan (2006)
    b. Los Angeles County Metro Bicycle Master Plan (2006)
    c. Los Angeles River Revitalization Master Plan (2007)
    d. City of Los Angeles Department of Public Works 2011 Bicycle Master Plan (2011)
18. Attachment 18: Public Participation Documentation
19. Attachment 19: CCC/LACCC Contact Documentation

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

General Instructions

☒ New Project	Date:	5/20/14

District	EA	Project ID	PPNO	MPO ID	TCRP No.
07					

County	Route/Corridor	PM Bk	PM Ahd	Project Sponsor/Lead Agency	
LA				LARRC	
				MPO	**Element**
				SCAG	Local Assistance

Project Manager/Contact	Phone	E-mail Address
Jennifer Samson	323-221-7800	jsamson@larivercorp.com

Project Title

North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Location, Project Limits, Description, Scope of Work ☐ See page 2

Located in northeast Los Angeles County, La Kretz Crossing crosses the LA River approximately one-half mile north of Los Feliz Boulevard in the North Atwater Village neighborhood of the City of Los Angeles. The crossing connects North Atwater Village, near existing equestrian facilities on the Los Angeles River's eastern bank, to an existing stretch of LA River Bikeway on the River's western bank, enabling safe, year-round passage for pedestrians and equestrians into Griffith Park, and connecting bike/ped travelers from Atwater to the LA River Bikeway. Project includes construction, outreach/education & data count equip installation.

☒ Includes ADA Improvements ☒ Includes Bike/Ped Improvements

Component	Implementing Agency
PA&ED	
PS&E	
Right of Way	
Construction	Los Angeles River Revitalization Corp (LARRC)

Purpose and Need ☐ See page 2

The bridge provides safe, year-round, multi-modal crossing of the LA River between Atwater Village and Griffith Park for pedestrians/equestrians, and between Atwater Village and the LA River Bike Path for pedestrians/bicyclists. The project meets LA City Council priorities for recreational, cultural, access, and water quality benefits, and is a step toward implementing the City Council-adopted LA River Revitalization Master Plan. The project is included in the Plan's priority list as No. 147. The project meets SCAG goals of increasing active recreational opportunities, especially in income- and environmentally disadvantaged communities and closes gaps in regionally significant facilities in the regional active transportation network.

Project Benefits ☒ See page 2

Direct connections to Griffith Park hiking/park amentities increase public health and commute options for economically disadvantaged and environmentally burdened communities as does bicycle commute option facilitated by connection to the LA River Greenway/Bike Path. GHG emissions reduction attributable to project-related decreases in VMT of 5M per year, is 1,162 metric tons, or 23,249 metric tons over the 20-year life of the project.

☒ Supports Sustainable Communities Strategy (SCS) Goals ☒ Reduces Greenhouse Gas Emissions

Project Milestone			Proposed
Project Study Report Approved			
Begin Environmental (PA&ED) Phase			
Circulate Draft Environmental Document	**Document Type**		
Draft Project Report			
End Environmental Phase (PA&ED Milestone)			
Begin Design (PS&E) Phase			
End Design Phase (Ready to List for Advertisement Milestone)			
Begin Right of Way Phase			
End Right of Way Phase (Right of Way Certification Milestone)			
Begin Construction Phase (Contract Award Milestone)			03/01/15
End Construction Phase (Construction Contract Acceptance Milestone)			08/31/16
Begin Closeout Phase			
End Closeout Phase (Closeout Report)			

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised May 2013)

General Instructions

☒ New Project	Date:	5/20/14

District	EA	Project ID	PPNO	MPO ID	TCRP No.
07					

Project Title

North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Additional Information

The total cost associated with the construction this bridge project is $9,038,333. Based on the monetary value of a range of project benefits attributable to the bridge La Kretz Crossing will provide $2,801,035 worth of annual benefits over a 20-year project life, for a total of $66,595,335. This results in a substantial positive Benefit-to-Total Project Cost ratio of 7.37, meaning that for every one dollar of investment, $7.37 in benefits is realized. Based on the ATP grant request of $3,660,000, the Benefit-to-Program Funds Requested ratio is 18.2, meaning that for every one dollar of Caltrans investment, there is a return of $18.20.

Annualized project benefits derive from the following categories directly relevant to the goals of the Active Transportation Program: Mobility benefits for bicyclists using new access to the L.A. River Bike Path ($171,000); decreased injury and fatalities by shifting some AT trips onto a safer route ($576,000); increased health outcomes related to increased physical activity ($1,985,854); reductions in GHG ($54,636); and reductions in criteria pollutants ($12,880). One hundred percent of these benefits accrue to disadvantaged communities, though others also enjoy the benefits.

The bridge avoids future equestrian accidents from horses attempting to negotiate the slippery LA River bottom to access Griffith Park

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					

Project Title: North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Proposed Total Project Cost ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		9,038						9,038
TOTAL		9,038						9,038

Notes

"Con" component consists of Bridge construction and "Non-Infrastructure" elements eligible for ATP funding: Outreach/Education to support safe use of facility.

Fund No. 1: **Active Transportation Program (ATP) Funding**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		3,660						3,660
TOTAL		3,660						3,660

Program Code

20.30.720

Funding Agency

State

"Con" component consists of Bridge construction, installation of ped/bike/horse count devices and "Non-Infrastructure" elements eligible for ATP funding: Outreach/Education to support safe use of facility.

Fund No. 2: **Match**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		1,037						1,037
TOTAL		1,037						1,037

Program Code

Funding Agency

Match funds come from the donor for whom the equestrian/pedestrian/bicycle bridge is named.

Fund No. 3: **Additional Donations**

Proposed Funding ($1,000s)

Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON		4,341						4,341
TOTAL		4,341						4,341

Program Code

Funding Agency

LARRC has worked to leverage private donations to help fund La Kretz Crossing.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					
Project Title:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")					

Fund No. 4:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 5:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 6:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 7:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (Revised July 2013)

Date: 5/20/14

District	County	Route	EA	Project ID	PPNO	TCRP No.
7	LA					
Project Title:	North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")					

Fund No. 8:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 9:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

Fund No. 10:									**Program Code**
Proposed Funding ($1,000s)									
Component	Prior	14/15	15/16	16/17	17/18	18/19	19/20+	Total	**Funding Agency**
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL									

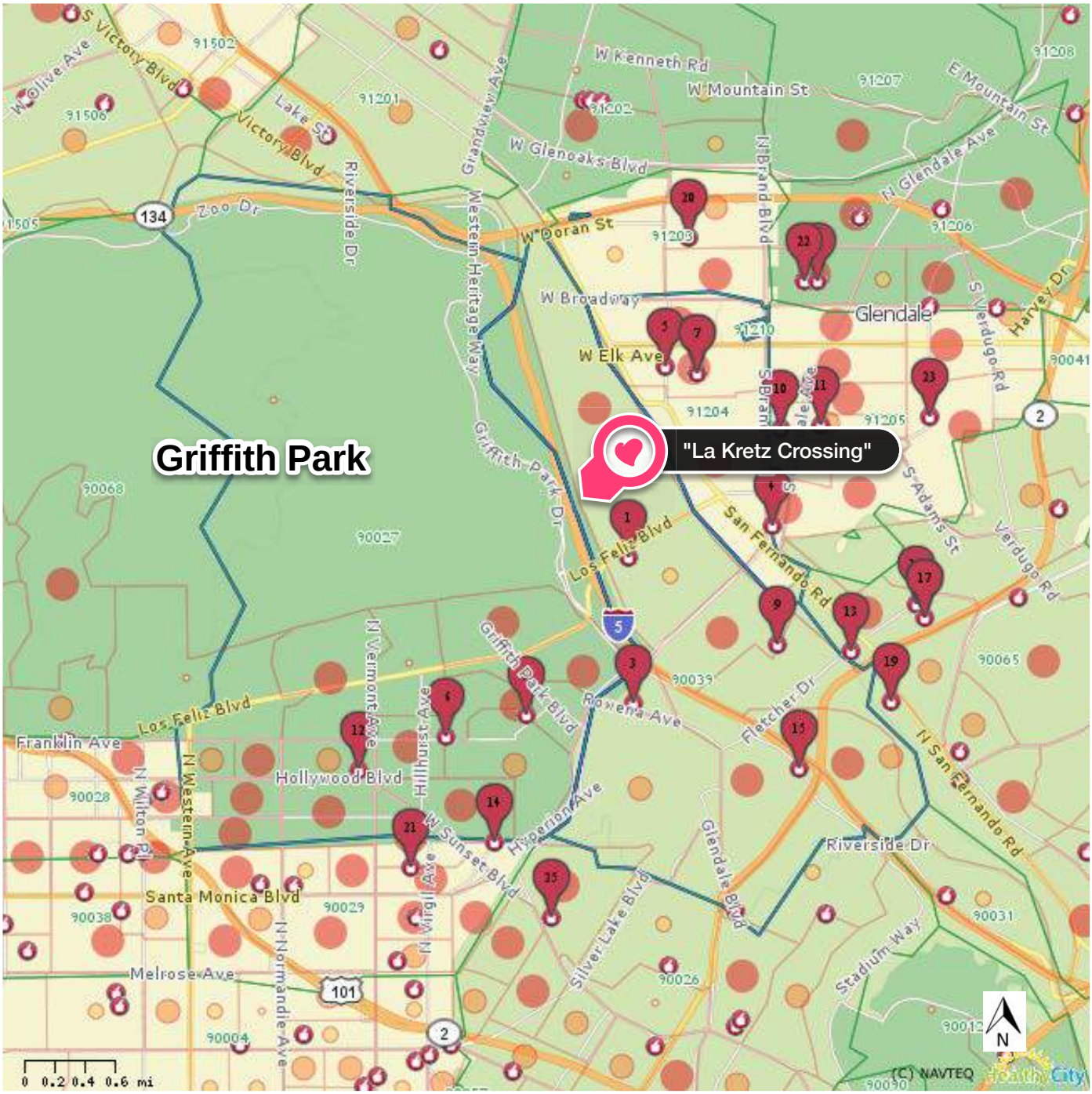
Project Name: North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Attachment 3: Project Tasks, Costs and Schedule

Start Date	End Date	Task/Deliverables	Cost
		Paid out of Local Match and Other Funds	
8/25/11	2/20/13	Complete Community Outreach related to Design	55,240
8/25/11	1/15/14	Begin and Complete Design	625,000
4/2/12	8/7/14	Complete Permits & Approvals	581,000
11/1/14	12/1/14	Hire Construction Management Firm (and set aside related costs)	150,000
12/1/14	2/1/15	Vet Potential Trade Partners and General Contractors	2,500
2/1/15	3/1/15	Release Notice of RFP to General Contractors	2,500
3/1/15	4/1/15	Release RFP and Bid Project	10,000
3/1/15	4/1/15	Determine Inspection Schedule (and set aside related costs)	73,793
		Sub-Total	**1,500,033**
		Paid out of Local Match, Other Funds, and ATP Funds	
		** The below work does not begin UNTIL AFTER FHWA authorization. Fields highlighted in yellow to be paid with ATP funds.*	
3/1/15	4/1/15	Conduct Manual Active Transportation User Counts Adjacent to Bridge	5,000
3/1/15	4/1/15	Begin Bridge Construction Education and Community Outreach	25,000
4/1/15	5/1/15	Mobilization and Materials/Contract Buy-outs by GC	159,566
4/1/15	5/1/16	General Conditions, taxes, and insurance	789,685
4/14/15	*5/11/15*	Site Preparation	143,250
5/12/15	*8/3/15*	Foundations and Piers	2,114,329
8/4/15	*10/26/15*	Steel Superstructure	2,623,928
10/27/15	*12/7/15*	Site Improvements	360,340
12/8/15	*2/29/16*	Install Infrared Count Devices	60,000
3/1/16	*4/1/16*	Donor Wall	150,000
3/1/16	*4/1/16*	Tuned Mass Dampers	294,000
3/1/16	*5/1/16*	Design and Pricing Contingency	542,838
4/1/16	*5/1/16*	Construction Contingency	270,364
		Sub-Total	**7,538,300**
		TOTAL PROJECT COST	**9,038,333**

Total Raised	5,378,333
Local Match	*1,036,697*
Additional Other Funds Raised by Project Proponent	*4,341,636*
ATP Funds Needed	3,660,000

N. Atwater Bridge ("La Kretz Crossing") Project Location and Impact Area



Park and Open Space Density: Square Miles of Open Space per 10,000 Children age 0-5

- Data unavailable
- 0.00 - 0.319
- 0.32 - 3.889
- 3.89 - 199.869
- 199.87 - 3,995,689.39

Description: Open access open space in square miles per 10,000 children aged 0-5 calculation completed with CPAD v. 1.9 open space and ESRI 2012 population statistics. This indicator is a broad categorization of types of open space, including federal, state, and special resource protection areas available to the

Means of Transportation to Work: Walked

- Data unavailable
- 0.0 % - 0.39 %
- 0.4 % - 1.49 %
- 1.5 % - 3.49 %
- 3.5 % - 100.0 %

Description: Number of workers who walked.

Resources / Deficits

- Education

Filter: Type of School: Elementary Schools (Public), High Schools (Public), Junior High Schools

Map created on May 13, 2014 at **HealthyCity.org**

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public for recreational use and opportunities. To look at this data in more detail, and compare it to published standards, visit GreenInfo Network's mapsportal.org.

Universe: Children aged 0,1,2,3,4 and 5

Data Source: California Protected Areas Database

Data Year: 2013

Data Level: ZIP Code (2012)

Universe: Workers 16 Years and Over

Data Source: American Community Survey 5-Year Estimates

Data Year: 2006 - 2010

Data Level: Census Tract (2010)

(Public).

1 **Glenfeliz Boulevard Elementary**
3955 Glenfeliz Boulevard
Los Angeles, CA 90039-1441

2 **John Marshall Senior High**
3939 Tracy Street
Los Angeles, CA 90027-3207

3 **Ivanhoe Elementary**
2828 Herkimer Street
Los Angeles, CA 90039-2010

4 **Cerritos Elementary**
120 East Cerritos Avenue
Glendale, CA 91205-3107

5 **Thomas Edison Elementary**
435 South Pacific Avenue
Glendale, CA 91204

6 **Franklin Avenue Elementary**
1910 North Commonwealth Avenue
Los Angeles, CA 90027-2800

7 **Atwater Avenue Elementary**
3271 Silver Lake Boulevard
Los Angeles, CA 90039-2253

8 **Horace Mann Elementary**
501 East Acacia Avenue
Glendale, CA 91205-2823

9 **Los Feliz Elementary**
1740 North New Hampshire Avenue
Los Angeles, CA 90027-4208

10 **Alliance Environmental Science and Technology High**
2930 Fletcher Drive
Los Angeles, CA 90065

HealthyCity

1541 Wilshire Blvd, Suite 508, Los Angeles, CA 90017

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11 Allesandro Elementary
2210 Riverside Drive
Los Angeles, CA 90039-4009

12 Fletcher Drive Elementary
3350 Fletcher Drive
Los Angeles, CA 90065-2915

13 Los Feliz Charter School for the Arts
2709 East Media Center Drive
Los Angeles, CA 90065

14 Columbus Elementary
425 West Milford Street
Glendale, CA 91203-1708

15 Lexington Avenue Primary Center
4564 West Lexington Avenue
Los Angeles, CA 90027

16 John Muir Elementary
912 South Chevy Chase Drive
Glendale, CA 91205-2540

17 Micheltorena Street Elementary
1511 Micheltorena Street
Los Angeles, CA 90026-1621

18 Lockwood Avenue Elementary
4345 Lockwood Avenue
Los Angeles, CA 90029-2809

19 Clifford Street Elementary
2150 Duane Street
Los Angeles, CA 90039-3919

20 Ramona Elementary
1133 North Mariposa Avenue
Los Angeles, CA 90029-1413

HealthyCity

1541 Wilshire Blvd, Suite 508, Los Angeles, CA 90017

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21 John Marshall Elementary
1201 East Broadway
Glendale, CA 91205-1407

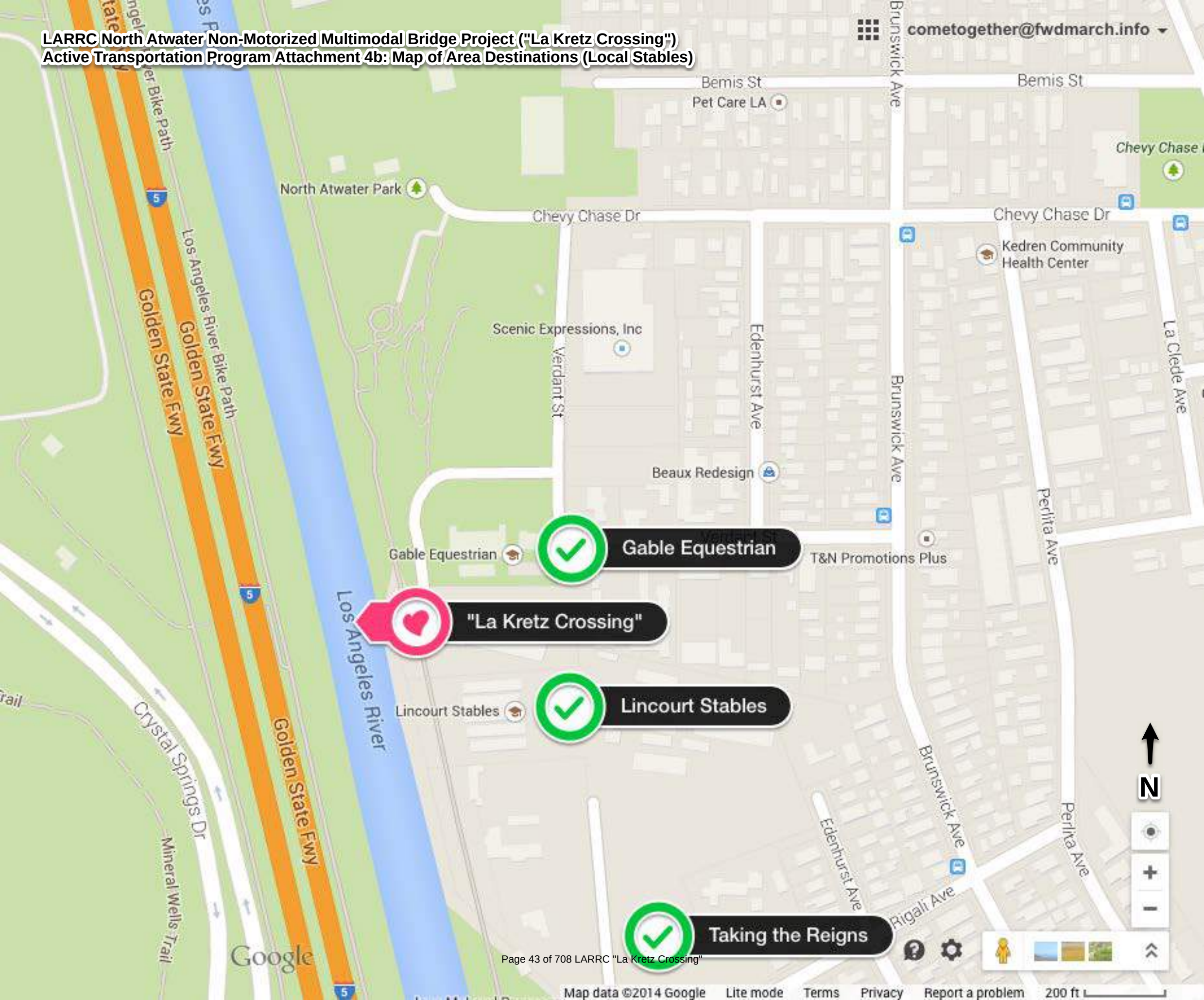
22 Glassell Park Elementary
2211 West Avenue 30
Los Angeles, CA 90065-1204

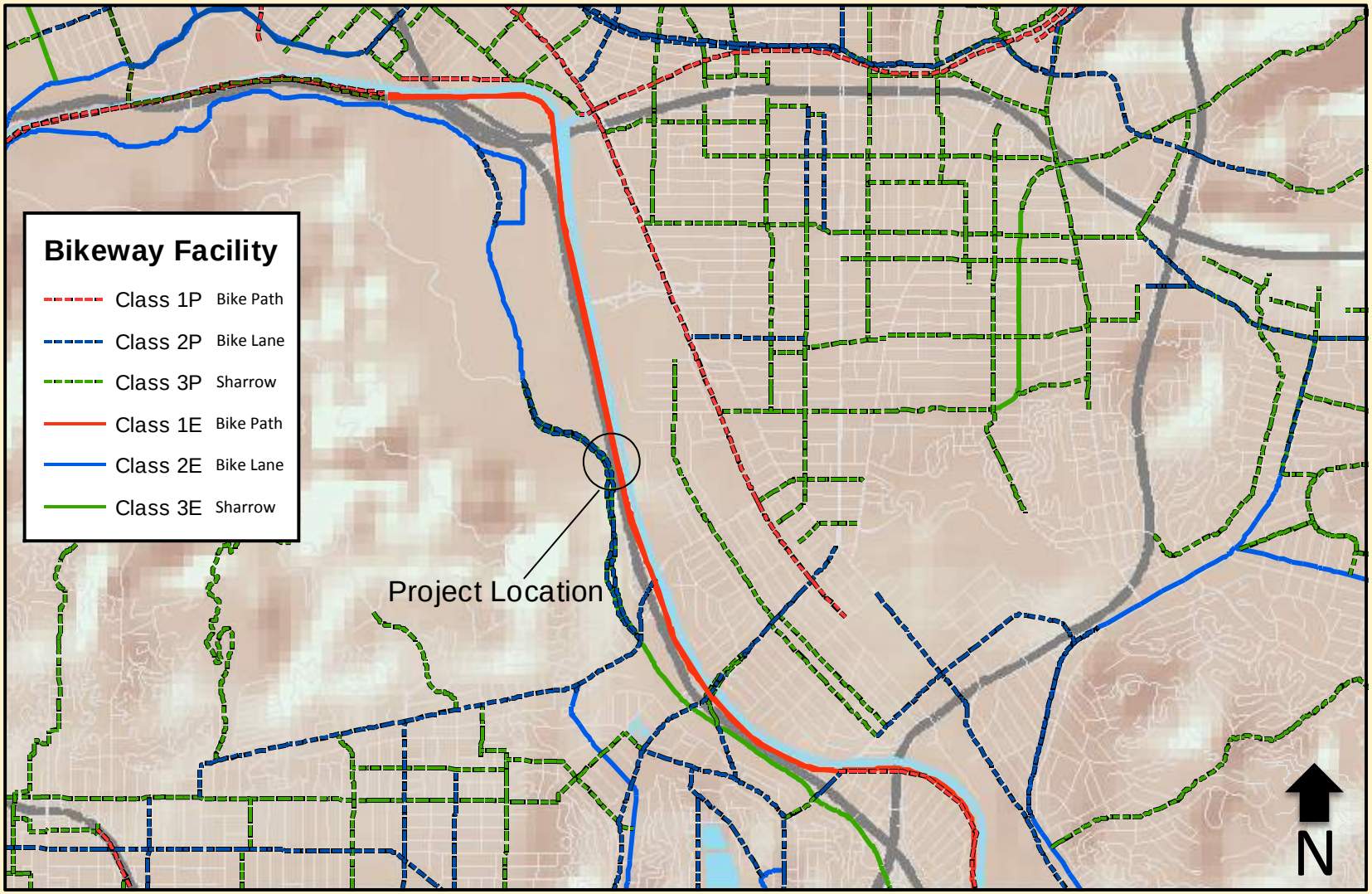
23 Magnolia Science Academy 5
5616 Carlton Way
Hollywood, CA 90028

24 Kingsley Elementary
5200 West Virginia Avenue
Los Angeles, CA 90029

25 R. D. White Elementary
744 East Doran Street
Glendale, CA 91206-2422

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 4b: Map of Area Destinations (Local Stables)





P = Proposed

E = Existing

La Kretz Crossing Bicycle Facility Context Map

0 0.225 0.45 0.9 1.35 1.8 Miles

Coordinate System: Transverse Mercator
Central Meridian: 117°0'0"W
1st Std Parallel: 0°0'0"
2nd Std Parallel: 0°0'0"
Latitude of Origin: 0°0'0"

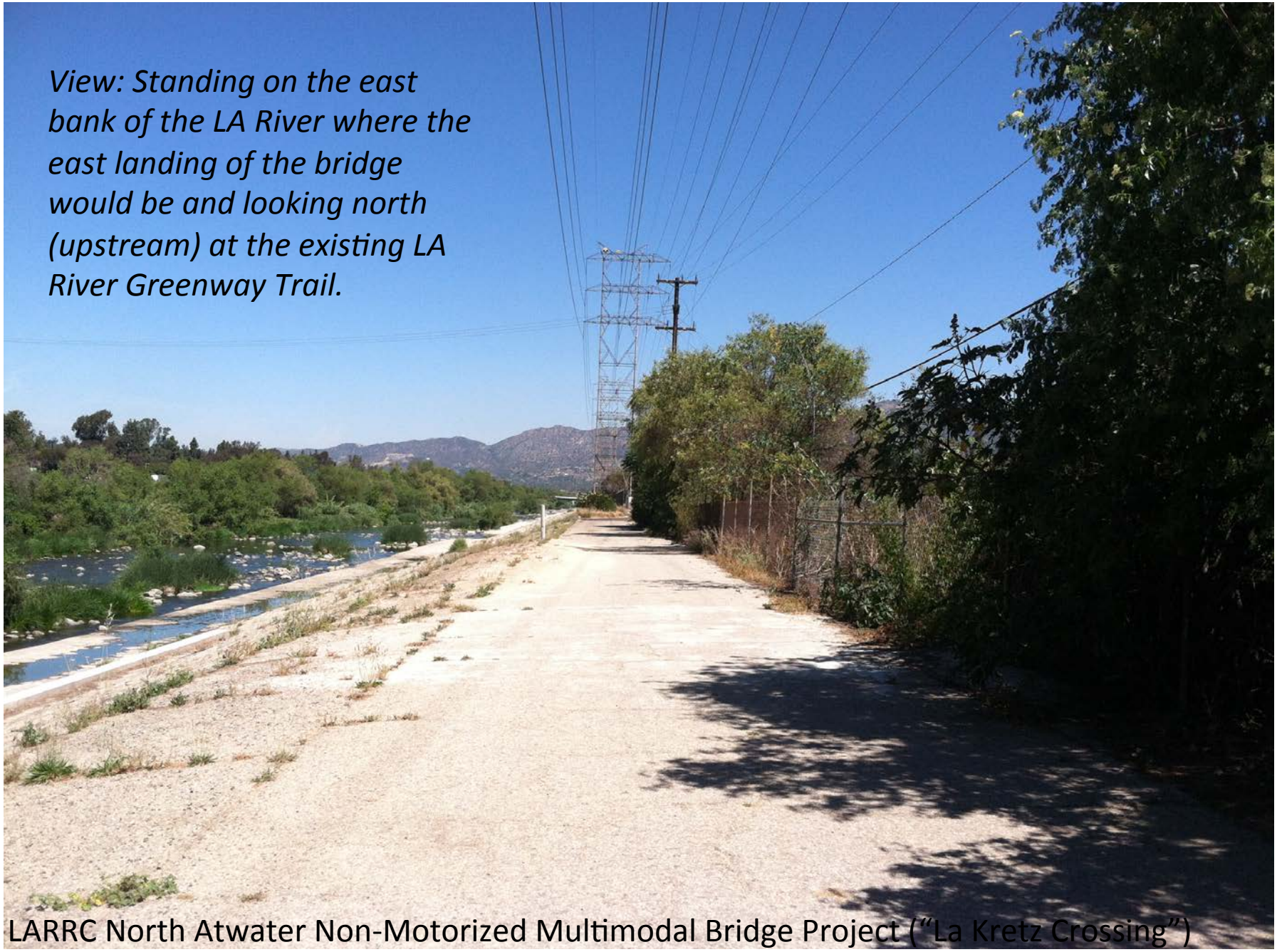
LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 5: Photos (Aerial, project location)

Google earth

feet 1000
meters 300

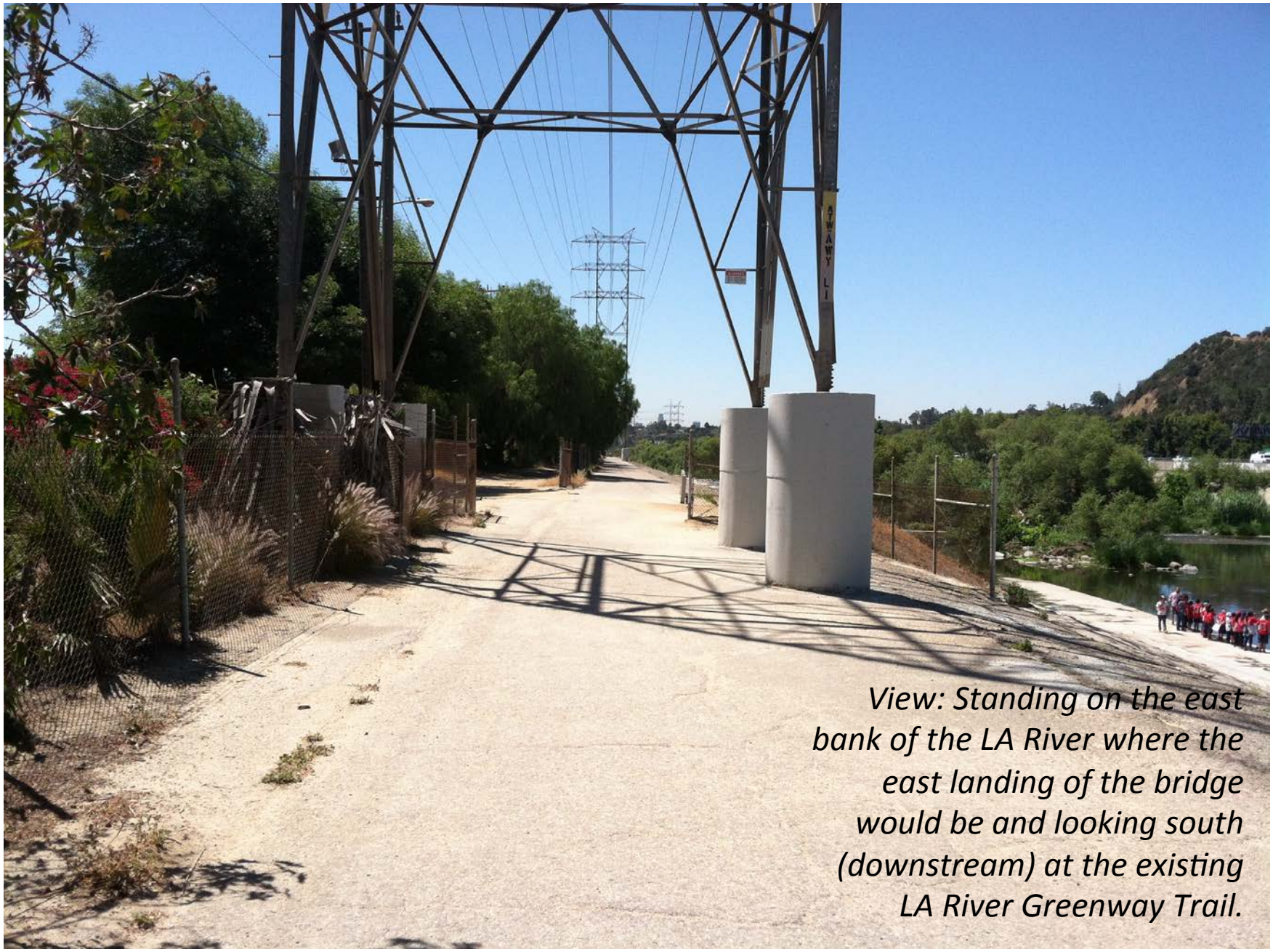
View: Standing on the east bank of the LA River where the east landing of the bridge would be and looking southwest across to the LA River Bike Path.

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 5: Photos (General Photo of Location)



LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Active Transportation Program Attachment 5: Photos (Greenway Trail, current condition)



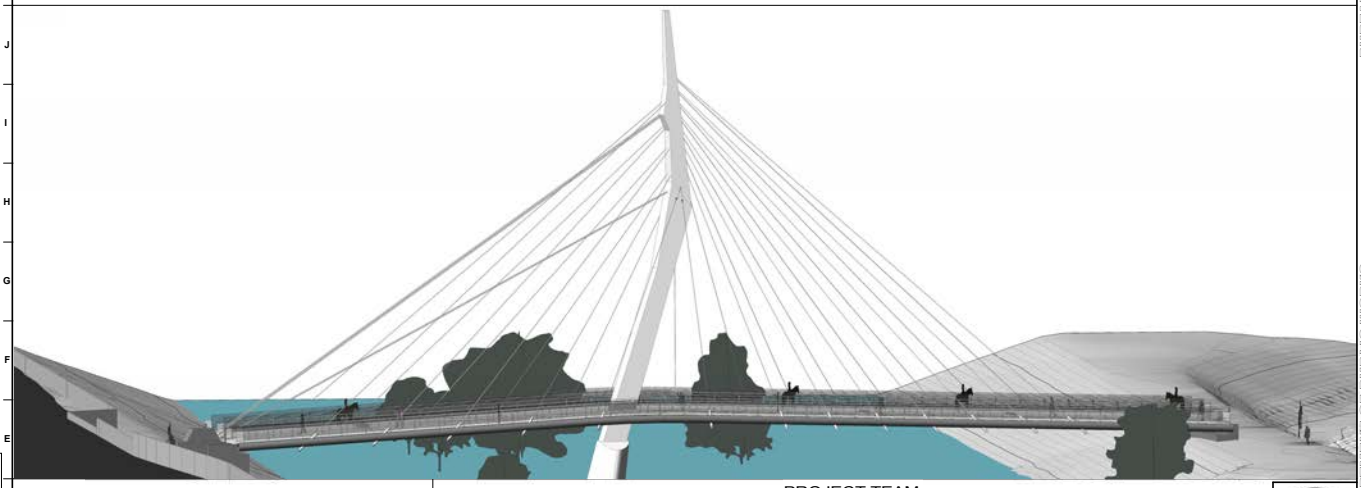
View: Standing on the east bank of the LA River where the east landing of the bridge would be and looking south (downstream) at the existing LA River Greenway Trail.

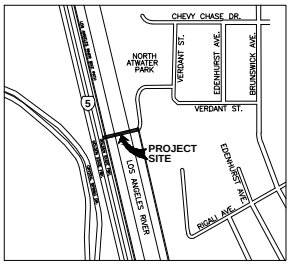
LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 5: Photos (Greenway Trail, current condition)

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 5: Photos (Aerial, connectivity to Bike Path and Griffith Park)

BUREAU OF ENGINEERING
DEPARTMENT OF PUBLIC WORKS
CITY OF LOS ANGELES

ATWATER PARK MULTI-MODAL BRIDGE





VICINITY MAP

NOT TO SCALE

PROJECT TEAM

CIVIL DESIGN: **FUSCOE ENGINEERING, INC.**

ANDREW WILLRODT, P.E., LEED® AP BD+C
PROJECT ENGINEER

600 WILSHIRE BLVD., SUITE 1470
LOS ANGELES, CA 90017
213-988-8802

LANDSCAPE: **MIA LEHRER+ASSOCIATES**

BEN FELDMAN
LANDSCAPE ARCHITECT

3780 WILSHIRE BLVD, SUITE 250
LOS ANGELES, CA 90010
213-384-3844

SURVEY: **FUSCOE ENGINEERING, INC.**

600 WILSHIRE BLVD., SUITE 1470
LOS ANGELES, CA 90017
213-988-8802

ELECTRICAL: **BURO HAPPOLD CONSULTING ENGINEERS**

DANI ISMAIL, PE
ELECTRICAL ENGINEER

9601 JEFFERSON BLVD, SUITE B
CULVER CITY, CA 90232
310-945-4800

STRUCTURAL & BRIDGE DESIGN: **BURO HAPPOLD CONSULTING ENGINEERS**

I KEI LAU, P.E.
PRINCIPAL ENGINEER

9601 JEFFERSON BLVD, SUITE B
CULVER CITY, CA 90232
310-945-4800

GEOTECHNICAL: **LEIGHTON CONSULTING**

VINCENT IP, P.E.
GROUP MANAGER

611 Wilshire, Suite 1404
Los Angeles, CA 90017
213-892-1530

PLANS PREPARED BY:
Buro Happold
9601 Jefferson Blvd, Suite B
Culver City, CA 90232
Tel: 310.558.9600
Fax: 310.558.9697
www.BuroHappold.com

TRACT PARCEL MAP, VAC., ZA/CPC, R3 GEN. IMP.

BUREAU OF ENGINEERING APPROVAL
APPROVED FOR PUBLIC RELEASE
DESIGNED BY PRINTS/DATE | SIGNATURE | DATE

REVISIONS | DATE | BY
1 | CONTRACT AND CONSTRUCTION
2 | 04-01-13
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INDEX NO.

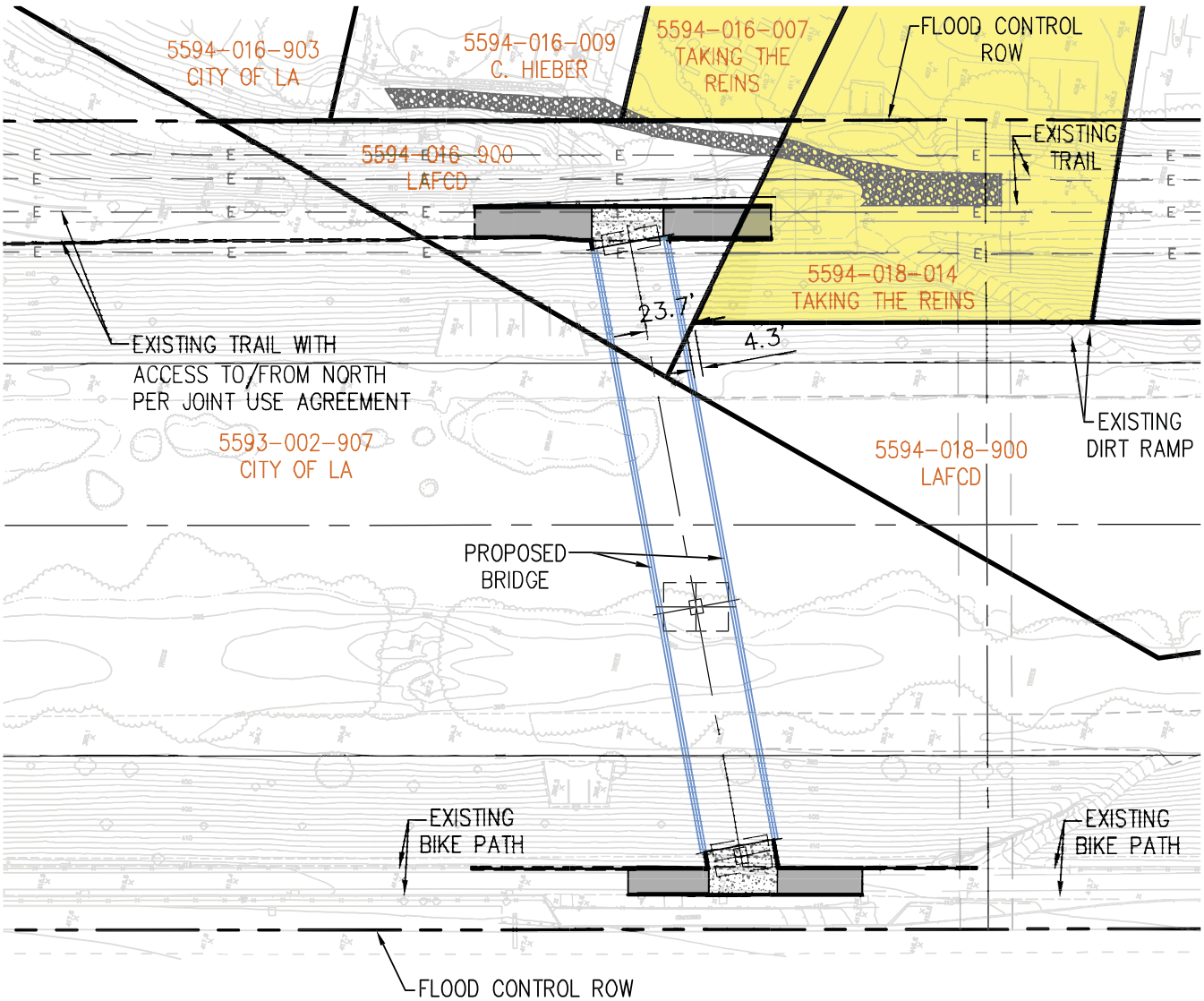
B - FB86815

DESIGN GROUP
BURO HAPPOLD CONSULTING ENGINEERS
ENGINEER: Steve Dunnack
DRAWN BY: Andrew Hain
CHECKED BY: Ikai Frank Chaar
APPROVED BY: I Kei Lau

VERTICAL CONTROL: NAVD 88 | HORIZONTAL CONTROL: NAD83 STATE PLANE
SHEET TITLE: COVER SHEET
PROJECT: ATWATER BRIDGE
ADDRESS: ATWATER VILLAGE, CA

PROJECT NO. 028643
DRAWING NO. 1
SHEET 1 OF 45 SHEETS

Sheet Version 4.01.2.2005



LEGEND

TAKING THE REINS PARCEL

5593-002-907
CITY OF LA
APN BOUNDARY & OWNER'S ID

80' 0' 40' 80'

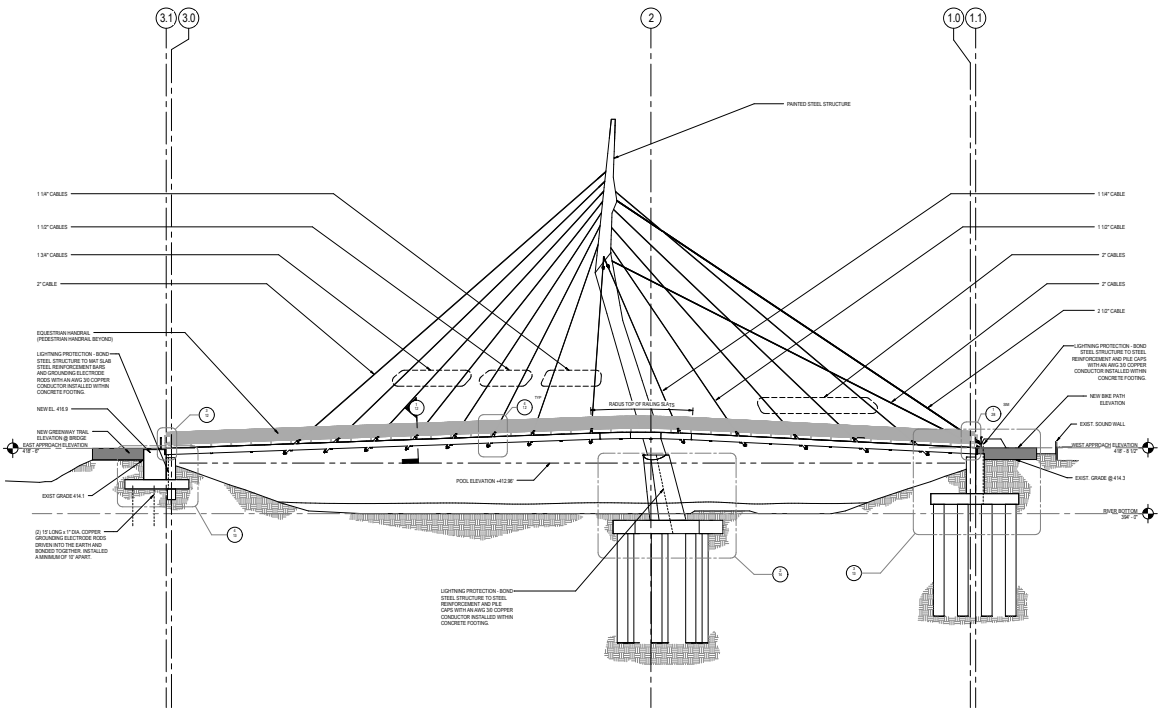
SCALE: 1" = 80'

ATWATER BRIDGE EASEMENT EXHIBIT

12.18.2012

FUSCOE
ENGINEERING
full circle thinking
600 WILSHIRE BLVD., STE. 1470, LOS ANGELES, CA 90017
PHONE: 213.988.8802 FAX: 213.988.8803

P:\PROJECTS\880\06\01\ENG\EXHIBITS\88006XH - TAKING THE RAINS EASEMENT EXHIBIT.DWG (12-18-12 10:16:09AM) Plotted by: Nora Jimenez



NORTH ELEVATION

SCALE: 1/16" = 1'-0"

TRACT, PARCEL MAP, VAC., ZA/CPC, R3 GEN. IMP.

PLANS PREPARED BY:

Buro Happold
9901 Jefferson Blvd, Suite B
Culver City, CA 90232
Tel: 310.558.9600
Fax: 310.558.9607
www.BuroHappold.com

Buro Happold

VERTICAL CONTROL: NAVD 88 DATUM
HORIZONTAL CONTROL: SURVEY IN GRIDS NAD83/CA 1983 ZONE 5

SHEET TITLE: NORTH ELEVATION
PROJECT: ATWATER BRIDGE
ADDRESS: ATWATER VILLAGE, CA

PROJECT NO. 028643
DRAWING NO. 10
SHEET 10 OF 45 SHEETS

DESIGN GROUP
BURO HAPPOLD CONSULTING ENGINEERS
DRAWN BY: Hal Liu
CHECKED BY: Ryan Reynolds
DESIGNED BY: Andrew Halm
CHECKED BY: Alan Hoare Chapel
APPROVED BY: Hal Liu

BUREAU OF ENGINEERING APPROVAL
APPROVED FOR PERMITS
DESIGN BY PRINTSHOP
SIGNATURE | DATE

NO.	REVISIONS	DATE	BY
1	CONSTRUCT AND DISTRIBUTION	04/4/13	

WORK ACCEPTED
INDEX NO.
B - PB08875

LA DWP ENGINEERING

Sheet Version: 4.01 2-2005

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Revision 3/28/2013

REVISION DATE
DESCRIPTION
REV. NO.

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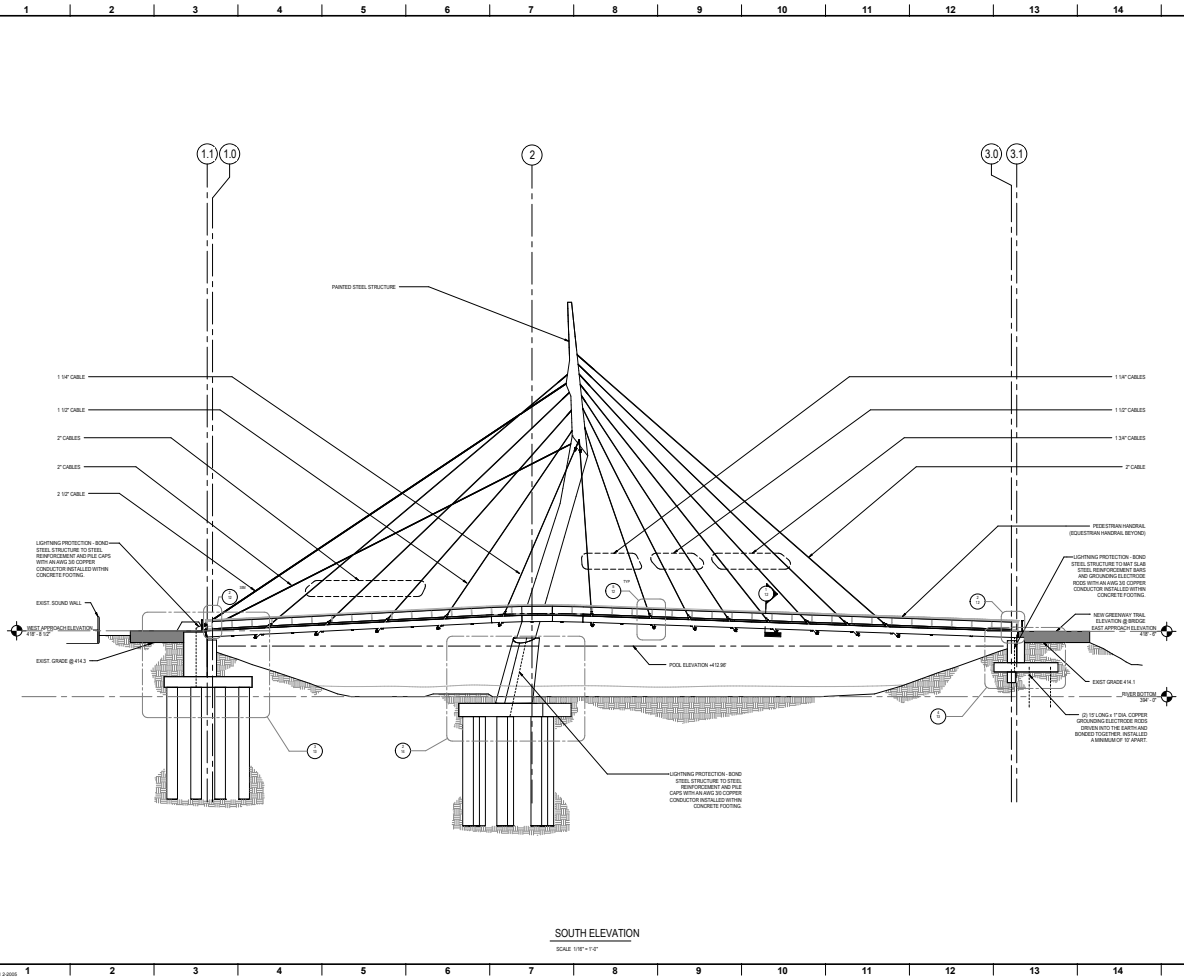
BUREAU OF ENGINEERING WWW.LADWP.COM/BOE

COPY COPY PLEASE AVOID PLASTIC USE



SOUTH ELEVATION

SCALE: 1/16" = 1'-0"

TRACT, PARCEL MAP, VAC., ZA/CPC, R3 GEN. IMP.

PLANS PREPARED BY:
Buro Happold
9601 Jefferson Blvd. Suite B
Culver City, CA 90232
Tel: 310.558.9600
Fax: 310.558.9607
www.BuroHappold.com

Buro Happold

VERTICAL CONTROL: SURVEY IN FEET NGVD29 1929 ADJ.
HORIZONTAL CONTROL: NAD83 EPOCH 1991.3

SHEET TITLE: SOUTH ELEVATION
PROJECT: ATWATER BRIDGE
ADDRESS: ATWATER VILLAGE, CA

PROJECT NO. 028643
DRAWING NO. 11
SHEET 11 OF 45 SHEETS

DESIGN GROUP
ENGINEER: Hal Ua
CO-ENGINEER: Tom Kovach
DRAFTSMAN: Andrew Hahn
CHECKED BY: Jian Hsiere Chang
APPROVED BY: Hal Ua

BUREAU OF ENGINEERING APPROVAL
APPROVED FOR CONSTRUCTION
APPROVED FOR PERMITS
SIGNATURE | DATE

1	PERMITS	04-01-05	
0	CONSTRUCT AND CONSTRUCTION		
	WORK ACCEPTED		

ISSUE NO. B - PERMITS
INDEX NO.

LA DWP ENGINEERING

BUREAU OF ENGINEERING
COUNTY OF LOS ANGELES DIVISION OF PUBLIC WORKS

THE PLANS, SPECIFICATIONS, AND ESTIMATES OF COST FOR THE ACCOMPLISHMENT OF THE WORK SHOWN ON THIS PLAN SHEET HAVE BEEN PREPARED BY ME OR UNDER MY DIRECTION AND I AM THE ENGINEER RESPONSIBLE FOR THE ACCURACY OF THE CONTENT THEREOF. ELECTRONIC COPIES OF THIS PLAN SHEET HAVE BEEN PREPARED BY THE COUNTY OF LOS ANGELES OR ITS VENDORS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE CONTENT THEREOF ELECTRONIC COPIES OF THIS PLAN SHEET

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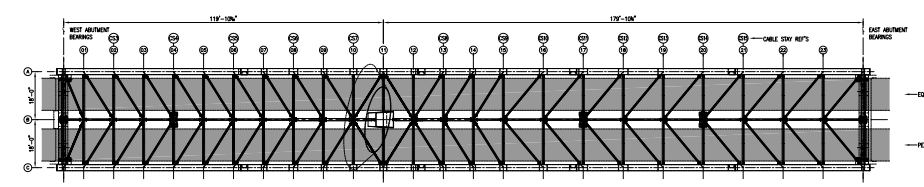
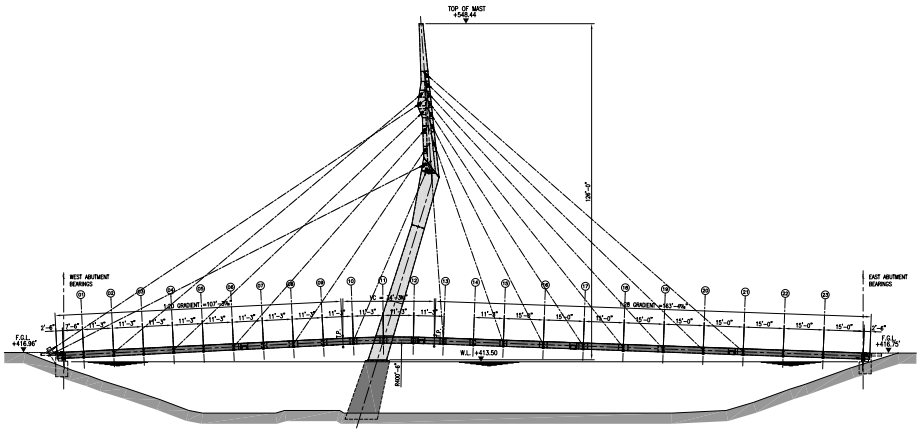
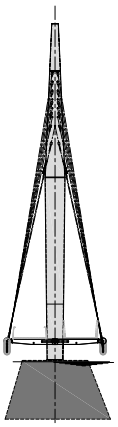
Sheet Version: 4.01 2-2005



PLAN AT BRIDGE DECK LEVEL
(CABLES OMITTED FOR CLARITY)
SCALE 1/16th" TO 1ft



BRIDGE ELEVATION
(LOOKING NORTH)
SCALE 1/8" TO 1ft



SECTIONAL ELEVATION
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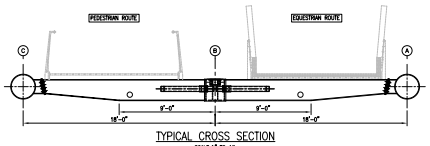
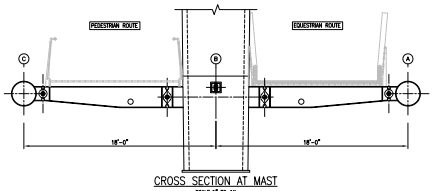
SCALE 1/8" TO 1ft



TYPICAL CROSS SECTION
SCALE 1/8" TO 1ft



CROSS SECTION AT MAST
SCALE 1/8" TO 1ft

TRACT, PARCEL MAP, VAC., ZA/CPC, R3, GEN. IMP.

PLANS PREPARED BY:
Buro Happold
9601 Jefferson Blvd., Suite B
Culver City, CA 90232
Tel: 310 558 9800
Fax: 310 558 9807
www.burohappold.com

Buro Happold

CITY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

CONTROL CONTROL: Projects Division
SUBCONTROL CONTROL: Design Division
COMPANY / DIVISION NAME: Design Group
EXAMINED: Andrew Chan
CHECKED BY: Andrew Chan
COMPUTED BY: Andrew Chan
DRAWN BY: Bikash Pun
CHECKED BY: Bikash Pun
APPROVED BY: Hal Iida

SHEET TITLE: General Arrangement - Superstructure
PROJECT: ATWATER BRIDGE
ADDRESS: ATWATER VILLAGE, CA

PROJECT NO. 028643
DRAWING NO. 16
SHEET 16 OF 45 SHEETS

BUREAU OF ENGINEERING
APPROVAL
CITY ENGINEER
DATE
DRAWING
DATE

DATE	DESCRIPTION
1.	FOR PERMIT AND CONSTRUCTION

ISSUE DATE
REV. NO.
B - PERMITS
INDEX NO.

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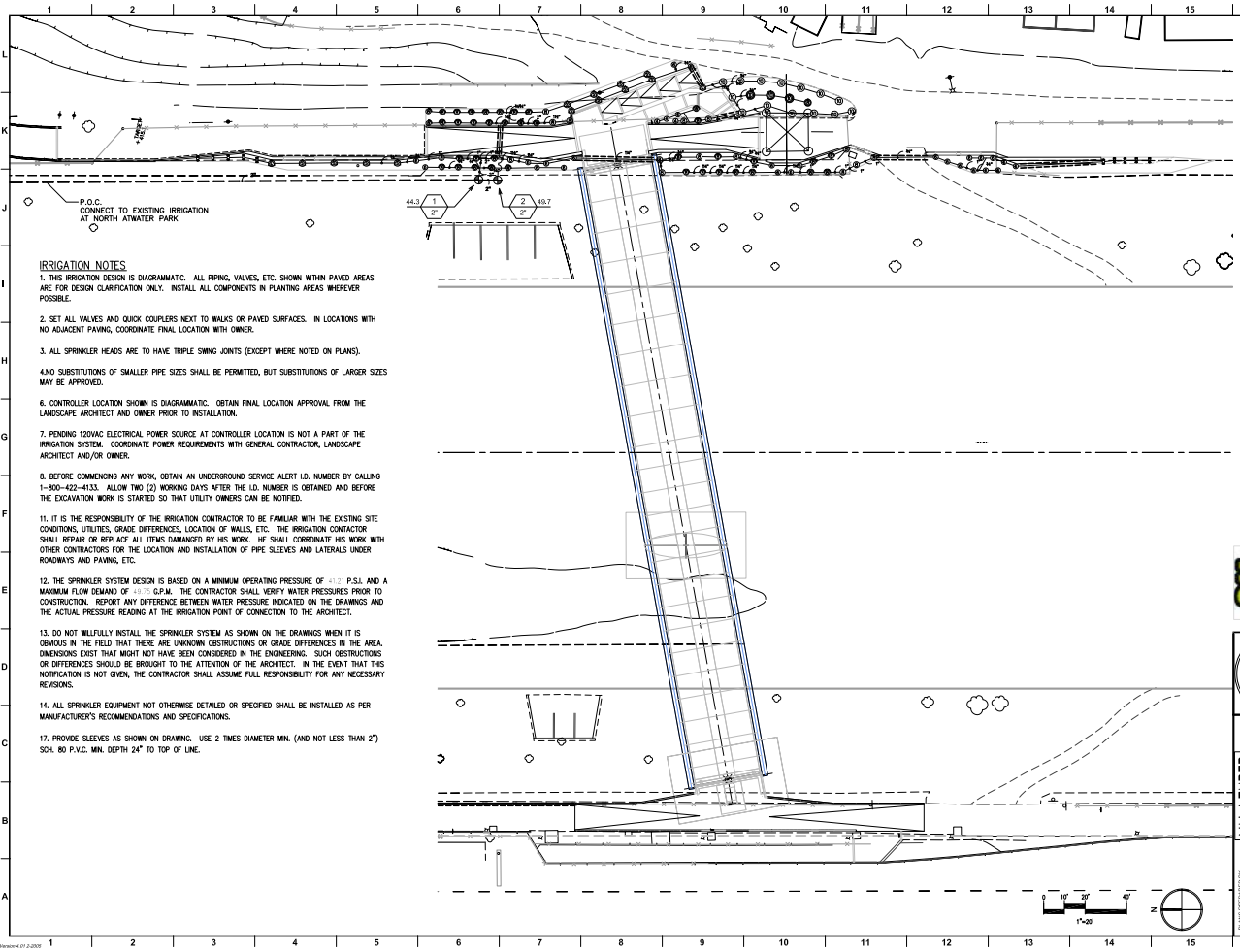

IRRIGATION NOTES

1. THIS IRRIGATION DESIGN IS DIAGRAMMATIC. ALL PIPING, VALVES, ETC. SHOWN WITHIN PAVED AREAS ARE FOR DESIGN CLARIFICATION ONLY. INSTALL ALL COMPONENTS IN PLANTING AREAS WHEREVER POSSIBLE.

2. SET ALL VALVES AND QUICK COUPLERS NEXT TO WALKS OR PAVED SURFACES. IN LOCATIONS WITH NO ADJACENT PAVING, COORDINATE FINAL LOCATION WITH OWNER.

3. ALL SPRINKLER HEADS ARE TO HAVE TRIPLE SWING JOINTS (EXCEPT WHERE NOTED ON PLANS).

4.NO SUBSTITUTIONS OF SMALLER PIPE SIZES SHALL BE PERMITTED, BUT SUBSTITUTIONS OF LARGER SIZES MAY BE APPROVED.

6. CONTROLLER LOCATION SHOWN IS DIAGRAMMATIC. OBTAIN FINAL LOCATION APPROVAL FROM THE LANDSCAPE ARCHITECT AND OWNER PRIOR TO INSTALLATION.

7. PENDING 120VAC ELECTRICAL POWER SOURCE AT CONTROLLER LOCATION IS NOT A PART OF THE IRRIGATION SYSTEM. COORDINATE POWER REQUREMENTS WITH GENERAL CONTRACTOR, LANDSCAPE ARCHITECT AND/OR OWNER.

8. BEFORE COMMENCING ANY WORK, OBTAIN AN UNDERGROUND SERVICE ALERT I.D. NUMBER BY CALLING 1-800-422-4133. ALLOW TWO (2) WORKING DAYS AFTER THE I.D. NUMBER IS OBTAINED AND BEFORE THE EXCAVATION WORK IS STARTED SO THAT UTILITY OWNERS CAN BE NOTIFIED.

11. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO BE FAMILIAR WITH THE EXISTING SITE CONDITIONS, UTILITIES, GRADE DIFFERENCES, LOCATION OF WALLS, ETC. THE IRRIGATION CONTACTOR SHALL REPAIR OR REPLACE ALL ITEMS DAMANGED BY HIS WORK. HE SHALL CORRDINATE HIS WORK WITH OTHER CONTRACTORS FOR THE LOCATION AND INSTALLATION OF PIPE SLEEVES AND LATERALS UNDER ROADWAYS AND PAVING, ETC.

12. THE SPRINKLER SYSTEM DESIGN IS BASED ON A MINIMUM OPERATING PRESSURE OF [illegible] P.S.I. AND A MAXIMUM FLOW DEMAND OF [illegible] G.P.M. THE CONTRACTOR SHALL VERIFY WATER PRESSURES PRIOR TO CONSTRUCTION. REPORT ANY DIFFERENCE BETWEEN WATER PRESSURE INDICATED ON THE DRAWINGS AND THE ACTUAL PRESSURE READING AT THE IRRIGATION POINT OF CONNECTION TO THE ARCHITECT.

13. DO NOT WILLFULLY INSTALL THE SPRINKLER SYSTEM AS SHOWN ON THE DRAWINGS WHEN IT IS OBVIOUS IN THE FIELD THAT THERE ARE UNKNOWN OBSTRUCTIONS OR GRADE DIFFERENCES IN THE AREA. DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED IN THE ENGINEERING. SUCH OBSTRUCTIONS OR DIFFERENCES SHOULD BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. IN THE EVENT THAT THIS NOTIFICATION IS NOT GIVEN, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY NECESSARY REVISIONS.

14. ALL SPRINKLER EQUIPMENT NOT OTHERWISE DETAILED OR SPECIFIED SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

17. PROVIDE SLEEVES AS SHOWN ON DRAWING. USE 2 TIMES DIAMETER MIN. (AND NOT LESS THAN 2") SCH. 80 P.V.C. MIN. DEPTH 24" TO TOP OF LINE.

Know what's below. Call 811 before you dig.

MA LEHRER associates landscape architecture
2108 Wilshire Boulevard Suite 200
Santa Monica, California 90403
Tel 310 396-3551
Fax 310 396-3552
www.malehrer.com

PLANS PREPARED BY:

CITY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING

FUSCOE ENGINEERING
DESIGN GROUP
ENGINEERS: MA LEHRER AND ASSOCIATES
DESIGNED BY: [illegible]
DRAWN BY: [illegible]
CHECKED BY: JEFF HUTCHINS
APPROVED BY: MA LEHRER

BUREAU OF ENGINEERING APPROVALS
DESIGNED BY: [illegible]
DRAWN BY: [illegible]
DATE: [illegible]

✓ FOR CONSTRUCTION
0 FOR PERMIT AND CONSTRUCTION (DATE)
DATE: [illegible]
DATE: [illegible]
DATE: [illegible]

Atwater Park Multimodal Bridge
Los Angeles River Revitalization Corporation
CD Estimate Rev 4
Cable Stay Bridge Option

EXECUTIVE SUMMARY Date 10-Jul-13

	Previous Estimate 07.03.12	Internal VE Estimate for Design Team Only	PROJECT SUMMARY Estimate 07.10.13		
Construction Costs				303 lf	7,272 sf
Description	Cost ($)		Cost ($)	$/lf	$/sf
Site Preparation	$143,250	$143,250	$143,250	$472.77	$19.70
Foundations and Piers	$1,160,129	$1,389,557	$2,114,329	$6,977.98	$290.75
Superstructure	$2,046,634	$2,821,309	$2,623,928	$8,659.83	$360.83
Site Improvements	$243,188	$341,909	$360,340	$1,189.24	$49.55
SUB TOTAL	$3,593,201	$4,696,025	$5,241,847	$17,299.83	$720.83
General Conditions	$287,456	$375,682	$419,348	$1,383.99	$57.67
Local Taxes	$38,807	$50,717	$56,612	$186.84	$7.78
Fee	$117,584	$153,673	$171,534	$566.12	$23.59
Subguard	$46,426	$60,675	$67,727	$223.52	$9.31
Insurance / Bond	$51,043	$66,710	$74,463	$245.75	$10.24
SUB TOTAL	$541,316	$707,457	$789,685	$2,606.22	$108.59
Contingency - Design & Pricing	$206,726	$270,174	$301,577	$995.30	$41.47
Contingency - Construction (Held by Client not included in Estimate)	$0	$0	$0	$0.00	$0.00
Escalation from DD estimate July 2012 4%. For further escalation trends see costs below and exclusions	$0	$0	$241,261	$796.24	$33.18
SUB TOTAL	$206,726	$270,174	$542,838	$1,791.54	$74.65
TOTAL CONSTRUCTION COST	$4,341,243	**$5,673,656**	**$6,574,370**	**$21,697.59**	**$904.07**

Exclusions

Client Contingency @ 5% of the total construction costs, NOT INCLUDED in the estimate above	**$328,718**
Client's Direct Costs	**TBA**
	$328,718

Future Escalation NOT INCLUDED in Estimate Above

2013 - 5% escalation	$328,718
2014 - a further 5% escalation	$345,154

Donor Wall & Signage

The donor wall & signage has not been included in this estimate. Two sub contractors have declined to price we are currently looking for other subcontractors

- Note: There has been additional price refining since the July 2013 estimate detailed above.
- The current estimate for $7,538,300 construction costs (hard costs related items only) vs. the $6,574,370 estimate date July 10, 2013 (detailed above) is based on the following inclusions:
  - $30,000 for pedestrian counts and community education
  - $60,000 for infrared count devices
  - $159,566 for GC mobilization and contract buy-outs
  - $150,000 for a donor wall
  - $294,000 for Tuned Mass Dampers required by the City of LA
  - $270,364 for hard cost contingency, previously excluded
- TOTAL for inclusions since July 2013 = $963,930 = $7,538,300 - $6,574,370
- Please see accounting to the right

July 10, 2013 Hard Cost Estimate	6,574,370
May 2014 Hard Cost Estimate	7,538,300
Delta	(963,930)
Additional Inclusions	
Manual counts	5,000
Community outreach	25,000
Infrared count devices	60,000
GC contract buy-outs	159,566
Donor wall	150,000
Tuned Mass Dampers	294,000
Hard Cost Contingency	270,364
Sum	963,930

ii

Project Name: North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Attachment 3: Project Tasks, Costs and Schedule

Start Date	End Date	Task/Deliverables	Cost
		Paid out of Local Match and Other Funds	
8/25/11	2/20/13	Complete Community Outreach related to Design	55,240
8/25/11	1/15/14	Begin and Complete Design	625,000
4/2/12	8/7/14	Complete Permits & Approvals	581,000
11/1/14	12/1/14	Hire Construction Management Firm (and set aside related costs)	150,000
12/1/14	2/1/15	Vet Potential Trade Partners and General Contractors	2,500
2/1/15	3/1/15	Release Notice of RFP to General Contractors	2,500
3/1/15	4/1/15	Release RFP and Bid Project	10,000
3/1/15	4/1/15	Determine Inspection Schedule (and set aside related costs)	73,793
		Sub-Total	**1,500,033**
		Paid out of Local Match, Other Funds, and ATP Funds	
		** The below work does not begin UNTIL AFTER FHWA authorization. Fields highlighted in yellow to be paid with ATP funds.*	
3/1/15	4/1/15	Conduct Manual Active Transportation User Counts Adjacent to Bridge	5,000
3/1/15	4/1/15	Begin Bridge Construction Education and Community Outreach	25,000
4/1/15	5/1/15	Mobilization and Materials/Contract Buy-outs by GC	159,566
4/1/15	5/1/16	General Conditions, taxes, and insurance	789,685
4/14/15	*5/11/15*	Site Preparation	143,250
5/12/15	*8/3/15*	Foundations and Piers	2,114,329
8/4/15	*10/26/15*	Steel Superstructure	2,623,928
10/27/15	*12/7/15*	Site Improvements	360,340
12/8/15	*2/29/16*	Install Infrared Count Devices	60,000
3/1/16	*4/1/16*	Donor Wall	150,000
3/1/16	*4/1/16*	Tuned Mass Dampers	294,000
3/1/16	*5/1/16*	Design and Pricing Contingency	542,838
4/1/16	*5/1/16*	Construction Contingency	270,364
		Sub-Total	**7,538,300**
		TOTAL PROJECT COST	**9,038,333**

Total Raised	5,378,333
Local Match	*1,036,697*
Additional Other Funds Raised by Project Proponent	*4,341,636*
ATP Funds Needed	3,660,000

LA CONSERVATION CORPS

Mailing Address: P.O. Box 15868, Los Angeles, CA 90015

December 8, 2011

Omar Brownson
Executive Director
Los Angeles River Revitalization Corporation
Los Angeles River Center and Gardens
570 West Avenue 26, Suite 475
Los Angeles, CA 90065

RE: COMMITMENT OF MAINTENANCE SERVICES FOR THE NORTH ATWATER MULTIMODAL BRIDGE

Dear Mr. Brownson:

As one of the founding board members of the Los Angeles River Revitalization Corporation (RRC), Executive Director of the Los Angeles Conservation Corps since 1995, and founder of the LA Conservation Corps' Los Angeles River Corps (River Corps), I am delighted to let you know our commitment via the River Corps to participate in the maintenance services for the RRC's North Atwater Multimodal Bridge project.

As you know, since 1986 the LA Conservation Corps' primary mission is to provide at-risk young adults and school-aged youth with opportunities for success through job skills training, education and work experience with an emphasis on conservation and service projects that benefit the community. Since 2008, LACC youth have been serving as River Corps members in the Glendale Narrows stretch of the Los Angeles River (River), providing an important public interface role and ensuring that park, greenway, and related projects are safe, and clean for the public's enjoyment. We are prepared to amend our prevailing agreement with the City or enter into a new agreement in order to provide the necessary maintenance services for the bridge project once the RRC donates the bridge to the City.

Thus, related to its past work along the River, the LA Conservation Corps' River Corps will assume the costs of and responsibility for maintenance of the North Atwater Multimodal Bridge project for at least ten years. I understand that regular maintenance activities regarding bicycle use and equestrian use of the bridge will need to be coordinated with the City's Departments of Transportation and Recreation and Parks, respectively. I also understand that, in addition to typical maintenance activities associated with landscaping and paths, the bridge's unique design features will require repainting and cable-tuning and treatment and/or replacement of the bridge's timber decking during our period of service.

Through LA Conservation Coprs programs and services, we seek to provide a supportive and enriching environment for at-risk youth and young adults to help them develop self-esteem, achieve their educational goals, establish and pursue life and career goals and gain the skills necessary to become self-sufficient, responsible citizens who will positively contribute to their communities and society. Expanding the LA Conservation Corps' River Corps in support of this important RRC

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project will go a long way toward instilling critical environmental stewardship values in exceptional young Angelenos who are tomorrow's leaders. Please let me know if you have any questions: (213) 362-9000 and BSaito@lacorps.org.

Sincerely,

Bruce Saito

Bruce Saito
Executive Director

North Atwater Crossing Mitigated Negative Declaration

(also known as the North Atwater Multi-Modal Bridge over the Los Angeles River)

June 2013

Prepared by:
CDM Smith
523 W. 6th Street, Suite 400
Los Angeles, CA 90014

for the
City of Los Angeles
Department of Public Works
Bureau of Engineering
Environmental Management Group
1149 S. Broadway, Suite 600
Los Angeles, CA 90015

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CITY OF LOS ANGELES
CALIFORNIA ENVIRONMENTAL QUALITY ACT

INITIAL STUDY

(Article I - City CEQA Guidelines)

Council District: 4 and 13 Date: June 2013

Lead City Agency: Department of Public Works, Bureau of Engineering

Project Title: North Atwater Crossing Project

I. INTRODUCTION

A. Purpose of an Initial Study

The California Environmental Quality Act (CEQA) was enacted in 1970 for the purpose of providing decision-makers and the public with information regarding environmental effects of proposed projects; identifying means of avoiding environmental damage; and disclosing to the public the reasons behind a project's approval even if it leads to environmental damage. The Bureau of Engineering Environmental Management Group (EMG) has determined the proposed project is subject to CEQA and no exemptions apply. Therefore, the preparation of an initial study is required.

An initial study is a preliminary analysis conducted by the lead agency, in consultation with other agencies (responsible or trustee agencies, as applicable), to determine whether there is substantial evidence that a project may have a significant effect on the environment. If the initial study concludes that the project, with mitigation, may have a significant effect on the environment, an environmental impact report should be prepared; otherwise the lead agency may adopt a negative declaration or mitigated negative declaration.

This Initial Study (IS) has been prepared in accordance with CEQA (Public Resources Code §21000 et seq.), the State CEQA Guidelines (Title 14, California Code of Regulations, §15000 et seq.), and the City of Los Angeles CEQA Guidelines (1981, amended July 31, 2002).

B. Document Format

This Initial Study is organized into eight sections as follows:

Section I, Introduction: provides an overview of the project and the CEQA environmental documentation process.

Section II, Project Description: provides a description of the project location, project background, and project components.

Section III, Existing Environment: provides a description of the existing environmental setting

with focus on features of the environment which could potentially affect the proposed project or be affected by the proposed project.

Section IV, Potential Environmental Effects: provides a detailed discussion of the environmental factors that would be potentially affected by this project as indicated by the screening checklist in Appendix A.

Section V, Mitigation Measures: provides the mitigation measures that would be implemented to ensure that potential adverse impacts of the proposed project would be reduced to a less than significant level.

Section VI, Preparation and Consultation: provides a list of key personnel involved in the preparation of this report and key personnel consulted.

Section VII, Determination – Recommended Environmental Documentation: provides the recommended environmental documentation for the proposed project; and,

Section VIII, References: provides a list of reference materials used during the preparation of this report.

C. CEQA Process

Once the adoption of a negative declaration (or mitigated negative declaration) has been proposed, a public comment period opens for no less than twenty (20) days or thirty (30) days if there is state agency involvement. The purpose of this comment period is to provide public agencies and the general public an opportunity to review the initial study and comment on the adequacy of the analysis and the findings of the lead agency regarding potential environmental impacts of the proposed project. If a reviewer believes the project may have a significant effect on the environment, the reviewer should (1) identify the specific effect, (2) explain why it is believed the effect would occur, and (3) explain why it is believed the effect would be significant. Facts or expert opinion supported by facts should be provided as the basis of such comments.

After the close of the public review period, the Board of Public Works considers the negative declaration or mitigated negative declaration, together with any comments received during the public review process, and makes a recommendation to the City Council on whether to approve the project. One or more Council committees may then review the proposal and documents and make its own recommendation to the full City Council. The City Council is the decision-making body and also considers the negative declaration or mitigated negative declaration, together with any comments received during the public review process, in the final decision to approve or disapprove the project.

During the project approval process, persons and/or agencies may address either the Board of Public Works or the City Council regarding the project. Public notification of agenda items for the Board of Public Works, Council committees and City Council is posted 72 hours prior to the public meeting. The Council agenda can be obtained by visiting the Council and Public Services Division of the Office of the City Clerk at City Hall, 200 North Spring Street, Suite 395; by calling 213/978-1047, 213/978-1048 or TDD/TTY 213/978-1055; or via the internet at http://www.lacity.org/CLK/index.htm .

If the project is approved, the City will file a Notice of Determination with the County Clerk within 5 days. The Notice of Determination will be posted by the County Clerk within 24 hours of

receipt. This begins a 30-day statute of limitations on legal challenges to the approval under CEQA. The ability to challenge the approval in court may be limited to those persons who objected to the approval of the project, and to issues which were presented to the lead agency by any person, either orally or in writing, during the public comment period.

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services, and activities.

II. PROJECT DESCRIPTION

A. Location

The North Atwater Crossing Project (also known as the North Atwater Multi-Modal Bridge over the Los Angeles River or proposed project) would be located in the Atwater Village neighborhood of the City of Los Angeles Council District 4 and District 13. The crossing would connect between the Northeast Los Angeles Community Plan Area (near existing equestrian facilities) on the Los Angeles River's (LA River or River's) eastern bank to an existing stretch of the LA River Bikeway on the River's western bank, enabling safe, year-round passage into Griffith Park, which is in the Hollywood Community Plan Area. The proposed project would cross the LA River approximately one-half mile upstream of where Los Feliz Boulevard crosses the LA River. The proposed project would cross land that falls within the jurisdiction of the City of Los Angeles (or City), Los Angeles County Flood Control District, and the U.S. Army Corps of Engineers (USACE). The proposed project would be located on land of the Rancho Los Feliz Tract that was purchased by Colonel Griffith J. Griffith and bequeathed to the City of LA in 1896, now known as Griffith Park.

Refer to **Figure1, Regional Map**, and **Figure 2, Project Vicinity Map**, for the location of the proposed project.

B. Purpose

The proposed project was initiated by the RRC consistent with its mission to support LA River revitalization by attracting external funds to further implement the City Council-adopted LA River Revitalization Master Plan. The proposed project is included in the Plan's priority list as No. 147. As discussed in the "Background" section above, the purpose of the proposed project is to provide a safe, year-round, multi-modal crossing of the LA River between Atwater Village and Griffith Park for pedestrians, equestrians, and bicyclists. Providing such a crossing would meet expressed priorities of the City Council in achieving recreational, cultural, access, and water quality benefits. The proposed project would be the first privately-funded capital project resulting from the City's LA River Revitalization Master Plan. The private donor intends to gift the finished project to the City, much like the land given by Colonel Griffith in the late 1800s that created Griffith Park. As prescribed in the LA River Revitalization Master Plan, the proposed project would be a "signature" bridge expressing a distinct design and artistic sensibility that would become a landmark for the River.

C. Background

In 1998, the City Council (Council File [C.F.] 98-1729) recognized the need for an equestrian bridge across the LA River in Atwater Village:

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Figure1, Regional Map

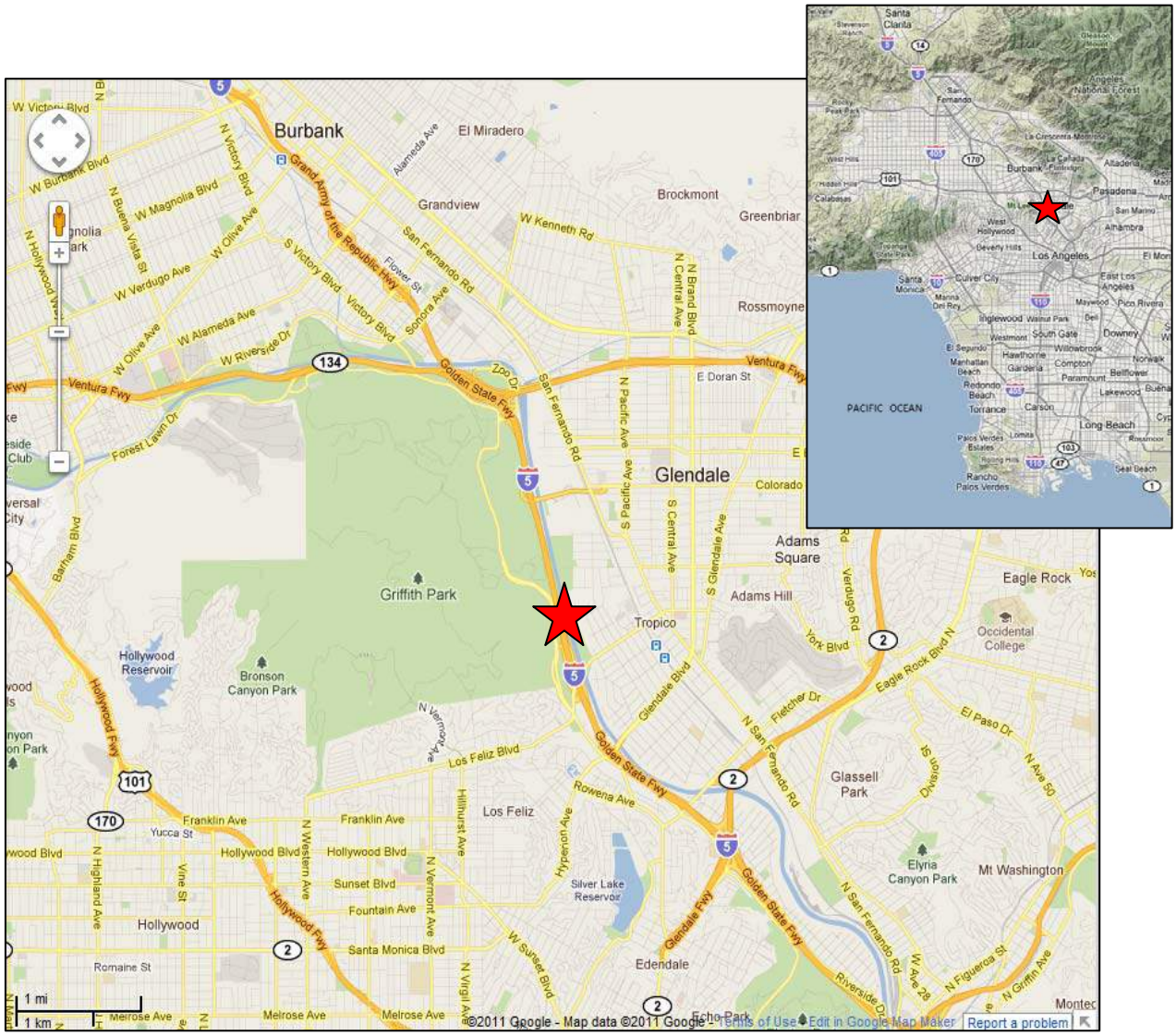

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Figure 2, Project Vicinity Map

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> *In the last ten years park equestrian riders have had to contend with a possibly very dangerous condition in the Los Angeles River just north of Los Feliz Boulevard. About 3,100 feet north of Los Feliz Boulevard there is an area of the Los Angeles River that is being used as a horse crossing for equestrian riders who ride and maintain their horses in the Atwater Village area. Everyday equestrians cross the sometimes fast moving Los Angeles River to exercise their horses in Griffith Park. Inevitably some of these horses may slip and fall due to the slippery cement and algae lined floor of the River Basin. Though steps have been taken to limit the city's liabiltiy [sic] from such accidents, there might still remain significant exposure to potential legal action in these instances. The only reasonable way to address these concerns would be to construct an equestrian bridge across the Los Angeles River.*

At the time, as part of the same Council action, it was stated that sufficient funds were available in the Equestrian Trust Fund[1] to undertake preliminary planning and design work for the proposed project and requiring the City's Bureau of Engineering and Recreation and Parks (RAP) to report back "with recommendations on potential funding sources for the further design and ultimate construction of the equestrian bridge." Further investigation revealed that the resources to build the bridge were not available.

Subsequent actions by the Council have demonstrated the importance of such facilities to the City on a continuing basis.

In 2008, the City Council (via C.F. 05-2443) recognized that:

> *Horse back riding is a leisure time activity currently enjoyed by many Angelenos. Los Angeles offers a variety of scenic trails, particularly in the Griffith Park area, to be used by equestrians. Along the banks of the Los Angeles River are located several stables and the Equestrian Center which offer equestrian amenities to riders…Riders must cross the Los Angeles River to reach the trails in Griffith Park. Recently, residents in the area have complained about the increasing amount of horse feces which is appearing in the River. The residents are fearful that the water quality in the River is being compromised.*

As part of the same Council action, RAP, with the assistance of the City's Bureau of Sanitation, was directed to:

> *(a) determine if the quality of water in Los Angeles River adjacent to Griffith Park complies with the standards set by the Los Angeles Regional Water Quality Control Board for the River; (b) determine if any particular individuals, or entities are contributing to pollution of the River by depositing horse fecal matter in the River; (c) devise an education and information program for horse riders in the Griffith Park area advising them about how to dispose of horse feces properly and about water standards imposed for the Los Angeles River, and report back to the Arts, Parks, Health and Aging and Environmental Quality and Waste Management Committees with findings and recommendations.*

In 2006, the report in response to the Council direction recommended the following:

[1] The Equestrian Trust Fund contains annually assessed Equine License Fees paid by equestrian riders in Los Angeles and the funds are devoted to "provide for construction of new equestrian facilities, which includes the proposed project.

1. *Instruct the Chief Legislative Analyst to establish a multi-jurisdictional Task Force comprised of appropriate representatives from the Cities of Los Angeles, Burbank, and Glendale to:*
   a. *Identify potential sources of bacteria pollution entering the Los Angeles River and its tributaries.*
   b. *Develop a joint water quality monitoring program for the Los Angeles River and its tributaries in the section of the River potentially impacted by equestrian activities in the three cities.*
   c. *Develop a multi-jurisdictional education and information program for the area's equestrian community and a conduct outreach effort to reach those users.*

2. *Support the City's initiatives to secure funding from Federal, State, and Local sources for:*
   a. *Develop a stormwater management plan for the Los Angeles Equestrian Center and other equestrian operations under the jurisdiction of the Department of Recreation and Parks to identify appropriate Best Management Practices.*
   b. *Implementation of selected Best Management Practices at the Los Angeles Equestrian Center and adjacent trails; and*
   c. *Development and implementation of improved education and information programs for equestrian users in the City of Los Angeles.*

Implementation of the proposed project would remove the need for horses to cross via the riverbed within the River, thereby having the potential to improve water quality overall within this portion of the River.

In 2007, the City Council (C.F. 07-1342) adopted the long-range LA River Revitalization Master Plan, which, among its recommendations, includes: “Continue development of non-motorized transportation and recreation elements including bike and pedestrian paths and multiuse trails in the River and tributary rights of way; connect neighborhoods to the river with “Equestrian Loops” along and across the River; enhance river identity with non-motorized bridges: “Commission ‘signature’ non-motorized bridges that express a design or artistic sensibility and become landmarks for the river,” “Bridges should always safely accommodate both pedestrians and bicycle traffic,” and “Light for safety, and design lighting features to highlight the bridge.” The Plan also included the “Los Feliz Equestrian/Non-motorized Bridge” as its Project No. 147.

The actions summarized above provide context for the proposed project evaluated herein. In 2009, the City Council and the Mayor established the LA River Revitalization Corporation (RRC), which subsequently secured funding from a private donor to meet the objectives of each of these City Council-supported priorities by committing to construct the North Atwater Crossing/Multi-Modal Bridge over the LA River.

On April 4, 2011, the RRC presented the proposed project to the LA River Cooperation Committee—a public entity comprised of high-level managers in the City and Los Angeles County Flood Control District with participation from the Los Angeles District of the USACE—and the project was approved as proposed. This is significant because these entities have final authority in providing the necessary permissions to construct the proposed project.

D. Description

The proposed project would be constructed with a steel bridge frame that would span the LA River channel and include one major pier supported via new concrete footings below the channel bottom. The bridge, which would cross the approximately 325 foot width of the LA River in this area, would be a cable-stayed bridge. The cable-stayed bridge would use high stressed cables attached to a tall mast or pylon to hang the bridge deck. The proposed configuration is a modified "fan", where the cables are incrementally attached along the mast proportionally corresponding to the distance the cable is attached from the mast. This fan pattern, along with the unique mast profile, would combine to create a distinctive and unique element in the landscape.

Refer to **Figure 3, Project Components**, for a visual representation of the proposed project.

Dimensions
The bridge would be approximately 302 feet long and 38 feet wide with two separate paths, one designated for equestrian use and the other shared by pedestrians and bicyclists. No motorized vehicles would be allowed on the bridge. Bollards would be placed to keep all vehicles off the walking and riding surfaces. A 156-foot tall mast or pylon would be used to support the bridge deck with steel cables, as shown in **Figure 4, Bridge Cross-Section**.

The main bearing point would be the single pier, which would be located in the LA River approximately 114 feet from the River's western bank. This pier would be designed to be as hydraulically-neutral as possible thereby impacting the River's flows as little as possible. This concrete pier would land in the present "long island" found at the bottom of the LA River in this area. The pier would sit on piles that would be sunk to bedrock approximately 30 feet below the River bottom. This island presently includes some vegetation. After construction of the pier, the island would be restored with native grasses and plants.

Two abutments would be constructed at each end of the bridge to anchor the structure on the banks and outside the riverbed. These elements would be constructed of concrete and would sit on piles and footings. The sloping concrete slurry bank would be restored around them.

The existing ramps that are presently used for equestrian access to cross the LA River would be restored to their original condition and use, providing maintenance access to the River bottom. The proposed project would create an alternative and safe passage for equestrian crossings of the LA River. Whereas there may be short-term impacts to the River's vegetation during construction of the pier structure, as evaluated in this IS/MND, the bridge's long-term operation is expected to result in benefits to the River's habitat quality by reducing the use of the riverbed itself by horses and reducing associated wastes from the LA River.

Materials
The bridge structure would be painted steel with wood decks and detailing. The single pier placed in the LA River would be concrete. The bridge would be painted a neutral color so as not to compete with the River landscape while also providing the opportunity to see and understand its form. The wood would be finished and left in a natural color.

Construction
The site is constricted and bridge construction would require an orchestrated approach to the sequence of construction. Any work in the LA River would occur during the summer months and would require an active approach to avoid adversely impacting the surrounding environment

and water quality.

A work platform would be created over the River bottom to keep vehicles and workers out of the sandy bottom surface. A construction crane would be used to install the structural steel frame and mast. This crane would be located so that it would be able to retrieve components from delivery trucks on the I-5 Freeway shoulder. Minimal storage would be allowed in this area. Workers would access the site from the North Atwater Park parking lot (at the end of Chevy Chase Drive) or along the River access road connecting from Los Feliz Boulevard, both of which are on the east side of the River. This area would also facilitate the movement of smaller components, equipment, and materials to-and-from the site. The I-5 Freeway shoulder would only be utilized for the delivery and unloading of the steel bridge structure and mast.

Construction Schedule

Construction is estimated to take approximately 8-10 months. Project construction would generally consist of five phases: mobilization, site preparation, site work, steel fabrication, and architectural finishings. Details for each of the five phases are provided below. Other than delivery of the bridge structure and mast, the time of which will be worked out with the California Department of Transportation (Caltrans), construction would occur between the hours of 7:00 a.m. to 3:30 p.m. Monday through Friday, and between 8:00 a.m. and 6:00 p.m. on Saturday. No construction would occur on Sundays or national holidays.

Mobilization

Contractor mobilization would occur during an approximately 2-week period of time and would involve the set-up of a construction trailer and the equipment storage yard. During this time, detours would be established and signs would be posted. No actual work would take place in the River itself.

Site Preparation

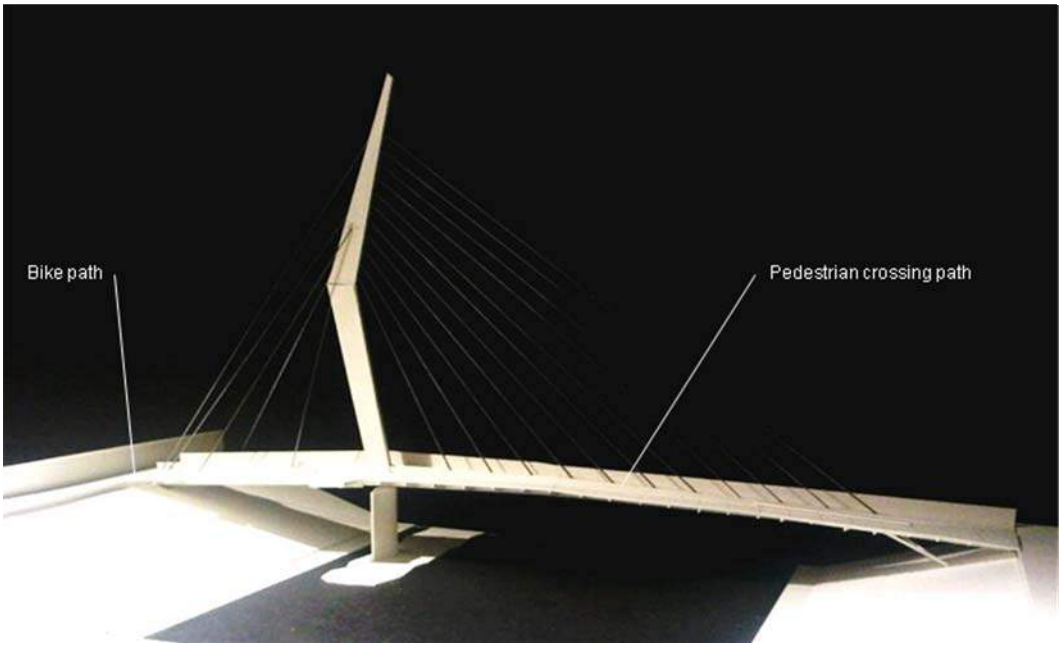
Site preparation involves clearance of the site and preparing the project area for construction. Site preparation would occur over a period of approximately 4 weeks and would be initiated in the spring, when the River officially “opens.” This phase would include redirecting the channel as required away from work zone, water quality mitigation, erosion control, removal or trimming of vegetation (including trees) as needed and removal of the slurry surface where abutments would be constructed. The construction site would be defined and fenced off and construction ramps would be built. Heavy equipment, including bull dozers, trucks and pneumatic hammers, would arrive to the construction site from the east side of the River.

Site Work

The site work phase would involve excavation, forming and placing piers and concrete. This phase of construction would last approximately 8-12 weeks. Also during this phase, piles would be placed, formed and pile caps would be poured. Forms for abutments and piers would be constructed, and the fabrication and setting of imbed plates and other attachments to the concrete would be completed. Equipment utilized during this phase of construction would include drill rigs, back hoes, flat-bed trucks, bull dozers, concrete trucks and pumpers.

Figure 3. Project Components

View from across the interstate



View from the Southeast

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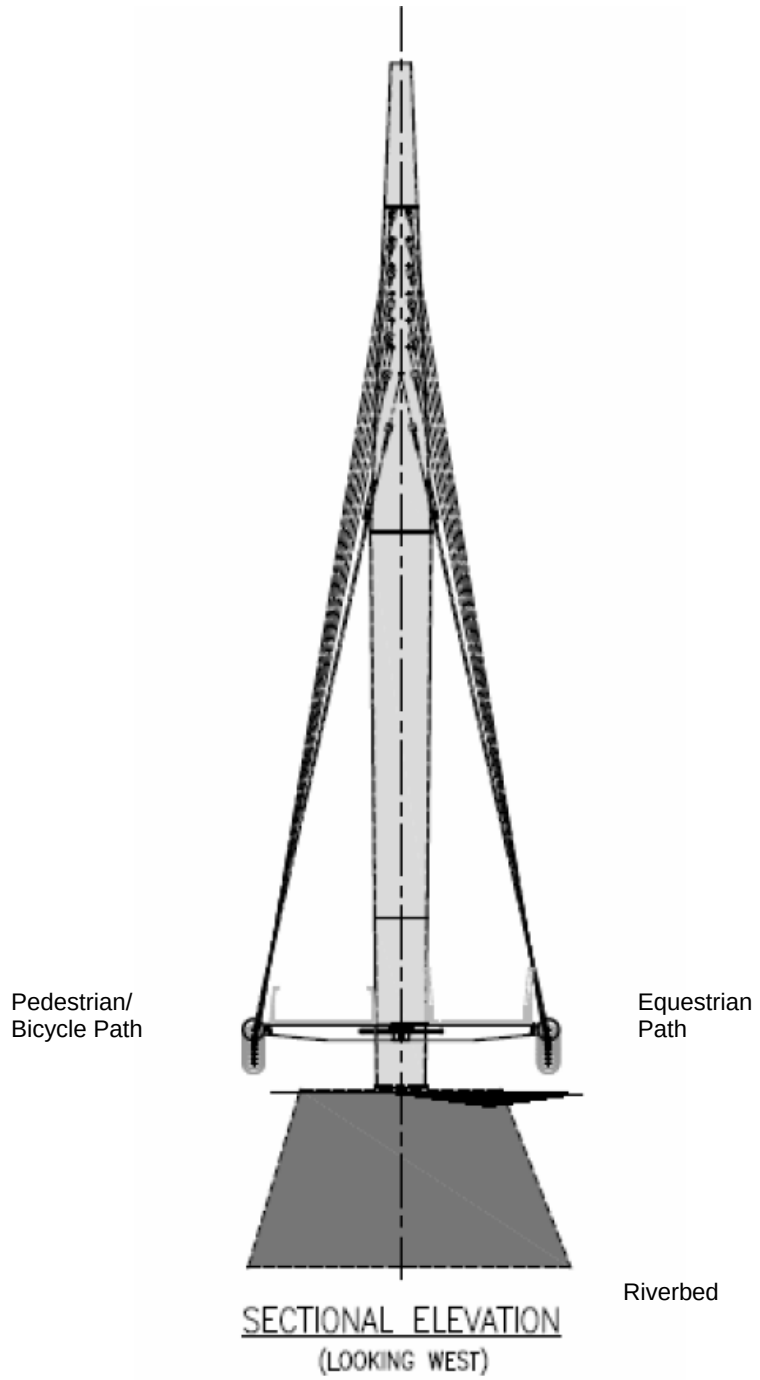
Figure 4, Bridge Cross-Section



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Steel Fabrication
Portions of this phase of construction would occur concurrent with the Site Work phase, including finalization of shop drawings and fabrication of components. The estimated timeframe for this phase of construction is approximately 10-12 weeks. The primary coordination issue would be the quantifying the exact field dimensions of the concrete bearing and then fabricating to match.

This work would then be brought to the site in sequence and components stored on site until erected. Delivery of bridge components would occur along the shoulder of the I-5 Freeway at times stipulated by the Encroachment Permit that will be obtained from Caltrans. Delivery and unloading would likely occur during the nighttime hours on weekends, so as to minimize disruptions to northbound traffic on the I-5 Freeway. The deck structure would be shored in place across the River, the mast erected, cables set, and painting done on areas that would become inaccessible after removal of the shoring. Following removal of the shoring, the balance of the work in the River channel would be completed, including replacement of the sloped concrete surfaces, repair of the channel, and removal of all construction material in the waterway. Equipment utilized during this phase of construction would include shoring material (frames, beams – steel or aluminum), crane(s) for lifting and placing bridge components in place, hydraulic jacking equipment on trucks, concrete trucks and pumpers (on the banks of the River).

Architectural Finishings
During this phase of construction, the deck material, handrails, finishes, lighting and other architectural details would be installed. This work would occur over a period of approximately 8 weeks and take place outside and above the LA River channel. Concurrently, the grading replacement and repair of the bike path, long curbs and retaining walls and other site/landscape features would be completed. Equipment utilized during this phase of construction would include smaller truck cranes, and bobcats with truck access along the banks of the River.

Operation and Maintenance
Once the finished project has been gifted to the City, operation and maintenance would be the responsibility of the Los Angeles Conservation Corps for a period of 10 years, as documented in a letter dated December 8, 2011. After 10 years, operation and maintenance would become the responsibility of the City. The primary responsibilities will be the maintenance and upkeep of the bridge for continued use by pedestrians, bicyclists and equestrians.

Project Actions and Approvals
The proposed project and environmental documentation would require approval by the City's Board of Public Works, Board of Recreation and Parks Commissioners, and City Council. Additional anticipated approvals or permits for the proposed project include, but are not limited to the following:

- USACE Section 10/404 Permit
- USACE Section 208 or 408 approval for flood control structures
- California Department of Fish and Game: Streambed alteration agreement
- State Water Resources Control Board/Los Angeles Regional Water Quality Control Board (LARWQCB), project review and National Pollutant Discharge Elimination System (NPDES) General Construction Permit and 401 Water Quality Certification

- Caltrans, District 7, Transportation Permit for bridge transport and construction staging in the right-of-ways
- Los Angeles County Flood Control District, easement acquisition and permit to construct
- City's Department of Transportation, Traffic Control Plan review
- City's Department of Recreation and Parks, project and design review

The analysis in this document assumes that, unless otherwise stated, the project will be designed, constructed and operated following all applicable laws, regulations, ordinances and formally adopted City standards including but not limited to:

- Los Angeles Municipal Code
- Bureau of Engineering Standard Plans
- Standard Specifications for Public Works Construction
- Work Area Traffic Control Handbook
- Additions and Amendments to the Standard Specifications for Public Works Construction

III. EXISTING ENVIRONMENT

The proposed project is located approximately 6 miles northwest of downtown Los Angeles in the Atwater Village community. It lies within the United States Geological Survey (USGS) Burbank Topographic Quadrangle and the Los Angeles River watershed. The project site is primarily located within the Griffith Park land grant boundary, within the LA River, one-half mile upstream of Los Feliz Boulevard, downstream of Chevy Chase Drive, just downstream of the future North Atwater Park Expansion project (under construction on the eastern bank of the River), nearby the Los Angeles Police Department's Metropolitan Division mounted police and private stables (on the eastern bank of the River), just upstream of the Los Feliz Golf Course (existing, on the eastern bank of the River), and near the I-5 Freeway (which parallels the River's western bank). Refer to **Figure 5, Existing Conditions**, for views of the project site.

Including Assessor's Parcel Nos. 5594018900 and 5593002907, the project site is zoned OS-1XL and designated as Open Space in the City's General Plan (See the Northeast Los Angeles Community Plan: http://cityplanning.lacity.org/complan/central/pdf/genlumap.nla.pdf).

IV. POTENTIAL ENVIRONMENTAL EFFECTS

The environmental factors checked below would be potentially affected by this project, involving at least one impact as indicated by the checklist in Appendix A. A detailed discussion of these potential environmental effects follows.

☒ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality

☒ Biological Resources	☒ Cultural Resources	☒ Geology /Soils
☒ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials	☒ Hydrology / Water Quality
☒ Land Use/Planning	☐ Mineral Resources	☒ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☒ Transportation/Traffic	☒ Utilities/Service Systems	☐ Mandatory Findings of Significance

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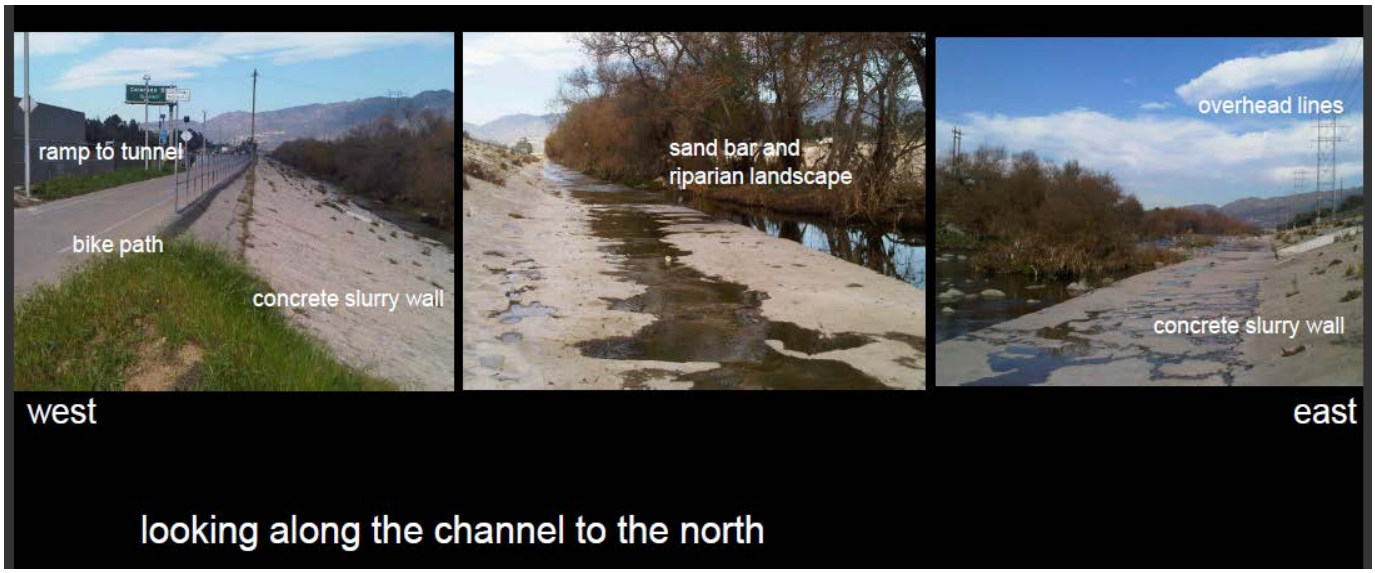
Figure 5. Existing Conditions



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A. Aesthetics

1. Scenic Vistas

A scenic vista generally provides focal views of objects, settings, or features of visual interest; or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. A significant impact may occur if the proposed project introduced incompatible visual elements within a field of view containing a scenic vista or substantially altered a view of a scenic vista.

The proposed project would be the first LA River bridge of the 21st century and would have a unique and distinctive design. A cable stayed bridge is proposed, with a span of approximately 302 feet across the River.

As shown in **Figure 6,** distant views of the Verdugo Mountains are available from the project area, including from the I-5 Freeway as well as from the existing bicycle paths on the east and west sides of the River. Also within the existing viewshed of these uses are a series of high voltage power lines. The proposed bridge structure would place a new structure in the foreground of distant views available from the bicycle paths and I-5 Freeway. Only one mast would be used to support the bridge deck. Although the mast would be 156 feet tall, it would be narrow and would not substantially obstruct views of the Verdugo Mountains. As shown in **Figure 6**, the Verdugo Mountains would still be visible from the bicycle and equestrian trails. In addition, the proposed project would provide a new viewing point for the public of the Verdugo Mountains. Therefore, construction and operation of the proposed project would have a less than significant effect on a scenic vista and impacts would be less than significant.

2. Scenic Resources

A significant impact may occur where scenic resources within a state scenic highway would be damaged or removed as a result of the proposed project.

Te project site is not along or near any designated California Scenic Highway or locally designated scenic highway. The proposed project is expected to enhance access to Griffith Park, the LA River, and the Verdugo Mountains and would not involve the destruction of any existing scenic resources. Therefore, no impact is anticipated from the construction and operation of the proposed project.

3. Visual Character and Quality

A significant impact may occur if the proposed project introduced incompatible visual elements to the project site or visual elements that would be incompatible with the character of the area surrounding the project site.

Construction of the proposed project would occur over a period of approximately 10 months and would involve the construction of a 302-foot long multimodal bridge over the Los Angeles River. The temporary staging and receiving area for prefabricated pieces of the bridge would be located along the eastern shoulder of the I-5 Freeway adjacent to the project site. Construction staging and primary construction worker access would occur along the east side of the River. Construction activities would result in temporary visual disruptions to the immediate vicinity. In addition, the ten-lane I-5 Freeway located to the west of the project site and transmission lines adjacent to and east of the project site currently detract from the visual

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Figure 6. View of Verdugo Mountains with Proposed Project

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quality of the LA River. Construction activities would not significantly affect the aesthetic appeal or extensively intrude into LA River.

The proposed project would cross the LA River approximately one-half mile upstream of where Los Feliz Boulevard crosses the LA River. The project site consists of the LA River and associated vegetation. The River generally runs in the north and south direction in the project vicinity. The LA River Bikeway and the ten-lane I-5 Freeway are located to the west of the River, and transmission lines and equestrian facilities are located to the east. As indicated above, the iconic form of this first LA River bridge of the 21st century continues a great tradition of unique bridge structures that has been an integral part of Los Angeles landscape throughout the 20th century.

The bridge structure would be painted steel with wood decks and detailing. The bridge would be painted a neutral color so as not to compete with the River landscape. The wood would be finished and left in a natural color. The larger-scale steel structure would be a more sculptural element of the bridge. In accordance with the LA River Revitalization Master Plan, the proposed bridge would be a “signature” bridge expressing a distinct design and artistic sensibility that would become a landmark for the River. Views of this new bridge structure would be available from the neighboring bicycle paths and the I-5 Freeway; introduction of this bridge would alter views, however, the existing transmission lines currently detract from the visual quality of the project area. As such, operation of the proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings; impacts would be less than significant.

4. Light and Glare

A significant impact would occur if the proposed project caused a substantial increase in ambient illumination levels beyond the property line or caused new lighting to spill-over onto light-sensitive land uses such as residential, some commercial and institutional uses that require minimum illumination for proper function, and natural areas.

The nearest residential uses to the proposed project are within the Lincourt Stable property and are approximately 500 feet from the eastern edge of the project site. In addition, there is a residential neighborhood approximately 700 feet to the east of the project site. The majority of construction activities associated with the proposed project would occur during daylight hours and, therefore, would not require lighting. However, delivery and unloading of the bridge structure from the I-5 Freeway shoulder would occur during the nighttime hours and would therefore require nighttime lighting along the west side of the River on the night(s) of delivery. Lighting would be directed downward and be limited to the work area and would not be placed within the riverbed itself. Given the short-term nature of nighttime lighting, the limiting of nighttime lighting to the work area, and the distance from the nearest residences (approximately 500 to 700 feet), and existing lighting associated with the surrounding area (such as the I-5 Freeway), therefore, nighttime lighting during construction would be minimal and impacts would be less than significant.

Upon completion of construction, operational lighting for the bridge would be directed on to the structure itself and would only illuminate walking surfaces and the vertical mast. No lighting would be placed within the landscape area, in the riverbed, or anyplace that could create spill-over light onto the ground in the River habitat zone. All lighting will be light emitting diodes (LED) source with electricity generated from photovoltaics attached to the bridge structure. Given the distance from the nearest residences (approximately 500 to 700 feet) and existing lighting associated with the surrounding area (such as the I-5 Freeway), the potential light and

glare impacts associated with operation of the proposed project would be less than significant.

B. Agriculture and Forestry Resources

Initial screening determined that the proposed project would cause no impact or less than significant impact. (see Appendix A)

C. Air Quality

1. Consistency with Air Quality Plans

A significant impact may occur if the proposed project would conflict with or obstruct implementation of the applicable air quality plan.

The proposed project is located within the South Coast Air Basin (SCAB), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is responsible for administering the Air Quality Management Plan (AQMP) for the SCAB, which is a comprehensive air pollution control program for attaining state and federal ambient air quality standards. The City has an adopted Air Quality Element that is part of the General Plan. The Air Quality Element contains policies and goals for attaining state and federal air quality standards, while continuing economic growth, and includes implementation strategies for local programs contained in the AQMP. A significant impact would occur if the proposed project is inconsistent with the AQMP or the Air Quality Element of the City's General Plan.

The proposed project is located within the Northeast Los Angeles Community Plan area. The community plan includes transportation measures from a Transportation Improvement and Mitigation Program (TIMP) prepared for the area through an analysis of land use impacts on transportation. The TIMP includes measures to improve public transportation and reduce congestion, such as expanded Los Angeles Department of Transportation (LADOT) Commuter Express Services, street widening, and a parking management program. The proposed project would be consistent with the community plan as it does not impact transportation in the study area. The project would provide enhanced access to the Los Angeles trail network for pedestrians, bicyclists and equestrians and may therefore have the potential to reduce automobile trips and vehicle miles traveled. The community plan is required to conform to the General Plan and its elements, including the Air Quality Element. As such, the proposed project would also be consistent with the Air Quality Element and the AQMP. Therefore, the impact of construction and operation of the proposed project is less than significant.

2. Consistency with Air Quality Standards

A significant impact may occur if the proposed project would violate any air quality standard or contribute substantially to an existing or projected air quality violation.

SCAB is a state nonattainment area for ozone (O_3) (classified as extreme nonattainment for 1-hour O_3 standard), particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), nitrogen dioxide (NO_2), and lead (Los Angeles County only). In determining attainment of air quality standards, the SCAQMD has established thresholds of significance for these and other state criteria pollutants. A significant impact would occur if the proposed project results in substantial emissions during construction or operation, which would exceed the established thresholds.

Regional Construction Analysis

The air quality analysis was conducted to determine construction-related emissions using the California Emissions Estimator Model (CalEEMod), Version 2011.1.1 (see Appendix A for results). The analysis assumed that construction would occur over an eight-month period commencing in 2013 (earliest time possible for construction, as well as shortest period, which represents a worse case assumption). Operational emissions would be negligible because the bridge would be used for equestrian, bicycle, and pedestrian crossing and vehicular access would not occur; therefore, operational emissions were not quantified.

The main construction phases would include site preparation, site work, steel fabrication, and architectural finishings. Construction would occur six days per week over one shift and individual phases would not overlap. The footprint of the construction site was assumed to be equal to the bridge's total area, approximately 11,476 square feet (302 feet long by 38 feet wide). The type and quantity of off-road construction equipment, construction worker trips, and vendor trips assumed for the proposed project is included in Appendix A. No importing or exporting of excavated soil would occur during construction.

A summary of the regional emissions analysis is provided in Table 1 below.

Table 1. Maximum Daily Criteria Pollutant Construction Emissions

Phase	**Daily Emissions (lbs/day)**					
	VOC	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	3.18	25.53	14.96	0.02	3.73	2.51
Site Work	1.68	13.00	10.88	0.02	1.32	0.99
Steel Fabrication	0.92	8.36	3.19	0.01	0.44	0.30
Architectural Finishings	9.02	28.19	14.67	0.03	1.73	1.58
Maximum	**9.02**	**28.19**	**14.96**	**0.03**	**3.73**	**2.51**
Significance Threshold	75	100	550	150	150	55
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Note:
PM_{10} and $PM_{2.5}$ emissions assume that fugitive dust is controlled by watering (SCAQMD Rule 403).
Key:
CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
SO_2 = sulfur dioxide
VOC = volatile organic compounds

Results of the analysis indicate that project-related construction emissions would not exceed the established SCAQMD thresholds for criteria pollutants, and thus would be less than significant. As such, the construction of the proposed project would not result in a violation of air quality standards or substantially contribute to existing or projected air quality violations; therefore, the impact would be less than significant.

Localized Significance Thresholds

The SCAQMD developed thresholds for local air quality impacts from construction activity (SCAQMD 2008 and SCAQMD 2009). Localized significance thresholds (LSTs) are only applicable to the following criteria pollutants: NOx, CO, PM_{10}, and $PM_{2.5}$. LSTs are analogous to California Ambient Air Quality Standards (CAAQS); pollutant levels below LSTs would not necessarily be expected to violate the CAAQS. LSTs consider ambient concentrations of pollutants for each source receptor area and distances to the nearest sensitive receptor.

LST emission tables were developed by the SCAQMD for project sizes up to five acres. SCAQMD recommends using the equipment type to determine the maximum daily disturbed acreage when analyzing air emissions with CalEEMod (SCAQMD 2011). A review of the

proposed equipment types (e.g., bulldozer, backhoe, etc.) indicated that no more than half an acre would be disturbed per day. The LST tables for one acre, the smallest acreage available, were therefore used to complete the analysis.

As described in the SCAQMD's LST Methodology (SCAQMD 2008), only on-site emissions, which include fugitive dust and off-road construction equipment, were included in the LST analysis and not offsite mobile emissions from the proposed project (e.g., construction worker commuting or vendor trips). Onsite operational emissions are anticipated to be negligible and were not quantified.

Table 2 summarizes the allowable emissions for construction emissions for a project located in the Central Los Angeles Source-Receptor Area (SRA). The closest receptor would be located in the equestrian center immediately adjacent to the proposed construction site. As a result, a distance of approximately 82 feet (25 meters) was used to complete the LST analysis.

Table 2. Maximum Daily Onsite Criteria Pollutant Construction Emissions

Phase	**Daily Emissions (lbs/day)**			
	NOx	**CO**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	25.45	14.18	3.57	2.50
Site Work	11.85	9.40	1.07	0.94
Steel Fabrication	7.94	2.35	0.28	0.28
Architectural Coatings	28.11	13.89	1.57	1.57
Maximum	**28.11**	**14.18**	**3.57**	**2.50**
LST	74	680	5	3
Significant?	**No**	**No**	**No**	**No**

Key:
CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance threshold
NOx = nitrogen oxides
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter

As shown in Table 2, construction emissions associated with the proposed project would not exceed the LST thresholds and localized peak daily emissions would be less than significant. Operational emissions would be negligible because the bridge would be used for equestrian, bicycle, and pedestrian crossing and vehicular access would not occur; therefore, no impacts from operational emissions are anticipated from the proposed project.

3. Criteria Pollutants in Non-Attainment Region

A significant impact would occur if the proposed project's incremental air quality effects are considerable when viewed in connection with the effects of past, present, and future projects.

According to the SCAQMD white paper on *Potential Control Strategies to Address Cumulative Impacts from Air Pollution, Appendix D: Cumulative Impact Analysis Requirements Pursuant to CEQA* (SCAQMD 2003), projects that do not exceed the significance thresholds are generally not considered to be cumulatively significant. As shown in Table 1, the construction emissions of the nonattainment pollutants (PM_{10}, $PM_{2.5}$, NO_2, and O_3 precursors [nitrogen oxides and volatile organic compounds]) would be less than the SCAQMD regional significance thresholds. No impacts are anticipated with operation. Therefore, the cumulative impact from the proposed project would be less than significant.

4. Pollutant Concentrations

A significant impact may occur if construction or operation of the proposed project generated pollutant concentrations to a degree that would significantly affect sensitive receptors. Sensitive

receptors include residences, board and care facilities, schools, playgrounds, hospitals, parks, child care centers, and outdoor athletic facilities.

The project site is located in the LA River between Los Feliz Boulevard and Chevy Chase Drive. The I-5 Freeway is located to the west of the project site and separates the LA River from Griffith Park (approximately 200 feet). The project site is downstream of North Atwater Park and upstream of the Los Feliz Golf Course. The Los Angeles Police Department's Metropolitan Division mounted police and private stables are east of the project site. The LA River Greenway Trail and the LA River Bike Path run parallel to the LA River and would pass the project site, but these routes would be closed during construction and traffic would be detoured to allow users to continue to access Griffith Park. The closest residential receptor is approximately 550 feet from the project site. Although there are sensitive receptors near the project site, as discussed above under items a through c, proposed project construction would not cause substantial increases of air pollutants at the sensitive receptors.

Construction of the proposed project has the potential to emit toxic air contaminants (TACs) in exhaust emissions, such as diesel particulate matter; however, construction would be short-term and its impacts would be temporary. Additionally, any increases in emissions from operation (such as painting activities) would have the potential to emit TACs but would rarely occur and considered negligible. As a result, a less than significant impact on sensitive receptors is anticipated during construction and operation of the proposed project.

5. Odors

A significant impact would occur if the project created objectionable odors during construction or operation that would affect a substantial number of people.

The use of diesel construction equipment during construction may generate near-field odors that are considered to be a nuisance. Diesel equipment emits a distinct odor that may be considered offensive to certain individuals. Odors from construction activities would be temporary and would not affect a substantial number of people. Further, given the proposed project's close proximity to the I-5 Freeway, which generate odors from fuel use, including from diesel-powered vehicles, it is unlikely construction-generated odors would be differentiable from existing odor sources. Therefore, proposed project construction would have a less than significant impact associated with the creation of objectionable odors affecting a substantial number of people.

D. Biological Resources

1. Candidate, Sensitive, or Special Status Species

A significant impact may occur if the proposed project would remove or modify habitat for any species identified or designated as a candidate, sensitive, or special status species in local or regional plans, policies, or regulation, or by the state or federal regulatory agencies cited.

The proposed project is located at a section of the LA River known as Glendale Narrows. The LA River channel in the vicinity of the proposed project consists of concrete-lined banks with a soft bottom substrate supporting a Southern Cottonwood Willow Riparian Forest community with vegetation dominated by willows (Salix spp.) along with invasive species such as giant reed (Arundo donax) (City of Los Angeles 2008). Vegetation within the channel is regularly affected by scouring floods that occur with seasonal rain events. Vegetation does not occur along the concrete-lined channel banks.

Common wildlife species utilizing the LA River include Pacific treefrog, western fence lizard, two-striped garter snake, great-blue heron, black-necked stilt, mallard, red-shouldered hawk, black phoebe, and yellow warbler, and mammals such as raccoon, opossum, skunk, and coyote. Fish such as common carp, tilapia, and mosquitofish occur in the LA River in the vicinity of the proposed project (Friends of the Los Angeles River [FOLAR] 2008).

Special-Status Species
A search of the California Natural Diversity Database (CNDDB) was conducted to identify special-status plants and animals with the potential to occur in the proposed project area. Table 3 presents special-status wildlife and plant species and ecosystems (plant communities) listed on the CNDDB as having the potential to occur within the USGS Burbank 7.5-minute quadrangle in which the proposed project is located.

For the purpose of this assessment, “special-status species” are those species that meet one or more of the following criteria:

- Listed as threatened or endangered, or proposed or candidate for listing, under the federal Endangered Species Act;
- Listed as threatened or endangered, or candidate for listing, under the California Endangered Species Act;
- California species of special concern;
- California fully protected species;
- U.S. Forest Service and/or Bureau of Land Management sensitive species;
- U.S. Fish and Wildlife Service (USFWS) bird of conservation concern;
- Plants listed as rare under the California Native Plant Protection Act, or ranked as rare, threatened, or endangered in California (California Rare Plant Rank [RPR] of 1A, 1B, or 2);
- Taxa that meet the criteria for listing, even if not currently included on any list, as described in Section 15389 of the State CEQA Guidelines; or
- Migratory birds protected under the Migratory Bird Treaty Act.

In addition to those species listed by the CNDDB for the Burbank quadrangle, three bat species were added to the list, due to their detection along the LA River during a 2009 bat survey (City of Los Angeles 2009).

Table 3. Ecosystems and Special-Status Wildlife and Plant Species Potentially in the Project Area

Species	Status	Habitat	Potential to Occur at Project site
Reptiles			
Silvery legless lizard *Anniella pulchra pulchra*	CSSC, USFS-S	Sandy or loose loamy soils under sparse vegetation.	Low; no known occurrence near project site.

Western pond turtle *Emys marmorata*	CSSC, BLM-S, USFS-S	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 kilometers from water for egg-laying.	None; no known occurrence near project site; habitat lacks sandy banks.
Birds*			
Burrowing owl *Athene cunicularia*	CSSC, BLM-S, BCC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	None; no suitable habitat present.
Southwestern willow flycatcher *Empidonax traillii extimus*	FE, CE	Riparian woodlands in southern California.	Low; no known occurrence near project site. May occur transiently during migration.
Coastal California gnatcatcher *Polioptila californica californica*	FT, CSSC	Obligate, permanent resident of coastal sage scrub below 2,500 feet in southern California.	None; no suitable habitat present.
Mammals			
Pallid bat *Antrozous pallidus*	CSSC, BLM-S, USFS-S	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Low; no known occurrence near project site. Could occur transiently.
Western mastiff bat *Eumops perotis californicus*	CSSC	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Low; no known occurrence near project site. Could occur transiently.
Western red bat *Lasiurus blossevillii*	CSSC, USFS-S	Feeds over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests.	Present. Detected at the LA River (City of Los Angeles 2009).
Hoary bat *Lasiurus cinereus*	None	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Generally roosts in dense foliage of medium to large trees.	Present. Detected at the LA River (City of Los Angeles 2009).

Western yellow bat *Lasiurus xanthinus*	CSSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats.	None; no known occurrence near project site.
Yuma myotis *Myotis yumanensis*	FSC, BLM-S	Found in a wide variety of habitats; prefer open forests and woodlands with sources of water over which to feed. Roosts in buildings, mines, caves, or crevices. Has been seen roosting in abandoned swallow nests and under bridges.	Present. Detected at the LA River (City of Los Angeles 2009).
Big free-tailed bat *Nyctinomops macrotis*	CSSC	Low-lying arid areas in southern California.	None; no known occurrence near project site.
Mexican free-tailed bat *Tadarida brasiliensis*	None	All habitats up through mixed conifer forests are used, but open habitats such as woodlands, shrublands, and grasslands are preferred. Requires caves, mine tunnels, crevices, or buildings for roosting.	Present. Detected at the LA River (City of Los Angeles 2009).
Southern grasshopper mouse *Onychomys torridus ramona*	CSSC	Desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	None; no suitable habitat present.
San Diego desert woodrat *Neotoma lepida intermedia*	CSSC	Coastal scrub with moderate to dense canopies preferred. Particularly abundant in rock outcrops and rocky cliffs and slopes.	None; no suitable habitat present.
American badger *Taxidea taxus*	CSSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	None; no suitable habitat present.
Plants			
Parish's brittlecale *Atriplex parishii*	CNPS-1B.1, USFS-S	Coastal bluff scrub, coastal scrub.	None; no suitable habitat present.
Nevin's barberry *Berberis nevinii*	FE, SE, CNPS-1B.1, USFS-S	Chaparral, cismontane woodland, coastal scrub, riparian scrub.	None; no suitable habitat present.
Round-leaved filaree *California macrophylla*	CNPS-1B.1, BLM-S	Cismontane woodland, valley and foothill grassland.	None; no suitable habitat present.
Slender mariposa-lily *Calochortus clavatus* var. *gracilis*	CNPS-1B.2, USFS-S	Chaparral, coastal scrub.	None; no suitable habitat present.
Plummer's mariposa-lily *Calochortus plummerae*	CNPS-1B.2, USFS-S	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest.	None; no suitable habitat present.

San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	FC, SE, CNPS-1B.1, USFS-S	Coastal scrub.	None; no suitable habitat present.
Slender-horned spineflower *Dodecahema leptoceras*	FE, SE, CNPS-1B.1, USFS-S	Chaparral, coastal scrub (alluvial fan sage scrub).	None; no suitable habitat present.
Many-stemmed dudleya *Dudleya multicaulis*	CNPS-1B.2, BLM-S, USFS-S	Chaparral, coastal scrub, valley and foothill grassland.	None; no suitable habitat present.
Mesa horkelia *Horkelia cuneata* ssp. *puberula*	CNPS-1B.1, USFS-S	Chaparral, cismontane woodland, coastal scrub.	None; no suitable habitat present.
Davidson's bush-mallow *Malacothamnus davidsonii*	CNPS-1B.2	Coastal scrub, riparian woodland, chaparral.	None; no known occurrence near project site.
White rabbit-tobacco *Pseudognaphalium leucocephalum*	CNPS-2.2	Riparian woodland, cismontane woodland, coastal scrub, chaparral.	None; no known occurrence near project site.
Ecosystems (Vegetation Communities)			
California Walnut Woodland	None	Cismontane woodland.	Does not occur at project site
Southern Coast Live Oak Riparian Forest	None	Riparian forest	Does not occur at project site
Southern Cottonwood Willow Riparian Forest	None	Riparian forest	Present
Southern Sycamore Alder Riparian Woodland	None	Riparian woodland	Does not occur at project site

Source: CNDDB 2012; City of Los Angeles 2009.
Key:
*In addition to the bird species listed in the table as identified by CNDDB, nearly all native North American bird species are protected by the Migratory Bird Treaty Act (MBTA).
BCC: U.S. Fish and Wildlife Service Birds of Conservation Concern
BLM-S: Bureau of Land Management Sensitive Species
CE: California Endangered
CSSC: California Species of Special Concern
CNPS-1A: California Native Plant Society (CNPS) Plants presumed extinct in California
CNPS-1B.1: Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California
CNPS-1B.2: Plants rare, threatened, or endangered in California and elsewhere, fairly threatened in California
CNPS-2.2: Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California
FC: Federal Candidate
FE: Federal Endangered
FSC: Federal Species of Concern
FT: Federal Threatened
None: no formal listing but considered rare to varying extent
USFS-S: U.S. Forest Service Sensitive Species

Based on the vegetation communities and habitat present at the project site; the urbanized nature of the project vicinity; the habitat requirements of the special-status species listed in Table 3; the regular scouring that occurs in the LA River channel during the rainy season; and the lack of known occurrences for many of the special-status species in Table 3 there is little or no potential for most special-status wildlife or plant species to occur in or be affected by the proposed project. In addition, there is no designated critical habitat in the project area (USFWS 2002).

The Federal Migratory Bird Treaty Act protects all migratory birds and their parts (including eggs, nests, and feathers). Many species of migratory birds utilize habitat in the project area for foraging, nesting, roosting, and dispersal during migration, including shorebirds, wading birds, ducks, raptors, and passerines (Friends of Griffith Park 2007). Potential effects to migratory

birds are discussed under Section 4, **Interference with Movement and/or Migration,** below.

However, four sensitive bat species listed in Table 3 are considered "present" due to their detection at the LA River during bat surveys conducted in Griffith Park (City of Los Angeles 2009). Of these, the western red bat and the hoary bat may roost in trees near the project site. Both of these species tend to move the location of their day roost daily from tree to tree. If these species are roosting in the project area, they would be expected to readily move to trees away from disturbance during construction and operation. Potential removal of trees during project construction would not have a significant impact on tree-roosting bats due to the proximity of other suitable roosting trees in the project area. Therefore, impacts to special-status species would be less than significant.

Potential impacts to the Southern Cottonwood Willow Riparian Forest vegetation community found at the project site are discussed in the following Section 4, **Riparian Habitat and Natural Communities**.

2. Riparian Habitat and Natural Communities

As mentioned above, the LA River channel in the vicinity of the proposed project consists of concrete-lined banks with a soft bottom substrate supporting a Southern Cottonwood Willow Riparian Forest community. This is considered a sensitive natural community by the California Department of Fish and Game (CDFG).

Riparian habitat, including Southern Cottonwood Willow Riparian Forest, a sensitive natural community, is present at the proposed project site. Vegetation within the work zone where abutments would be constructed would be removed. Therefore, temporary and short-term impacts to riparian habitat would occur from the removal of riparian vegetation within the work zone. In addition, impacts related to the spread of invasive vegetation could occur.

Following construction, disturbed areas would be restored with native grasses and plants. In addition, it is anticipated that riparian vegetation would quickly re-establish in the disturbed area through colonization by seedlings of willows, cottonwoods, and other riparian species following completion of construction (Riparian Habitat Joint Venture 2009). Therefore, no permanent loss of riparian habitat is anticipated to occur and temporary impacts would be less than significant.

Arundo donax is a prevalent invasive plant in the LA River ecosystem, and efforts to control its spread are on-going. Impacts to riparian habitat from the spread of this and other invasive species during construction of the proposed project could be significant, and mitigation would be required to avoid these impacts. Implementation of the following mitigation measures would be necessary to reduce this impact to less than significant:

> **Mitigation Measure BIO-1. Preventing Spread of Invasive Species**
> To minimize the spread of invasive plant species into construction areas, construction vehicles and equipment shall be cleaned with compressed water or air within a designated containment area prior to accessing the work area.
>
> **Mitigation Measure BIO-2. Vegetation Removal and Disposal**
> During vegetation removal, invasive plants, including seeds, rhizomes, and other plant parts, shall be contained and disposed of in an appropriate disposal facility away from the work zone.

With the implementation of mitigation to control invasive species and the natural re-

establishment of riparian vegetation in the channel, impacts to riparian habitat from the proposed project would be less than significant. No impacts to riparian habitat are anticipated during operation of the proposed project.

3. Wetlands

A significant impact may occur if federally protected wetlands, as defined by Section 404 of the Clean Water Act, would be modified or removed.

A wetland survey/delineation of the proposed project site was not conducted for this IS/MND. However, the LA River is considered a water of the U.S. subject to the jurisdiction of the USACE. Federal wetlands are typically defined as having three required elements; hydrophytic vegetation (i.e., riparian vegetation), hydric soils (i.e., soils that are wet and anaerobic for certain periods during the growing season), and wetland hydrology (i.e., source of water). As described above, portions of the project site are characterized by Southern Cottonwood Willow Riparian Habitat, which can establish within areas that meet the three criteria for federal wetlands. Although a formal wetlands survey/delineation was not conducted, it is assumed for the purposes of this Initial Study that federal wetlands occur within the project site and could be impacted during project construction. As indicated above in Section IV.C.2., the construction work area is assumed to equal the total bridge area, which spans approximately 302 feet and is approximately 38 feet wide for a total of 11,476 square feet. Given that the banks of the work area are concrete lined, only the unlined soft river bottom area would potentially contain federal wetlands. The span of the soft bottom is estimated to be approximately 150 to 175 feet, which multiplied times a work area width of approximately 35 feet, would equate to approximately 5,250 to 6,125 square feet (0.12 to 0.14 acre or 0.0486 to 0.0567 hectares). Completion of a formal wetlands delineation, as would be required to obtain the necessary approvals for any construction work within wetland areas (see discussion below), may determine to actual area of federal wetlands to be less than estimated above, should portions of the subject area not meet all of the criteria for defining federal wetlands.

The proposed project would result in permanent fill (placement of bridge abutments) of a water of the U.S. and temporary disturbance from diversion of the water flow and construction equipment in the channel. In addition, temporary effects to water quality could occur from increased turbidity and sedimentation due to soil disturbance and release of hazardous materials (e.g., fuels and oils) associated with construction equipment.

Permanent fill within the LA River channel would be limited to the area of the bridge pier. In addition, the pier would be as hydraulically-neutral as possible such that it affects the River's flows as little as possible.

Construction of the proposed project would occur during the summer months when flow in the LA River is at its lowest. Prior to construction, a work platform would be created over the LA River bottom to keep vehicles and workers out of the sandy bottom surface. During the site preparation phase of construction, the LA River channel would be redirected away from the work zone and erosion control structures would be installed to avoid impacts to water quality.

Because the LA River is considered a water of the U.S. subject to the jurisdiction of USACE, implementation of the proposed project would require a Clean Water Act Section 10/404 permit and a Section 401 Water Quality Certification prior to construction. The preparation and review of the applications for these approvals would take into account the nature and extent of any federal wetlands impacted by the project. Similarly, impacts to wetlands subject to state jurisdiction would require the issuance of a Streambed Alteration Agreement under Section

1600 of the California Fish and Game Code.. These federal and state permits would specify project-specific requirements to avoid or minimize impacts to regulated wetlands, or where impact avoidance is not practicable, requirements to compensate for any loss of wetlands, which may include wetlands replacement or enhancement at a mitigation ratio and/or other measures set forth by the affected regulatory agencies (i.e., USACE, CDFG, LARWQCB). The impacts evaluation and resultant mitigation requirements associated with each of these permits/approvals would take into account the fact that the majority of impacts associated with the project would be temporary in nature and only a very limited area - the single bridge pier – would have a permanent impact to wetlands, if any.

As described above, required permits would set forth avoidance and minimization measures that would be required during construction to avoid or minimize potential impacts to the LA River from direct disturbance and from effects on water quality and vegetation. Implementation of the measures to be outlined in these permits would reduce water quality impacts to less than significant. In the long-term, the operation of the proposed project would be expected to result in benefits to water quality, as horses would utilize the new bridge to cross over the LA River rather than entering the channel as they do currently, which would reduce the potential for horse manure to reach the water and for crossings to stir up sediments. Therefore, the impacts associated with the proposed project would be less than significant.

4. Interference with Movement and/or Migration

A significant impact may occur if the proposed project interfered or removed access to a migratory wildlife corridor or impeded the use of native wildlife nursery sites.

In the vicinity of the proposed project, land use to the north, east, and south consists primarily of residential, commercial, and industrial uses and heavily-travelled arterials. Just west of the proposed project, Griffith Park is a large open space area of over 4,000 acres containing native habitat that supports a diversity of wildlife. As such, Griffith Park has been designated a Significant Ecological Area (SEA) (Los Angeles County 2008). The proposed project is located at the eastern edge of this habitat and therefore, does not link significant wildlife habitat. However, the LA River itself can be considered to be a wildlife corridor along the soft bottom areas through which aquatic and riparian species can move. In addition, migratory birds utilize the riparian vegetation along the LA River for nesting during the breeding season and for dispersal during migration.

The project site is located within an urban area surrounded by developed properties. The LA River channel is used as a wildlife corridor for aquatic and riparian species and migratory birds. These conditions would not change with construction or operation of the proposed project. In addition, the bridge would maintain a clear span over the LA River and would place the minimum footprint within the River. Therefore, impacts associated with wildlife movement would be less than significant.

The LA River at the project site provides habitat for migratory birds, which are protected by the Federal Migratory Bird Treaty Act and State migratory bird protection code. Therefore, there could be significant impacts associated with disturbance of nesting migratory birds during construction. The following mitigation measure would be required to reduce this impact to a less than significant level:

<u>Mitigation Measure BIO-3. Nesting Bird Avoidance</u>

Construction activities that involve tree removal or trimming would be timed as much as possible to occur outside the migratory bird nesting season, which

occurs generally from March 1 through August 31 and as early as February 1 for raptors. If construction must occur during the nesting season, surveys for nesting birds would be conducted prior to construction activities, including removal of vegetation. Two biological surveys would be conducted, one 15 days prior and a second 72 hours prior to construction that would remove or disturb suitable nesting habitat. The surveys would be performed by a biologist with experience conducting breeding bird surveys. The biologist would prepare survey reports within 24 hours of conducting the surveys, documenting the presence or absence of any protected native bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (or within 500 feet for raptors). If an active nest is located, construction within 300 feet of the nest (or 500 feet for raptor nests) would be postponed until the nest is vacated and juveniles have fledged (minimum of six weeks after egg-laying) and when there is no evidence of a second attempt at nesting.

With implementation of Mitigation Measure BIO-3 identified above, impacts would be less than significant. No impacts to wildlife corridors or migratory birds are anticipated during operation of the proposed project.

5. Consistency with Applicable Plans

A significant impact may occur if the proposed project would cause an impact that was inconsistent with local regulations pertaining to biological resources.

The Conservation and Open Space Element of the Los Angeles County General Plan identifies SEAs containing biological resources and sets forth the goal of conserving these areas. While development within a SEA is not prohibited, the Plan does require development to be limited and controlled in order to avoid impacting valuable biological resources (County of Los Angeles 2011).

In addition, oaks and other native tree species are protected by local ordinances including the Los Angeles County Oak Tree Ordinance and the City of Los Angeles Native Tree Protection Ordinance.

Construction or operation of the proposed project could result in removal or pruning of trees. Should the trees requiring removal or pruning be protected by local tree protection ordinances, the impacts to these trees would result in potentially significant impacts. The following mitigation would be required:

Mitigation Measure BIO-4. Protected Trees

Prior to removal or pruning of a protected tree, a tree removal permit would be obtained in compliance with local tree protection ordinances. The tree removal permit may require replanting of protected trees within the project area or at another location to mitigate for the removal of these trees. Replanting would be done at a ratio of one new tree for every one removed. Further, if construction or operation would entail pruning of any protected tree, the pruning would be performed in a manner that does not cause permanent damage or adversely affect the health of the trees.

With implementation of Mitigation Measure BIO-4 identified above, potentially significant impacts from construction and operation of the proposed project would be reduced to a less than significant level.

E. Cultural Resources

1. Historic Resources

A significant impact may result if the proposed project caused a substantial adverse change to the significance of a historical resource (as identified above).

Griffith Park is a City of Los Angeles Historic-Cultural Monument, and encompasses the Los Angeles River in the area of the project site. However, the project site is not designated as an historically sensitive resource, historically sensitive resource area, or wilderness area (which is an historically sensitive resource) according to the Griffith Park Historic Resources Map. An historically sensitive resource or area is a resource or area that appears to be historically significant and serves as a contributing element or character-defining feature of the monument. Construction of the proposed project would not affect any historically sensitive resources, historically sensitive resource areas, or wilderness areas. The proposed project involves the construction of a multi-modal bridge over the LA River, which is separated from main park area by the ten-lane I-5 Freeway. Construction of the proposed project would not involve demolition, substantial alteration or relocation of the monument. Nonetheless, the proposed project would be constructed in accordance with Section 22.171.14 of the City of Los Angeles Administrative Code (LAAC). The U.S. Secretary of the Interior's Standards for Rehabilitation are expressly incorporated into the LAAC and provide standards concerning the historically appropriate construction activities, which will ensure the continued preservation of the monument, for projects involving the demolition, substantial alteration, or relocation of a monument. No impacts are anticipated from operation of the proposed project. No other local, state, or nationally-listed resources exist in the immediate project vicinity. Therefore, impacts associated with the construction and operation of the proposed project would be less than significant.

2. Archaeological Resources

A significant impact may occur if the proposed project were to cause a substantial adverse change in the significance of an archaeological resource, which falls under the CEQA Guidelines section cited above.

The project area is located in an urban, built environment in the City of Los Angeles. Most of the project area consists of existing freeway, highway, ramps, bridge over-crossings, bicycle and equestrian paths, and other related transportation improvements. The I-5 Freeway and the LA River are prominent elements of the existing environment, while modern buildings and landscaping characterize much of the remaining project area. The area adjacent to the project site has been disturbed with the construction of levees on either side of the LA River; the archaeological sensitivity of the project site is unknown because the project area has not been previously surveyed.

Ground disturbing activities during construction would involve installation of the pilings to support the bridge. One piling would be located within the riverbed, and a second piling would be located within the levee on the eastern side of the River. Given that one piling would be placed within the riverbed itself, and that the second piling would be located within the fill used to construct the levee, the likelihood of encountering archaeological resources is low. Nonetheless, during construction, the Contractor would follow the uniform practices established by the Southern California Chapter of the American Public Works Association, such as the Standard Specifications for Public Works Construction ("Greenbook"). In the event that archaeological resources are encountered during excavation and grading, existing practices in the Greenbook requires the suspension of work, in whole or in part, until it is determined appropriate to resume. Therefore, impacts associated with construction of the proposed project

would be less than significant. No impacts on archaeological resources during operation are anticipated.

3. Paleontological Resources

A significant impact may occur if grading or excavation activities associated with the proposed project would disturb unique paleontological resources or unique geologic features.

During construction, the Contractor would follow the uniform practices established by the Southern California Chapter of the American Public Works Association, such as the Standard Specifications for Public Works Construction ("Greenbook"). In the event that paleontological resources are encountered during excavation, existing practices in the Greenbook require the suspension of excavation, in whole or in part, until it is determined appropriate to resume. As discussed under 5 (b) above, given that pilings would be located either directly within the riverbed and within the levee constructed of fill material, the likelihood of encountering paleontological resources is low. Nonetheless, in the event of an unanticipated discovery, compliance with the Greenbook during construction would ensure impacts would be less than significant. No impacts on paleontological resources during operation are anticipated.

4. Human Remains

A significant impact may occur if grading or excavation activities associated with the proposed project would disturb interred human remains.

No known burial sites are located within the project site; however, it is still possible that human remains could exist in the subsurface. In the event that an unknown burial site or human remains are found during excavation, in accordance with Section 7050.5 of the California Health and Safety Code, the County Coroner shall be notified within 24 hours of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of the discovery, the appropriate treatment and disposition of the human remains.

If the County Coroner determines that the remains are or believed to be Native American, s/he shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American. The descendents shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains. Therefore, potential impacts to any unknown burial site or human remains being encountered during construction activities associated with the proposed project would be less than significant. No impact is anticipated from the operation of the proposed project.

F. Geology and Soils

1. Seismic Ground Shaking

A significant impact may occur if the proposed project design did not comply with building code requirements intended to protect people from hazards associated with strong seismic ground shaking.

As with most locations in Southern California, the project site is susceptible to ground shaking emanating from causative faults during an earthquake. As indicated in 6(a)(i) above, the project site is not located within an Alquist-Priolo Fault Zone, and thus the potential for hazards

associated with strong seismic ground-shaking such as ground surface rupture affecting the site is considered low. Known regional faults that could produce significant ground shaking at the project site include the Hollywood, Raymond, and Puente Hills Faults. The closest of these is the Hollywood Fault, located approximately 1.72 miles south of the project site. Seismic activity along any of the above-mentioned faults could affect the proposed project, and is being considered during the design of the proposed structure.

The 2012 geotechnical exploration report prepared specifically for the proposed project evaluated the potential for strong seismic ground shaking and provides recommendations to address these hazards. The facility would be designed by California-licensed professional civil and structural engineers. Construction work would be overseen by a licensed professional contractor, and as required by state regulations, compliance with safety standards would reduce the risk of seismic hazards. Designs and plans would also require reviews and permits per local, state and federal laws. In addition, compliance with applicable portions of existing codes pertaining to seismic building design and standards, such as the most recent edition of the California Building Code, the LAMC, and Bureau of Engineering's Standard Project Specifications would also reduce potential adverse effects associated with seismic ground shaking. As such, the construction and operation of the proposed project are expected to have a less than significant impact related to exposing people or structures to strong seismic ground shaking.

2. Ground Failure and Liquefaction

A significant impact may occur if the proposed project would be located in an area identified as having a high risk of liquefaction and appropriate design measures required within such designated areas were not incorporated into the project.

There is potential for liquefaction-induced settlement resulting from an earthquake occurring along any of several major active and potentially active faults in Southern California. Liquefaction typically occurs when near-surface (usually upper 50 feet) saturated, clean, fine-grained loose sands are subject to intense ground shaking. The shallowest groundwater encountered at the project site was at a depth of 19 feet below ground surface at the location of the proposed bridge. As indicated in the geotechnical exploration report, the project site is located within a potentially liquefiable zone. Potentially liquefiable soils are present at the project site at depths ranging from 20 to 25 feet. The 2012 geotechnical exploration report prepared specifically for the proposed project evaluated the potential for liquefaction and the proposed project includes design recommendations to ensure the structural integrity of the bridge from liquefaction-induced settlement resulting from seismic events. As such, construction and operation of the proposed project would not have the potential to result in significant impacts associated with liquefaction and impacts would be less than significant.

3. Erosion

A significant impact may occur if the proposed project were to expose large areas to the erosion effects of wind or water for a prolonged period of time.

The majority of project construction would occur within the LA River, which is currently affected by water erosion. Construction of the proposed project would include ground-disturbing activities, such as excavation, trenching, drilling, grading, and landscaping. During construction, the LA River channel would be redirected away from the work zone as required. These activities could result in the potential for erosion to occur at the proposed project site, though soil exposure would be temporary and short-term in nature. In accordance with standard specifications for public works construction (Greenbook) and building code requirements, the

proposed project would require implementation of a Storm Water Pollution Prevention Plan (SWPPP) for erosion and sedimentation control. Best management practices (BMPs) would also be undertaken to control runoff and erosion from any earthmoving activities that would occur. Implementation of such control measures would prevent substantial soil erosion or the loss of topsoil from exposed soils. After construction is completed within the LA River, the areas where native grasses and plants were removed during construction would be restored. Other than the main bearing pier located in the LA River, no other structures would be placed in the River. The proposed project would not expose new soil that was not previously exposed to erosion effects of the River. As such, construction or operation of the proposed project would not result in a substantial amount of erosion or the loss of topsoil and impacts would be less than significant.

4. Soil Stability

A significant impact may occur if the proposed project was built in an unstable area without proper site preparation or design features to provide adequate foundations for project buildings, thus posing a hazard to life and property.

Based on borings conducted at the project site, the western bank of the LA River consists of artificial fill underlain by alluvium, which is underlain by Topanga Formation Bedrock. On the eastern bank of the LA River, soils consist of artificial fill underlain by alluvium. The shallowest groundwater encountered at the project site was approximately 19 feet below ground surface.

As indicated above, the project site is located within a potentially liquefiable zone. Potentially liquefiable soils are present at the project site at depths ranging from 20 to 25 feet. Due to soil liquefaction, the riverbanks are likely to experience displacement due to lateral spreading. However, the 2012 geotechnical exploration report prepared for the proposed project includes design recommendations and construction measures to ensure that the soils are suitable for construction of the proposed project. For example, the potentially liquefiable soils in the riverbed, at the proposed location of the main pier, would be removed and replaced with aggregate and in-situ ground improvement techniques would be used for the liquefiable soils on the riverbanks. As such, implementation of the proposed project would not have the potential to result in significant impacts associated with unstable soils and impacts would be less than significant.

5. Expansive Soils

A significant impact may occur if the proposed project would be built on expansive soils without proper site preparation or design features to provide adequate foundations for project buildings, thus posing a risk to life and property.

Generally, expansive soils are clayey soils that can expand due to moisture change. The project site contains the following soil formations: Topanga Formation (Ttsl); Stream Channel Deposits (Og); and Artificial Fill. Based on borings conducted for the proposed project, some of the Topanga Formation is clayey and potentially expansive, but these types of soils are at significant depths. Expansive soils typically pose a problem for light structures supported on shallow foundation such that the moisture change (due to irrigation, seasonal change, rainfall, etc) can expand/heave and push foundation upwards causing distress. The proposed bridge is a heavy structure that would be supported on piles embedded at significant depth below the existing grade. As a result, potentially expansive soils would not affect construction and operation of the proposed project and impacts would be less than significant.

G. Greenhouse Gas Emissions

1. Emissions Generation

SCAQMD developed a recommended interim threshold for assessing the significance of potential greenhouse gas (GHG) emissions that uses a tiered approach to determining significance. The preferred significance threshold for GHG emissions from industrial projects is less than 10,000 metric tons of carbon dioxide equivalent (CO2e) per year, which includes construction emissions amortized over 30 years and then added to operational GHG emissions. The SCAQMD also proposed a screening level for significance for residential/ commercial projects of 3,000 MTCO2e per year, which also includes construction emissions amortized over 30 years and then added to operational GHG emissions to determine total project GHG emissions. On December 5, 2008, the SCAQMD Board adopted the industrial source threshold of 10,000 MTCO2e per year, but did not vote on the residential/commercial threshold because SCAQMD staff needed additional time to complete analysis on the threshold.

The California Air Pollution Control Officers Association (CAPCOA) released the white paper CEQA & Climate Change in 2008 that evaluated several possible significance thresholds that could be used by lead agencies. Notwithstanding a net zero emissions threshold, the lowest quantitative threshold that was evaluated by CAPCOA was 900 metric tons per year. This threshold would be sufficient to capture approximately 90 percent of emissions from residential units or office spaces.

Total CO2e construction emissions were estimated to be 168 metric tons (Appendix A) over the eight-month construction period. Total CO2e emissions would be approximately six percent of SCAQMD's proposed threshold of 3,000 MTCO2e for residential or commercial projects. Emissions would also represent approximately 19 percent of CAPCOA’s suggested threshold for similar project types. No long-term operational GHG emissions would occur as a result of the proposed project.

While SCAQMD's 3,000 MTCO2e threshold was not adopted, it is presented here as a benchmark for comparison purposes to demonstrate that the proposed project would not result in substantial amounts of GHG emissions that could potentially have a significant impact on the environment. Emissions would also not exceed CAPCOA’S lowest non-zero suggested quantitative threshold, further strengthening this conclusion. Therefore, GHG emissions associated with the construction of the proposed project would be less than significant.

2. Consistency with Adopted Plans

A significant impact may occur if the proposed project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

As described below, several initiatives, plans, policies, and regulations have been adopted at the state and local level related to reducing GHG emissions. In general, California's goals and strategies for the systematic statewide reduction of GHG emissions are embodied in the combination of Executive Order S-3-05 and Assembly Bill (AB) 32, which call for the following reductions of GHG emissions:

- 2000 levels by 2010 (11 percent below business-as-usual)
- 1990 levels by 2020 (25 percent below business-as-usual)
- 80 percent below 1990 levels by 2050

At a local level, in May 2007, the City introduced Green LA - An Action Plan to Lead the Nation in Fighting Global Warming. Green LA presents a framework targeted to reduce the City's GHG emissions by 35 percent below 1990 levels by 2030 through actions such as increasing renewable energy, energy efficiency, water conservation, tree planting, recycling, and infrastructure improvements. In 2008, the City followed up Green LA with an implementation plan called Climate LA – Municipal Program Implementing the Green LA Climate Action Plan, which includes steps that can be taken to achieve the City's GHG emission reduction goal, such as reducing energy use at City facilities.

As discussed in 7(a) above, GHG emissions associated with the proposed project would be well below SCAQMD's proposed GHG threshold for construction or operations of residential/commercial projects (used for comparison purposes in the absence of more a more relevant established threshold). Further, the proposed project is being proposed to provide benefits to the water quality in the LA River, and it would not conflict with any applicable plans, policies, or regulations adopted for the purposes of reducing GHG emissions. As such, impacts would be less than significant.

H. Hazards and Hazardous Materials

1. Transport of Hazardous Materials

A significant impact may occur if the proposed project utilizes substantial amounts of hazardous materials as part of its routine operations and could potentially pose a hazard to the public under accident or upset conditions.

The proposed project would involve the construction of a multi-modal bridge across the LA River. Construction activities would be short-term and limited in nature and may involve transport, storage, use or disposal of hazardous materials. Some examples of hazardous materials handling include fueling and servicing construction equipment on-site, and the transport of fuels, lubricating fluids, and solvents. These types of materials are not acutely hazardous, and all storage, handling, and disposal of these materials are regulated.

No sites with known hazardous materials releases were identified on the project site or within the immediate vicinity of the proposed project. The EnviroStor database identified 11 leaking underground fuel tank (LUFT), 8 cleanup sites in the project vicinity, and zero LUFTs and cleanup sites within a one-quarter mile radius of the project site. The following sites are located within the general vicinity of the proposed project:

- Garrett Estate Property, located at 3941 Goodwin Avenue, is listed as a Voluntary Cleanup Site for sludge, PCBs and asbestos-containing materials in soil from warehousing uses; a No Further Action determination was issued in January 2001.

- Excello Plating Company, Inc., located at 4057 Goodwin Avenue, is listed as a Tiered Permit site for metals in soil and for contaminants stored at the site; the site was referred to the Regional Water Quality Control Board in August 2005.

- Adams Rite Products, Inc., located at 540 West Chevy Chase Drive, is listed as a Tiered Permit site and was referred to another agency.

- San Fernando Valley (Area 4) Pollack Federal Superfund Site, is listed as a National Priorities List site for tetrachloroethylene (PCE), trichloroethylene (TCA), trichloroethylene

(TCE), chromium III and chromium IV in an aquifer used for drinking water, soil and a well used for drinking water from aerospace manufacturing and maintenance as well as metal plating; the site is undergoing operations and maintenance as of January 1999.

- Los Feliz Charter School for the Arts, located at 2709 Media Center Drive, is listed as a School Investigation site for arsenic, lead and diesel from manufacturing uses; the site is inactive and requires evaluation, as of December 2008.

- Franciscan Ceramics, located at 2901 Los Feliz Boulevard, is listed as a State Response site for lead, cadmium and zinc in soil from manufacturing and ceramics uses; the site is in operations maintenance as of December 1994.

- Wilshire Properties, located at 4685 San Fernando Road, is listed as a State Response site for arsenic, lead, diesel and gasoline in soil and soil vapor from metal planting; the site was certified in November 1985.

- Pacific Edison School, located at Pacific Avenue and Vine Street, is listed as a School Investigation site for metals, semivolatile organic compounds and volatile organic compounds in soil; the site received a No Further Action determination in September 2001.

The status of the LUFT cases includes ten closed cases and one open-site case under remediation. All of the open and closed LUFT cases and cleanup sites are located at least one-half mile from the project site where no improvements are proposed. The identified LUFT and clean-up sites are not anticipated to have an impact on the proposed project and project construction would not affect ongoing remediation activities at the open sites.

Should contaminated soils be encountered during construction activities, the soils would be excavated, treated or disposed of to the satisfaction of the applicable regulatory agencies, which could include the Los Angeles Fire Department, the LARWQCB, and/or California Department of Toxic Substances Control (DTSC), thereby eliminating any future risk of upset or accidental conditions. Likewise, if contaminated groundwater is encountered, it would be handled in compliance with applicable federal, state, and local regulations and would not pose a future risk of upset or accidental conditions. Adherence to regulations set forth by local, state, and federal regulatory agencies would reduce the potential for hazardous materials impacts to less than significant levels.

Operation of the proposed project would not affect ongoing remediation activities at the open LUFT sites nor require routine transport, use, or disposal of significant quantities of hazardous materials, including, but not limited to oils, pesticides, or chemicals; therefore, no impact is anticipated.

2. Emissions Near Schools

A significant impact may occur if the proposed project were located within one-quarter mile of an existing or proposed school site and were projected to release toxic emissions which pose a hazard beyond regulatory thresholds.

There are no schools located within a one-quarter mile radius of the project site. The nearest school to the site is Glenfeliz Boulevard Elementary School located at 3955 Glenfeliz Boulevard, approximately 0.6 miles southeast of the project site. As discussed in 8(a) above, the proposed project would not result in a hazard to the public or environment and, therefore, would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or

waste within one-quarter mile of an existing or proposed school. As a result, impact would be less than significant.

3. Interference with Emergency Plans

A significant impact may occur if the proposed project were to substantially interfere with roadway operations used in conjunction with an emergency response plan or evacuation plan or would generate sufficient traffic to create traffic congestion that would interfere with the execution of these plans.

In the project area, the I-5 Freeway is a selected transportation route as identified in the Critical Facilities and Lifeline Systems map of the City of Los Angeles General Plan Safety Element. Main components of the bridge would be fabricated off-site and then transported and delivered to the project site. Delivery trucks would require the use of the eastern shoulder of the northbound I-5 Freeway adjacent to the project site and possible temporary northbound travel lane closure(s) directly adjacent to the shoulder. However, closures would be temporary and would occur at night on weekends. The majority of the I-5 Freeway would remain open during construction. Therefore, emergency access would continue to be provided along the I-5 Freeway. No other roadway closures would be required during construction or operation of the proposed project. As such, impacts would be less than significant.

I. Hydrology and Water Quality

1. Violate Water Quality Standards

A significant impact may occur if the proposed project discharged water which did not meet the quality standards of agencies which regulate surface water quality and water discharge into stormwater drainage systems such as the LARWQCB. These regulations include compliance with the Standard Urban Storm Water Mitigation Plan (SUSMP) requirements to reduce potential water quality impacts.

Within the project area are ramps located along the banks of the LA River currently utilized by pedestrians and horses to cross the LA River between Griffith Park and Atwater Village. Any refuse discarded during transit by the pedestrians and horses is deposited directly in the LA River. Large runoff events wash all refuse discarded by those traversing through the riverbed itself.

Construction of the multi-modal bridge would involve one support structure being located within the LA River; one pier would be located in the riverbed while two abutments would be located on the banks of the River (outside of the riverbed). During normal operations, the size and shape of the support structures would not cause a significant reduction in the hydraulic capacity of the River, as discussed in 9(c) below. Additionally, the project would require to comply with the National Pollution Discharge and Elimination System (NPDES) permit requirements.

For purposes of defining and identifying Total Maximum Daily Loads (TMDLs) of pollutants within the LA River, the River is divided into Reaches. The proposed project is located in the LA River Reach 3. Currently, there are six pollutants with TMDLs that apply to this Reach: Trash, ammonia nitrogen, nitrate, nitrite, copper, and lead. Identified impairments for this waterbody include ammonia, algal growth through nutrients, odor, and unnatural scum/foam. Downstream Reaches 1 and 2 list an additional TMDL for bacteria, and list additional impairments for coliforms, oil, trash, cyanide, and diazinon (pesticide).

The existing ramps that are presently used for equestrian access to cross the LA River would be restored to their original condition and use of providing maintenance access to the River bottom. The proposed project would create an alternative and safe passage for equestrian crossings of the LA River. The bridge's long-term operation is expected to result in benefits to the River's water quality by reducing the use of the riverbed itself by horses and reducing associated wastes from the LA River.

There may be short-term impacts to River vegetation during construction of the pier structure; however, these impacts are expected to be mitigated through standard stormwater detainment BMPs during construction. As such, discharged water from the construction and operation of the proposed project would result in less than significant impacts to hydrology and water quality.

2. Alteration of Drainage Patterns

A significant impact may occur if the proposed project resulted in a substantial alteration of drainage patterns that resulted in a substantial increase in erosion or siltation during construction or operation of the project.

Construction of the proposed project would introduce one concrete pier into the LA River located in the middle of the River span approximately 114 feet east of the bridge's west. In order to evaluate potential impacts to the River flow, including impacts as a result of siltation, a hydraulic analysis was prepared to compare the changes to the channel's hydraulic performance based on the proposed bridge project. Based upon the results from the hydraulic assessments conducted for the proposed project, the project has the potential to cause a 1.27-foot increase to the channel's design water surface elevation based upon the project's proposed bridge pier locations and configurations. The backwater effect due to the new pier placement is estimated to propagate upstream approximately 2,500 feet, but in terms of substantial increases the backwater propagation is more on the order of approximately 500 feet. Therefore, the project does have the potential to substantially affect drainage and flow within the LA River at this location as a result of the new pier and potential siltation, which in turn translates to a potentially significant impact with a resulting loss in "freeboard protection"[2] along this particular portion of the River.

In order to mitigate the loss of freeboard protection and therefore minimize the potential risk from flooding upstream of the bridge, implementation of mitigation is required. Implementation of either one of the following two mitigation measures would reduce potentially significant impacts to a less than significant level:

<u>Mitigation Measure HYDRO-1. Provide Freeboard Minimums</u>

Prior to placing the support pier for the multi-modal bridge into the Los Angeles River (River) the following flood wall improvements shall be constructed: along west bank a new 176-foot long by 12-inch high curb element upstream transitioning to a new 250-foot long by 8-inch high curb element upstream; and along the east bank a new 272-foot long by 18-inch high curb element upstream transitioning to a new 200-foot long by 12-inch high curb element upstream) transitioning to a new 1160-foot long by 6-inch high curb element upstream.

[2] Freeboard is the additional capacity in the River above the calculated capacity and is used to minimize the risk of flooding. Freeboard protection is the maintaining of this safety factor through the design of structures (such as the proposed project) in such a manner that the freeboard is not compromised and the risk of flooding is minimized.

Implementation of either of these mitigation measures would mitigate the negative hydraulic impacts of operation of the proposed project within the LA River by offsetting the estimated increase to the LA River's channel design water surface elevation (thus maintaining freeboard protection). With implementation of either of the above mitigation measures, flows in the LA River would not be adversely impacted by the bridge support pier or siltation. Drainage of the River would continue and impacts from construction and operation of the proposed project would be less than significant.

3. Structures within 100-Year Flood Zone

A significant impact may occur if the proposed project were to place within a 100-year flood hazard area structures that would impede or redirect flood flows. Two of the support structures for the bridge would be constructed within the LA River Reach 3 channel. However, with implementation of Mitigation Measure HYDRO-1, flows within the River would continue to be accommodated. Therefore, with implementation of mitigation, impacts would be less than significant.

4. Seiche, Tsunami or Mud Flow

A significant impact may occur if the proposed project would cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. The project site is not located adjacent to any enclosed large bodies of water that could experience seiches during an earthquake. Thus, the potential for seiches impacting the project site and the construction and operation of the proposed project is considered very low and, therefore, the impact is less than significant.

Tsunamis are tidal waves generated in large bodies of water caused by fault displacement or major ground movement. Hazardous tsunamis, which are rare along the Los Angeles coastline, have the potential to cause flooding in the low-lying coastal area. The project site and the construction and operation of the proposed project is located inland enough from the ocean that the potential to be affected by a tsunami is considered very low and, therefore, the impact is less than significant.

J. Land Use and Planning

1. Consistency with Adopted Plans

A significant impact may occur if the proposed project were inconsistent with the General Plan, or other applicable plan, or with the site's zoning if designated to avoid or mitigate a significant potential environmental impact.

The project site is zoned OS-1XL and designated as Open Space in the City's General Plan. The proposed project involves the construction of a multi-modal bridge over the LA River. As indicated in Section 12.04.05 of the LAMC, park and recreational facilities are an allowable use under the OS designation. However, park and recreational facilities may not be located on land which includes a lake, river, or stream or which is designated by the City as an historic or cultural landmark, unless approved as a conditional use. Given the site's proximity to Griffith Park, which is a designated Historic-Cultural Monument, there is the potential need for a conditional use permit. If required, and with approval of a conditional use permit per Section

12.04.05 of the LAMC, the proposed project would be consistent under the General Plan and zoning designations.

The LA River Revitalization Master Plan includes revitalization measures for the 32 miles of the LA River in the City of Los Angeles. The project site is located in the Plan area and the proposed project is included in the LA River Revitalization Master Plan's priority list as Project No. 147. Therefore, construction and operation of the proposed project would be consistent with the LA River Revitalization Master Plan.

Therefore, no inconsistency is expected from the construction and operation of the proposed project and the impact would be less than significant.

2. Habitat Conservation Plans

A significant impact may occur if the proposed project were located within an area governed by a habitat conservation plan or natural community conservation plan and would conflict with such plan.

As previously discussed in 4(e), the Conservation and Open Space Element of the Los Angeles County General Plan identifies SEAs containing biological resources and sets forth the goal of conserving these areas. The City of Los Angeles has adopted the same conservation areas. While development within a SEA is not prohibited, the Plan does require development to be limited and controlled in order to avoid impacting valuable biological resources (County of Los Angeles 2011).

In addition, oaks and other native tree species are protected by local ordinances including the Los Angeles County Oak Tree Ordinance and the City of Los Angeles Native Tree Protection Ordinance.

Construction or operation of the proposed project would result in removal of vegetation, however no protected trees are proposed to be removed. As such, impacts would be less than significant.

K. Mineral Resources

Initial screening determined that the proposed project would cause no impact or less than significant impact. (see Appendix A)

L. Noise

1. Noise Standards

A significant impact may occur if the proposed project were to exposure persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

The City regulates construction noise via the LAMC (Chapter IV, Article 1, Section 41.40; Chapter XI, Article 2, Section 112.05). A significant impact may occur if the proposed project generates construction noise outside of the hours prescribed in the LAMC or increases noise levels during project operation in excess of 5 dBA (A-weighted decibel) over ambient Community Noise Equivalent Level (CNEL).

The City allows construction during the week between the hours of 7:00 a.m. and 9:00 p.m., and specifically prohibits night construction if related noise can disturb persons occupying sleeping quarters in any dwelling, hotel, or residence. In addition, construction within 500 feet of a residence is restricted to the hours of 8:00 a.m. to 6:00 p.m. on Saturdays and National Holidays, and prohibited on Sundays. The City's standard construction specifications require construction equipment to have noise suppressing devices, and requires noise controls such as placement of noise barriers, use of low-noise generating equipment, maintenance of mufflers and ancillary noise abatement equipment, scheduling high noise producing activities during periods that are least sensitive, routing construction-related truck traffic away from noise-sensitive areas, and reducing construction vehicle speeds. Construction equipment noise levels within 500 feet of residential areas are limited to 75 dBA at 50 feet, if technically feasible.

Each anticipated piece of construction equipment, at 50 feet, is estimated to produce between 74 and 81 dBA, on average. Based on the anticipated construction equipment by construction phase and the FHWA Roadway Construction Noise Model, daily construction CNELs are estimated to range from 83 to 88 dBA at 50 feet (FHWA, 2006). At residential areas 500 feet away, the daily average noise level with construction would be approximately 67 dBA or less. It is estimated that the existing ambient noise level of the residential area is approximately 65 dBA; therefore, the increase in noise level with construction would be 2 dBA or less, which would be imperceptible. Most construction would occur Monday through Friday between the hours of 7:00 a.m. and 9:00 p.m. (most likely, daily construction would not occur after 3:30 p.m.) and between the hours of 8:00 a.m. and 6:00 p.m. on Saturdays.

The nearest residential uses to the proposed project are within the Lincourt Stable property and are approximately 500 feet from the eastern edge of the project site. In addition, there is a residential neighborhood approximately 700 feet to the east of the project site.

The only instance where night construction would occur is when the bridge components are delivered to the project site via the I-5 Freeway on the west side of the River. As delivery of construction materials at night is prohibited, permission from the Executive Director of the Board of Police Commissioners must be obtained in writing. To mitigate temporary elevated noise associated with night construction on nearby residences, the following mitigation measure would be implemented:

Mitigation Measure NOISE-1. Nighttime Construction Noise

During nighttime construction activities where the construction work zone falls within 500 feet or with a direct line of sight to residences, the contractor shall monitor nighttime construction noise and implement applicable measures as identified in the project's *Noise Monitoring and Control Plan* described below. As applicable, the contractor or City project manager shall obtain approval for construction outside of the City's Noise Ordinance from the Board of Police Commissioners.

The contractor shall submit a *Noise Monitoring and Control Plan* prepared by a qualified acoustical professional for review and approval of the project manager prior to start of nighttime construction. The plan shall identify personnel responsible for receiving and resolving noise complaints as well as noise complaint reporting requirements and methods for complaint logging, investigation, and status tracking. The plan shall also include potential noise reduction measures to be implemented as needed to ensure compliance with the approval from the Board of Police Commissioners and to address potential

night construction impacts. Such measures may include but not be limited to the following:

- Maintaining construction equipment in good working condition in order to minimize general noise emissions.
- Providing temporary sound wall, noise curtain, noise blanket, or other acoustical noise barrier of a sufficient height, length and configuration so as to provide substantial noise reduction and effectively block the line-of-sight between nearby noise-sensitive receivers and the work zone.
- Limiting the number of construction equipment operating at one time.
- As feasible, providing equipment with exhaust mufflers, noise shield, noise blanket, or other acoustical noise barrier or enclosure.
- Configuring traffic pattern to minimize backing movement and backup alarms.
- Using noise-producing signals, including horns, whistles, alarms, and bells for safety warning purposes only.
- Minimizing idling equipment.
- Locating material stockpiles and mobile equipment staging, parking, and maintenance areas as far as practicable form noise-sensitive receptors.
- As feasible, using electrically-powered equipment instead of pneumatic or internal combustion powered equipment.

Operation of the proposed project, a multi-modal bridge, would not result in exposure of persons to or generation of noise levels in excess of established standards because the project would operate passively and only maintenance and inspections would occur, which are minor activities that do not generate substantial noise levels.

Therefore, a less than significant noise impact is anticipated from construction and operation of the proposed project.

2. Groundborne Vibration

A significant impact may occur if the project were to expose persons to or to generate excessive groundborne vibration or groundborne noise levels.

Construction activities associated with the proposed project could generate minor groundborne vibration from use of heavy equipment. Construction equipment such as drill rigs, compaction equipment, and haul trucks would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures or residents. Vibration levels greater than 0.3 inches per second (in/sec) have potential to damage older residential structures and levels greater than 0.4 in/sec would be severely noticeable to a human (Caltrans 2004). All phases of the construction involve multiple vibration producing equipment resulting in predicted vibration levels of approximately up to 0.003 in/sec at the residences closest to the construction area (FTA 2006). Excessive groundborne vibration and/or groundborne noise are not anticipated.

Project operations would not involve activities that could generate vibrations or groundborne noise, or otherwise expose persons to such impacts.

Therefore, construction and operation of the proposed project would not result in significant impacts related to groundborne vibration or noise and impacts would be less than significant.

M. Population and Housing

Initial screening determined that the proposed project would cause no impact or less than significant impact. (see Appendix A)

N. Public Services

1. Fire Protection

A significant impact may occur if the project required the addition of a new fire station or the expansion, consolidation or relocation of an existing facility to maintain service.

The project site and surrounding area is within the service area of local Fire Station No. 50 located at 3036 Fletcher Drive, Glassell Park (approximately 2.3 miles driving distance from project site). One additional fire station is located within the project area. Fire Station No. 56, located at 2759 Rowena Avenue, Los Angeles, is approximately 2.3 miles driving distance from the project site. The proposed project would involve the construction of a multi-modal bridge over a portion of the LA River which is currently used as an equestrian crossing. Construction of the bridge would not result in the need for a new fire station or expansion of an existing fire station. Operation of the proposed project would not result in the need for additional fire service. As such, impacts from the construction and operation of the proposed project would be less than significant.

2. Police Protection

A significant impact may occur if the proposed project were to result in an increase in demand for police services that would exceed the capacity of the police department responsible for serving the site.

The project site and surrounding area is served by the Los Angeles Police Department Northeast Community Station located at 3353 San Fernando Road (approximately 1.9 miles driving distance from the project site). The project would not require additional police protection beyond what is currently provided. The proposed project would involve the construction of a multi-modal bridge over a portion of the LA River which is currently used as an equestrian crossing. Construction of the proposed bridge may result in an increase in the number of people who use the bike and equestrian trails along the River, however, not to such an extent that police serviced would be affected. Operation of the proposed project would not result in the need for additional police service. As such, impacts from the construction and operation of the proposed project would be less than significant.

3. Parks

A significant impact may occur if the recreation and park services available could not accommodate the population increase resulting from the implementation of the proposed project and new or physically altered facilities were needed.

As discussed above, construction and operation of the proposed project would not result in population growth. Currently, an equestrian crossing exists at the project site. The existing crossing poses a hazard when equestrians try to cross the River when waters are fast moving. In addition, the slippery cement and algae-lined floor of the River poses a hazard to equestrians. Implementation of the proposed project would enable safe, year-round passage into Griffith Park. The proposed project may result in an increase in the number of people who use the bike and equestrian trails along the River; however, not to such an extent that new or physically altered recreational facilities would be needed. As such, impacts from the construction and operation of the proposed project would be less than significant.

O. Recreation

Initial screening determined that the proposed project would cause no impact or less than significant impact. (see Appendix A)

P. Transportation/Traffic

1. Circulation System Capacity

Because this project is subject to the requirement of Caltrans for determining Level of Service (LOS) impacts on the I-5 Freeway, the proposed project would have a significant traffic impact if the traffic volume to roadway capacity ratio is increased, as shown in Table 3 below.

Table 3. Caltrans Level of Service (LOS) Criteria*

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum V/C	Maximum Service Flow Rate (pc/hr/ln)
A	11	65.0	0.30	710
B	18	65.0	0.50	1170
C	26	64.6	0.71	1680
D	35	59.7	0.89	2090
E	45	52.2	1.0	2350

*Basic freeway segments at 65 mph

The proposed project would provide a crossing over the LA River for pedestrians, bicyclists and equestrians; no vehicle crossings would be permitted. Given that no vehicle crossings would be permitted and that no roadways would be affected by operation and use of the bridge crossing, no operational traffic impacts would occur.

During project construction, there is the potential for construction activities to affect the I-5 Freeway northbound lanes adjacent to the project area. A traffic impact study was prepared for the project and is included in Appendix D. For impacts to vehicular traffic on the I-5 Freeway, Highway Capacity Manual (HCM) Freeway Mainline Analysis methods were used to evaluate the impact of project construction activities during various hours of the day on the northbound I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The project as proposed will require the use of the adjacent freeway shoulder as well as one through lane on the adjacent I-5 freeway mainline segment. For a conservative analysis, a maximum of two through lanes was used for evaluating project construction impacts. Given the duration of the proposed project is less than 12 months, the analysis was limited to the following two traffic scenarios:

- Existing (2012) Conditions
- Existing (2012) Plus Project Conditions

Existing 24-hour traffic counts were obtained from Caltrans District 7 for the northbound I-5 freeway segment between Los Feliz Boulevard and Colorado Boulevard. Using the collected data, a LOS analysis was conducted. The analyses were conducted using the appropriate procedures from the Highway Capacity Manual as per Caltrans' latest Traffic Impact Analysis Guidelines, as detailed in Appendix D. Caltrans desired LOS range for freeway mainline segments is at the transition between LOS "C" and LOS "D" for State highway facilities. If a

segment is forecasted to fall to LOS "D" under project conditions, mitigation measures should be pursued. If the State highway facility is currently operating at less than the appropriate target LOS, the existing level of service shall be maintained.

Based on the data collected for the mainline freeway segment adjacent to the project site, the northbound I-5 Freeway lanes are operating at LOS C or better during all hours of the day and days of the week. During construction of the proposed project, which would involve closure of the shoulder and up to two northbound lanes of traffic on the I-5 Freeway, the existing northbound segment north of Los Feliz Boulevard would maintain an acceptable LOS "C" or better during all hours and days with a few exceptions. The only exceptions occur when freeway mainline segment operations fall to LOS "D" during the 8:00 p.m. to 11:00 p.m. period from Monday through Thursday and during the 9:00 p.m. to 11:00 p.m. period on Sundays. During these limited time periods, the proposed project does have the potential to result in significant construction impacts. The following mitigation measure shall be implemented:

> **Mitigation Measure TRAF-1. Traffic Management Plan**
> A Traffic Management Plan (TMP) shall be prepared prior to the start of construction for review and approval by Caltrans District 7. The Traffic Management Plan shall outline provisions for maintaining LOS "C" or better conditions on the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The TMP shall include measures to offset traffic congestion and maintain traffic flow. The preliminary TMP shall include proposed Lane Closure Charts and Detour Plans and will be finalized by the time final designs are prepared.

With implementation of Mitigation Measure TRAF-1 identified above, potentially significant impacts to the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard can be reduced to a less than significant level.

2. Congestion Management Program

A significant impact may occur if the proposed project would conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

Construction and operation of the proposed project would not interfere or conflict with an applicable congestion management plan. During project construction, delivery of the bridge structure to the project site would have short-term lane closure impacts to the northbound I-5 Freeway between Los Feliz Boulevard and Colorado Boulevard, as discussed in Section 16(a) above; however, with implementation of Mitigation Measure TRAF-1, all potentially significant impacts to the I-5 Freeway northbound travel lanes could be reduced to a less than significant level. Operation of the proposed project would not affect travel lanes on any roadways, as the proposed project is a multi-modal bridge designed to serve pedestrians, bicyclists and equestrians.

Therefore, construction and operation of the proposed project would not interfere or conflict with an applicable congestion management plan and impacts would be less than significant.

3. Consistency with Alternative Transportation Plans

A significant impact may occur if the proposed project were to conflict with adopted policies, plans, or programs supporting alternative transportation.

The purpose of the proposed project is to construct a multi-modal bridge to provide improved access and crossings between the east and west sides of the LA River in the Atwater Park area of the City of Los Angeles. The multi-modal bridge would serve pedestrians, bicyclists and equestrians and provide connections to the existing trail networks on the east and west sides of the River, as well as provide improved equestrian access to Griffith Park. Operation of the proposed project would not conflict with adopted policies, plans or programs supporting alternative transportation; operation of the bridge would enhance and further implement alternative transportation plans for the City.

During construction, however, the existing LA River Greenway Trail, located on the east side of the River, and the LA River Bike Path, located on the west of the LA River would be temporarily closed to facilitate staging for and construction of the bridge. The closure would block pedestrian and equestrian access to North Atwater Park from the south, and restrict bicycle travel along the LA River between Colorado Boulevard and Los Feliz Boulevard for approximately 8-10 months during the construction of the bridge structure and rehabilitation of the paths following bridge installation. During this approximately 8- to 10-month period of time, loss of access to these paths would result in temporary significant impacts. The following mitigation measure would be implemented:

> **Mitigation Measure TRAF-2. Detour Notification and Plans**
> At least 30 days prior to closure of the LA River Greenway Trail and the LA River Bike Path, signage and detour plans for non-motorized traffic shall be developed and posted at the trails. The detours shall include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction closure areas, and provide appropriate traffic systems and signage, traffic support, and safety elements.

With implementation of the mitigation measure identified above, potentially significant temporary impacts associated with the closure of the LA River Greenway Trail and the LA River Bike Path could be reduced to less than significant levels.

Q. Utilities and Service Systems

1. Landfill Capacity

The management of solid waste in the City involves public and private refuse collection services as well as public and private operation of solid waste transfer, resource recovery, and disposal facilities. A significant impact would occur if the proposed project results in solid waste generation of five tons or more per week.

The City's Bureau of Sanitation and private refuse companies manage the collection, transfer, and disposal of municipal solid waste. The sole source of solid waste generated by the proposed project would be the excavated materials at the project site during construction. Excavated soils may be retained on-site, at staging areas, or hauled off-site. The estimated amount of soil to be excavated from the site is 740 cubic yards, or approximately 200 tons.

Soils would be disposed of at one of the facilities listed below, or identified by the contractor in accordance with the City's project specifications.

- Sunshine Canyon Landfill is located at 14747 San Fernando Road, Sylmar, CA,

approximately 21 miles from the project site. This facility has a maximum permitted throughput of 12,100 tons per day with a remaining capacity of 112,300,000 cubic yards (as of July 31, 2007), and has an estimated closure date of 2037. The waste types accepted at this facility include construction and demolition debris, green materials, industrial, inert, and mixed municipal.

- Calabasas Sanitary Landfill is located at 5300 Lost Hills Road, Agoura, CA, approximately 30 miles from the project site. This facility has a maximum permitted throughput of 3,500 tons per day with a remaining capacity of 18,100,000 cubic yards (as of March 31, 2008), and has an estimated closure date of 2025.

- Chiquita Canyon Sanitary Landfill is located at 29201 Henry Mayo Drive, Castaic, CA, approximately 35 miles from the project site. This facility has a maximum permitted throughput of 6,000 tons per day with a remaining capacity of 29,300,000 cubic yards (as of November 23, 2006), and has an estimated closure date of 2019. The waste types accepted at this facility include mixed municipal, green materials, construction and demolition debris, industrial, and inert.

- Azusa Land Reclamation Co. Landfill is located at 1211 West Gladstone Street, Azusa, CA, approximately 23 miles from the project site and consists of several units (active and closed). For purposes of the proposed project, only Unit 1 of this facility may be used for the disposal of asbestos, and is therefore described herein. Unit 1 has a maximum permitted throughput of 6,500 tons per day with a remaining capacity of 34,100,000 cubic yards (as of March 31, 1995), and has an estimated closure date of 2025. The waste types accepted at Unit 1 of this facility include asbestos, friable, inert, and tires.

- Clean Harbor Buttonwillow Landfill is located at 2500 West Lokern Road, Buttonwillow, CA approximately 126 miles from the project site. This facility has a maximum permitted capacity of 10,482 tons per day with a remaining capacity of 14,293,760 cubic yards (no date available), and has an estimated closure date of 2040. The waste types accepted at this facility (classified as Class I) includes contaminated soil, industrial, other designated, and other hazardous. The excavated soils from the Remedial Action Areas (RAA-1 and RAA-2) would be disposed of at this facility, as well as any other waste considered as hazardous during construction, demolition, and/or remediation activities.

The excavated material would be recycled whenever possible, or disposed of at an appropriate facility. As demonstrated above and according to the CalRecycle's SWIS database, there is sufficient inert waste disposal capacity available in Los Angeles County to adequately accommodate the anticipated excavated material. Further, certain landfills accept wastes considered to be beneficial-use materials, such as soil, green waste, and asphalt. Soils are used as part of regular landfill operations and also are used to cap closed landfills. Several landfills in the greater Los Angeles area accept excavated soil, including those that otherwise are restricted by ordinances from accepting municipal solid waste generated in the City. Therefore, impacts associated with solid waste generation and disposal during project construction would be short-term in nature and within the capacity available; therefore, the impact would be less than significant. Operation of the proposed project would not generate any solid waste; therefore, no operational impact is anticipated.

2. Compliance with Solid Waste Programs

A significant impact may occur if the proposed project would generate solid waste that was in excess of or was not disposed of in accordance with applicable regulations.

The City of Los Angeles Solid Waste Management Policy Plan (SWMPP) is the long range solid waste management policy plan for the City. The objective of the SWMPP is to reduce at the source or recycle a minimum of 50 percent of the City's waste and calls for the disposal of the remaining waste in local and possibly remote landfills. The SWMPP establishes citywide diversion objectives, including diversion of 75 percent by 2013. While the SWMPP is the long-range solid waste management policy plan for the City, the Source Reduction and Recycling Element (SRRE) is the strategic action policy plan for diverting solid waste from landfills. The source reduction, recycling, composting, special waste, and public education goals are defined by specific programmatic elements including tasks, roles, responsibilities, and an implementation schedule. The SRRE provides solid waste diversion objectives in accordance with the requirements of AB 939. It is updated annually and is based on an ongoing evaluation of programs and waste analysis. Guidance for, and implementation of, the solid waste diversion programs identified in the SRRE are administered by the City of Los Angeles Department of Public Works, Bureau of Sanitation, Solid Resources Citywide Recycling Division. The City's Bureau of Sanitation presently operates other solid waste reduction and recycling programs, such as its Curbside Recycling Program, which was designed to promote source reduction to achieve the goals established by Assembly Bill 939 (AB 939) and associated City programs (e.g., the SRRE).

As discussed above in 17(f), construction activities would generate an estimated total of approximately 200 tons of excavated materials, considered to be solid waste; project operation would not generate any solid waste. Solid waste generated onsite would be disposed of by permitted solid waste haulers to regulated sites that have adequate capacity and are in compliance with all applicable regulations related to solid waste collection and disposal. Solid waste impacts from construction of the proposed project would be less than significant. Operation of the proposed project would not generate any solid waste; therefore, no operational impact is anticipated.

R. Mandatory Findings of Significance

Based on the foregoing, it has been determined that:

- The project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.
- The project does not have impacts that are individually limited, but cumulatively considerable. "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
- The project does not have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The project does not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly.

V. MITIGATION MEASURES

The following describes the mitigation measures that, if incorporated into the project, would reduce an effect to less than significant and briefly explains how each mitigation measure

reduces the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced).

Mitigation Measure BIO-1. Preventing Spread of Invasive Species
To minimize the spread of invasive plant species into construction areas, construction vehicles and equipment shall be cleaned with compressed water or air within a designated containment area prior to accessing the work area.

Mitigation Measure BIO-2. Vegetation Removal and Disposal
During vegetation removal, invasive plants, including seeds, rhizomes, and other plant parts, shall be contained and disposed of in an appropriate disposal facility away from the work zone.

Mitigation Measure BIO-3. Nesting Bird Avoidance
Construction activities that involve tree removal or trimming would be timed as much as possible to occur outside the migratory bird nesting season, which occurs generally from March 1 through August 31 and as early as February 1 for raptors. If construction must occur during the nesting season, surveys for nesting birds would be conducted prior to construction activities, including removal of vegetation. Two biological surveys would be conducted, one 15 days prior and a second 72 hours prior to construction that would remove or disturb suitable nesting habitat. The surveys would be performed by a biologist with experience conducting breeding bird surveys. The biologist would prepare survey reports within 24 hours of conducting the surveys, documenting the presence or absence of any protected native bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (or within 500 feet for raptors). If an active nest is located, construction within 300 feet of the nest (or 500 feet for raptor nests) would be postponed until the nest is vacated and juveniles have fledged (minimum of six weeks after egg-laying) and when there is no evidence of a second attempt at nesting.

Mitigation Measure BIO-4. Protected Trees
Prior to removal or pruning of a protected tree, a tree removal permit would be obtained in compliance with local tree protection ordinances. The tree removal permit may require replanting of protected trees within the project area or at another location to mitigate for the removal of these trees. Replanting would be done at a ratio of one new tree for every one removed. Further, if construction or operation would entail pruning of any protected tree, the pruning would be performed in a manner that does not cause permanent damage or adversely affect the health of the trees.

Mitigation Measure HYDRO-1. Provide Freeboard Minimums
Prior to placing the support pier for the multi-modal bridge into the Los Angeles River (River) the following flood wall improvements shall be constructed: along west bank a new 176-foot long by 12-inch high curb element upstream transitioning to a new 250-foot long by 8-inch high curb element upstream; and along the east bank a new 272-foot long by 18-inch high curb element upstream transitioning to a new 200-foot long by 12-inch high curb element upstream) transitioning to a new 1160-foot long by 6-inch high curb element upstream.

Mitigation Measure NOISE-1. Nighttime Construction Noise

During nighttime construction activities where the construction work zone falls within 500 feet or with a direct line of sight to residences, the contractor shall monitor nighttime construction noise and implement applicable measures as identified in the project's *Noise Monitoring and Control Plan* described below. As applicable, the contractor or City project manager shall obtain approval for construction outside of the City's Noise Ordinance from the Board of Police Commissioners.

The contractor shall submit a *Noise Monitoring and Control Plan* prepared by a qualified acoustical professional for review and approval of the project manager prior to start of nighttime construction. The plan shall identify personnel responsible for receiving and resolving noise complaints as well as noise complaint reporting requirements and methods for complaint logging, investigation, and status tracking. The plan shall also include potential noise reduction measures to be implemented as needed to ensure compliance with the approval from the Board of Police Commissioners and to address potential night construction impacts. Such measures may include but not be limited to the following:

- Maintaining construction equipment in good working condition in order to minimize general noise emissions.
- Providing temporary sound wall, noise curtain, noise blanket, or other acoustical noise barrier of a sufficient height, length and configuration so as to provide substantial noise reduction and effectively block the line-of-sight between nearby noise-sensitive receivers and the work zone.
- Limiting the number of construction equipment operating at one time.
- As feasible, providing equipment with exhaust mufflers, noise shield, noise blanket, or other acoustical noise barrier or enclosure.
- Configuring traffic pattern to minimize backing movement and backup alarms.
- Using noise-producing signals, including horns, whistles, alarms, and bells for safety warning purposes only.
- Minimizing idling equipment.
- Locating material stockpiles and mobile equipment staging, parking, and maintenance areas as far as practicable form noise-sensitive receptors.
- As feasible, using electrically-powered equipment instead of pneumatic or internal combustion powered equipment.

Mitigation Measure TRAF-1. Traffic Management Plan

A Traffic Management Plan (TMP) shall be prepared prior to the start of construction for review and approval by Caltrans District 7. The Traffic Management Plan shall outline provisions for maintaining LOS "C" or better conditions on the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The TMP shall include measures to offset traffic congestion and maintain traffic flow. The preliminary TMP shall include proposed Lane Closure Charts and Detour Plans and will be finalized by the time final designs are prepared.

Mitigation Measure TRAF-2. Detour Notification and Plans

At least 30 days prior to closure of the LA River Greenway Trail and the LA River Bike Path, signage and detour plans for non-motorized traffic shall be developed

and posted at the trails. The detours shall include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction closure areas, and provide appropriate traffic systems and signage, traffic support, and safety elements.

VI. NAME OF PREPARER

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VII. DETERMINATION - RECOMMENDED ENVIRONMENTAL DOCUMENTATION

A. Summary

The proposed project will implement a project identified in the City Council-adopted long-range LA River Revitalization Master Plan. The proposed project will facilitate safe, year-round LA River crossings by pedestrians, cyclists, and equestrians—obviating the need for a through-river crossing presently used by equestrians. The project's implementation will address community needs that have been expressed by multiple stakeholders over the past two decades. The proposed project is expected to result in public safety, biological resource, recreational, and cultural improvements and its implementation will help the City meet the bacteria TMDL adopted by the LARWQCB to protect the designated beneficial uses of the receiving waters by creating a safe passage over the LA River thereby removing the need for the equestrian crossing via the riverbed itself. With implementation of mitigation measures, all impacts would be less than significant.

B. Recommended Environmental Documentation

On the basis of this initial evaluation:

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

Prepared By: _____
Nicole Cobleigh, Environmental Planner

Approved By: Gary Lee Moore, P.E.
City Engineer

By: _____
James E. Doty, Environmental Affairs Officer
Environmental Management Division

APPENDICES

Appendix A: Environmental Screening Checklist

Appendix B: Air Quality and Greenhouse Gas Emission Worksheets

Appendix C: Geotechnical Exploration Report

Appendix D: Hydraulics and Water Surface Assessments Report

Appendix E: Traffic and Transportation Impact Analysis

VIII. REFERENCES:

The following sources were used in the preparation of this document. Sources not available via the internet are available by appointment for review at the offices of the Bureau of Engineering, 650 South Spring Street, Suite 500, Los Angeles.

American Public Works Association, Southern California Chapter. *Standard Specifications for Public Works Construction* (Greenbook).

American Public Works Association, Southern California Chapter. *Work Area Traffic Control Handbook* (WATCH), 2001.

California Air Pollution Control Officers Association. CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008.

California Air Resources Board, AB 32 Fact Sheet – California Global Warming Solutions Act of 2006. Accessed August 2012 at http://www.arb.ca.gov/cc/factsheets/ab32factsheet.pdf.

California Air Resources Board, 2011 State Area Designation Maps, Accessed August 2009 at http://www.arb.ca.gov/desig/adm/adm.htm#state.

California Department of Conservation (CDC), Division of Land Resources Protection. *California Agricultural Land Evaluation and Site Assessment Model,* 1997.

California State Department of Conservation Farmland Mapping and Monitoring Program website. Accessed in July 2012 at http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx.

California, Department of Conservation (CDC), Division of Mines and Geology. Special Publication 42: “Fault Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Map”. Released 1997, Supplemented in 1999, Interim revision 2007. Accessed July 2012 at http://www.consrv.ca.gov/CGS/rghm/ap/index.htm.

California Department of Fish and Game. *California Natural Diversity Database*. Commercial Version, dated March 1, 2009.

California Department of Resources Recycling and Recovery. Solid Waste Information System website. Accessed July 2012 at http://www.calrecycle.ca.gov/SWFacilities/Directory/

California Department of Transportation (CALTRANS). California Scenic Highway Mapping System website. Accessed July 2012 at http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.

California Department of Transportation (Caltrans). *Transportation and Construction Induced Vibration Manual*. 2004.

California Environmental Protection Agency, Department of Toxic Substances Control Board (DTSC). EnviroStor Data Management System. Last accessed July 2012 at http://www.envirostor.dtsc.ca.gov.

California Integrated Waste Management Act of 1989. Assembly Bill 939.

California Natural Diversity Database (CNDDB). 2012. California Department of Fish and Game. Accessed August 10, 2012 at: http://www.dfg.ca.gov/biogeodata/cnddb/.

Los Angeles County Department of Public Works, Summary Water Quality Data - Storm Water Quality Data Tables (1994-2000). Accessed August 2009 at http://ladpw.org/wmd/npdes/9400_wq_tbl/Table_4-12.pdf.

City of Los Angeles. *Climate LA – Municipal Program Implementing the Green LA Climate Action Plan*, 2008.

City of Los Angeles, *City of Los Angeles Municipal Code*.

City of Los Angeles, Department of City Planning. *Historic-Cultural Monuments (HCM) Listing.* Last updated September 2007. Accessed in July 2012 at http://preservation.lacity.org/files/HCMDatabase090707.pdf.

City of Los Angeles, Department of City Planning. *General Plan*, including community plans and technical elements. Last accessed in July 2012 at http://cityplanning.lacity.org.

City of Los Angeles, Department of City Planning. Planning and Zoning Code. Last accessed in July 2012 at City's web page at http://cityofla.org/PLN/.

City of Los Angeles, Department of City Planning. ZIMAS (Zone Information & Map Access System). Last accessed in July 2012 at http://zimas.lacity.org.

City of Los Angeles, Department of Public Works, Bureau of Engineering. *Los Angeles River Revitalization Master Plan,* 2007, www.lariver.org.

City of Los Angeles, Department of Public Works Bureau of Sanitation. *Solid Waste Integrated Resources Plan*, www.zerowaste.lacity.org.

City of Los Angeles, Department of Public Works Bureau of Sanitation. Recycling, www.lacitysan.org/solid_resources/recycling.

City of Los Angeles, Department of Public Works Bureau of Sanitation and Department of Water and Power. *Integrated Resources Plan*. Prepared by CH:CDM. July 2004.

City of Los Angeles, Department of Public Works Bureau of Sanitation and Department of Water and Power. *Integrated Resources Draft Environmental Impact Report* (IRP DEIR). November 2005.

City of Los Angeles, Department of Public Works Bureau of Sanitation. *Los Angeles River Total Maximum Daily Loads (TMDLs) for the LA River.*

City of Los Angeles, Department of Recreation and Parks. 1978. *Griffith Park Master Plan.* Accessed August 2012 at http://www.laparks.org/dos/parks/griffithPK/gp_masterplan.htm.

City of Los Angeles, Department of Recreation and Parks. 2008. *Griffith Park Wildlife Management Plan*. Developed by Cooper Ecological Monitoring. Accessed August 2012 at: http://www.laparks.org/dos/parks/griffithpk/wildlife/index.html.

City of Los Angeles, Department of Recreation and Parks. *Bat Survey of Griffith Park.* Prepared by S. Remington and D. Cooper. Accessed August 12 at: http://www.friendsofgriffithpark.org/GPNHS/GP%202009%20Bat%20Survey%20Report.pdf. 2009.

City of Los Angeles, Environmental Affairs Department. *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles*. 2006. Accessed July 2012 at http://lacity.org/ead/EADWeb-AQD/thresholdsguide.htm.

City of Los Angeles, *Green LA -- An Action Plan to Lead the Nation in Fighting Global Warming*, 2007.

City of Los Angeles, NavigateLA website. Planning Department Parcel Profile Report. July 2012.

County of Los Angeles, *Draft General Plan*, 2008.

County of Los Angeles Department of Public Works, *2007 Annual Report on the Countywide Siting Summary Plan and Countywide Siting Element*, June 2008.

County of Los Angeles, Department of Regional Planning. *Los Angeles County Draft. General Plan – Figure 6.3 Significant Ecological Areas.* 2008.

County of Los Angeles *2011 Draft General Plan 2035, Chapter 6: Conservation and Open Space Element.* 2011.

Dallman, Suzanne, Ph.D. and Tom Piechota, Ph.D., P.E. *Stormwater: Asset Not Liability*. Los Angeles: LASGRWC, 1999. Last accessed June 2009 at http://www.lasgrwc.org/publications.html.

DTSC EnviroStor Data Management System. Last accessed July 2012 at http://www.envirostor.dtsc.ca.gov/public.

Los Angeles County Airport Land Use Commission. Burbank/Glendale/Pasadena Airport, Airport Influence Area Map, 2003. http://planning.lacounty.gov/assets/upl/project/aluc_airport-burbank.pdf

Federal Emergency Management Agency, Flood Insurance Rate Map (FIRM), Community Panel Number 060371566 F, September 2008.

Federal Highway Administration. *Roadway Construction Noise Model User's Guide*. January 2006.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. 2006.

FOLAR. *State of the River 2: The Fish Study*. 2008.

Friends of Griffith Park. 2007. Birds of Griffith Park. Accessed September 2012 at: http://www.friendsofgriffithpark.org/GPNHS/GriffithBirds.htm.

Riparian Habitat Joint Venture. 2009. *California Riparian Habitat Restoration Handbook, Second Edition.* Accessed July 2012 at: http://www.riverpartners.org/documents/Restoration_Handbook_Final_Dec09.pdf.

South Coast Air Quality Management District (SCAQMD). *Appendix C – Mass Rate LST Look-up Tables*, October 21, 2009.

SCAQMD. California Emissions Estimator Model (CalEEMod), Version 2011.1.1. Prepared by ENVIRON International Corporation. Last accessed August 2012 at http://www.caleemod.com/.

SCAQMD. *CEQA Air Quality Handbook*, April 1993 (amended March 2011)

SCAQMD. *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, October 2008.

SCAQMD. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds, 2011.

SCAQMD. *Final 2007 Air Quality Management Plan*, June 2007.

SCAQMD. *Final Localized Significance Threshold Methodology*, June 2003 (Revised July 2008).

SCAQMD. *White Paper on Potential Control Strategies to Address Cumulative Impacts From Air Pollution*, Appendix D: Cumulative Impact Analysis Requirements Pursuant to CEQA, August 2003.

State Water Resources Control Board (SWRCB) LUST and UST listings on Geotracker website. Accessed in July 2012 at http:geotracker.swrcb.ca.gov.

The Thomas Guide. *Los Angeles County Street Guide*, 2010.

U.S. Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974.

U.S. Environmental Protection Agency website EnviroMapper for Envirofacts. Accessed in July 2012 at http://www.epa.gov/enviro/html/em/index.html.

USFWS. 2012. Critical Habitat Portal. Accessed August 10, 2012 at: http://criticalhabitat.fws.gov/crithab/.

CHANGES TO THE MITIGATED NEGATIVE DECLARATION SINCE PUBLIC CIRCULATION

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Since public circulation of the Mitigated Negative Declaration (MND) for the North Atwater Crossing project, comments received and refinements to the project design resulted in necessary minor changes to the MND. Therefore, the Final MND has been updated as follows:

Page 1: Cover Image, Bridge Rendering
The graphic for the cover image has been replaced to more accurately depict the design of the bridge, including the precise orientation of the main mast. No new impacts would occur with the updated bridge design. The changes are merely structural engineering modifications.

Page 9: Figure 2, Project Vicinity Map
The graphic for Figure 2 has been replaced to more accurately depict the planned location for the bridge. No new impacts would occur with the bridge location slightly north from where it was previously depicted.

Page 13: Third Paragraph
Modifications to the paragraph with the subtitle of “Dimensions” have been made to reflect minor changes in the project design. No new impacts would occur with the new bridge design; the changes are merely structural engineering modifications.

Page 17: Figure 4, Bridge Cross-Section
The graphic for Figure 4 has been replaced to reflect the new cross-section of the bridge, based on the minor structural changes made to the bridge design. No new impacts would occur as a result of the modified bridge design.

Page 19: Fourth Paragraph
Text has been added to clarify that the Los Angeles Conservation Corp will be responsible for operation and maintenance of the bridge for the first 10 years; the City will be responsible thereafter.

Page 19: Fifth Paragraph
Text has been modified to reflect that a Conditional Use Permit and Caltrans Encroachment Permit may not be required for the project.

Page 20: Third and Last Bullet Points
The following two bullet points were deleted from the list of Project Actions and Approvals:

- City’s Department of Building and Safety, building and grading permits
- City’s Department of Planning, Conditional Use Permit for construction of a multi-modal bridge over the LA River

These two bullet points were deleted because these two permits will no longer be required by the City.

Page 50: Fifth Paragraph
Modifications to the section titled “Hydrology and Water Quality” have been made to reflect minor changes in the project design. No new impacts would occur with the new bridge design; the changes are merely structural engineering modifications.

Page 51: Fourth Paragraph
Modifications to the section titled “Alteration of Drainage Patterns” have been made to reflect minor changes in the project design. No new impacts would occur with the new bridge design; the changes are merely the result of structural engineering modifications.

Page 52: Last Paragraph
Text has been modified to reflect that a Conditional Use Permit may no longer be required for the project.

COMMENTS RECEIVED DURING THE PUBLIC REVIEW AND RESPONSES TO THOSE COMMENTS

Letter 1

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

December 31, 2012

Michael Affeldt
City of Los Angeles, Dept of Public Works
Bureau of Engineers
1149 S. Broadway, 6th Floor, MS 939
Los Angeles, CA 90015

Subject: North Atwater Crossing Project
SCH#: 2012111091

Dear Michael Affeldt:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on December 28, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

1

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2012111091
Project Title North Atwater Crossing Project
Lead Agency Los Angeles, City of

Type MND Mitigated Negative Declaration

Description The project involves the construction of a multi-modal, cable-stay bridge over the Los Angeles River to facilitate crossings for bicycles, pedestrians and equestrians. The bridge would be approximately 325 feet long, crossing over the River and include support columns in two locations within the River. Although the proposed project could have a significant effect on biological resources, hydrology and water quality, noise and traffic, there would not be a significant effect as a result on the implementation of the identified mitigation measures.

Lead Agency Contact

Name Michael Affeldt
Agency City of Los Angeles, Dept of Public Works
Phone 213 485 5733 **Fax**
email
Address Bureau of Engineers
1149 S. Broadway, 6th Floor, MS 939
City Los Angeles **State** CA **Zip** 90015

Project Location

County Los Angeles
City Los Angeles, City of
Region
Cross Streets Los Angeles River and Rigali Avenue
Lat / Long 34° 7' 51.57" N / 118° 16' 24.42" W
Parcel No. 5594018900, 5593002907
Township 1N **Range** 13W **Section** **Base** SBB&M

Proximity to:

Highways I-5, SR 134, Hwy 2
Airports
Railways UPRR
Waterways Los Angeles River
Schools
Land Use Zoned OS-1XL and designated as Open Space in the City of Los Angeles General Plan

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse

Reviewing Agencies Resources Agency; Department of Fish and Game, Region 5; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Caltrans, District 7; Regional Water Quality Control Board, Region 4; Native American Heritage Commission; Public Utilities Commission; State Lands Commission; Santa Monica Mountains Conservancy

Date Received 11/29/2012 **Start of Review** 11/29/2012 **End of Review** 12/28/2012

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

Clear 12/28/12

RECEIVED
DEC 11 2012
STATE CLEARING HOUSE

December 5, 2012

Mr. Michael Affeldt
City of Los Angeles Department of Public Works
Bureau of Engineering
1149 South Broadway, Sixth Floor, Mail Stop 939
Los Angeles, CA 90015

Re: SCH#2012111091; CEQA Notice of Completion; proposed MITIGATED NEGATIVE DECLARATION for the **"North Atwater Crossing Project;"** located in Atwater Village area of the City of Los Angeles; Los Angeles County, California

Dear Mr. Affeldt:

The California Native American Heritage Commission (NAHC) is the State of California 'trustee agency' for the preservation and protection of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604).

This letter includes state and federal statutes relating to Native American historic properties or resources of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendment s effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ... objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC advises the Lead Agency to request a Sacred Lands File search of the NAHC if one has not been done for the 'area of potential effect' or APE previously.

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r).

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to CA Public Resources Code § 5097.95, the NAHC requests cooperation from other public agencies in order that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Govemment Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties, including archaeological studies. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and California Public Resources Code Section 21083.2 (Archaeological Resources) that requires documentation, data recovery of cultural resources, construction to avoid sites and the possible use of covenant easements to protect sites.

Furthermore, the NAHC if the proposed project is under the jurisdiction of the statutes and regulations of the National Environmental Policy Act (e.g. NEPA; 42 U.S.C. 4321-43351). Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for inadvertent discovery of human remains mandate the processes to be followed in the event of a discovery of human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

Finally, when Native American cultural sites and/or Native American burial sites are prevalent within the project site, the NAHC recommends 'avoidance' of the site as referenced by CEQA Guidelines Section 15370(a).

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

Letter 1

Correspondence from the State of California, Governor's Office of Planning and Research, State Clearinghouse and Planning Unit, dated December 31, 2012

Response 1

The City of Los Angeles acknowledges receipt of the transmitted comment letter from the Native American Heritage Commission. Responses to that comment letter, Letter 2, are provided on a subsequent page.

Letter 2

STATE OF CALIFORNIA Edmund G. Brown

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

December 5, 2012

Mr. Michael Affeldt
City of Los Angeles Department of Public Works
Bureau of Engineering
1149 South Broadway, Sixth Floor, Mail Stop 939
Los Angeles, CA 90015

Re: SCH#2012111091; CEQA Notice of Completion; proposed MITIGATED NEGATIVE DECLARATIQN for the **"North Atwater Crossing Project;"** located in Atwater Village area of the City of Los Angeles; Los Angeles County, California

Dear Mr. Affeldt:

1 The California Native American Heritage Commission (NAHC) is the State of Califomia 'trustee agency' for the preservation and protection of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604).

This letter includes state and federal statutes relating to Native American historic properties or resources of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

2 The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendment s effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ... objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC advises the Lead Agency to request a Sacred Lands File search of the NAHC if one has not been done for the 'area of potential effect' or APE previously.

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3 Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to CA Public Resources Code § 5097.95, the NAHC requests cooperation from other public agencies in order that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties, including archaeological studies. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and California Public Resources Code Section 21083.2 (Archaeological Resources) that requires documentation, data recovery of cultural resources, construction to avoid sites and the possible use of covenant easements to protect sites.

4 Furthermore, the NAHC if the proposed project is under the jurisdiction of the statutes and regulations of the National Environmental Policy Act (e.g. NEPA; 42 U.S.C. 4321-43351). Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq*. and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

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6 Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for inadvertent discovery of human remains mandate the processes to be followed in the event of a discovery of human remains in a project location other than a 'dedicated cemetery'.

7 To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

8 Finally, when Native American cultural sites and/or Native American burial sites are prevalent within the project site, the NAHC recommends 'avoidance' of the site as referenced by CEQA Guidelines Section 15370(a).

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
December 5, 2012

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Cultural Resources Director
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3094 Mace Avenue, Apt. B Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(619) 294-6660-work
(310) 428-5690 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
palmsprings9@yahoo.com
626-676-1184- cell
(310) 587-0170 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012111091; CEQA Notice of Completion; proposed Mitigated Negative Declaration for the North Atwater Crossing; located in the City of Los Angeles, near the Los Angeles River; Los Angeles County, California.

Native American Contacts
Los Angeles County
December 5, 2012

Gabrieleno Band of Mission Indians
Andrew Salas, Chairperson
P.O. Box 393 Gabrielino
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.com

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Cnde, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012111091; CEQA Notice of Completion; proposed Mitigated Negative Declaration for the North Atwater Crossing; located in the City of Los Angeles, near the Los Angeles River; Los Angeles County, California.

Letter 2

Correspondence from the Native American Heritage Commission, dated December 6, 2012

Response 1
The City acknowledges receipt of the letter from the Native American Heritage Commission (NAHC) and the list of tribes and interested Native American individuals ("consulting parties").

Response 2
A Sacred Lands File search by the NAHC has been requested.

Response 3
The Native American contacts identified in the list attached to NAHC's letter have been consulted regarding the location of the proposed project.

Response 4
Consultations in support of the Environmental Assessment being prepared in compliance with NEPA and separately from the Mitigated Negative Declaration have been made.

Response 5
If sacred lands are identified, the City will make sure to keep the details and locations of such lands confidential.

Response 6
The provisions within Public Resources Code Section 5097.98, California Government Code Section 27491 and Health and Safety Code Section 7050.5 regarding the inadvertent discovery of human remains shall be followed in the event of such an unanticipated discovery.

Response 7
Consultations with NAHC and the Native American tribes identified by the NAHC have been completed.

Response 8
Neither Native American cultural resources nor burial sites are prevalent within the project site. In the event of unanticipated discoveries, the provisions of CEQA Guidelines Section 15370 will be followed.

Letter 3

Arroyo Seco Foundation

City of Los Angeles Department of Public Works

Bureau of Engineering, EMG

Attention: Nicole Cobleigh

1149 S. Broadway, Suite 600, Mail Stop 939

Los Angeles, CA 90015-2213

RE: "North Atwater Crossing"

Dear Ms. Cobleigh,

1 The Arroyo Seco Foundation would like to express our support for the North Atwater Crossing Project. This Project spanning the Los Angeles River between Atwater Village and the Interstate 5 Freeway, provides an important trail connection to Griffith Park via the existing equestrian tunnel beneath Interstate 5. The riverine trail network of the Los Angeles River Watershed, including major tributaries such as the Arroyo Seco, has the potential to be the greatest recreational opportunity in the Los Angeles metropolitan area. This project will fill a major gap of the existing network.

2 The Arroyo Seco Foundation is confident that the environmental benefits of this project, including air quality and riparian habitat improvements will be substantial. This project will serve as a milestone for Los Angeles River Watershed restoration and revitalization.

Thank you for the opportunity to comment on the North Atwater Crossing Project.

Sincerely,

570 W. Avenue 26 #450, Los Angeles, CA 90065
PO Box 91622, Pasadena, CA 91109-1622 (323) 405-7326

Arroyo Seco Foundation

Tim Brick

Tim Brick

Managing Director,

Arroyo Seco Foundation

570 W. Avenue 26 #450, Los Angeles, CA 90065
PO Box 91622, Pasadena, CA 91109-1622 (323) 405-7326

Letter 3

Correspondence from the Arroyo Seco Foundation, undated

Response 1
The commenter's support of the project in noted.

Response 2
The community and environmental benefits that would result from the proposed project, as identified by the commenter, are noted.

Letter 4

Friends of the Los Angeles River

December 28, 2012

Nicole Cobleigh
City of Los Angeles
BOE EMG
1149 South Broadway, Suite 600, Mail Stop 939
Los Angeles, CA 90015

RE: Support for CEQA findings for the North Atwater Multimodal Bridge

Dear Ms. Cobleigh:

1 I am writing on behalf of Friends of the Los Angeles River to express support for the North Atwater Multimodal Bridge. Our group has reviewed the CEQA document, and we agree with its finding that the project poses no significant environmental impacts. For the impacts that were identified, we agree with the mitigation plans identified and believe them to be satisfactory and sufficient methods.

2 This bridge will provide multiple benefits to the public, including safer passage for horses crossing the river bed into Griffith Park, protection of water quality by reduction of animal wastes in the river, and transportation connectivity for equestrians, pedestrians and bicyclists in the river community. We look forward to enjoying spectacular views of the parks and river from atop this bridge.

Sincerely,

Shelly Backlar
Executive Director

cc Mr. Omar Brownson, Los Angeles River Revitalization Corporation

FoLAR
Los Angeles River Center
570 W. Ave 26 Suite 250 Los Angeles, CA 90065-1047
Tel: 323-223-0585
Fax: 323-223-2289
WWW.folar.org
E-Mail: mail@folar.org

Letter 4

Correspondence from Friends of the Los Angeles River, dated December 28, 2012

Response 1
The commenter's support of the project and concurrence with the analysis, mitigation and findings in the MND is noted.

Response 2
The community and environmental benefits that would result from the proposed project, as identified by the commenter, are noted.

Letter 5

RE: Fwd: 12/03/2012 - 30-Day Public Review Period Opens for the Nt.Atwater Bridge: 11.29.12 to 12.28.12

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ptakfam@earthlink.net <ptakfam@earthlink.net> Wed, Dec 19, 2012 at 9:53 AM
Reply-To: ptakfam@earthlink.net
To: JENNIFER SAMSON <jsamson@larivercorp.com>, Michael Affeldt <michael.affeldt@lacity.org>, Nicole Cobleigh <nicole.cobleigh@lacity.org>

Greetings,

1 Yesterday, I stopped by the Atwater Library with a fellow Taking the Reins boardmember to look at the bridge documents.

We remain confused because it appears that the bridge may be on or immediately adjacent to our property, designated as Parcel 3. We had thought from conversations (initiated by us) with Jennifer Samson that the bridge was to be a few feet north of the high tension tower which would place it as adjacent to our land, designated as Parcel 1.

Perhaps the easiest way to resolve our questions would be for you to review our Alta Survey and indicate to us where exactly the bridge will be built.

2 I understand that there was a meeting with other neighbors in the past; it certainly would have been helpful if Taking the Reins had been included since it appears we will be the most affected by construction and the bridge itself.

We hope this matter can be resolved quickly.

Sincerely,
Margaret Black
Taking the Reins, Board Member
323.656.9271

Letter 5

Correspondence from Margaret Black, dated December 19, 2012

Response 1

In order to clarify the exact location of the proposed bridge, a revised figure has been included in the final MND. Additionally, this figure is provided below for your reference.

Response 2

Taking the Reins will be informed of future project developments and news, as requested by the commenter.

Letter 6

[redacted]

demonstrating that such proposed alteration or permanent use and occupation of the Federal flood control project is "not injurious to the public interest and will not impair the usefulness of such work." USACE has historically exercised its review of modifications under 33 C.F.R. § 208.10 (Section 208.10). However, since 2006 USACE has considered some modifications directly under Section 408 and on June 18, 2010 the Director of Civil Works issued a memorandum stating that "from this date forward, [Section 408] will be the sole authority utilized for approvals to modify USACE projects."

4 How can you privatize a bridge when the "owner" as no site control. And then, you call it a "gift"? You even fail to disclose the "owner".

5 Griffith Park has an indenture attached to the use and cannot be privatized.

6 You are misrepresenting this project.

7 CEQA study is premature without the initiation with the US Army Corps of Engineers USACE through the Governing Board of the Los Angeles County Flood Control District and the federal process. You fail to state who controls this Reach, as USACE and County maintenance control is determined as to when built.

8 According to the LA River Revitalization Master Plan LARRMP, it states:

> *Maintenance accomplished by either the Corps or County is primarily required to ensure serviceability of the structures during times of flood. These activities include clearance of debris, weeds, or vegetation growth; repair of damage caused by erosion, storm runoff, or other forces; and repair of concrete cracking, chipping, or breaking. Further, the responsibility includes rodent control; subdrain maintenance and restoration; flap gate maintenance; inlet and outlet structures maintenance; repair of fencing; maintenance of berms and access roadways, bike paths, and landscaping; and ensuring that approach and egress paths are clear of obstructions and debris. The County performs graffiti removal and eviction of homeless encampments.*

9 Neglected are the studies and identification of Federal migratory bird laws and endangered species. You fail to recognize the ecosystem connectivity to Echo Park Lake and its effects.

10 You ignore the jurisdiction of CA Fish and Game and Department of Water Resources over the 200-year floodplain issues as well as Native American Heritage.

11 LARRMP states:

-

<u>River Channel Modifications</u>

> *No improvements or modifications may pass over, under, or through the walls of the River channel or levees, nor shall any excavation or construction be permitted within the limits of the project's rights-of-way, without the prior determination that such improvements or modifications will not adversely affect the functioning of the channel and/or associated facilities. Improvements or modifications that may be desirable and permissible need to go through a permit application process, for which the County is the first point-of-contact. Even for those reaches that are federally-maintained, applications for permits are submitted to the County, and then the County requests comments from the Corps. County-initiated work—for example as would be necessary for construction of storm drain outfalls—are also submitted to the Corps for review.*

12 You state:

On April 4, 2011, the RRC presented the proposed project to the LA River Cooperation Committee—a public entity comprised of high-level managers in the City and Los Angeles County Flood Control District with participation from the Los Angeles District of the USACE—and the project was approved as proposed. This is significant because these entities have final authority in providing the necessary permissions to construct the proposed project.

12 cont. USACE did not attend the meeting. The "approval" is not valid action for this project because the LA River Cooperation Committee has no jurisdiction as the Governing Body of the LA County Flood Control District.

13 USACE Initial Report Review Comments dated March 7, 2012 (Appendix H in the Appendix D Hydraulics Report) does not constitute an approval. Appendix G *Preliminary Project Site Plans and Bridge Plans* are missing from Appendix D Hydraulics Report.

14 You state:

As prescribed in the LA River Revitalization Master Plan, the ***proposed project would be a "signature" bridge expressing a distinct design and artistic sensibility that would become a landmark for the River.***

15 You do not take seriously the responsibility of this Public Works Project and, instead, choose to consider it as a Public Art project. You have not outreached to the surrounding communities for input on this project.

16 No Public Health and Safety issues are under consideration as to the effects on the surrounding communities. You have not addressed weather patterns and increased water flows (under a 200-year flood).

17 You state:

Operation and Maintenance
Once the finished project has been gifted to the City, operation and maintenance would be the responsibility of several departments within the City, including the Departments of Public Works, RAP, and Transportation. The primary responsibilities will be the maintenance and upkeep of the bridge for continued use by pedestrians, bicyclists and equestrians.

Again, you do not identify the responsible parties correctly and have no consideration of budget issues including City as well as County budgets.

18 You falsely refer to a City Conditional Use Permit as the action required.

19 You fail to recognize the Arroyo Seco National Scenic Byway designation. This part of the trail system in the Northeast area and does effect the continuation of the trail system and the scenic vistas. Arroyo Seco is a tributary to the LA River.
Visual character and quality count. Light and glare count.

20 City of Los Angeles has failed to update the Circulation Element of the General Plan, as is

20 cont. required by the State.

21 You fail to address the County of Los Angeles Sediment Management Plan.

22 Increased ozone levels and poor air quality occur with lighting.

23 The project is within the Hollywood Community Plan area (Open Space) as well as the Northeast Los Angeles Community Plan. Griffith Park, itself, is within the Hollywood Community Plan.

24 You state, in relationship to the Northeast Community Plan:

The project would provide enhanced access to the Los Angeles trail network for pedestrians, bicyclists and equestrians and may therefore have the potential to reduce automobile trips and vehicle miles traveled.

This is just an assumption. You completely miss an aspect of the Northeast area which includes connectivity from the Rose Bowl to Downtown Los Angeles and Griffith Park. It is not an assumed reduction of vehicle miles traveled, but an aspect of cultural and historical tourism.

25 Griffith Park is also a City of Los Angeles Historic-Cultural Monument. Grizzly bear trails are
26 said to exist.

27 Quicksand was identified in the LA River back in the late 1800s. Does it still exist.

28 *Green LA-An Action Plan to Lead the Nation in Fighting Global Warming* and *Climate LA–Municipal Program Implementing the Green LA Climate Action Plan* are not legislatively adopted plans.

29 Missing is testing criteria on TMDLs Total Daily Maximum Loads and a baseline measurement. Only assumptions are made:

> *The proposed project is expected to result in public safety, biological resource, recreational, and cultural improvements and its implementation will help the City meet the bacteria TMDL adopted by the LARWQCB to protect the designated beneficial uses of the receiving waters by creating a safe passage over the LA River thereby removing the need for the equestrian crossing via the riverbed itself.*

30 The Urban Waters Partnership UWP shows the project partners as:

30 cont.

1. *USACE*
2. *National Park Service*
3. *LA River Revitalization Corporation*

Lead Agency Department of Public Works, Bureau of Engineering is not listed.

31

UWP lists the following federal *Applicable Laws and Regulations:*

- Council on Environmental Quality (CEQ/AR-200-1&2)
- California Environmental Quality Act (CEQA)
- Clean Water Act
- Clean Air Act
- Endangered Species Act
- Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
- Farmland Protection Act
- National Historic Preservation Act
- California Endangered Species Act
- Executive Order #11990, Wetlands Protection
- Executive Order #11988, Floodplain Management/Protection of Wetlands
- Executive Order #12898, Environmental Justice in Minority Populations and Low-Income Populations

Joyce Dillard
P.O. Box 31377
Los Angeles, CA 90031

Letter 6

Correspondence from Joyce Dillard, dated December 28, 2012

Response 1
The City of Los Angeles is the Lead Agency under the California Environmental Quality Act (CEQA). The US Army Corps of Engineers (Corps) is the Lead Agency under the National Environmental Policy Act (NEPA). Construction of the proposed project will require approval from both agencies, as well as Los Angeles County.

Response 2
The Corps is preparing a separate Environmental Assessment (EA) in compliance with NEPA.

Response 3
Section 408 permitting will be discussed and evaluated in detail within the EA being prepared by the Corps.

Response 4
Funding for construction of the bridge was provided to the Los Angeles River Revitalization Corps (RRC) as a gift. RRC is overseeing the permitting and construction of the bridge; the owner of the bridge will be the City of Los Angeles. The City will also be responsible for maintenance of the bridge.

Response 5
Comment noted. The bridge will be public.

Response 6
Comment noted.

Response 7
The Corps is preparing a separate Environmental Assessment (EA) in compliance with NEPA. The bridge would be located within Reach 3 of the Los Angeles River, which is maintained by the Corps.

Response 8
Comment noted

Response 9
As discussed on pages 33 through 41 of the IS/MND, impacts to sensitive, candidate and listed species, including migratory birds, would be less than significant with implementation of mitigation measures. Specifically, Mitigation Measure BIO-3, Nesting Bird Avoidance, relates to avoiding impacts to migratory birds. The commenter mentions Echo Park Lake; this lake is located nearly five

miles from the bridge site; construction and operation of the multi-modal bridge would not affect Echo Park Lake.

Response 10
Resource issues of concern by the California Department of Fish and Game are discussed on pages 33 through 41 of the IS/MND. Flood-related issues are within the jurisdiction of the U.S. Army Corps of Engineers, who is in the process of preparing an EA for the federal actions required as part of the project. Resource issues of concern by the Native American Heritage Commission are discussed on page 43 of the IS/MND.

Response 11
Comment noted.

Response 12
Comment noted. The Corps is preparing a separate Environmental Assessment (EA) in compliance with NEPA.

Response 13
Comment noted. The Corps is preparing a separate Environmental Assessment (EA) in compliance with NEPA.

Response 14
Comment noted.

Response 15
The project was reviewed and recommended by the Los Angeles River Cooperation Committee at its meeting on April 4, 2011. All meetings of this committee are noticed and open to the public. Additionally, the following other outreach has been completed for the proposed project:

- The project proponent, RRC, has had meetings with individual property owners and stakeholders associated with and near the project site (details?)
- Representatives for the project were present with an informational booth at several events in the project vicinity, including (river cleanup event) on (date).
- The Notification of Intent to adopt the draft version of this MND was circulated widely to established distribution lists of interested parties, was published in the Los Angeles Times on November 29, 2012, and the document was available on the Bureau of Engineering's website, at local Council District offices, and the Atwater Village branch library.

Furthermore, the Los Angeles River Revitalization Master Plan identifies this project as Project No. 147, the "Los Feliz Equestrian/Non-Motorized Bridge" (on p. 10-30), which underwent an extensive public outreach process from 2005 through2007, including 18 formal public meetings, approximately 40 small group

outreach events, and its own EIR public review process, prior to the Plan's adoption by the City Council on May 9, 2007.

Response 16
The purpose of the IS/MND is to evaluate potential impacts to the environment and surrounding communities resulting from implementation of the proposed multi-modal bridge project. Human health and safety is evaluated in the following sections of the IS/MND: Air Quality, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Public Services, Recreation, and Transportation and Traffic. As shown in the analysis included in the IS/MND, all potentially significant impacts can be reduced to less than significant levels through implementation of mitigation. Additionally, water flows are evaluated within the Hydrology and Water Quality section, on pages 49 through 51 of the IS/MND.

Response 17
Funding for construction of the bridge was provided to the Los Angeles River Revitalization Corp (RRC) as a gift. RRC is overseeing the permitting and construction of the bridge; the owner of the bridge will be the City of Los Angeles. The City will also be responsible for maintenance of the bridge. The project may incrementally add to the City's operation and maintenance costs. However, there is not evidence that such an increase would result in a direct, indirect or cumulatively significant impact.

Response 18
As discussed on pages 51 and 52 in the MND, a Conditional Use Permit may be required. The project site is zoned OX-1XL and designated as Open Space in the City's General Plan. The proposed project involves the construction of a multi-modal bridge over the LA River. As indicated in Section 12.04.05 of the LAMC, park and recreational facilities are an allowable use under the OS designation. However, park and recreational facilities may not be located on land which includes a lake, river, or stream or which is designated by the City as an historic or cultural landmark, unless approved as a conductional use. The project is located within the vicinity of Griffith Park, a listed Historic-Cultural Monument; however, the bridge may not actually be located within the park itself and therefore may not require a conditional use permit. Therefore, if it becomes necessary, with approval of a conditional use permit per Section 12.04.05 of the LAMC, the proposed project would be consistent under the General Plan and zoning designations.

Response 19
The project location is adjacent to Interstate 5 and not within the vicinity of the Arroyo Seco National Scenic Byway, which is located to the southeast. Visual impacts of the proposed project are evaluated within the MND, and resources potentially affected by the visual character and lighting of the bridge are identified.

Response 20
Comment noted. This comment is not within the scope of the North Atwater Crossing project.

Response 21
Construction and operation of the new bridge structure would not result in the generation of new sediment, as discussed on pages 49 through 51 of the IS/MND; as such, the Los Angeles County Sediment Management Strategic Plan is not discussed.

Response 22
Air quality and greenhouse gas analyses were completed as part of the proposed project. Please see pages 30 through 33 for the air quality analysis and pages 46 and 47 for the greenhouse gas analysis. As discussed in both of these analyses, air quality and greenhouse gas impacts resulting from the proposed project would be less than significant.

Response 23
Comment noted.

Response 24
Comment noted.

Response 25
The commenter correctly notes that Griffith Park is a City of Los Angeles Historic-Cultural Monument.

Response 26
No known grizzly bear sightings in recent history exist for Griffith Park.

Response 27
As discussed in the Geotechnical Exploration Report prepared by Leighton Consulting, Inc., included as Appendix C of the IS/MND, no quicksand exists within the riverbed in the project vicinity.

Response 28
The documents cited by the commenter are resource and guidance documents utilized in the preparation of the IS/MND.

Response 29
The intent of the new multi-modal bridge is to aid in improving water quality in the River; as such, no TMDL measurements were made.

Response 30
Comment noted.

Response 31
Comment noted.

Letter 7

Nicole Cobleigh <nicole.cobleigh@lacity.org>

North Atwater Crossing

2 messages

Sandra Maliga <sandy@maliga.com> Thu, Dec 6, 2012 at 9:52 AM
To: Nicole.Cobleigh@lacity.org

Ms. Cobleigh,

1 This bridge is a beautiful and functional solution. It will be a tremendous asset to the local community and to everyone who visits the area.
I support it entirely.

Sandy Maliga

4763 Toland Way
Los Angeles, CA 90042-2255

Letter 7

Correspondence from Sandra Maliga, dated December 6, 2012

Response 1

The commenter's support is noted.

CHANGES TO THE MITIGATED NEGATIVE DECLARATION SINCE PUBLIC CIRCULATION

Since public circulation of the Mitigated Negative Declaration (MND) for the North Atwater Crossing project, comments received and refinements to the project design resulted in necessary minor changes to the MND. Therefore, the Final MND has been updated as follows:

Page 9: Figure 2, Project Vicinity Map
The graphic for Figure 2 has been replaced to more accurately depict the planned location for the bridge. No new impacts would occur with the bridge location slightly north from where it was previously depicted.

Page 13: Third Paragraph
Modifications to the paragraph with the subtitle of “Dimensions” have been made to reflect minor changes in the project design. No new impacts would occur with the new bridge design; the changes are merely structural engineering modifications.

Page 17: Figure 4, Bridge Cross-Section
The graphic for Figure 4 has been replaced to reflect the new cross-section of the bridge, based on the minor structural changes made to the bridge design. No new impacts would occur as a result of the modified bridge design.

Page 19: Fourth Paragraph
Text has been added to clarify that the Los Angeles River Revitalization Corp will be responsible for operation and maintenance of the bridge for the first 10 years; the City will be responsible thereafter.

Page 19: Fifth Paragraph
Text has been modified to reflect that a Conditional Use Permit may no longer be required for the project.

Page 20: Third and Last Bullet Points
The following two bullet points were deleted from the list of Project Actions and Approvals:

- City’s Department of Building and Safety, building and grading permits
- City’s Department of Planning, Conditional Use Permit for construction of a multi-modal bridge over the LA River

These two bullet points were deleted because these two permits will no longer be required by the City.

Page 51: Last Paragraph
Text has been modified to reflect that a Conditional Use Permit may no longer be required for the project.

APPENDIX A
ENVIRONMENTAL SCREENING CHECKLIST

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
1. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
Comment: See the discussion in Section A1 of the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections A.1 and A.2); Northeast Los Angeles Community Plan.				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
Comment: See the discussion in Section A2 of the IS/MND.				
Reference: California Scenic Highway Mapping System, L.A. CEQA Thresholds Guide (Sections A.1 and A.2); City of Los Angeles General Plan; Northeast Los Angeles Community Plan; California Department of Transportation, California Scenic Highway Mapping System website (http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm)				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
Comment: See the discussion in Section A3 of the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections A.1 and A.2)				
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐
Comment: See the discussion in Section A4 of the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section A.4)				
2. AGRICULTURE AND FOREST RESOURCES – Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
Comment: No prime or unique farmland, or farmland of statewide importance exists within the project area or vicinity. The project site is not located on or near any property zoned or otherwise intended for agricultural uses.				
Reference: California State Department of Conservation Farmland Mapping and Monitoring Program website (http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx); City of Los Angeles General Plan Conservation Element; Zone Information & Map Access System (ZIMAS).				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
Comment: No land on or near the project site is zoned for or contains agricultural uses. Additionally, the				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
City of Los Angeles does not participate in the Williamson Act.				
Reference: California State Department of Conservation Farmland Mapping and Monitoring Program website (http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx); City of Los Angeles General Plan Conservation Element, Zone Information & Map Access System (ZIMAS).				
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code Section 4526)?	☐	☐	☐	☒
Comment: The project site is zoned Open Space and supports recreational uses. No forest land or timberland exists within or surrounding the project area.				
References: City of Los Angeles General Plan.				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
Comment: No forest land exists at the project site or the surrounding area.				
References: City of Los Angeles General Plan.				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
Comment: No farmland exists at the project site or in the vicinity of the project.				
Reference: California State Department of Conservation Farmland Mapping and Monitoring Program website (http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx); City of Los Angeles General Plan Conservation Element; Zone Information & Map Access System (ZIMAS).				
3. AIR QUALITY – Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
Comment: See the discussion in Section C1 in the IS/MND.				
Reference: City of Los Angeles General Plan; L.A. CEQA Thresholds Guide (Sections B1 and B2); Northeast Los Angeles Community Plan; South Coast Air Quality Management District, Final 2007 Air Quality Management Plan, June 2007.				
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
Comment: See the discussion in Section C2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections B1 and B2); California Air Resources Board, 2011 State Area Designations; SCAQMD, California Emissions Estimator Model (CalEEMod, Version 2011.1.1), 2007; SCAQMD, CEQA Air Quality Handbook, 1993 (as amended March 2011); SCAQMD, Final Localized Significance Threshold Methodology, 2008;SCAQMD, Mass Rate LST Look-up Tables, 2009; SCAQMD, Fact Sheet for Applying CalEEMod to LST, 2011.				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
Comment: See the discussion in Section C3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections B1 and B2); CARB, 2011 State Area Designations; SCAQMD, California Emissions Estimator Model (CalEEMod, Version 2011.1.1), 2007; SCAQMD, CEQA Air Quality Handbook, 1993 (as amended March 2011); SCAQMD, Cumulative Impact Analysis Requirements, 2003.				
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
Comment: See the discussion in Section C4 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections B1, B2, and B3).				
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐
Comment: See the discussion in Section C5 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections B1 and B2).				
4. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
Comment: See the discussion in Section D1 in the IS/MND.				
Reference: California Natural Diversity Database (CNDDB) Rare Finds Database, searched August 2012; City of Los Angeles General Plan; L.A. CEQA Thresholds Guide (Section C); U.S. Fish and Wildlife Service Habitat Conservation Plan (HCP) Program; U.S. Fish and Wildlife Service Critical Habitat Database (http://crithab.fws.gov/); City of Los Angeles Department of Recreation and Parks Griffith Park Wildlife Management Plan; Friends of the Los Angeles River State of the River 2: The Fish Study; City of Los Angeles Department of Recreation and Parks Griffith Park Bat Survey.				
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☒	☐	☐
Comment: See the discussion in Section D2 in the IS/MND.				
Reference: See 4 (a) above; California Riparian Habitat Restoration Handbook, Second Edition.				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not	☐	☐	☒	☐

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				
Comment: See the discussion in Section D3 in the IS/MND.				
Reference: CNDDB, City of Los Angeles General Plan; L.A. CEQA Thresholds Guide (Section C); U.S. Fish and Wildlife Service Habitat Conservation Plan (HCP) Program; U.S. Fish and Wildlife Service Critical Habitat Database (http://crithab.fws.gov/).				
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
Comment: See the discussion in Section D4 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section C); Los Angeles County Draft General Plan – Figure 6.3 Significant Ecological Areas.				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
Comment: See the discussion in Section D5 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section C); Recreation & Parks' Urban Forest Program; County of Los Angeles Draft General Plan, Chapter 6: Conservation and Open Space Element.				
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒
Comment: The proposed project does not occur within or immediately adjacent to any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or approved conservation plan area.				
Reference: CNDDB, City of Los Angeles General Plan, City of Los Angeles General Plan Conservation Element, L.A. CEQA Thresholds Guide (Section C), U.S. Fish and Wildlife Service Habitat Conservation Plan (HCP) Program; County of Los Angeles Draft General Plan Figure 6.3 Significant Ecological Areas.				
5. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in California Code of Regulations Section 15064.5?	☐	☐	☒	☐
Comment: See the discussion in Section E1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section D.3); City of Los Angeles Cultural Heritage Commission Historic-Cultural Monuments (HCM) Listing; Northeast Los Angeles Community Plan; City of Los Angeles General Plan Conservation Element, Zone Information & Map Access System (ZIMAS); Cultural Heritage Commission, Historic-Cultural Monument Application and Findings for Griffith Park.				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to California Code of Regulations Section 15064.5?	☐	☐	☒	☐

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Comment: See the discussion in Section E2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section D.3); Northeast Los Angeles Community Plan; South Central Coastal Information Center, Cultural Resources Records Search Quick Check (July 26, 2012).				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
Comment: See the discussion in Section E3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section D.1), Standard Specification for Public Works Construction.				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐
Comment: See the discussion in Section E4 in the IS/MND.				
Reference: Standard Specification for Public Works Construction, L.A. CEQA Thresholds Guide (Section D.2)				
6. GEOLOGY AND SOILS – Would the project:				
xpose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☒
Comment: The project site is not located within an Alquist-Priolo Zone.				
Reference: California Department of Conservation Publication 42; L.A. CEQA Thresholds Guide (Section E.1); Leighton Consulting, Inc., Geotechnical Exploration Report, May 1, 2012.				
ii) Strong seismic ground shaking?	☐	☐	☒	☐
Comment: See the discussion in Section F1 in the IS/MND.				
Reference: California Department of Conservation Publication 42; L.A. CEQA Thresholds Guide (Section E.1); Leighton Consulting, Inc., Geotechnical Exploration Report, May 1, 2012.				
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
Comment: See the discussion in Section F2 in the IS/MND.				
Reference: California Department of Conservation Publication 42; Los Angeles, California; L.A. CEQA Thresholds Guide (Section E.1), General Plan Safety Element; Leighton Consulting, Inc., Geotechnical Exploration Report, May 1, 2012.				
iv) Landslides?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Comment: The project site is located in a flat area and would not be subject to landslides.				
Reference: City of Los Angeles General Plan (Landslide Inventory and Hillside Areas in the City of Los Angeles Map); California Department of Conservation Publication 42; L.A. CEQA Thresholds Guide (Section E.1).				
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
Comment: See the discussion in Section F3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section E.2).				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
Comment: See the discussion in Section F4 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section C1); Los Angeles General Plan (Landslide Inventory and Hillside Areas in the City of Los Angeles Map); Leighton Consulting, Inc., Geotechnical Exploration Report, May 1, 2012.				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
Comment: See the discussion in Section F5 in the IS/MND.				
Reference: Uniform Building Code; Leighton Consulting, Inc., Geotechnical Exploration Report, May 1, 2012.				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
Comment: No septic tank systems are proposed as part of the project.				
Reference: None applicable.				
7. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
Comment: See the discussion in Section G1 in the IS/MND.				
Reference: South Coast Air Quality Management District (SCAQMD). Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008; CAPCOA, CEQA & Climate Change, January 2008.				
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse	☐	☐	☒	☐

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
gases?				
Comment: See the discussion in Section G2 in the IS/MND.				
Reference: California Air Resources Board, The California Global Warming Solutions Act of 2006 (AB32), 2006; City of Los Angeles, Green LA -- An Action Plan to Lead the Nation in Fighting Global Warming, 2007; City of Los Angeles, Climate LA – Municipal Program Implementing the Green LA Climate Action Plan, 2008.				
8. HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
Comment: See the discussion in Section H1 in the IS/MND.				
Reference: DTSC EnviroStor Data Management System (http://www.envirostor.dtsc.ca.gov/public), accessed August 8, 2012; SWRCB LUST and UST listings on Geotracker (http:geotracker.swrcb.ca.gov).				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
Comment: See the discussion in Section H1 in the IS/MND				
Reference: DTSC EnviroStor Data Management System (http://www.envirostor.dtsc.ca.gov/public), accessed July 2012; L.A. CEQA Thresholds Guide (Sections F1 and F.2); SWRCB LUST and UST listings on Geotracker (http:geotracker.swrcb.ca.gov).				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
Comment: See the discussion in Section H2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section F.2).				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
Comment: The site is not listed as a hazardous materials site.				
Reference: DTSC EnviroStor Data Management System (http://www.envirostor.dtsc.ca.gov/public); L.A. CEQA Thresholds Guide (Section F.2); SWRCB's GeoTracker, and USEPA EnviroMapper.				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
Comment: The project is not located within two miles of a public airport or within an airport land use plan area.				
Reference: General Plan, L.A. CEQA Thresholds Guide (Section F.1); Northeast Los Angeles Community				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Plan; The Thomas Guide, Los Angeles County Street Guide (2010).				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
Comment: The project site is not located within the vicinity of a private airstrip.				
Reference: L.A. CEQA Thresholds Guide (Section F.1); Northeast Los Angeles Community Plan; The Thomas Guide, Los Angeles County Street Guide (2010).				
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
Comment: See the discussion in Section H3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section F.1); City of Los Angeles General Plan.				
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐
Comment: The project site is not located in an area potential subject to wildland fires.				
Reference: Northeast Los Angeles Community Plan; Planning Department Parcel Profile Report; NavigateLA.				
9. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
Comment: See the discussion in Section I1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section G.2); Santa Monica Bay Beaches Bacterial TMDLs Coordinated Shoreline Monitoring Plan (2004); Los Angeles County Department of Public Works, Summary Water Quality Data - Storm Water Quality Data Tables (1994-2000). Accessed August 2009. http://ladpw.org/wmd/npdes/9400_wq_tbl/Table_4-12.pdf; Schueler, T. 1987. Controlling Urban Runoff, A Practical Manual for Planning and Designing Urban BMPs, Metropolitan Washington Council of Governments; Watershed Assessment, Tracking & Environmental Results (WATERS). USEPA, Accessed August 2012. http://www.epa.gov/waters/ir/index.html.				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
Comment: The project would not require the use of groundwater or interfere with groundwater recharge.				
Reference: L.A. CEQA Thresholds Guide (Sections G.2 and G.3).				
c) Substantially alter the existing drainage pattern of the site or area,	☐	☒	☐	☐

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				
Comment: See the discussion in Section I2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Sections G.1 and G2); Atwater Bridge Hydraulics and Water Surface Assessments Report, Fuscoe Engineering, Inc., April 2012.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☒	☐	☐
Comment: See the discussion in Section I2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section G.1); Atwater Bridge Hydraulics and Water Surface Assessments Report, Fuscoe Engineering, Inc., April 2012.				
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
Comment: Construction and operation of this proposed project would not generate new runoff.				
Reference: L.A. CEQA Thresholds Guide (Section G.2).				
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
Comment: See the discussion in Section I1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section G.1); Atwater Bridge Hydraulics and Water Surface Assessments Report, Fuscoe Engineering, Inc., April 2012.				
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
Comment: No housing would be constructed as part of the proposed project.				
Reference: FIRM FEMA Panel No 06037 1566 F; L.A. CEQA Thresholds Guide (Sections G.1 to G.3).				
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☒	☐	☐
Comment: See the discussion in Section I3 in the IS/MND.				
Reference: FIRM FEMA Panel No. 06037 1566 F; L.A. CEQA Thresholds Guide (Sections G.1 & G.3).				
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☒	☐	☐
Comment: See the discussion in Section I2 in the IS/MND.				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Reference: City of Los Angeles General Plan Safety Element, L.A. CEQA Thresholds Guide (Sections E.1 & G.3).				
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐
Comment: See the discussion in Section I4 in the IS/MND.				
Reference: City of Los Angeles General Plan Safety Element, LA CEQA Thresholds Guide (Section E.1).				
10. LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
Comment: The project would connect, rather than divide, established communities.				
Reference: City of Los Angeles General Plan; Northeast Los Angeles Community Plan; LA CEQA Thresholds Guide (Section H.2).				
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
Comment: See the discussion in Section J1 in the IS/MND.				
Reference: City of Los Angeles General Plan, LA CEQA Thresholds Guide (Sections H.1 & H.2); City of Los Angeles General Plan; Northeast Los Angeles Community Plan; Zone Information & Map Access System (ZIMAS).				
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☒	☐	☐
Comment: See the discussion in Section J2 in the IS/MND.				
Reference: City of Los Angeles General Plan, LA CEQA Thresholds Guide (Sections H.1 & H.2); Los Angeles County Draft General Plan, Figure 6.3 Significant Ecological Areas.				
11. MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
Comment: No mineral resources would be affected by this project.				
Reference: City of Los Angeles General Plan, L.A. CEQA Thresholds Guide (Section E4).				
12. NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
Comment: See the discussion in Section L1 in the IS/MND.				
Reference: LAMC (Chapter IV, Article 1, Section 41.40; Chapter XI, Article 2, Section 112.05); L.A. CEQA				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Thresholds Guide (Section I); Federal Highway Administration (FHWA) Roadway Construction noise Model User's Guide (2006), EPA Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (1974).				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
Comment: See the discussion in Section L2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section I), Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006); California Department of Transportation (Caltrans) Transportation and Construction Induced Vibration Manual (2004).				
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
Comment: No new noise sources would be generated by the permanent use of the new multi-modal bridge.				
Reference: Draft L.A. CEQA Thresholds Guide (I.2).				
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
Comment: See the discussion in Section L1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (2006); EPA Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (1974); FHWA Roadway Construction Noise Model User's Guide (2006).				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
Comment: The project site is not located within two miles of an airport or within an airport land use plan.				
Reference: Los Angeles County Airport Land Use Commission, Burbank/Glendale/Pasadena Airport, Airport Influence Area Map.				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
Comment: The project site is not located within the vicinity of a private airstrip.				
Reference: The Thomas Guide, Los Angeles County Street Guide, 2007; Google Earth, 2012.				
13. POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
Comment: The project would not result in population growth.				
Reference: General Plan, including the Northeast Los Angeles Community Plan; L.A. CEQA Thresholds				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Guide (Section J.1).				
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
Comment: No housing would be displaced by project implementation.				
Reference: L.A. CEQA Thresholds Guide (Sections J.1 and J.2).				
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
Comment: No people would be displaced through implementation of the proposed project.				
Reference: See 12(b) above.				
14. PUBLIC SERVICES – a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☒	☐
Comment: See the discussion in Section N1 in the IS/MND.				
Reference: City of Los Angeles General Plan Safety Element, L.A. CEQA Thresholds Guide (Section K.2).				
ii) Police protection?	☐	☐	☒	☐
Comment: See the discussion in Section N2 in the IS/MND.				
Reference: City of Los Angeles General Plan Safety Element, L.A. CEQA Thresholds Guide (Section K.1).				
iii) Schools?	☐	☐	☐	☒
Comment: The project would not generate growth such that schools would be affected.				
Reference: L.A. CEQA Thresholds Guide (Section K.3).				
iv) Parks?	☐	☐	☒	☐
Comment: See the discussion in Section N3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section K.4).				
v) Other public facilities?	☐	☐	☐	☒
Comment: The project would not generate growth such that other public services would be affected.				
Reference: None applicable.				
15. RECREATION –				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
Comment: The proposed project may result in an increase in the number of people who use the bike and equestrian trails along the River; however, not to a level that would result in the substantial physical deterioration trails or require the construction or expansion of new recreational facilities.				
Reference: L.A. CEQA Thresholds Guide (Section K.4).				
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐
Comment: The proposed project may result in an increase in the number of people who use the bike and equestrian trails along the River; however, not to a level that would result in the substantial physical deterioration trails or require the construction or expansion of new recreational facilities.				
Reference: L.A. CEQA Thresholds Guide (Section K.4).				
16. TRANSPORTATION/TRAFFIC – Would the project:				
a) Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☒	☐	☐
Comment: See the discussion in Section P1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section L); Traffic and Transportation Impact Analysis for the Proposed North Atwater Non-Motorized Bridge Project by Minagar & Associates, Inc.				
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☒	☐	☐
Comment: See the discussion in Section P2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section L).				
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	☒
Comment: The project would not affect air traffic patterns.				
Reference: L.A. CEQA Thresholds Guide (Section L); Traffic and Transportation Impact Analysis for the Proposed North Atwater Non-Motorized Bridge Project by Minagar & Associates, Inc.				
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Comment: The project would not introduce new design features that could pose a hazard to vehicles.				
Reference: L.A. CEQA Thresholds Guide (Section L.5).				
e) Result in inadequate emergency access?	☐	☐	☐	☒
Comment: The project would not impede emergency access for vehicles.				
Reference: L.A. CEQA Thresholds Guide (Section L.5 and L.8).				
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☒	☐	☐
Comment: See the discussion in Section P3 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section L); Traffic and Transportation Impact Analysis for the Proposed North Atwater Non-Motorized Bridge Project by Minagar & Associates, Inc.				
g) Result in inadequate parking capacity?	☐	☐	☐	☒
Comment: No parking would be displaced, and no parking would be required as part of the proposed project.				
Reference: L.A. CEQA Thresholds Guide (Section L).				
17. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
Comment: The project would not generate wastewater.				
Reference: L.A. CEQA Thresholds Guide (Section M.2).				
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
Comment: The project would not require the use of water or generate wastewater such that new facilities would be required.				
Reference: L.A. CEQA Thresholds Guide (Sections M.1 and M.2).				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
Comment: The project would not generate new storm water.				
Reference: L.A. CEQA Thresholds Guide (Section M.2).				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
Comment: The project would not require the use of water supplies.				

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
Reference: L.A. CEQA Thresholds Guide (Section M.1).				
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
Comment: The project would not generate wastewater.				
Reference: L.A. CEQA Thresholds Guide (Section M.2).				
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
Comment: See the discussion in Section Q1 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section M.3); California Department of Resources Recycling and Recovery (2010), Solid Waste Information System (http://www.calrecycle.ca.gov/SWFacilities/Directory/); City of Los Angeles Solid Waste Integrated Resources Plan (http://www.zerowaste.lacity.org) and Bureau of Sanitation (http://www.lacitysan.org/solid_resources/recycling); California Integrated Waste Management Act of 1989 (Assembly Bill 939).				
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐
Comment: See the discussion in Section Q2 in the IS/MND.				
Reference: L.A. CEQA Thresholds Guide (Section M.3).				
18. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
Comment: See the discussion in Section R of the IS/MND.				
Reference: Preceding analyses.				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
Comment:				
Reference: Preceding analyses.				
c) Does the project have the potential to achieve short-term	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant w/ Mitigation	Less Than Significant	No Impact
environmental goals to the disadvantage of long-term environmental goals?				
Comment:				
Reference: Preceding analyses.				
d) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐
Comment:				
Reference: Preceding analyses.				

North Atwater Crossing Project

Table 1. Maximum Daily Criteria Pollutant Construction Emissions

	Daily Emissions (lbs/day)					
Phase	**VOC**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Site Preparation	3.18	25.53	14.96	0.02	3.73	2.51
Site Work	1.68	13.00	10.88	0.02	1.32	0.99
Steel Fabrication	0.92	8.36	3.19	0.01	0.44	0.30
Architectural Finishings	9.02	28.19	14.67	0.03	1.73	1.58
Maximum	**9.02**	**28.19**	**14.96**	**0.03**	**3.73**	**2.51**
Significance Threshold	75	100	550	150	150	55
Significant?	No	No	No	No	No	No

Source: South Coast Air Quality Management District. 2011. SCAQMD Air Quality Significance Thresholds. March. Available online at: http://www.aqmd.gov/ceqa/handbook/signthres.pdf [Accessed on: August 1, 2012].

Note:

PM10 and PM2.5 emissions assume that fugitive dust is controlled by watering (SCAQMD Rule 403).

Table 2. Annual Greenhouse Gas Construction Emissions

	Annual Emissions (metric tons per year)					
Phase	**Bio- CO2**	**NBio- CO2**	**Total CO2**	**CH4**	**N2O**	**CO2e**
Site Preparation	0.00	28.85	28.85	0.00	0.00	28.91
Site Work	0.00	38.90	38.90	0.00	0.00	38.98
Steel Fabrication	0.00	28.52	28.52	0.00	0.00	28.57
Architectural Finishings	0.00	71.86	71.86	0.01	0.00	72.01
Total	**0.00**	**168.13**	**168.13**	**0.01**	**0.00**	**168.47**

North Atwater Crossing Project

Table 3. Maximum Daily Onsite Criteria Pollutant Construction Emissions

	Daily Emissions (lbs/day)			
Phase	**NOx**	**CO**	**PM10**	**PM2.5**
Site Preparation	25.45	14.18	3.57	2.50
Site Work	11.85	9.40	1.07	0.94
Steel Fabrication	7.94	2.35	0.28	0.28
Architectural Finishings	28.11	13.89	1.57	1.57
Maximum	**28.11**	**14.18**	**3.57**	**2.50**
Significance Threshold	74	680	5	3
Significant?	No	No	No	No

Table 4. Maximum Number of Acres Disturbed on Peak Day

Equipment Type	Acres/8hr-day
Crawler Tractors	0.5
Graders	0.5
Rubber Tired Dozers	0.5
Scrapers	1

Source: SCAQMD. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds. Available online at: http://www.aqmd.gov/ceqa/handbook/LST/LST.html [Accessed on: August 2, 2012]

Table 5. Maximum Daily Disturbed Acres from Equipment List

Phase	Construction Equipment	OFFROAD Description	Quantity	Acres/8hr-day
Site preparation	Bulldozers	Rubber Tired Dozers	1	0.5
	Backhoes		1	n/a
Site work	Drill rigs		1	n/a
	Backhoes		2	n/a
	Bulldozers	Rubber Tired Dozers	1	0.5
Steel fabrication	Cranes		2	n/a
Archictectural Finishings	Cranes		2	n/a
	Bobcats		2	n/a

City:	Los Angeles
Source Receptor Area Zone:	1
Daily Acreage:	0.5
Receptor Distance (meters):	25

North Atwater Crossing Project

Table 6. Preliminary Construction Schedule

Phase	Duration	Construction Equipment	Quantity	Workers	Trips/Day	Vendors
Mobilization	2 weeks	None				
Site preparation	4 weeks	Bulldozers	1	5	10	0
		Backhoes	1			
		Pneumatic hammers	2			
Site work	8-12 weeks	Drill rigs	1	5	10	6
		Backhoes	2			
		Bulldozers	1			
		Flatbed trucks	1			
		Hydraulic jacking equipment	1			
		Concrete trucks	1			
Steel fabrication	10-12 weeks	Cranes	2	4	8	2
		Concrete trucks	1			
Archictectural Finishings	8 weeks	Cranes	2	5	10	
		Bobcats	2			

Bridge Dimensions

325	feet long
35	feet wide
11,375	square feet
0.26	acres

North Atwater Crossing Project

Construction Start Date 1/6/2013

Table 7. Estimated Construction Schedule

Phase	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Start Date	End Date	Workdays
Mobilization	2																																	1/6/2013	1/19/2013	12
Site preparation	4																																	1/20/2013	2/16/2013	24
Site work	8																																	2/17/2013	4/13/2013	48
Steel fabrication	10																																	4/14/2013	6/22/2013	60
Archictectural Finishings	8																																	6/23/2013	8/17/2013	48

Operating Schedule

6 days per week

26 days per month

North Atwater Crossing Project

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
User Defined Recreational	11375	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Los Angeles Department of Water & Power
Climate Zone	11	**Precipitation Freq (Days)**	33		

1.3 User Entered Comments

Project Characteristics -

Land Use - Dimensions equal to area of bridge (325' L x 35' W)

Construction Phase - Schedule estimated from project description

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from PD

Trips and VMT - Worker trips estimated from construction equipment. Vendor trips equal to flatbed trucks, hydraulic jacking equipment on trucks, and concrete trucks.

Construction Off-road Equipment Mitigation - Watering required according to SCAQMD Rule 403 to minimize fugitive dust emissions

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	9.01	28.18	14.95	0.03	6.20	1.57	7.41	3.32	1.57	4.53	0.00	3,308.30	0.00	0.32	0.00	3,314.95
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	9.01	28.18	14.95	0.03	2.51	1.57	3.73	1.30	1.57	2.51	0.00	3,308.30	0.00	0.32	0.00	3,314.95
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.04	0.00	6.04	3.31	0.00	3.31						0.00
Off-Road	3.11	25.45	14.18	0.02		1.21	1.21		1.21	1.21		2,528.21		0.28		2,534.09
Total	**3.11**	**25.45**	**14.18**	**0.02**	**6.04**	**1.21**	**7.25**	**3.31**	**1.21**	**4.52**		**2,528.21**		**0.28**		**2,534.09**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.07**	**0.07**	**0.78**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**128.48**		**0.01**		**128.65**

3.2 Site Preparation - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.36	0.00	2.36	1.29	0.00	1.29						0.00
Off-Road	3.11	25.45	14.18	0.02		1.21	1.21		1.21	1.21	0.00	2,528.21		0.28		2,534.09
Total	**3.11**	**25.45**	**14.18**	**0.02**	**2.36**	**1.21**	**3.57**	**1.29**	**1.21**	**2.50**	**0.00**	**2,528.21**		**0.28**		**2,534.09**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.07**	**0.07**	**0.78**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**128.48**		**0.01**		**128.65**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.75	0.00	0.75	0.41	0.00	0.41						0.00
Off-Road	1.51	11.85	9.40	0.02		0.78	0.78		0.78	0.78		1,499.86		0.13		1,502.68
Total	**1.51**	**11.85**	**9.40**	**0.02**	**0.75**	**0.78**	**1.53**	**0.41**	**0.78**	**1.19**		**1,499.86**		**0.13**		**1,502.68**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.02	0.66	0.00	0.06	0.04	0.09	0.00	0.04	0.04		166.05		0.00		166.15
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.17**	**1.09**	**1.44**	**0.00**	**0.21**	**0.05**	**0.25**	**0.01**	**0.05**	**0.05**		**294.53**		**0.01**		**294.80**

3.3 Grading - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.29	0.00	0.29	0.16	0.00	0.16						0.00
Off-Road	1.51	11.85	9.40	0.02		0.78	0.78		0.78	0.78	0.00	1,499.86		0.13		1,502.68
Total	**1.51**	**11.85**	**9.40**	**0.02**	**0.29**	**0.78**	**1.07**	**0.16**	**0.78**	**0.94**	**0.00**	**1,499.86**		**0.13**		**1,502.68**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.02	0.66	0.00	0.06	0.04	0.09	0.00	0.04	0.04		166.05		0.00		166.15
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.17**	**1.09**	**1.44**	**0.00**	**0.21**	**0.05**	**0.25**	**0.01**	**0.05**	**0.05**		**294.53**		**0.01**		**294.80**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.83	7.94	2.35	0.01		0.28	0.28		0.28	0.28		895.64		0.07		897.20
Total	**0.83**	**7.94**	**2.35**	**0.01**		**0.28**	**0.28**		**0.28**	**0.28**		**895.64**		**0.07**		**897.20**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.03	0.34	0.22	0.00	0.02	0.01	0.03	0.00	0.01	0.01		55.35		0.00		55.38
Worker	0.05	0.05	0.62	0.00	0.12	0.00	0.13	0.00	0.00	0.01		102.79		0.01		102.92
Total	**0.08**	**0.39**	**0.84**	**0.00**	**0.14**	**0.01**	**0.16**	**0.00**	**0.01**	**0.02**		**158.14**		**0.01**		**158.30**

3.4 Building Construction - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.83	7.94	2.35	0.01		0.28	0.28		0.28	0.28	0.00	895.64		0.07		897.20
Total	**0.83**	**7.94**	**2.35**	**0.01**		**0.28**	**0.28**		**0.28**	**0.28**	**0.00**	**895.64**		**0.07**		**897.20**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.03	0.34	0.22	0.00	0.02	0.01	0.03	0.00	0.01	0.01		55.35		0.00		55.38
Worker	0.05	0.05	0.62	0.00	0.12	0.00	0.13	0.00	0.00	0.01		102.79		0.01		102.92
Total	**0.08**	**0.39**	**0.84**	**0.00**	**0.14**	**0.01**	**0.16**	**0.00**	**0.01**	**0.02**		**158.14**		**0.01**		**158.30**

3.5 Architectural Coating - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.49					0.00	0.00		0.00	0.00						0.00
Off-Road	3.46	28.11	13.89	0.03		1.57	1.57		1.57	1.57		3,179.81		0.31		3,186.31
Total	**8.95**	**28.11**	**13.89**	**0.03**		**1.57**	**1.57**		**1.57**	**1.57**		**3,179.81**		**0.31**		**3,186.31**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.07**	**0.07**	**0.78**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**128.48**		**0.01**		**128.65**

3.5 Architectural Coating - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.49					0.00	0.00		0.00	0.00						0.00
Off-Road	3.46	28.11	13.89	0.03		1.57	1.57		1.57	1.57	0.00	3,179.81		0.31		3,186.31
Total	**8.95**	**28.11**	**13.89**	**0.03**		**1.57**	**1.57**		**1.57**	**1.57**	**0.00**	**3,179.81**		**0.31**		**3,186.31**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.07	0.78	0.00	0.15	0.01	0.16	0.01	0.01	0.01		128.48		0.01		128.65
Total	**0.07**	**0.07**	**0.78**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**128.48**		**0.01**		**128.65**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
User Defined Recreational	8.90	13.30	7.40	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Unmitigated	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.07					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.23					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.07					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.23					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Vegetation

North Atwater Crossing Project

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
User Defined Recreational	11375	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Los Angeles Department of Water & Power
Climate Zone	11	**Precipitation Freq (Days)**	33		

1.3 User Entered Comments

Project Characteristics -

Land Use - Dimensions equal to area of bridge (325' L x 35' W)

Construction Phase - Schedule estimated from project description

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from PD

Trips and VMT - Worker trips estimated from construction equipment. Vendor trips equal to flatbed trucks, hydraulic jacking equipment on trucks, and concrete trucks.

Construction Off-road Equipment Mitigation - Watering required according to SCAQMD Rule 403 to minimize fugitive dust emissions

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	9.02	28.19	14.91	0.03	6.20	1.57	7.41	3.32	1.57	4.53	0.00	3,298.84	0.00	0.32	0.00	3,305.50
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	9.02	28.19	14.91	0.03	2.51	1.57	3.73	1.30	1.57	2.51	0.00	3,298.84	0.00	0.32	0.00	3,305.50
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.04	0.00	6.04	3.31	0.00	3.31						0.00
Off-Road	3.11	25.45	14.18	0.02		1.21	1.21		1.21	1.21		2,528.21		0.28		2,534.09
Total	**3.11**	**25.45**	**14.18**	**0.02**	**6.04**	**1.21**	**7.25**	**3.31**	**1.21**	**4.52**		**2,528.21**		**0.28**		**2,534.09**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.07**	**0.08**	**0.74**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**119.03**		**0.01**		**119.19**

3.2 Site Preparation - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.36	0.00	2.36	1.29	0.00	1.29						0.00
Off-Road	3.11	25.45	14.18	0.02		1.21	1.21		1.21	1.21	0.00	2,528.21		0.28		2,534.09
Total	**3.11**	**25.45**	**14.18**	**0.02**	**2.36**	**1.21**	**3.57**	**1.29**	**1.21**	**2.50**	**0.00**	**2,528.21**		**0.28**		**2,534.09**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.07**	**0.08**	**0.74**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**119.03**		**0.01**		**119.19**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.75	0.00	0.75	0.41	0.00	0.41						0.00
Off-Road	1.51	11.85	9.40	0.02		0.78	0.78		0.78	0.78		1,499.86		0.13		1,502.68
Total	**1.51**	**11.85**	**9.40**	**0.02**	**0.75**	**0.78**	**1.53**	**0.41**	**0.78**	**1.19**		**1,499.86**		**0.13**		**1,502.68**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.07	0.74	0.00	0.06	0.04	0.09	0.00	0.04	0.04		164.88		0.01		164.98
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.17**	**1.15**	**1.48**	**0.00**	**0.21**	**0.05**	**0.25**	**0.01**	**0.05**	**0.05**		**283.91**		**0.02**		**284.17**

3.3 Grading - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.29	0.00	0.29	0.16	0.00	0.16						0.00
Off-Road	1.51	11.85	9.40	0.02		0.78	0.78		0.78	0.78	0.00	1,499.86		0.13		1,502.68
Total	**1.51**	**11.85**	**9.40**	**0.02**	**0.29**	**0.78**	**1.07**	**0.16**	**0.78**	**0.94**	**0.00**	**1,499.86**		**0.13**		**1,502.68**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.07	0.74	0.00	0.06	0.04	0.09	0.00	0.04	0.04		164.88		0.01		164.98
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.17**	**1.15**	**1.48**	**0.00**	**0.21**	**0.05**	**0.25**	**0.01**	**0.05**	**0.05**		**283.91**		**0.02**		**284.17**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.83	7.94	2.35	0.01		0.28	0.28		0.28	0.28		895.64		0.07		897.20
Total	**0.83**	**7.94**	**2.35**	**0.01**		**0.28**	**0.28**		**0.28**	**0.28**		**895.64**		**0.07**		**897.20**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.03	0.36	0.25	0.00	0.02	0.01	0.03	0.00	0.01	0.01		54.96		0.00		54.99
Worker	0.06	0.06	0.59	0.00	0.12	0.00	0.13	0.00	0.00	0.01		95.23		0.01		95.35
Total	**0.09**	**0.42**	**0.84**	**0.00**	**0.14**	**0.01**	**0.16**	**0.00**	**0.01**	**0.02**		**150.19**		**0.01**		**150.34**

3.4 Building Construction - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.83	7.94	2.35	0.01		0.28	0.28		0.28	0.28	0.00	895.64		0.07		897.20
Total	**0.83**	**7.94**	**2.35**	**0.01**		**0.28**	**0.28**		**0.28**	**0.28**	**0.00**	**895.64**		**0.07**		**897.20**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.03	0.36	0.25	0.00	0.02	0.01	0.03	0.00	0.01	0.01		54.96		0.00		54.99
Worker	0.06	0.06	0.59	0.00	0.12	0.00	0.13	0.00	0.00	0.01		95.23		0.01		95.35
Total	**0.09**	**0.42**	**0.84**	**0.00**	**0.14**	**0.01**	**0.16**	**0.00**	**0.01**	**0.02**		**150.19**		**0.01**		**150.34**

3.5 Architectural Coating - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.49					0.00	0.00		0.00	0.00						0.00
Off-Road	3.46	28.11	13.89	0.03		1.57	1.57		1.57	1.57		3,179.81		0.31		3,186.31
Total	**8.95**	**28.11**	**13.89**	**0.03**		**1.57**	**1.57**		**1.57**	**1.57**		**3,179.81**		**0.31**		**3,186.31**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.07**	**0.08**	**0.74**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**119.03**		**0.01**		**119.19**

3.5 Architectural Coating - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	5.49					0.00	0.00		0.00	0.00						0.00
Off-Road	3.46	28.11	13.89	0.03		1.57	1.57		1.57	1.57	0.00	3,179.81		0.31		3,186.31
Total	**8.95**	**28.11**	**13.89**	**0.03**		**1.57**	**1.57**		**1.57**	**1.57**	**0.00**	**3,179.81**		**0.31**		**3,186.31**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.07	0.08	0.74	0.00	0.15	0.01	0.16	0.01	0.01	0.01		119.03		0.01		119.19
Total	**0.07**	**0.08**	**0.74**	**0.00**	**0.15**	**0.01**	**0.16**	**0.01**	**0.01**	**0.01**		**119.03**		**0.01**		**119.19**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
User Defined Recreational	8.90	13.30	7.40	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Unmitigated	0.30	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.07					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.23					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.07					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.23					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.30**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Vegetation

North Atwater Crossing Project

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
User Defined Recreational	11375	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Los Angeles Department of Water & Power
Climate Zone	11	**Precipitation Freq (Days)**	33		

1.3 User Entered Comments

Project Characteristics -

Land Use - Dimensions equal to area of bridge (325' L x 35' W)

Construction Phase - Schedule estimated from project description

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from construction schedule

Off-road Equipment - Equipment list estimated from PD

Trips and VMT - Worker trips estimated from construction equipment. Vendor trips equal to flatbed trucks, hydraulic jacking equipment on trucks, and concrete trucks.

Construction Off-road Equipment Mitigation - Watering required according to SCAQMD Rule 403 to minimize fugitive dust emissions

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.32	1.54	0.89	0.00	0.10	0.08	0.18	0.05	0.08	0.13	0.00	168.14	168.14	0.02	0.00	168.46
Total	**0.32**	**1.54**	**0.89**	**0.00**	**0.10**	**0.08**	**0.18**	**0.05**	**0.08**	**0.13**	**0.00**	**168.14**	**168.14**	**0.02**	**0.00**	**168.46**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.32	1.54	0.89	0.00	0.05	0.08	0.13	0.02	0.08	0.10	0.00	168.14	168.14	0.02	0.00	168.46
Total	**0.32**	**1.54**	**0.89**	**0.00**	**0.05**	**0.08**	**0.13**	**0.02**	**0.08**	**0.10**	**0.00**	**168.14**	**168.14**	**0.02**	**0.00**	**168.46**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.05	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.05	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.07	0.00	0.07	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.31	0.17	0.00		0.01	0.01		0.01	0.01	0.00	27.52	27.52	0.00	0.00	27.58
Total	**0.04**	**0.31**	**0.17**	**0.00**	**0.07**	**0.01**	**0.08**	**0.04**	**0.01**	**0.05**	**0.00**	**27.52**	**27.52**	**0.00**	**0.00**	**27.58**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.33	0.00	0.00	1.33
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.33**	**1.33**	**0.00**	**0.00**	**1.33**

3.2 Site Preparation - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.03	0.00	0.03	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.31	0.17	0.00		0.01	0.01		0.01	0.01	0.00	27.52	27.52	0.00	0.00	27.58
Total	**0.04**	**0.31**	**0.17**	**0.00**	**0.03**	**0.01**	**0.04**	**0.02**	**0.01**	**0.03**	**0.00**	**27.52**	**27.52**	**0.00**	**0.00**	**27.58**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.33	0.00	0.00	1.33
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.33**	**1.33**	**0.00**	**0.00**	**1.33**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.02	0.00	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.28	0.23	0.00		0.02	0.02		0.02	0.02	0.00	32.65	32.65	0.00	0.00	32.71
Total	**0.04**	**0.28**	**0.23**	**0.00**	**0.02**	**0.02**	**0.04**	**0.01**	**0.02**	**0.03**	**0.00**	**32.65**	**32.65**	**0.00**	**0.00**	**32.71**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.60	3.60	0.00	0.00	3.61
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.02**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.25**	**6.25**	**0.00**	**0.00**	**6.27**

3.3 Grading - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.28	0.23	0.00		0.02	0.02		0.02	0.02	0.00	32.65	32.65	0.00	0.00	32.71
Total	**0.04**	**0.28**	**0.23**	**0.00**	**0.01**	**0.02**	**0.03**	**0.00**	**0.02**	**0.02**	**0.00**	**32.65**	**32.65**	**0.00**	**0.00**	**32.71**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.60	3.60	0.00	0.00	3.61
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.02**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.25**	**6.25**	**0.00**	**0.00**	**6.27**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.02	0.24	0.07	0.00		0.01	0.01		0.01	0.01	0.00	24.37	24.37	0.00	0.00	24.41
Total	**0.02**	**0.24**	**0.07**	**0.00**		**0.01**	**0.01**		**0.01**	**0.01**	**0.00**	**24.37**	**24.37**	**0.00**	**0.00**	**24.41**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.01**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.15**	**4.15**	**0.00**	**0.00**	**4.16**

3.4 Building Construction - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.02	0.24	0.07	0.00		0.01	0.01		0.01	0.01	0.00	24.37	24.37	0.00	0.00	24.41
Total	**0.02**	**0.24**	**0.07**	**0.00**		**0.01**	**0.01**		**0.01**	**0.01**	**0.00**	**24.37**	**24.37**	**0.00**	**0.00**	**24.41**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.01**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.15**	**4.15**	**0.00**	**0.00**	**4.16**

3.5 Architectural Coating - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.13					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.08	0.67	0.33	0.00		0.04	0.04		0.04	0.04	0.00	69.21	69.21	0.01	0.00	69.35
Total	**0.21**	**0.67**	**0.33**	**0.00**		**0.04**	**0.04**		**0.04**	**0.04**	**0.00**	**69.21**	**69.21**	**0.01**	**0.00**	**69.35**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.65**	**2.65**	**0.00**	**0.00**	**2.66**

3.5 Architectural Coating - 2013

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.13					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.08	0.67	0.33	0.00		0.04	0.04		0.04	0.04	0.00	69.21	69.21	0.01	0.00	69.35
Total	**0.21**	**0.67**	**0.33**	**0.00**		**0.04**	**0.04**		**0.04**	**0.04**	**0.00**	**69.21**	**69.21**	**0.01**	**0.00**	**69.35**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	0.00	0.00	2.66
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.65**	**2.65**	**0.00**	**0.00**	**2.66**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
User Defined Recreational	8.90	13.30	7.40	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaturalGas Mitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NaturalGas Unmitigated	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
User Defined Recreational	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
User Defined Recreational	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
User Defined Recreational	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.05	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unmitigated	0.05	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.01					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.04					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.01					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.04					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

7.0 Water Detail

7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					0.00	0.00	0.00	0.00
Unmitigated					0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
User Defined Recreational	0 / 0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
User Defined Recreational	0 / 0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					0.00	0.00	0.00	0.00
Unmitigated					0.00	0.00	0.00	0.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
User Defined Recreational	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
User Defined Recreational	0					0.00	0.00	0.00	0.00
Total						**0.00**	**0.00**	**0.00**	**0.00**

9.0 Vegetation

GEOTECHNICAL EXPLORATION REPORT: PROPOSED ATWATER VILLAGE BRIDGE CROSSING OF THE LOS ANGELES RIVER, NORTH OF THE INTERSECTION OF LOS FELIZ BOULEVARD AND INTERSTATE 5, CITY OF LOS ANGELES, CALIFORNIA

Prepared for

Buro Happold

9601 Jefferson Boulevard, Suite B
Culver City, California 90232

Project No. 603253-001

May 1, 2012

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

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A LEIGHTON GROUP COMPANY

May 1, 2012

Project No. 603253-001

To: Buro Happold
9601 Jefferson Boulevard, Suite B
Culver City, California 90232

Attention: Mr. Steve Chucovich

Subject: Geotechnical Exploration Report: Proposed Atwater Village Bridge Crossing of the Los Angeles River, North of the Intersection of Los Feliz Boulevard and Interstate 5, City of Los Angeles, California

Leighton Consulting, Inc. (Leighton) is pleased to submit this report presenting the results of our exploration for the proposed Atwater Village Bridge Crossing of the Los Angeles River in the city of Los Angeles, California. The purpose of this exploration was to evaluate the geologic and geotechnical conditions at the project site, and to provide recommendations for design and construction of the project.

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further assistance, please call us at your convenience.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

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1.0 INTRODUCTION

1.1 Purpose

This report presents the findings and conclusions of our geotechnical exploration site for the proposed Atwater Park Bridge Crossing over the Los Angeles River, located in the City of Los Angeles, California. The site of the proposed crossing is located approximately 0.62 miles north of the intersection of Los Feliz Boulevard and Interstate 5, and is shown in Figure 1, Site Location Map.

The purpose of the exploration was to evaluate the geologic and geotechnical conditions of the site and to provide recommendations in support of the design and construction of the proposed project.

1.2 Proposed Structure

The current concept for the proposed Atwater Park Bridge Crossing is a split-deck, cable-stayed bridge. The proposed new bridge is to replace the existing equestrian crossing. The bridge will be primarily supported by a single-battered, triangular-shaped steel mast that will be approximately 70 feet above the deck at its highest point. The mast and the back-stay cables will be founded within the side slope of the western bank, and secondary support structures will be provided under the deck on both sides of the river bank. The clear span of the bridge will be approximately 250 feet.

The anticipated maximum loading due to self-weight is estimated to be on the order of 450 kips in compression and 125 kips in tension, with a maximum horizontal thrust on the order of 120 kips.

1.3 Scope of Work

Our scope of work included the following tasks:

- Reviewed pertinent, readily available published and unpublished geotechnical and geologic literature, aerial photographs, maps related to the site and its vicinity.

- Reviewed as-built documents of the existing Caltrans[1] properties along Interstate 5 in the vicinity of the site, including the as-built records for the Griffith Park access tunnel, the Griffith Park On- and Off-ramp bridges, and both the Los Feliz Boulevard and Colorado Boulevard bridges.

- Obtained drilling permits for subsurface exploration including the 408 Permits from the United State Army Corps of Engineers (USACE) and the County of Los Angeles Department of Public Works (LADPW) Flood Control District permit.

- Drilled and sampled a total of four hollow-stem auger borings to evaluate the stratigraphy of the subsurface soils and groundwater conditions.

- Conducted geotechnical laboratory testing of representative soil samples obtained from the site to assess pertinent physical/engineering properties of the subsoil.

- Performed engineering analysis to form the basis for our recommendations related to the design and construction of the bridge and other incidental improvements associated with the project.

- Prepared this report to document the results of this exploration.

[1] Caltrans: California Department of Transportation

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Two phases of drilling were performed during the course of the project. The initial phase of field exploration (Borings LB-1 and LB-2) was performed on February 10th and 13th, 2012, at the originally proposed bridge location. Subsequently, we were informed that the proposed bridge location had been moved by approximately 200 feet to the north. Therefore, another two borings (Borings LB-1A and LB-2A) were performed on April 2nd and 3rd, 2012 at the newly proposed bridge location.

Each phase of drilling consisted of drilling and sampling a hollow-stem soil boring near the bridge support on top of the embankment on each side of the Los Angeles River. The borings were advanced to a maximum depth of 71½ feet below ground surface (bgs) along the west side of the Los Angeles River, and to a maximum depth of 101½ feet bgs along the east side.

Ring and Standard Penetration Test (SPT) samples were collected with California-Modified split-spoon samplers from each sampling interval for geotechnical laboratory testing and analyses. In addition, bulk samples were collected from cuttings produced by the hollow-stem auger for geotechnical laboratory observation and testing.

The drilling activities were supervised, and the subsoil conditions were logged, by a Leighton geologist. The approximate locations of the boreholes are shown on Figure 2, Boring Location Map. The depths that the samples were collected from are presented on the Geotechnical Boring Logs that are included in Appendix B, Boring Logs.

2.2 Geotechnical Laboratory Testing

The engineering properties of the site soils were evaluated by testing representative soil samples obtained during drilling by the following test methods:

- Particle size analyses (ASTM D422, ASTM[2] D1140, and ASTM D6913);
- Unconfined compressive strength (ASTM D2166);
- Direct Shear (ASTM D3080); and
- Corrosion including water-soluble sulfate (CTM[3] Test 417), water-soluble chloride (CTM Test 422), pH and Minimum Resistivity (CTM Test 532/643)

The results of the laboratory tests are presented in Appendix C, Geotechnical Testing Results.

[2] ASTM: American Society of Testing and Materials

[3] CTM: California Testing Method

3.0 GEOLOGY AND SUBSURFACE CONDITIONS

3.1 Site Geology

The subject site lies near the southern margin of the Transverse Ranges Geomorphic Province. The Transverse Ranges Geomorphic Province is approximately 50 miles wide, extending from Point Arguello east-southeastward for approximately 275 miles towards, and south of, the Mojave Desert and is characterized by east-west trending mountain ranges and valleys. The northern and southern boundaries of the western part of the province are marked by fault line scarps situated along east-trending faults, such as the Santa Ynez and Santa Monica fault zones, respectively (Yerkes, 1965). The backbone of this geomorphic province in its central and eastern parts is formed by the San Gabriel and San Bernardino mountains, with major peaks extending to elevations of greater than 10,000 feet above sea level.

The proposed bridge will span the Los Angeles River at a location that is north-northwest of the intersection of Los Feliz Boulevard and Interstate 5. Prior to channelization, the site was part of a stream channel system associated with the river. To the north and east lies alluvial terrace and alluvial plains deposits, which are bounded to the west by Griffith Park and the eastern edge of the Santa Monica Mountains (Dibblee, 1991). Los Feliz Boulevard is located approximately 0.62 miles to the south-southeast of the site. The site is topographically lower than the surrounding alluvial plains on the north and east sides. Figure 3 depicts the geology of the site and its vicinity.

3.2 Subsurface Soil Conditions

As encountered in Leighton's borings, geologic conditions at both river banks is consistent with the geologic conditions depicted by Lamar (1970) and Dibblee (1991). Artificial fill overlies alluvium which, in turn, overlies Topanga Formation bedrock.

The earth units are characterized as follows:

- Artificial Fill (Af) is approximately 17 feet in thickness on both sides of the river, and predominately consists of sand with varying amounts of silt and gravel, with colors ranging from brown to tan.

- Alluvium (Qal) was encountered on the both sides of the river. On the west side of the river, the alluvium overlies bedrock and ranges in thickness from 31.5 feet in Boring LB-1 (initially proposed bridge location) to 28 feet in Boring LB-1A (currently proposed bridge location). On the east side of the river, Boring LB-2 (initially proposed bridge location) encountered 84.5 feet of alluvium and Boring LB-2A (currently proposed bridge location) encountered 85 feet of alluvium, but bedrock was not encountered. The alluvium was derived from bedrock in the San Gabriel Mountains (CDMG, 1998). Generally, the deposits consist of grayish brown to tan, poorly-graded sand with varying amounts of silt and gravel. Deposits encountered along the east side of the river are more gravelly with a few thin lenses of clay.

- Topanga Formation bedrock was only encountered on the west side of the river. In Boring LB-1 (initially proposed bridge location), it was encountered at an approximate depth of 49 feet (elevation 365 feet). In Boring LB-1A (currently proposed bridge location), it was encountered at an approximate depth of 45.5 feet (elevation 368.5 feet). This is consistent with the depictions of bedrock in the Caltrans Logs of Test Borings for the Griffith Park on- and off-ramps, and both the Los Feliz Boulevard and Colorado Boulevard bridges. The bedrock generally consists of hard, blocky, weathered, tan and olive brown to dark olive sandy siltstone and silty sandstone.

Based on the field exploration and laboratory testing results, the idealized subsurface soil profile for use in this study was characterized as follows:

Table 1 - Idealized Soil Profile					
Elevation (feet)	**Predominant Soil Types**	**Blowcounts (Blows per foot)**	**Unit Weight (pcf)**	**Shear Strength (psf)**	**Frictional Angle, Φ**
Embankment Fill 397 to 441	SP	18	102	0	32
Alluvium (1) (2) 312 to 397	SP-SW	7 to greater than 50	120	(1) (2) (3)	36

Notes

1. Topanga Formation bedrock was encountered below approximate elevation 368.5 feet at Boring LB-1A on the west side of the Los Angeles River. The shear strength was estimated to be approximately 2,600 psf.

2. Potentially liquefiable soil was encountered between elevation 392 feet and 387 feet in Boring LB-1A on the west side of the Los Angeles River. The residual shear strength was estimated at approximately 300 psf. The shear wave velocity V_{30} at Boring LB-1A was estimated at 400 meters per second.

3. Potentially liquefiable soil was encountered between elevation 394 and 390 feet in Boring LB-2A on the east side of the Los Angeles River. The residual shear strength was estimated at approximately 200 psf. The shear wave velocity V_{30} at Boring LB-2A was estimated at 340 meters per second.

3.3 Groundwater Conditions

The project site lies on the southeastern margin of the San Fernando Valley Groundwater Basin, which is bounded to the north by the Santa Susana and San Gabriel Mountains, to the east by the San Rafael Hills, to the south by Santa Monica Mountains, and to the west by the Simi Hills (California Department of Water Resources, 2004).

The site is located immediately adjacent to the Los Angeles River. At the time of drilling, groundwater was approximately 20 feet deep at the site of the initially proposed bridge location and approximately 19 feet deep at the currently proposed bridge location. The measured groundwater depths generally coincide with the river bottom. For the purpose of this report, we used the shallowest groundwater, i.e. at elevation 395 feet.

4.0 SEISMICITY AND SEISMIC HAZARDS

The site is located in seismically active southern California. Major faults within the region are capable of generating earthquakes with Magnitude 5.0 and larger. Figure 4, Regional Fault Map, shows the site location relative to the major earthquake faults in the region. The following sections discuss the major faults in the vicinity of the project site and the potential seismic hazards associated with strong earthquakes resulting from these faults and other major faults in the region.

4.1 Ground Rupture Potential

Based on our review of the available literature, the site is not located within an Alquist-Priolo Earthquake Fault (AP) Zone. Therefore, ground rupture potential at the site is considered low.

4.2 Ground Motions

The site is expected to experience moderate to strong earthquake ground motions during its life span. The magnitude of ground motion is generally characterized by using the peak horizontal ground acceleration (PHGA). Based on Caltrans ARS analysis (http://dap3.dot.ca.gov/shake_stable/), the principal earthquake faults in the area are the Hollywood, Raymond, and Puente Hills Blind Thrust faults. The deterministic seismic parameters of these faults are summarized in the table below:

Table 2 - Fault Characteristics

Fault Name	Type of Slip	Maximum Magnitude	Distance From Site (km)	Estimated PHGA (g)
Hollywood Fault	Strike Slip	6.6	2.77	0.51
Raymond Fault	Strike Slip	6.6	3.52	0.42
Puente Hills Blind Thrust	Reverse	7.3	6.42	0.59

The estimated PHGA was based on the average of the Cambell-Bozorgnia (2008) and Chiou-Youngs (2008) ground motion attenuation models.

To take into consideration the aggregate effects of the regional faults and the likelihood of a major earthquake occurring in the region, a probabilistic approach was used to assess the site ground motion hazard. Using the United States Geological Survey (USGS) Seismic Hazard Deaggregation Interactive Analysis (http://geohazards.usgs.gov/deaggint/2008/), the PHGA at the site without adjustments for near-fault and basin effects was estimated at 0.82g for an earthquake with a 5 percent probability of exceedance in 50 years (i.e. a 975-year return period). Based on deaggregation of the PHGA, the magnitude of the modal earthquake magnitude was calculated at 6.48 at a distance of 3.5 kilometers from the site. Our analyses are included in Appendix D, Seismic Hazard Analysis. The development of the recommended Acceleration Response Spectra (ARS) curve for designing the bridge is discussed in Section 5.1.

4.3 Liquefaction Potential

Soil liquefaction is the loss of soil strength or stiffness of cohesionless soil caused by the buildup of pore-water pressure during severe ground shaking. As shown on Figure 5, Seismic Hazards Map, the site is located in a Seismic Hazard Zone with respect to liquefaction (CDMG, 1999).

The site is underlain predominately by granular soils. Based on an analysis of the blowcounts recorded during drilling, potentially liquefiable soils are present at the site at depths ranging from 20 to 25 feet. Our analysis was performed using computer program LiqIT v.4.7 (Geologismiki, 2008). The program computed the safety factor against liquefaction following the NCEER Method (Youd et. al. 1998). The results of our analysis are included in Appendix D. The most significant adverse effects of liquefaction affecting the project site include lateral spreading of the riverbanks and loss of support for the bridge foundation. Recommendations for liquefaction mitigation are discussed in the foundation design section of this report.

4.4 Earthquake-induced Settlement

Strong ground motion during earthquakes tends to rearrange looser soil particles into a more compact arrangement, especially in granular soil deposits such as alluvium. The cumulative effects of soil particle rearrangement during an

earthquake will result in settlement of the soil column. In general, a poorly graded granular soil deposit is more susceptible to settlement than a fine-grained or a well-graded soil. Earthquake-induced ground settlement occurs in a soil column both above and below groundwater.

Earthquake-induced settlement calculations were performed using the blowcount records of the soil profile at each soil boring (LB-1A and LB-2A) in conjunction with the liquefaction analysis location using computer program LiqIT v.4.7 (Geologismiki, 2008). The program computed the earthquake-induced settlement using the Tokimatsu and Seed Method (Tokimatsu 1987). Based on our analysis, the earthquake-induced settlement due to liquefaction at the site was estimated to be on the order of one to two inches. The settlement in the non-liquefiable soils is insignificant. The results of the analysis are included in Appendix D.

4.5 Other Seismic Hazards

Other common hazards associated with earthquakes in the region are landslides, tsunamis, and seiches. Based on the location and topography of the site, the likelihood for occurrence of these hazards at the site is negligible.

5.0 CONCLUSION AND RECOMMENDATIONS

Based on the results of our exploration, we conclude that the proposed project is feasible from a geotechnical standpoint. The primary design consideration for the project is the potential for lateral spreading of the existing embankments due to liquefaction of the underlying loose granular soil. The following sections provide mitigation measures for the liquefiable soils and design parameters for the bridge foundation at the main pier and abutments.

5.1 Seismic Design Parameters

The development of the ARS curve for design of the bridge crossing was performed based on the procedures described in the Caltrans Geotechnical Services Design Manual (Caltrans 2009). The procedures consisted of comparing the deterministic ARS curves developed using Caltrans ARS analysis and probabilistic ARS Curves developed using the USGS Deaggregation Interactive analysis (See Section 4.2). Based on results of our analysis, the USGS probabilistic ARS curve will be used for design. Since bedrock was only encountered in one of the borings at the currently proposed bridge location, ARS curves were developed for each boring and the enveloped curve is recommended for the design of the subject bridge. The recommended ARS curve with adjustments for near fault and basin effects is presented in Appendix D, Seismic Hazard Analysis.

5.2 Scouring Potential

Scour potential describes the susceptibility of streambed deposits to erosion in the vicinity of bridges. Scour occurs when flowing water lifts and carries streambed sediments in the direction of flow, causing erosion (USGS, 2005).

The Los Angeles River in the location of the proposed crossing has been channelized, and includes cement-grouted rip-rap-lined side slopes, which would preclude erosion. We understand that the cement-grouted, rip-rap side slopes will be restored after construction of the bridge and therefore scour potential for the side slopes is considered negligible. However, the river bottom is unlined and therefore the bridge pier may be subject to scour.

Based on the topography map provided to us, the river bottom is approximately between elevation 393 feet and 395 feet. Based on the hydrology study results provided to us, the maximum flood water level in the river was estimated at elevation 415 feet.

To protect the bridge pier from scouring, a scour analysis may be required and mitigation measures including using rip-raps and other commercially available scour countermeasure products should be used, if warranted.

5.3 Foundation

Main Pier

Liquefaction Mitigation – The main pier of the bridge will be located in the riverbed, approximately 90 feet away from the top of the west bank. For the purpose of our analysis, we assumed the top of the pier foundation is at elevation 395 feet. Based on our interpretation of the subsurface soil data obtained from our field exploration, the potentially liquefiable soil at the pier extends to approximate elevation 387 feet. We recommended that the potentially liquefiable soils be removed and replaced with aggregate during construction.

Foundation Type – Due to high groundwater and the granular nature of the subsurface soil at the site, it is recommended that the main pier be supported on a driven-pile foundation system.

Axial Capacity – For the purpose of this report, a 14-inch concrete and a 16-inch steel pipe pile are recommended for consideration. The calculated axial capacity and recommended pile tip elevations are summarized in the table below.

Table 3 - Pile Capacity Summary

Type of Pile	Allowable Capacity (kips)		Tip Elevation (feet)
	Compression	Tension	
14-in Concrete	200	80	340
16-in Steel Pipe	200	80	345
Top of pile elevation was assumed at 390 feet.			

The calculations of axial capacity were performed using computer program APILE with an assumed scour depth of 3 feet below top of piles. In our analysis, the steel pipe piles were assumed to be driven in-place without removing the soil plug (i.e. unfilled). Therefore, a fully-plugged condition was assumed for the steel pipe pile with respect to developing end-bearing capacity. The pile capacity was limited to a maximum of 1 inch pile head settlement. No reduction of downward capacity is required if each pile is spaced a minimum of three times its diameter.

Lateral Capacity – The lateral capacity of the pile depends on the amount of lateral displacement allowed at the pile head and the connection of the pile at the pile cap. The load displacement relationships of the recommended pile types were evaluated using the computer program LPILE for a free head condition at the pile cap. The results are tabulated below:

14-inch Concrete Pile			
Pile Head Disp. (inch)	**Maximum Shear (kips)**	**Max. Moment (in-kip)**	**Depth to Max. Moment (ft)**
0.5	7.5	549	7.7
1.0	9.1	697	8.3
2.0	11.5	888	8.3

16-inch Steel Pipe Pile			
Pile Head Disp. (inch)	**Maximum Shear (kips)**	**Max. Moment (in-kip)**	**Depth to Max. Moment (ft)**
0.5	11	858	8.3
1.0	17	1,520	9.4
2.0	30	2,624	10.4

The lateral pile design parameters should be reevaluated when the final foundation plan is available.

Pile Installation – Proper pile installation is critical to the performance of any driven pile system. Although Leighton was able to drill to a maximum depth of approximately 100 feet, hard driving conditions may be encountered for the concrete piles given the likely presence of oversized alluvial materials in the

subsurface. If hard driving conditions are encountered, pre-drilling may be used if approved by the engineer. It is recommended that the pre-drilled depth should be at least 10 feet above the specified tip elevation of the pile. The pre-drilled diameter should not be larger than 12 inches.

It is recommended that dynamic load tests for at least two piles be performed during construction to verify the pile capacity. The test should be performed for both driving and restrike conditions. The results should be reviewed by the engineer prior to driving the production piles.

Abutments and Secondary Supports

Slope Stability – The stability of the existing embankments were determined to be stable under static loading conditions. Due to soil liquefaction, the riverbanks are likely to experience excessive displacement due to lateral spreading. Using the method by Bray and Travasarou (2007), the lateral displacements of the riverbanks on the verge of soil liquefaction were estimated to be on the order of 9 feet. As indicated in our analysis, the lateral displacement of the west riverbank could potentially extend into the adjacent Interstate 5 while the lateral displacement of the east riverbank could adversely affect the stability of the existing power lines. The results of our slope stability analysis are included in Appendix E, Slope Stability Analysis. The stability of the embankment including loading from the bridge should be evaluated in conjunction with the design of the liquefaction mitigation measures.

Liquefaction Mitigation – Considering the depth to the liquefiable soils below ground surface, in-situ ground improvement techniques appear to be the most effective measure to mitigate liquefaction potential at the site. The ground improvement techniques recommended for consideration are vibro-compaction, vibro-replacement (stone columns), and compaction grouting. The general approach for the recommended mitigation measures is to improve the shear strength of the liquefiable soil by densification or injection of grout. The improved soil zone will also exhibit adequate shear strength to stabilize the existing riverbanks, and to provide support for the bridge abutments.

The table below provides performance guidelines for mitigation in terms of stabilizing force per foot run of the embankment, and the anticipated post-mitigation displacement of the riverbank. A safety factor of 1.2 has been incorporate in the stabilization force. The stability of the embankments should be

reevaluated in conjunction with the selection and design of the mitigation measure.

Table 4 - Post-mitigation Displacement vs. Stabilization Force		
Post-Mitigation Displacement (inches)	**East Bank (kips/foot)**	**West Bank (kips/foot)**
36	8	10
12	16	24
6	26	35
3	38	55

The improved soil zone should extend transversely from either side of the bridge to a distance equal to one-half of the embankment slope. An experienced ground improvement contractor should be consulted in selecting the mitigation techniques.

Foundation Type – The abutment and the secondary supports of the bridge may be supported on a shallow foundation established on the improved soil zone within the river banks.

Allowable Bearing Capacity – The recommended allowable downward bearing capacity will depend on the mitigation measure selected for the site. For preliminary analysis, a maximum bearing value of 6,000 pounds per square foot (psf) may be assumed for the foundation for a post-construction settlement of one inch or less. The foundation should be at least 2 feet in width and embedded at least 18 inches into the improved soils. A one-third increase of the recommended valued is allowed for seismic and wind loads.

Lateral Load Resistance – The lateral resistance for the foundation may be calculated using friction force along the bottom and sides of the foundation and passive resistance developed on sides of the foundation against adjacent undisturbed native soils or engineered fill derived from the onsite soils. An allowable coefficient of friction of 0.5 and a passive pressure of 300 psf per foot depth may be used for calculating the lateral resistance. A one-third increase is allowed for both friction and passive resistance. When combining the friction and passive resistance, the passive resistance should be reduced by one half.

Uplift Resistance – It is recommended that tie-down anchors be used to provide uplift resistance for the bridge foundations. For designing gravity grouted tie-down anchors embedded in bedrock underneath the west bank, an ultimate bond stress of 2,000 psf between the grout and bedrock may be used. For tie-down gravity ground anchors installed in the native alluvium below elevation 384 feet underneath the east bank, a frictional angle of 36 degrees may be used. These values should be verified by load tests.

A minimum safety factor of 2 is recommended for designing the anchors. Each production anchor should be designed to carry 120 percent of the design load and proof-tested to at least 2.5 times the design load. The contractor should submit the load test program to the geotechnical engineer for review prior to installing the anchors.

Due to shallow groundwater, provisions to prevent the drilled holes from caving should be implemented during installation.

5.4 Earth Retaining Structures

Backfill for the retaining structures should be granular, very low expansive soil and be constructed with a backdrain. The backdrain should slope at a minimum of 1 percent toward an approved non-erosive outlet. The on-site soil is non-expansive and is suitable to be used as backfill behind retaining structures. The following parameters may be used for the design of conventional retaining structures backfilled with non-expansive backfill:

Condition	Equivalent Fluid Unit Weight for Granular Backfill
Active	35 psf/ft (Level Backfill)
At-Rest	60 psf/ft (Level Backfill)
Passive	300 psf/ft with a maximum of 3,000 psf
Seismic	20 psf/ft *
Coefficient of Friction	0.25

* Inverted Triangular Distribution and only required where retaining wall is taller than 12 feet.

Unrestrained walls that are free to rotate or deflect may be designed using the active earth pressure. For restrained walls that are fixed against rotation, the at-rest condition should be used. The lateral passive resistance should be taken

into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. We also recommend using the at-rest pressure for design of walls supporting settlement-sensitive structures, such as adjacent structures and improvements, if any. The above-recommended lateral pressures are based on a granular soil with total unit weight of 120 pcf. No factor of safety was applied to the above values.

Backfill for retaining walls should be compacted to a minimum of 90 percent relative compaction based on ASTM Test Method D1557. Relatively light construction equipment should be used to backfill the retaining walls.

Lateral pressures from other surcharge and superimposed loads (for example, from vehicle traffic and adjacent structures) should be added to the above recommended lateral earth pressures if the loads fall within a projected area of an imaginary line extended at an angle of 45 degrees from the wall foundation. Thirty percent of the surcharge load may be used for unrestrained walls and fifty percent of the surcharge may be used for restrained walls.

The foundations for retaining walls may be designed for a maximum net allowable soil bearing pressure of 3,000 psf supported by at least two feet of compacted fill. The bottom of the footing is recommended to be embedded at least 18 inches below the lowest adjacent exterior grade. The post-construction settlement of retaining wall foundations designed in accordance with the recommendations of this report is estimated to be less than one inch.

5.5 Soil Corrosivity

As a screening for potentially corrosive soil, a representative soil sample was tested during our study to assess minimum resistivity, chloride content, and pH. The test results are included in Appendix C of this report and are summarized in the following table.

Test	Results	Corrosivity Threshold	General Classification of Hazard
Water-Soluble Sulfate	81 to 88 ppm	> 2,000 ppm	Low Sulfate Exposure on Concrete
Water-Soluble Chloride	21 to 31 ppm	> 500 ppm	Low Chloride Exposure on Concrete
pH	7.18 to 7.99	< 5.5	Slightly Alkaline Soil
Minimum Resistivity	5,660 to 13,500 ohm-cm	< 2000	Non-corrosive to buried metals

ppm: Parts per million

5.6. Earthwork and Site Grading

The recommendations for earthwork and site preparation are based upon the assumptions that minor grading will be required to achieve planned grades. Recommendations in this report may be revised if site grades are raised to reach design grade. Leighton should be on-site during grading to confirm if the actual subgrade conditions are consistent with those encountered within our exploratory borings. Recommendations in this report may be revised, if necessary.

Site Preparation - Prior to construction, the site should be cleared of the existing pavement, vegetation, trash, and debris, which should be disposed of offsite. Unsuitable materials at the site should be completely removed. Efforts should be made to locate any existing or abandoned utility lines in the area. Existing utility conduits should be removed or rerouted if they interfere with the proposed construction, and the resulting cavities should be properly backfilled and compacted.

Overexcavation and Recompaction – Subgrade for all incidental site improvement work should be overexcavated and recompacted at least 18 inches below the proposed finish subgrade. The lateral extent of the overexcavation should be equal to the depth of overexcavation or a minimum of two feet beyond the footprint of the improvements, whichever is deeper.

Subgrade Preparation – Subgrade soil surfaces, including all excavation and removal bottoms, should be observed by a representative of the geotechnical engineer prior to placement of fill or construction of improvements to verify that

suitable onsite soil is exposed. The exposed subgrade should be scarified to a depth of six inches, moisture-conditioned to two to three percent above optimum moisture content prior to placing new fill.

Fill Placement and Compaction – The onsite soil, free of organic material, debris, and oversize materials (greater than 6 inches in largest dimension) is suitable to be used as fill. Import soil should be evaluated and tested by the geotechnical consultant before delivery to the site. In general, import material should be non-organic and free of debris or other deleterious materials, and low in expansion potential with an Expansion Index less than 35. All fill soil should be placed in thin, loose lifts less than 8 inches thick, moisture-conditioned as necessary to approximately two to three percent above optimum moisture content, and compacted using appropriate equipment to the minimum standard as noted below:

- Fill soil should be moisture-conditioned and compacted to a minimum of 90 percent relative compaction as determined by ASTM Test Method D1557.
- Base material should be compacted to a minimum of 95 percent relative compaction.

Utility Trench Backfill - The utility trench subgrade should be firm and unyielding and should be observed and tested by the geotechnical consultant prior to placing pipe bedding materials. The bedding materials should be compacted free draining sand, gravel, or crushed rock. If sand is used, the sand should have a sand equivalent greater than 30. Pipe bedding should extend below the pipe to a depth in accordance with the pipe manufacturer's specifications. The pipe bedding material should extend to at least 12 inches over the top of the pipe.

Trench excavations above the pipe bedding may be backfilled with suitable onsite soils under the observation of the geotechnical consultant. All fill soils should be placed in loose lifts, moisture-conditioned to two to three percent above optimum moisture content, and compacted to a minimum of 90 percent relative compaction, as determined by ASTM Test Method D1557. Lift thickness will be dependent on the equipment used as suggested in the latest edition of the Standard Specifications for Public Works Construction (SSPWC). The fill soils should extend to the bottom of the base course for any new pavement. Base material should be moisture-conditioned between optimum and two percent

above optimum moisture and compacted to a minimum of 95 percent relative compaction based on ASTM D1557. All compaction should be performed by mechanical means. Jetting or flooding of trench backfill deriving from the onsite granular soils may be used with caution.

5.7 Construction Dewatering

Temporary construction dewatering is expected for the construction of the main bridge pier and other improvements near or below the river invert. Due to the granular native of the onsite soils, dewatering using pumping may not be effective. Installing temporary sheet piling to construct a cofferdam may be used to allow excavation the space inside the cofferdam. If adequate embedment of the sheet piles into the native soil is achieved, intermittent pumping will then be used as a secondary means of keeping the excavation dry. A specialized dewatering contractor should be retained in designing and installing the sheet pile and dewatering system.

5.8 Temporary Excavation

All temporary excavations, including utility trenches, retaining wall excavations, and other excavations should be performed in accordance with project plans, specifications and all Occupational Safety and Health Administration (OSHA) requirements.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or five feet, whichever is greater, from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structures.

Temporary excavations should be performed in accordance with the State of California version of OSHA excavation regulations. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾h:1v (horizontal:vertical) slope for Type A soils, 1h:1v for Type B soils, and 1½h:1v for Type C soils. The onsite soils within the proposed structural depths

generally conform to OSHA soil Type C. Shoring can be designed using the appropriate lateral earth pressures provided in Section 5.4.

OSHA regulations are applicable in areas with no restriction of surrounding ground deformations. Shoring should be designed for areas with deformation restrictions. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances. Heavy construction loads, such as those resulting from stockpiles and heavy machinery, should be kept a minimum distance equivalent to the excavation height or five feet, whichever is greater, from the excavation unless the excavation is shored and these surcharges are considered in the design of the shoring system.

5.9 Geotechnical Observations and Testing

It is recommended the inspection and testing be performed by the geotechnical consultant during the following stages of construction:

- Excavation and placement of compacted fill
- Shoring installation
- Pile construction
- Foundation excavation
- Backdrain installation
- Removal or installation of support of buried utilities
- When any unusual subsurface conditions are encountered

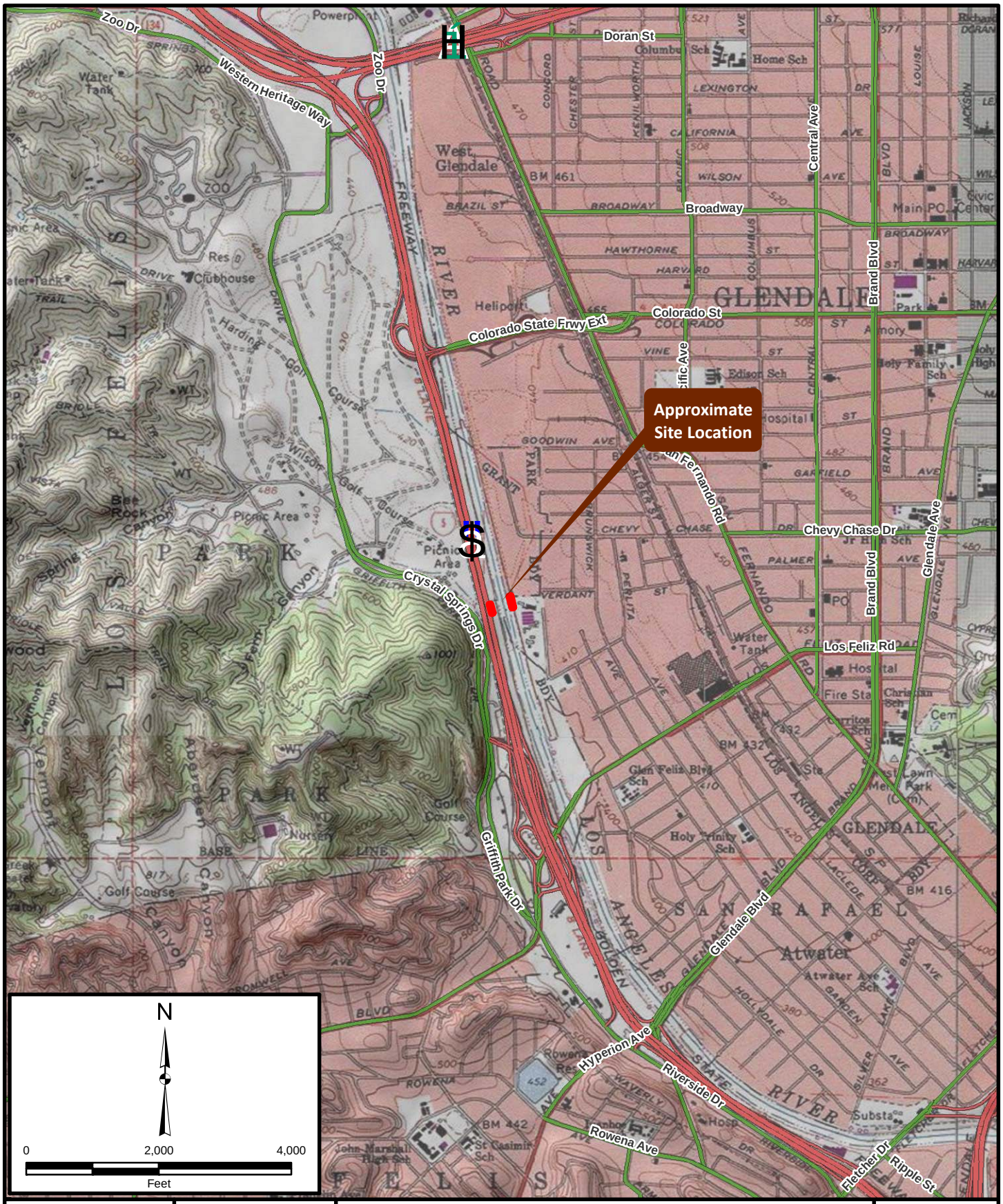
The consultant should review the final plans and specifications to verify if the recommendations contained in this report have been properly incorporated.

6.0 LIMITATIONS

Leighton's work was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the conclusions and professional opinions included in this report.

This report has been prepared for the express use of the owner, Buro Happold and other design team members of this project, and only as related expressly to the assessment of soil with respect to the geotechnical and geochemical constraints of developing the subject site and for construction purposes. This report may not be used by others or for other projects without the express written consent of the owner, Buro Happold, and our firm.

Any persons using this report for bidding or construction purposes should perform such independent investigations as they deem necessary to satisfy themselves as to the surface and/or subsurface conditions to be encountered and the procedures to be used in the performance of work on the subject site.



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Scale: 1 " = 2,000 '	Date: April, 2012

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

SITE LOCATION MAP

PROPOSED ATWATER PARK MULTIMODAL CROSSING
APPROX. 2/3 MI. N. OF LOS FELIZ BLVD.
LOS ANGELES, CALIFORNIA

Figure 1

Leighton

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Scale: 1 " = 100 '	Date: April, 2012

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

BORING LOCATION MAP

PROPOSED ATWATER PARK MULTIMODAL CROSSING
APPROX. 2/3 MI. N. OF LOS FELIZ BLVD.
LOS ANGELES, CALIFORNIA

Figure 2

Leighton

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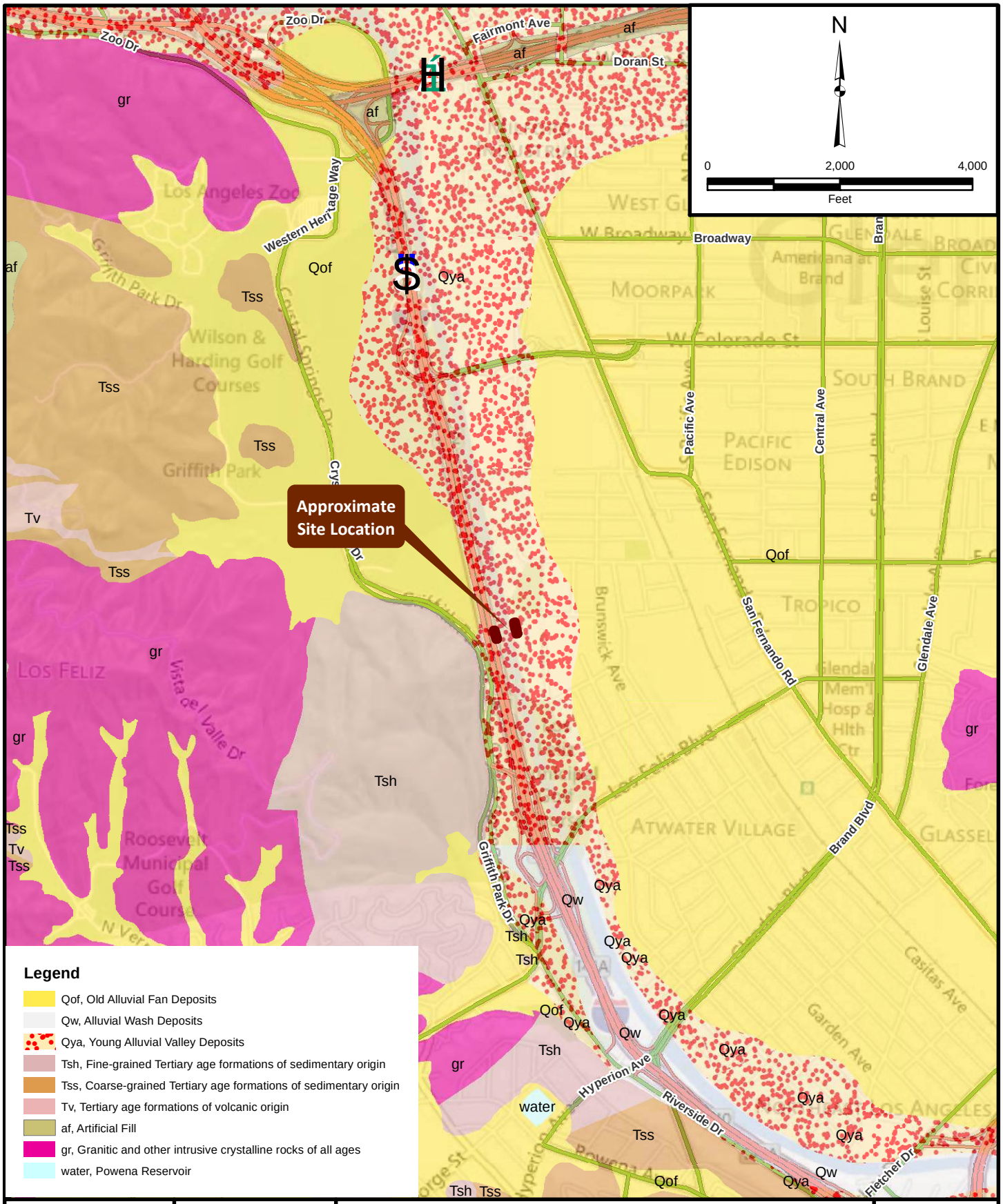

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Scale: 1 " = 2,000 '	Date: April, 2012

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

REGIONAL GEOLOGY MAP

PROPOSED ATWATER PARK MULTIMODAL CROSSING
APPROX. 2/3 MI. N. OF LOS FELIZ BLVD.
LOS ANGELES, CALIFORNIA

Figure 3

Leighton

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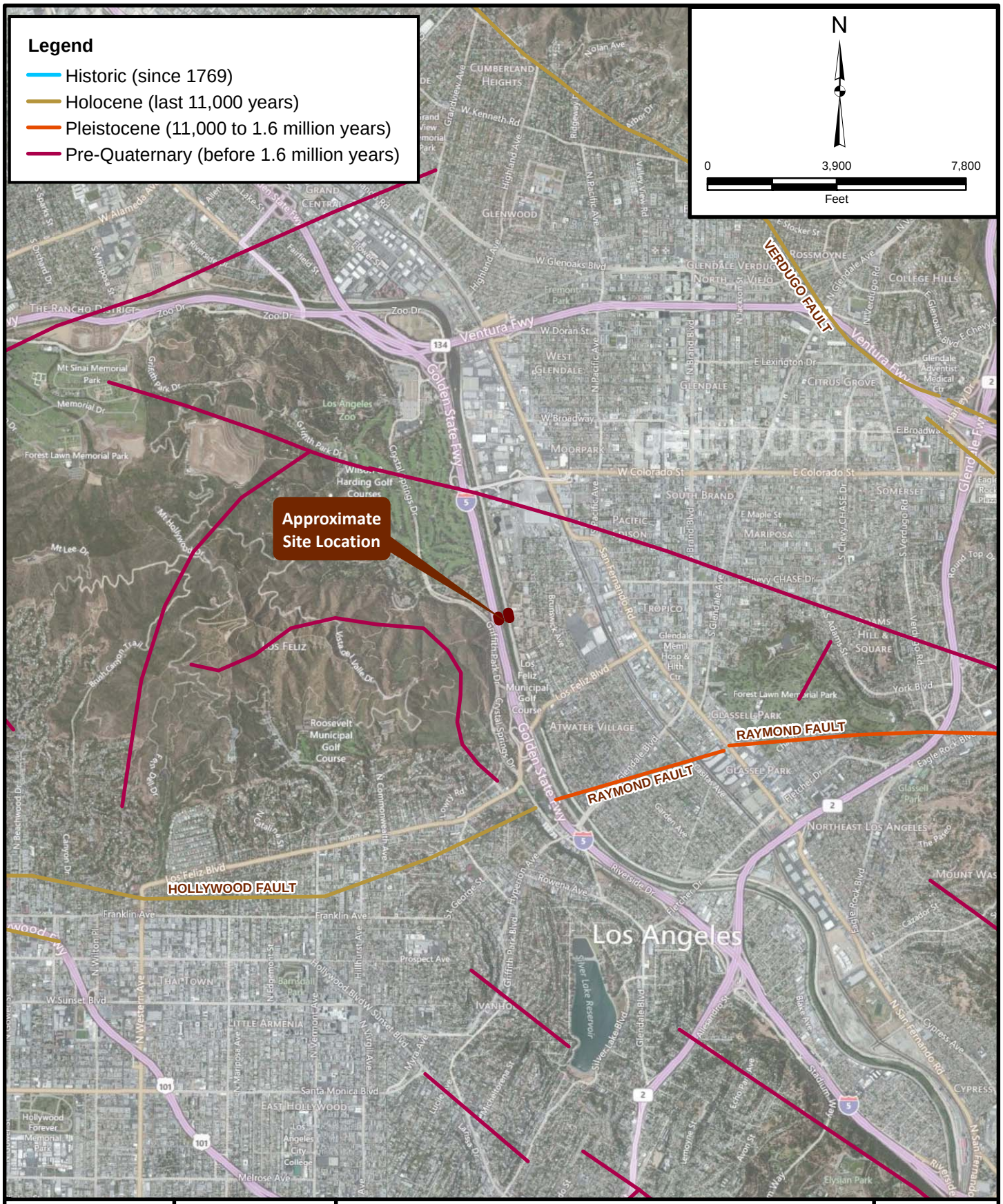

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Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

REGIONAL FAULT MAP

PROPOSED ATWATER PARK MULTIMODAL CROSSING
APPROX. 2/3 MI. N. OF LOS FELIZ BLVD.
LOS ANGELES, CALIFORNIA

Figure 4

Leighton

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Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

SEISMIC HAZARDS MAP

PROPOSED ATWATER PARK MULTIMODAL CROSSING
APPROX. 2/3 MI. N. OF LOS FELIZ BLVD.
LOS ANGELES, CALIFORNIA

Figure 5

Leighton

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APPENDIX A

APPENDIX A

References

California Department of Conservation, Division of Mines and Geology (CDMG), 1998, Seismic Hazard Zone Report for the Burbank 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 016, Revised 2001, June 13, 2005, and January 13, 2006.

California Department of Conservation, Division of Mines and Geology (CDMG), 1999, Seismic Hazard Zones Map, Burbank 7.5-Minute Quadrangle, Los Angeles County, California, Scale 1:24,000.

California Department of Transportation (Caltrans), 2011, “Guideline on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading”

California Department of Transportation (Caltrans), 2009 Version 1, “Geotechnical Services Design Manual

California Department of Transportation (Caltrans), 2009, Development of the Caltrans Deterministic PGA Map and Caltrans ARS Online.

California Department of Water Resources (CDWR), 2004, San Fernando Valley Groundwater Basin, South Coast Hydrologic Region, Bulletin 118, updated February 27, 2004.

Campbell K and Bozorgnia Y, 2008, NGA Ground Motion Modal for Geometric Mean Horizontal Component of PGA, PGV, PGD, and 5% Damped Linear Elastic Response Spectra for Periods Ranging From 0.01 to 10 sec., Earthquake Spectra, Vol. 24, pp. 139-172

Chiou B and Youngs R, 2008, An NGA Modal for The Average Horizontal Component of Peak Ground Motions and Response Spectra., Earthquake Spectra, Vol. 24, pp. 173-216.

Dibblee, Jr., T.W., 1991, Geologic Map of the Hollywood and Burbank (South ½) Quadrangles, Los Angeles County, California: Dibblee Geological Foundation Map DF-30, Santa Barbara, California, Scale 1:24,000.

Geologismiki, 2008 LiqIT V.4.7 Computer Program for Assessment of Soil Liquefaction.

Jonathan D. Bray and Thaleia Travasarou (2007), Simplified Procedures for Estimating Earthquake-induced Deviatoric slope Displacements, Journal of Geotechnical and Geoenvironmental Engineering, Volume 133

Lamar, D. L., 1970, Geologic Map of the Elysian Park-Repetto Hills Area, Los Angeles County, California, California Division of Mines and Geology (CDMG), Special Report 1, Plate 1. Scale 1:24,000.

Southern California Earthquake Data Center (SCEDC), 2011, Significant Earthquakes and Faults, Hollywood Fault, updated October 4, 2011, http://www.data.scec.org/significant/hollywood.html

Tokimatsu K. and Seed, H.B. (1987) Evaluation of Settlement in Sanes due to Earthquake Shaking", ASCE Journal of Geotechnical Engineering, Volume 113, No. 8.

United States Geological Survey (USGS), 2005, Evaluation of Scour Potential at Susceptible Bridges in Vermont, updated November 15, 2005, http://nh.water.usgs.gov/projects/vtscour.htm

United States Geological Survey (USGS), 2008, Interactive Deaggregation, http://geohazards.usgs.gov/deaggint/2008

Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E. and Vedder, J.G., 1965, Geology of the Los Angeles Basin, California -- An Introduction: U. S. Geological Survey Professional Paper 420-A, pp. 11-15, 57 p.

Youd et. al., 1998, "NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils", ASCE Journal of Geotechnical and Environmental Engineering Volume 124 No. 10.

APPENDIX B

APPENDIX B

Field Investigation

Reconnaissance

Prior to conducting the subsurface explorations, a reconnaissance of the site was carried out by Leighton personnel. The locations of the subsurface explorations were chosen to obtain subsurface information at locations appropriate for the objective of this preliminary report. These locations were marked in white paint and Underground Service Alert (USA) was notified at least 48 hours in advance of the subsurface explorations being performed. Access points, routes of ingress and egress, and distance from utilities were evaluated in determining the proper locations for each soil boring. Leighton encountered no underground utility lines during the subsurface exploration.

Subsurface Explorations

Two rounds of drilling were performed during the course of the project. The initial field exploration (LB-1 and LB-2) was performed on February 10th and 14th at the originally proposed bridge location. As a result of relocating the bridge to the north of approximately 200 feet, a second round of field exploration (LB-1A and LB-2A) was performed on April 2nd and 3rd, 2012. Each round of drilling consisted of drilling and sampling a hollow-stem soil boring near the bridge support on top of the embankment at each of the riverbank. The borings were advanced to a maximum depth of 71½ feet below ground surface (bgs) along the west side of the Los Angeles River, and to a maximum depth of 101½ feet bgs along the east side. The drilling activities were supervised, and the subsoil conditions were logged, by a Leighton geologist. The approximate locations of the boreholes are shown on Figure 2, Boring Location Map, and the logs of the borings are presented in this appendix. Details relating to the sampling and logging of the hollow-stem auger borings are presented below.

Sampling

Relatively undisturbed ring samples, Standard Penetration Test (SPT) samples, and bulk samples were obtained at the depths indicated on the boring logs. The relatively undisturbed ring samples were obtained by driving a California Modified Split-Spoon Sampler (Cal-Mod) into the bottom of the boring as it was being incrementally advanced. The Cal-Mod sampler has an outside diameter (OD) of 3.0 inches and is lined with twelve 1-inch high by 2.41-inch inside diameter (ID) sampling rings and a 6-inch high by 2.41-inch ID barrel. Six rings were chosen from the twelve containing the relatively undisturbed samples and were placed in plastic cans and labeled.

The SPT samples were obtained by driving a Standard Penetration Test (SPT) sampler into the bottom of the boring as it was being incrementally advanced. The SPTs were performed in general accordance with ASTM Test Method D1586. Samples of the materials obtained from the SPT sampler were placed in plastic bags, labeled, and transported to our laboratory.

Both the Cal-Mod and SPT samplers were driven a total of 18 inches unless refusal was encountered or other conditions precluded driving the sampler further. The number of blows under a 30-inch drop of the 140-pound hammer (hydraulic automatic standard hammer) to achieve a 6-inch penetration was recorded and is presented on the borings logs. The blow counts provide a measure of the apparent density (coarse-grained soils) or consistency (fine-grained soils) of the soils.

In addition to Cal-Mod and SPT samples, bulk samples were collected from cuttings produced by the hollow-stem auger for geotechnical laboratory observation and testing.

Logging and Classification

The borings were logged by a Leighton geologist, who also collected the soil samples. Visual observations were made of the materials at each sampling depth. The earth materials encountered in the borings were visually classified in accordance with ASTM Test Method D2488.

Stratification lines on the logs represent the approximate boundaries between predominant types of materials. Stratification may contain differing materials, with transitions generally occurring gradually.

Attachments

Boring logs LB-1 through LB-2A by Leighton (2012)

GEOTECHNICAL BORING LOG LB-1

Project No.	603253-001	**Date Drilled**	2-13-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0			B1					7" Asphalt pavement	CR
								SP	**Artificial Fill (Af):** Poorly graded SAND with GRAVEL, light brown to tan, moist, fine grained sand with some subrounded gravel between 3/4 in. and 2 in. in diameter	
410	5									
405										
	10			R-1	5 6 8			SP-SM	Poorly-graded SAND with SILT, medium dense, light brown to tan, moist, fine grained sand with non-plastic fines	DS
400	15			R-2	7 9 10				Same as at 10 ft.	DS
									Stream Channel Deposits (Qg):	
395	20			R-3 B2	2 2 Push			SM	SILTY SAND, very loose, grayish brown, wet, fine grained sand with non-plastic fines, no gravel	DS SA
				SPT-1	3 8 9			SP-SM	Same as at 10 ft. with trace small gravel	
390	25			SPT-2	4 9 14			SP	Poorly-graded SAND, medium dense, brown, wet, fine to medium grained sand with trace subangular gravel	-200
				SPT-3	10 7 7				GRAVELLY SAND, medium dense, brown, wet, medium grained sand with ~1 in. subangular gravel	
385	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-1

Project No.	603253-001	**Date Drilled**	2-13-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			SPT-4	4 12 18			SM	SILTY SAND, medium dense, brown to dark olive brown, wet, fine grained sand with non-plastic fines	-200
380				SPT-5	6 10 7			SP	Same as at 27.5 ft	
	35			SPT-6	6 17 19			SP-SM	Same as at 10 ft., dense	-200
375				SPT-7	8 17 21					
	40			SPT-8	12 20 22				contains some gravel	-200
370				SPT-9	11 14 17					
	45			SPT-10	6 10 11			SP	Poorly-graded SAND with GRAVEL, medium dense, brown to dark olive brown, wet, fine to medium grained sand with some subangular 3/4 in. gravel	-200
365				SPT-11	13 27 35				moderate to heavy iron oxide staining observed, very dense	
	50			R-4	50/5"				**Topanga Formation (Ttsl):** SILTSTONE, tan, wet, fractured with heavy oxidation on fracture faces	
360										
	55			SPT-12	11 20 50/4"				high clay/silt content	
355										
	60									

SAMPLE TYPES:
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- C CORE SAMPLE
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- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
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GEOTECHNICAL BORING LOG LB-1

Project No.	603253-001	**Date Drilled**	2-13-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	60			R-5	50/6"				SANDY SILTSTONE, less clayey, dark brown in portions	UC
350										
	65			SPT-13	40 50/6"				majority dark brown	
345										
	70			R-6	50/2"				SILTY SANDSTONE, less clayey, dark brown in portions	UC
340									Total Depth = 70 ft. bgs Total Sampled Depth = 71.5 ft. bgs Groundwater encountered at 20 ft. bgs Backfilled with cuttings to 25 ft., cuttings/cement mixture from 25 ft. to near surface, tamped, finished with ~3 in. of 3/4 in. gravel and patched to surface grade with cold patch asphalt	
	75									
335										
	80									
330										
	85									
325										
	90									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
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- CN CONSOLIDATION
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- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-1A

Project No.	603253-001	**Date Drilled**	4-2-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B1					6" Asphalt pavement	CR
								SP-SM	**Artificial Fill (Af):** Poorly-graded SAND with SILT and GRAVEL, brown, moist, fine grained sand with some non-plastic fines and ~3/4 in. subrounded gravel	
410	5									
405										
	10			R-1	10 14 15				medium dense, contains larger gravel, sample disturbed (large gravel lodged in sampler)	DS
400										
	15			R-2	12 16 17			SP	Poorly-graded SAND, dense, pale brown, moist, fine grained sand	
									Stream Channel Deposits (Qg):	
395										
	20			R-3 B2	17 10 15			SP	Poorly-graded SAND, medium dense, grayish brown, wet, fine grained sand, moderate iron oxide staining	
				SPT-1	4 5 8				Same as above	-200
390										
	25			SPT-2	2 3 4				loose, gray, fine to medium grained	
				SPT-3	6 12 16				medium dense with trace gravel	
385										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
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- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-1A

Project No.	603253-001	**Date Drilled**	4-2-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			SPT-4	8 15 15			SP	GRAVELLY SAND, medium dense, gray, wet, fine to medium grained sand with ~3/4 in. subangular gravel, trace iron oxide stained inclusions	
380	35			SPT-5	7 17 20			SP-SM	Poorly-graded SAND with SILT, dense, gray, wet, fine to medium grained sand with non-plastic fines, increased gravel content at sample bottom	-200
				SPT-6	26 17 23				Same as at sample bottom from 32.5 ft.	
375				SPT-7	8 25 16			SW	Well-graded SAND with GRAVEL, dense, grayish brown, wet, fine to coarse grained sand with some angular to subangular 1 in. gravel	
	40			SPT-8	6 12 18			SP	GRAVELLY SAND, medium dense, olive brown, wet, medium grained sand with subangular to angular 3/4-1.5 in. gravel	
370				SPT-9	6 21 18				Poorly-graded SAND, dense, gray, wet, medium to coarse grained sand, trace subangular gravel, iron oxide stained at sample bottom	
	45			SPT-10	50/5"				Limited Recovery - same as above to 45.5 ft.	
365									**Topanga Formation (Ttsl):** Clayey SILTSTONE, dark brown, wet, fractured	
	50			R-4	50/5"				Same as above	
360										
	55			SPT-11	50/3"				CLAY and SILTSTONE, dark brown, wet, fractured siltstone with moderately plastic fines	
355										
	60									

SAMPLE TYPES:
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- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-1A

Project No.	603253-001	**Date Drilled**	4-2-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60	N S		R-5	51				SILTY SANDSTONE, dark olive, wet, fractured	UC
350										
	65			SPT-12	50/2"				Limited Recovery - Same as at 45.5 ft.	
									Total Depth = 65 ft. bgs Total Sampled Depth = 66.5 ft. bgs Groundwater encountered at 20.83 ft. bgs Backfilled with cuttings to 15 ft. (caved), cuttings/cement mixture from 15 ft. to near surface, tamped, finished with ~3 in. of 3/4 in. gravel and patched to surface grade with cold patch asphalt	
345										
	70									
340										
	75									
335										
	80									
330										
	85									
325										
	90									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
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- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-2

Project No.	603253-001	**Date Drilled**	2-10-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	0			B1				SP	5" Asphalt pavement **Artificial Fill (Af):** Poorly-graded SAND with GRAVEL, light brown to tan, moist, fine grained sand with some subrounded gravel between 3/4 in. and 2 in. in diameter	
410	5									
405	10			R-1 B2	8 10 15				medium dense, no gravel	SA
400	15			R-2	6 9 15			SM	SILTY SAND, medium dense, light brown to tan, moist, fine grained sand with non-plastic fines, moderate iron oxide staining	DS
395				SPT-1	5 7 5			SP-SM	**Stream Channel Deposits (Qg):** Poorly-graded SAND with SILT, medium dense, gray, moist to wet at sample bottom (19 ft.), fine grained sand with non-plastic fines	-200
	20			SPT-2 B3	6 9 9				wet	
390				SPT-3	Push 8 12				same as at 17.5 ft. with moderate iron oxide staining	-200
	25			SPT-4	5 10 15				same as above	
385				SPT-5	4 15 40				fine to medium grained sand and trace gravel, very dense	-200
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
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GEOTECHNICAL BORING LOG LB-2

Project No.	603253-001	**Date Drilled**	2-10-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			SPT-6	4 12 19			SP-SM	fine grained sand only	
380				SPT-7	6 6 7			SM	SILTY SAND with GRAVEL, medium dense, light brown to tan, wet, fine grained sand with non-plastic fines and subangular gravel, slight rig chatter	-200
	35			SPT-8	12 14 13			SP-SM	same as at 27.5 ft	
375				SPT-9	6 10 13				same as above	-200
	40			SPT-10	17 15 15			SP	Poorly-graded SAND, medium dense, gray to light gray, wet, fine to medium grained sand	
370				SPT-11	13 29 23				very dense	
	45			SPT-12	14 18 19				slight chatter from drill rig observed, dense	
365				SPT-13	6 18 16					
	50			SPT-14	12 12 19					
360				SPT-15	9 16 20					
	55			SPT-16	21 50/6"				very dense	
355				SPT-17	6 13 26				dense	
	60									

SAMPLE TYPES:
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- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
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GEOTECHNICAL BORING LOG LB-2

Project No.	603253-001	**Date Drilled**	2-10-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N – S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	60			SPT-18	25 32 50/4"			SP	greenish gray, very dense	
				SPT-19	8 16 18				gray, dense	
350										
	65			SPT-20	5 16 30					
				SPT-21	11 27 26				very dense	
345										
	70			SPT-22	29 39 50/6"				light greenish gray	
340										
	75			SPT-23	14 32 50/6"					
335										
	80			SPT-24	22 50/6"					
330										
	85			SPT-25	18 50/5"					
325										
	90									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-2

Project No.	603253-001	**Date Drilled**	2-10-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	90			SPT-26	13 32 30			SP		
320										
	95			SPT-27	18 40 50/6"					
									chatter from drill rig observed	
315										
	100			SPT-28	20 50/6"					
									Total Depth = 100 ft. bgs Total Sampled Depth = 101.5 ft. bgs Groundwater encountered at 19 ft. bgs Backfilled with cuttings to 25 ft., cuttings/cement mixture from 25 ft. to near surface, tamped, finished with ~3 in. of 3/4 in. gravel and patched to surface grade with cold patch asphalt	
310										
	105									
305										
	110									
300										
	115									
295										
	120									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-2A

Project No.	603253-001	**Date Drilled**	4-3-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B1				SP	5" Asphalt pavement **Artificial Fill (Af):** Poorly-graded SAND, brown, moist, fine to medium grained sand, becomes pale brown with depth	
410	5									
405	10			R-1	7 12 15				medium dense, fine grained sand only	
400	15			R-2	11 23 27				dense, contains coarse grains, iron oxide stained at 16.5 ft., grades into well graded	
									Stream Channel Deposits (Og):	
				SPT-1	4 3 2			SW	Well-graded SAND, loose, pale brown, wet, fine to coarse grained sand	
395				B2				CL-ML	SILTY CLAY, medium stiff, brown, moist, slightly plastic fines with some non-plastic fines, becomes dark gray and less plastic at sample bottom	
	20			SPT-2	5 9 9			SP	Poorly-graded SAND with GRAVEL, medium dense, gray to light gray, wet, medium to coarse grained sand with subangular 3/4 in. gravel, 2 in. iron oxide stained portion at 21 ft., trace fines	
				SPT-3	2 7 15				GRAVELLY SAND, medium dense, light gray, wet, medium to coarse grained snad with subangular to angular ~3/4 in. gravel	
390	25			SPT-4	6 13 15				Poorly-graded SAND, medium dense, gray, wet, fine grained sand	
				SPT-5	12 19 21			SM	SILTY SAND, dense, gray, wet, fine grained sand with non-plastic fines	
385	30									

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SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-2A

Project No.	603253-001	**Date Drilled**	4-3-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			SPT-6	10 18 14			SP	GRAVELLY SAND, dense, gray, wet, fine to coarse grained sand with subangular 3/4 to 1 in. gravel (~20-25%)	
				SPT-7	7 15 19				Poorly-graded SAND with GRAVEL, dense, gray wet, fine to coarse grained sand with some 3/4 to 1 in. subangualr gravel	
380										
	35			SPT-8	8 22 28			SP-SMg	Poorly-graded SAND with SILT and GRAVEL, dense, gray, wet, fine to coarse grained sand with non-plastic fines and gravel	-200
				SPT-9	16 35 50/5"			SP	GRAVELLY SAND, very dense, gray, wet, fine to coarse grained sand with gravel	
375										
	40			SPT-10	9 20 21				dense	
				SPT-11	22 30 35				very dense	
370										
	45			SPT-12	6 22 27				Limited Recovery - dense	
				SPT-13	12 33 20				Same as at 42.5 ft.	
365										
	50			SPT-14	15 20 6				less gravelly, large broken gravel in sampler	
				SPT-15	18 20 25			CH	CLAY, hard, dark greenish gray, moist, highly plastic fines with trace iron oxide stained streamers	
360								SP	Same as at 50 ft., dense	
	55			SPT-16	14 24 26			SP-SMg	Poorly-graded SAND with SILT and GRAVEL, dense, gray, wet, fine to coarse grained sand with non-plastic fines and gravel	-200
				SPT-17	25 50/6"			SP	GRAVELLY SAND, very dense, gray, wet, fine to coarse grained sand with gravel	
355	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-2A

Project No.	603253-001	**Date Drilled**	4-3-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	60			SPT-18	18 34 48			SP	Same as above	
				SPT-19	50/6"				Same as at 20 ft., very dense, no iron oxide staining	
350										
	65			SPT-20	24 36 36				Same as at 60 ft., bluish gray	
				SPT-21	18 29 29				Poorly-graded SAND with GRAVEL, very dense, greenish gray, wet, fine to medium grained sand with some 3/4 in. angular to subangular gravel	
345										
	70			SPT-22	9 29 50/5"				Same as above	
340										
	75			SPT-23	5 30 50/4"				contains less gravel	
335										
	80			SPT-24	7 25 37					
330										
	85			SPT-25	7 34 36				gray in color	
325										
	90									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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GEOTECHNICAL BORING LOG LB-2A

Project No.	603253-001	**Date Drilled**	4-3-12
Project	Atwater Bridge	**Logged By**	W. Sconiers
Drilling Co.	2R Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	414'
Location	West Side of Los Angeles River, 0.62 mi. N. of Los Feliz Blvd.	**Sampled By**	W. Sconiers

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	90			SPT-26	10 30 42			SP	Poorly-graded SAND, very dense, gray, wet, fine grained sand with trace subrounded ~3/4 in. gravel	
320									mild chatter and vibration noted during drilling	
	95			SPT-27	17 50/6"				GRAVELLY SAND, very dense, greenish gray, wet, fine to medium grained sand with subangular 3/4 in. gravel	
315										
	100			SPT-28	12 50/6"				Same as above	
310									Total Depth = 100 ft. bgs Total Sampled Depth = 101.5 ft. bgs Groundwater encountered at 19.25 ft. bgs Backfilled with cuttings to 25 ft., cuttings/cement mixture from 25 ft. to near surface, tamped, finished with ~3 in. of 3/4 in. gravel and patched to surface grade with cold patch asphalt	
	105									
305										
	110									
300										
	115									
295										
	120									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
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- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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APPENDIX C

APPENDIX C

Geotechnical Laboratory Testing

The geotechnical laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site and to aid in verifying soil classification.

Particle Size and Fines Content Analysis: Particle size (ASTM D6913) and fines content analyses (ASTM D 1140) were performed on selected samples. This test was performed to assist in the classification of the soil and to determine grain size distributions of tested soils. Results of these tests are presented in this appendix.

Unconfined Compressive Strength: Unconfined compressive strength tests were performed in general accordance with ASTM Test Method D 2166 on selected core samples. Rock core samples were prepared to have a length-to-diameter ratio between 2 to 2.5, in general accordance with ASTM Test Method D 4543. Rock core samples were placed in the unconfined compression machine at deformation rate of 0.02 in/min or 0.045 in/min. The test results are presented in this appendix.

Direct Shear: Direct shear test (ASTM D 3080) was performed on selected samples. The shear strength of an earth material is obtained by successively shearing separate specimens partially contained within rings, utilizing a direct-shear machine. Varying normal pressures are applied, and the perpendicularly applied stress required to shear the specimen is recorded. The cohesion (c, in lb/ft2) and angle of internal friction (ϕ, in degrees) are then calculated: these constitute the shear strength characteristics of the material. The shearing stress is applied at a constant rate of strain. In order to simulate possibly adverse moisture conditions, the specimens are soaked prior to the test, and are sheared under water. The test results are presented in this appendix.

Soil Corrosivity: Two representative bulk samples of the near surface soil were tested for corrosivity. Tests for water-soluble sulfate, water-soluble chloride, pH and minimum resistivity were performed in accordance with State of California Standard Method CTM 417 Part II, CTM 422, and CTM 532/643 respectively. The test results are presented in this appendix.

Boring No.	LB-1	LB-1	LB-1	LB-1	LB-1	LB-2	LB-2	LB-2
Sample No.	SPT-2	SPT-4	SPT-6	SPT-8	SPT-10	SPT-1	SPT-3	SPT-5
Depth (ft.)	25	30	35	40	45	17.5	22.5	27.5
Sample Type	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT
Soil Identification	Gray poorly-graded sand (SP)	Gray silty sand (SM)	Gray poorly-graded sand with silt (SP-SM)	Gray poorly-graded sand with silt and gravel (SP-SM)g	Gray poorly-graded sand with gravel (SP)g	Gray poorly-graded sand with silt (SP-SM)	Gray poorly-graded sand with silt (SP-SM)	Gray poorly-graded sand with silt and gravel (SP-SM)g
Moisture Correction								
Wet Weight of Soil + Container (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dry Weight of Soil + Container (g)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weight of Container (g)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Moisture Content (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sample Dry Weight Determination								
Weight of Sample + Container (g)	823.72	660.73	838.93	965.59	668.12	765.78	1241.13	1007.85
Weight of Container (g)	106.93	108.55	107.88	107.97	109.66	110.93	111.84	108.55
Weight of Dry Sample (g)	716.79	552.18	731.05	857.62	558.46	654.85	1129.29	899.30
Container No.:								
After Wash								
Method (A or B)	B	B	B	B	B	B	B	
Dry Weight of Sample + Cont. (g)	799.31	546.36	800.65	913.43	644.39	731.05	1189.97	960.47
Weight of Container (g)	106.93	108.55	107.88	107.97	109.66	110.93	111.84	108.55
Dry Weight of Sample (g)	692.38	437.81	692.77	805.46	534.73	620.12	1078.13	851.92
% Passing No. 200 Sieve	**3.4**	**20.7**	**5.2**	**6.1**	**4.2**	**5.3**	**4.5**	**5.3**
% Retained No. 200 Sieve	96.6	79.3	94.8	93.9	95.8	94.7	95.5	94.7

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PERCENT PASSING
No. 200 SIEVE
ASTM D 1140

Project Name: Atwater Bridge
Project No.: 603253-001
Client Name: LCI/Santa Clarita
Tested By: S. Felter Date: 02/16/12

-200 LB-1 through LB-2

Boring No.	LB-2	LB-2						
Sample No.	SPT-7	SPT-9						
Depth (ft.)	32.5	37.5						
Sample Type	SPT	SPT						
Soil Identification	Gray silty sand with gravel (SM)g	Gray poorly-graded sand with silt (SP-SM)						
Moisture Correction								
Wet Weight of Soil + Container (g)	0.00	0.00						
Dry Weight of Soil + Container (g)	0.00	0.00						
Weight of Container (g)	1.00	1.00						
Moisture Content (%)	0.00	0.00						
Sample Dry Weight Determination								
Weight of Sample + Container (g)	647.66	529.72						
Weight of Container (g)	111.37	109.32						
Weight of Dry Sample (g)	536.29	420.40						
Container No.:								
After Wash								
Method (A or B)	B	B						
Dry Weight of Sample + Cont. (g)	486.12	501.22						
Weight of Container (g)	111.37	109.32						
Dry Weight of Sample (g)	374.75	391.90						
% Passing No. 200 Sieve	**30.1**	**6.8**						
% Retained No. 200 Sieve	69.9	93.2						

Leighton

PERCENT PASSING
No. 200 SIEVE
ASTM D 1140

Project Name: Atwater Bridge
Project No.: 603253-001
Client Name: LCI/Santa Clarita
Tested By: S. Felter Date: 02/16/12

Boring No.	LB-1A	LB-1A	LB-2A	LB-2A				
Sample No.	SPT-1	SPT-5	SPT-8	SPT-16				
Depth (ft.)	22.5	32.5	35.0	55.0				
Sample Type	SPT	SPT	SPT	SPT				
Soil Identification	Olive poorly-graded sand (SP)	Olive gray poorly-graded sand with silt (SP-SM)	Olive gray poorly-graded sand with silt and gravel (SP-SM)g	Olive gray poorly-graded sand with silt and gravel (SP-SM)g				
Moisture Correction								
Wet Weight of Soil + Container (g)	0.00	0.00	0.00	0.00				
Dry Weight of Soil + Container (g)	0.00	0.00	0.00	0.00				
Weight of Container (g)	1.00	1.00	1.00	1.00				
Moisture Content (%)	0.00	0.00	0.00	0.00				
Sample Dry Weight Determination								
Weight of Sample + Container (g)	573.80	658.70	710.00	892.40				
Weight of Container (g)	107.50	108.10	110.60	109.10				
Weight of Dry Sample (g)	466.30	550.60	599.40	783.30				
Container No.:								
After Wash								
Method (A or B)	B	B	B	B				
Dry Weight of Sample + Cont. (g)	556.20	630.30	672.60	833.40				
Weight of Container (g)	107.50	108.10	110.60	109.10				
Dry Weight of Sample (g)	448.70	522.20	562.00	724.30				
% Passing No. 200 Sieve	**3.8**	**5.2**	**6.2**	**7.5**				
% Retained No. 200 Sieve	96.2	94.8	93.8	92.5				

Leighton

PERCENT PASSING
No. 200 SIEVE
ASTM D 1140

Project Name: Atwater Bridge
Project No.: 603253-001
Client Name: LCI/Santa Clarita
Tested By: A. Santos Date: 04/13/12

-200 LB-1A through LB-2A

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Leighton

Project Name: Atwater Bridge | Tested By : V. Juliano | Date: 02/16/12

Project No. : 603253-001 | Data Input By: J. Ward | Date: 02/21/12

Boring No.	LB-1			
Sample No.	B-1			
Sample Depth (ft)	0-20			
Soil Identification:	Olive (SP), asphalt noted			
Wet Weight of Soil + Container (g)	203.42			
Dry Weight of Soil + Container (g)	198.49			
Weight of Container (g)	53.35			
Moisture Content (%)	3.40			
Weight of Soaked Soil (g)	100.80			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	8			
Crucible No.	27			
Furnace Temperature (°C)	840			
Time In / Time Out	7:20/8:05			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	17.6460			
Wt. of Crucible (g)	17.6441			
Wt. of Residue (g) (A)	0.0019			
PPM of Sulfate (A) x 41150	78.18			
PPM of Sulfate, Dry Weight Basis	**81**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	0.4			
PPM of Chloride (C -0.2) * 100 * 30 / B	20			
PPM of Chloride, Dry Wt. Basis	**21**			

pH TEST, DOT California Test 532/643

pH Value	**7.99**			
Temperature °C	18.4			

Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

Project Name:	Atwater Bridge	Tested By :	V. Juliano	Date:	02/20/12
Project No. :	603253-001	Data Input By:	J. Ward	Date:	02/21/12
Boring No.:	LB-1	Depth (ft.) :	0-20		
Sample No. :	B-1				

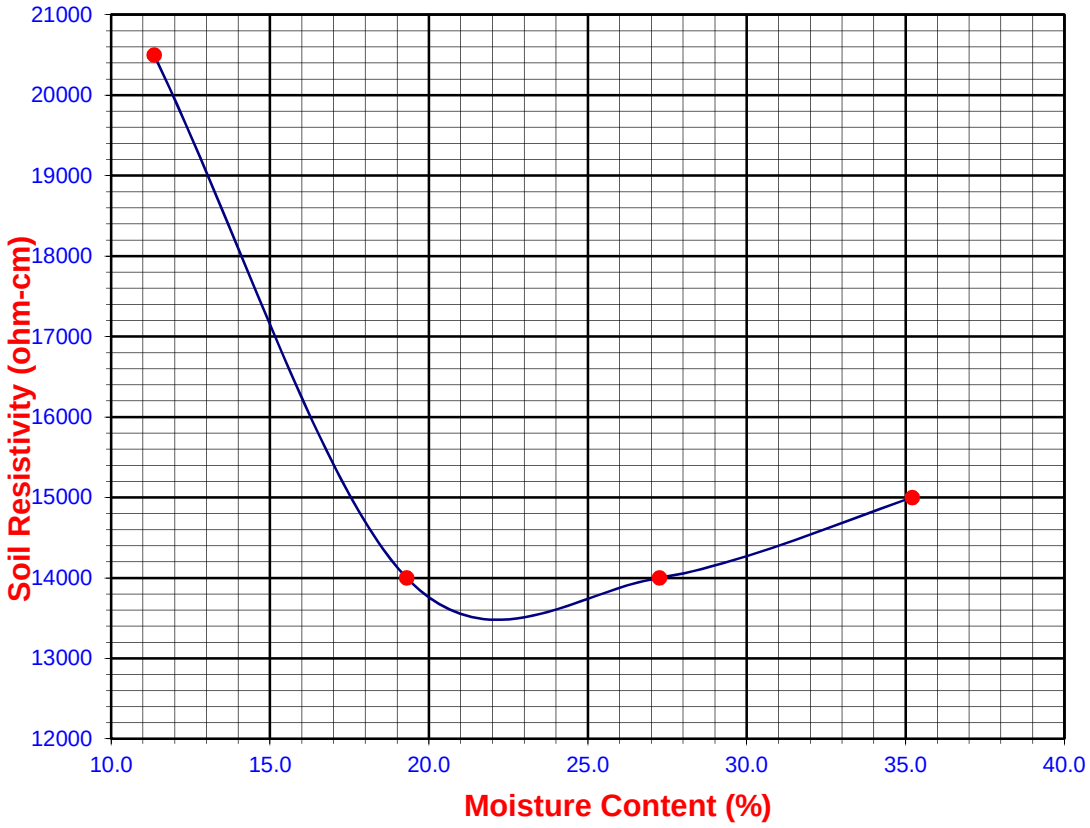
Soil Identification:* Olive (SP), asphalt noted

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	11.35	20500	20500
2	20	19.30	14000	14000
3	30	27.26	14000	14000
4	40	35.21	15000	15000
5				

Moisture Content (%) (MCi)	3.40
Wet Wt. of Soil + Cont. (g)	203.42
Dry Wt. of Soil + Cont. (g)	198.49
Wt. of Container (g)	53.35
Container No.	
Initial Soil Wt. (g) (Wt)	130.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
13500	**22.0**	**81**	**21**	**7.99**	**18.4**



TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Leighton

Project Name: Atwater Bridge | Tested By : V. Juliano | Date: 04/11/12

Project No. : 603253-001 | Data Input By: J. Ward | Date: 04/17/12

Boring No.	LB-1A			
Sample No.	B1			
Sample Depth (ft)	0-20			
Soil Identification:	Dark olive (SP-SM)			
Wet Weight of Soil + Container (g)	268.40			
Dry Weight of Soil + Container (g)	264.60			
Weight of Container (g)	70.40			
Moisture Content (%)	1.96			
Weight of Soaked Soil (g)	100.20			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	14			
Crucible No.	29			
Furnace Temperature (°C)	840			
Time In / Time Out	7:55/8:40			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	20.7414			
Wt. of Crucible (g)	20.7393			
Wt. of Residue (g) (A)	0.0021			
PPM of Sulfate (A) x 41150	86.41			
PPM of Sulfate, Dry Weight Basis	**88**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	0.5			
PPM of Chloride (C -0.2) * 100 * 30 / B	30			
PPM of Chloride, Dry Wt. Basis	**31**			

pH TEST, DOT California Test 532/643

pH Value	**7.18**			
Temperature °C	21.0			

Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

Project Name:	Atwater Bridge	Tested By :	V. Juliano	Date:	04/16/12
Project No. :	603253-001	Data Input By:	J. Ward	Date:	04/17/12
Boring No.:	LB-1A	Depth (ft.) :	0-20		
Sample No. :	B1				

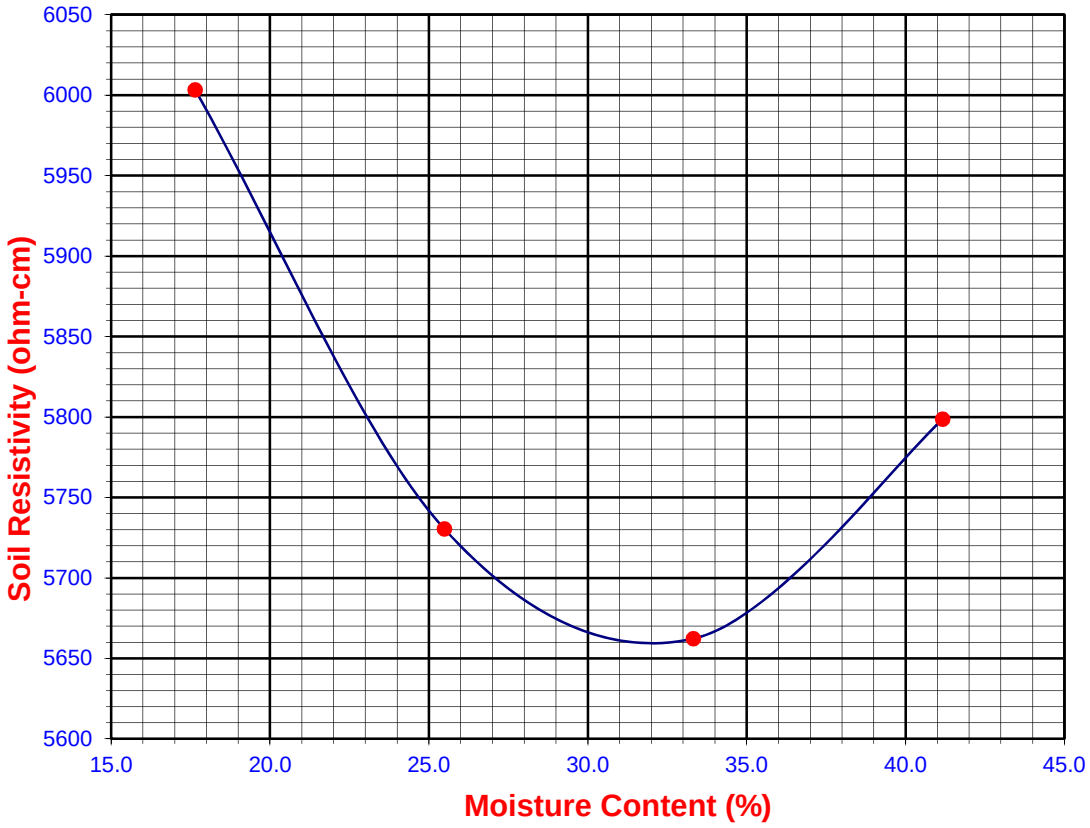
Soil Identification:* Dark olive (SP-SM)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	200	17.64	880	6003
2	300	25.49	840	5730
3	400	33.33	830	5662
4	500	41.17	850	5799
5				

Moisture Content (%) (MCi)	1.96
Wet Wt. of Soil + Cont. (g)	268.40
Dry Wt. of Soil + Cont. (g)	264.60
Wt. of Container (g)	70.40
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.822
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
5660	**32.0**	**88**	**31**	**7.18**	**21.0**



Leighton

DIRECT SHEAR TEST

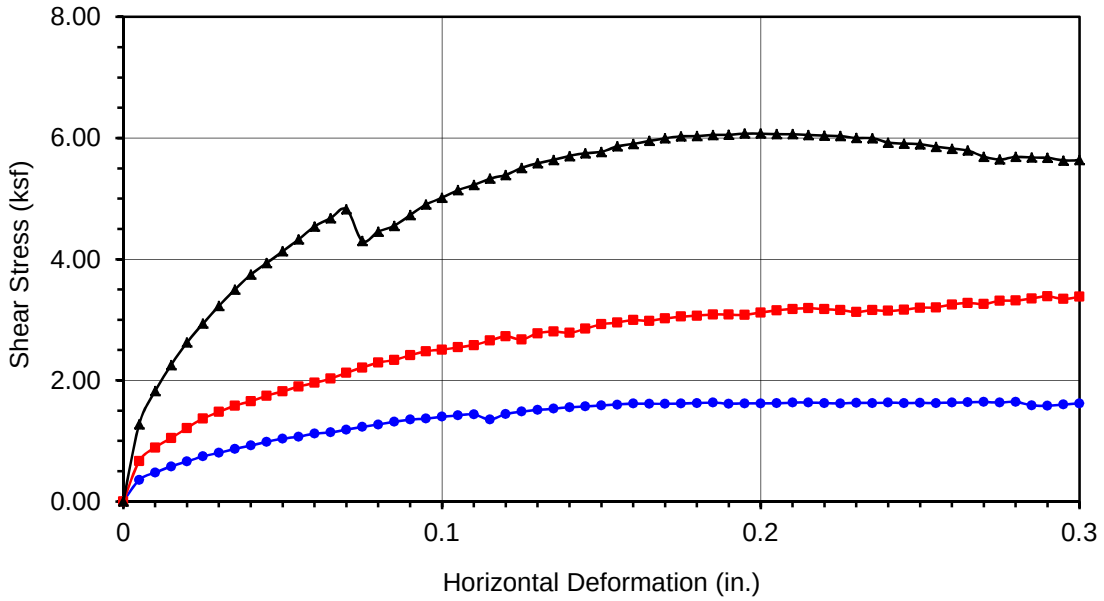
Consolidated Undrained

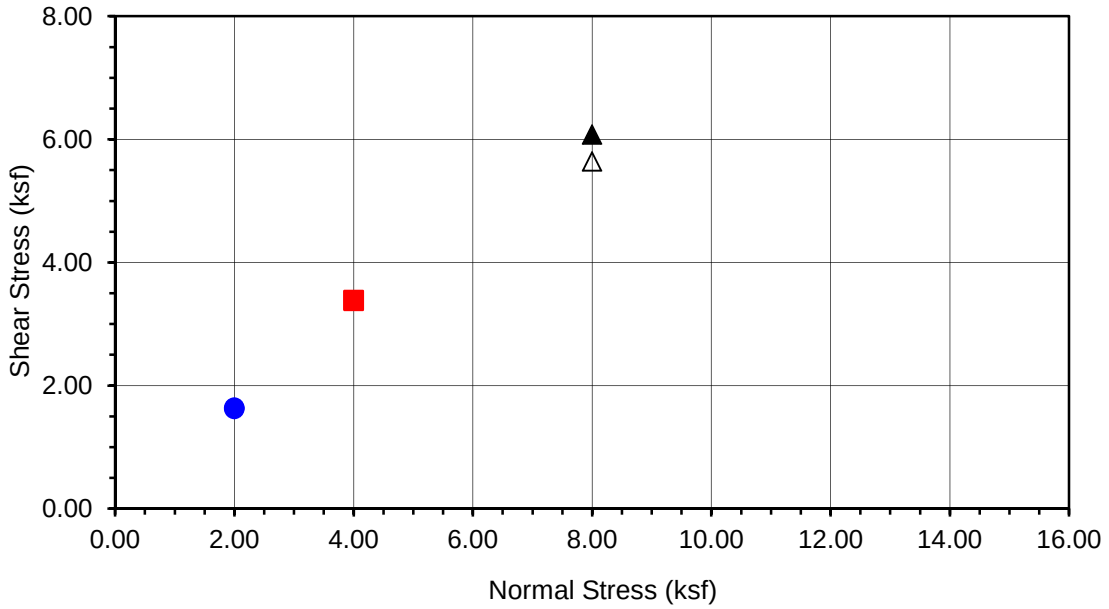
Project Name:	Atwater Bridge	Tested By:	A. Santos	Date:	04/11/12
Project No.:	603253-001	Checked By:	J. Ward	Date:	04/17/12
Boring No.:	LB-1A	Sample Type:	Drive		
Sample No.:	R-1	Depth (ft.):	10.0		

Soil Identification: Brown poorly-graded sand with silt (SP-SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	160.00	167.70	176.00
Weight of Ring(gm):	43.10	45.71	46.31
Before Shearing			
Weight of Wet Sample+Cont.(gm):	160.00	167.70	176.00
Weight of Dry Sample+Cont.(gm):	155.06	161.23	170.33
Weight of Container(gm):	43.10	45.71	46.31
Vertical Rdg.(in): Initial	0.3252	0.3441	0.0000
Vertical Rdg.(in): Final	0.3592	0.4039	-0.0498
After Shearing			
Weight of Wet Sample+Cont.(gm):	168.36	170.02	182.36
Weight of Dry Sample+Cont.(gm):	150.57	154.02	162.51
Weight of Container(gm):	38.61	38.50	38.49
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43

Note: Moisture contents before shearing were determined from the sample wet weights before shearing and the sample dry weights after shearing





Boring No.	**LB-1A**
Sample No.	**R-1**
Depth (ft)	**10**

Sample Type:

Drive

Soil Identification:
Brown poorly-graded sand with silt (SP-SM)

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.644	■ 3.386	▲ 6.074
Shear Stress @ End of Test (ksf)	○ 1.619	□ 3.380	△ 5.637
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	4.41	5.60	4.57
Dry Density (pcf)	93.1	96.1	103.1
Saturation (%)	14.7	20.0	19.5
Soil Height Before Shearing (in.)	0.9660	0.9402	0.9502
Final Moisture Content (%)	15.9	13.9	16.0

Leighton

DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 603253-001

Atwater Bridge

04-12

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Leighton

Project Name:	Atwater Bridge	Tested By:	G. Bathala	Date:	02/20/12
Project No.:	603253-001	Checked By:	J. Ward	Date:	02/21/12
Exploration No.:	LB-1	Depth (feet):	20-45		
Sample No.:	B-2				
Soil Identification:	Olive brown silty sand (SM)				

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	SP01	WR	Wt. of Air-Dry Soil + Cont.(g)	0.00	0.00
Wt. Air-Dried Soil + Cont.(g)	6504.40	759.80	Wt. of Dry Soil + Cont. (g)	0.00	0.00
Wt. of Container (g)	739.20	238.20	Wt. of Container No._____(g)	1.00	1.00
Dry Wt. of Soil (g)	5765.20	521.60	Moisture Content (%)	0.00	0.00

Passing #4 Material After Wet Sieve	Container No.	WR
	Wt. of Dry Soil + Container (g)	687.70
	Wt. of Container (g)	238.20
	Dry Wt. of Soil Retained on # 200 Sieve (g)	449.50

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
3"	75.000			
1 1/2"	37.500	0.00		100.0
3/4"	19.000	49.50		99.1
3/8"	9.500	266.60		95.4
#4	4.750	632.00		89.0
#8	2.360		50.70	80.3
#16	1.180		129.50	66.9
#30	0.600		224.30	50.7
#50	0.300		312.70	35.6
#100	0.150		398.60	21.0
#200	0.075		447.50	12.6
PAN				

GRAVEL: **11 %**

SAND: **76 %**

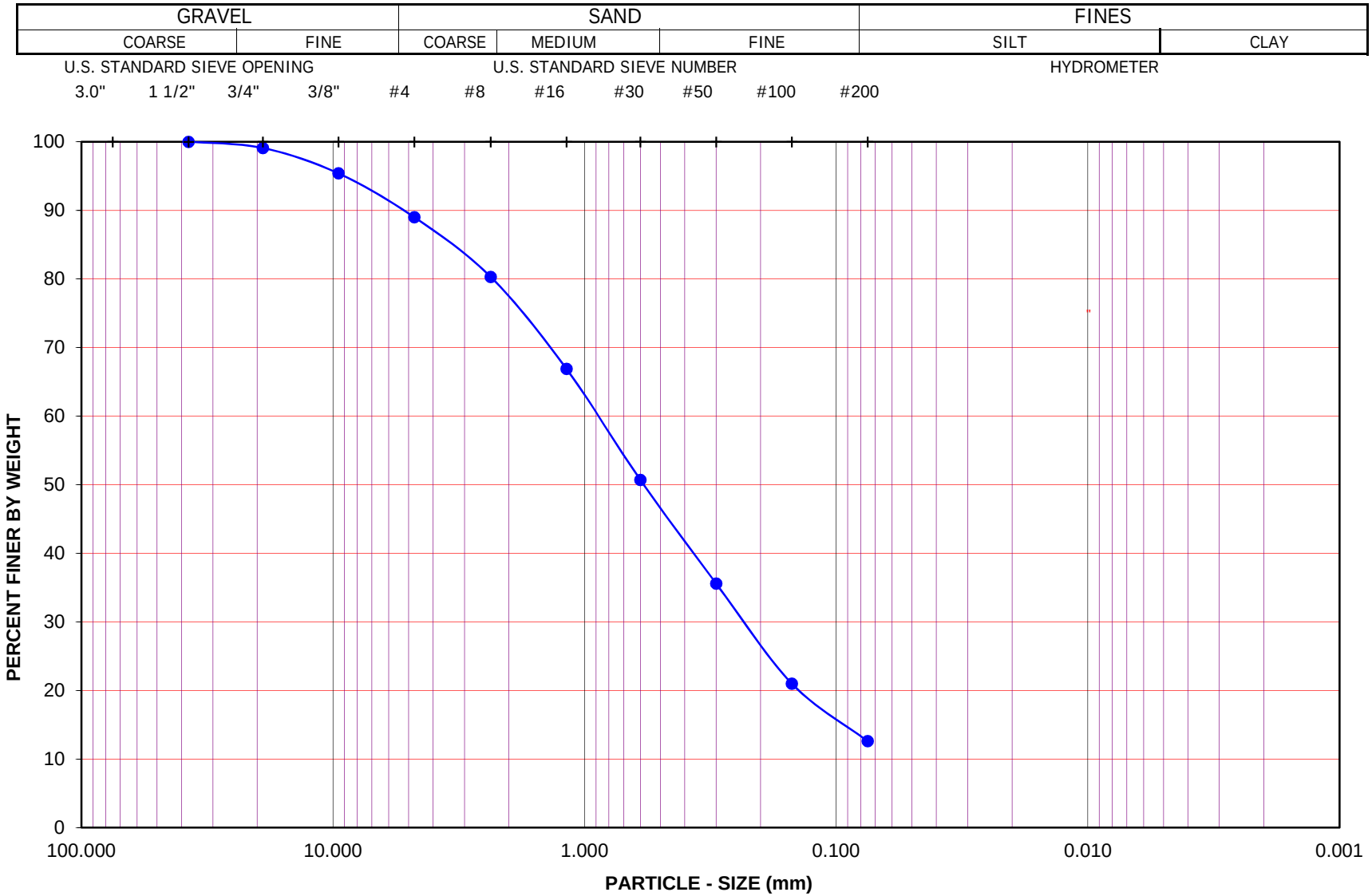
FINES: **13 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = _____

Cc = $(D30)^2/(D60*D10)$ = _____

Remarks:



Project Name: Atwater Bridge

Project No.: 603253-001

Exploration No.: LB-1 Sample No.: B-2

Depth (feet): 20-45 Soil Type : SM

Soil Identification: Olive brown silty sand (SM)

GR:SA:FI : (%) 11 : 76 : 13

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Feb-12

SA LB-1, B-2 @ 20-45

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Leighton

Project Name:	Atwater Bridge	Tested By:	G. Bathala	Date:	02/17/12
Project No.:	603253-001	Checked By:	J. Ward	Date:	02/20/12
Exploration No.:	LB-2	Depth (feet):	10-15		
Sample No.:	B-2				
Soil Identification:	Olive brown silty sand (SM), asphalt noted				

Calculation of Dry Weights	Whole Sample	Sample Passing #4	Moisture Contents	Whole Sample	Sample passing #4
Container No.:	M & M12	VI	Wt. of Air-Dry Soil + Cont.(g)	0.00	0.00
Wt. Air-Dried Soil + Cont.(g)	5640.40	728.90	Wt. of Dry Soil + Cont. (g)	0.00	0.00
Wt. of Container (g)	457.50	220.40	Wt. of Container No._____(g)	1.00	1.00
Dry Wt. of Soil (g)	5182.90	508.50	Moisture Content (%)	0.00	0.00

Passing #4 Material After Wet Sieve	Container No.	VI
	Wt. of Dry Soil + Container (g)	640.40
	Wt. of Container (g)	220.40
	Dry Wt. of Soil Retained on # 200 Sieve (g)	420.00

U. S. Sieve Size		Cumulative Weight of Dry Soil Retained (g)		Percent Passing (%)
	(mm.)	Whole Sample	Sample Passing #4	
3"	75.000			
1 1/2"	37.500	0.00		100.0
3/4"	19.000	72.70		98.6
3/8"	9.500	147.30		97.2
#4	4.750	214.70		95.9
#8	2.360		8.60	94.3
#16	1.180		24.90	91.2
#30	0.600		59.60	84.7
#50	0.300		143.60	68.8
#100	0.150		336.50	32.4
#200	0.075		415.40	17.6
PAN				

GRAVEL: **4 %**

SAND: **78 %**

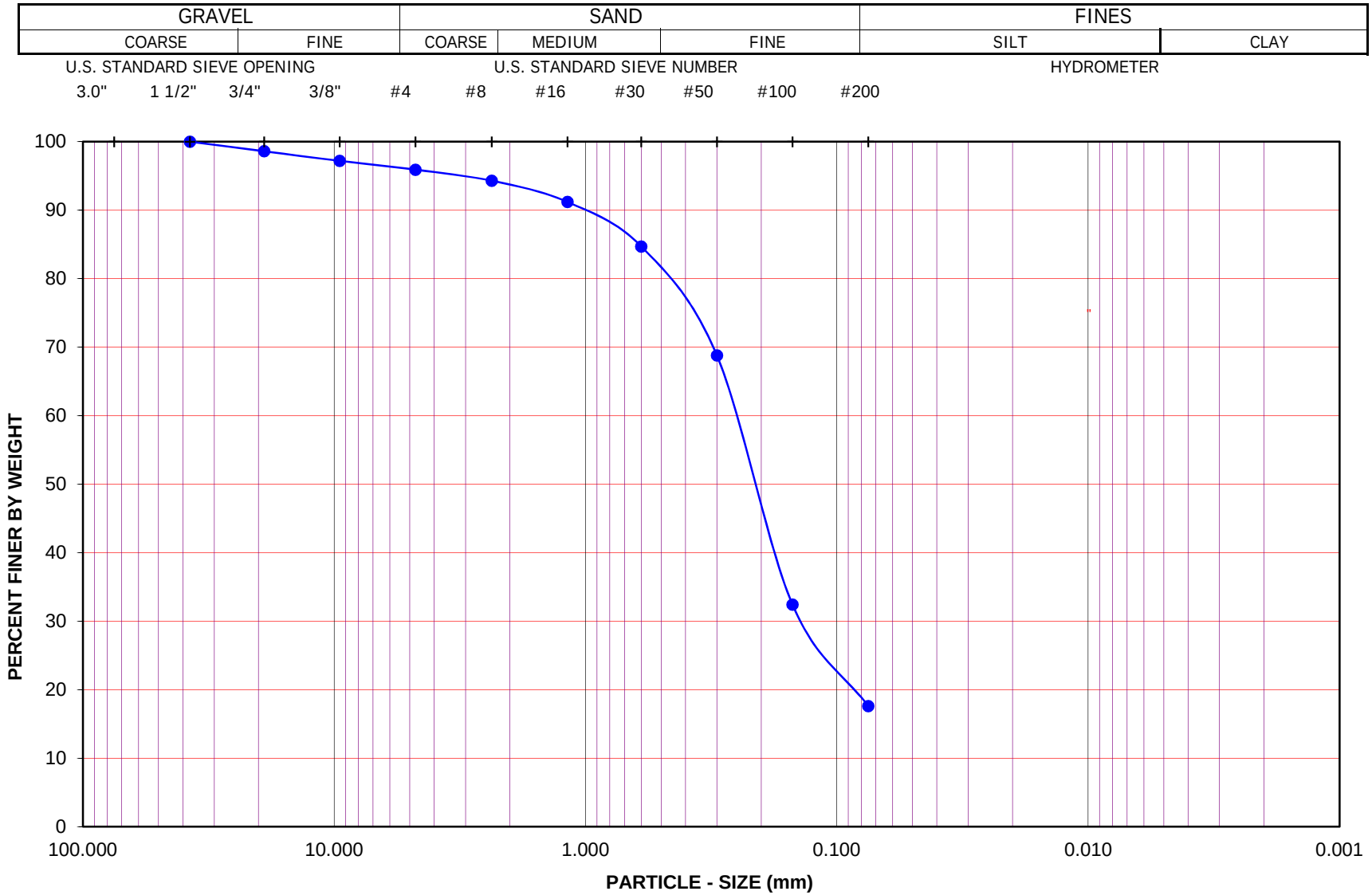
FINES: **18 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = _____

Cc = $(D30)^2/(D60*D10)$ = _____

Remarks:



Project Name: Atwater Bridge

Project No.: 603253-001

Exploration No.: LB-2 Sample No.: B-2

Depth (feet): 10-15 Soil Type : SM

Soil Identification: Olive brown silty sand (SM), asphalt noted

GR:SA:FI : (%) 4 : 78 : 18

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Feb-12

SA LB-2, B-2 @ 10-15

Leighton

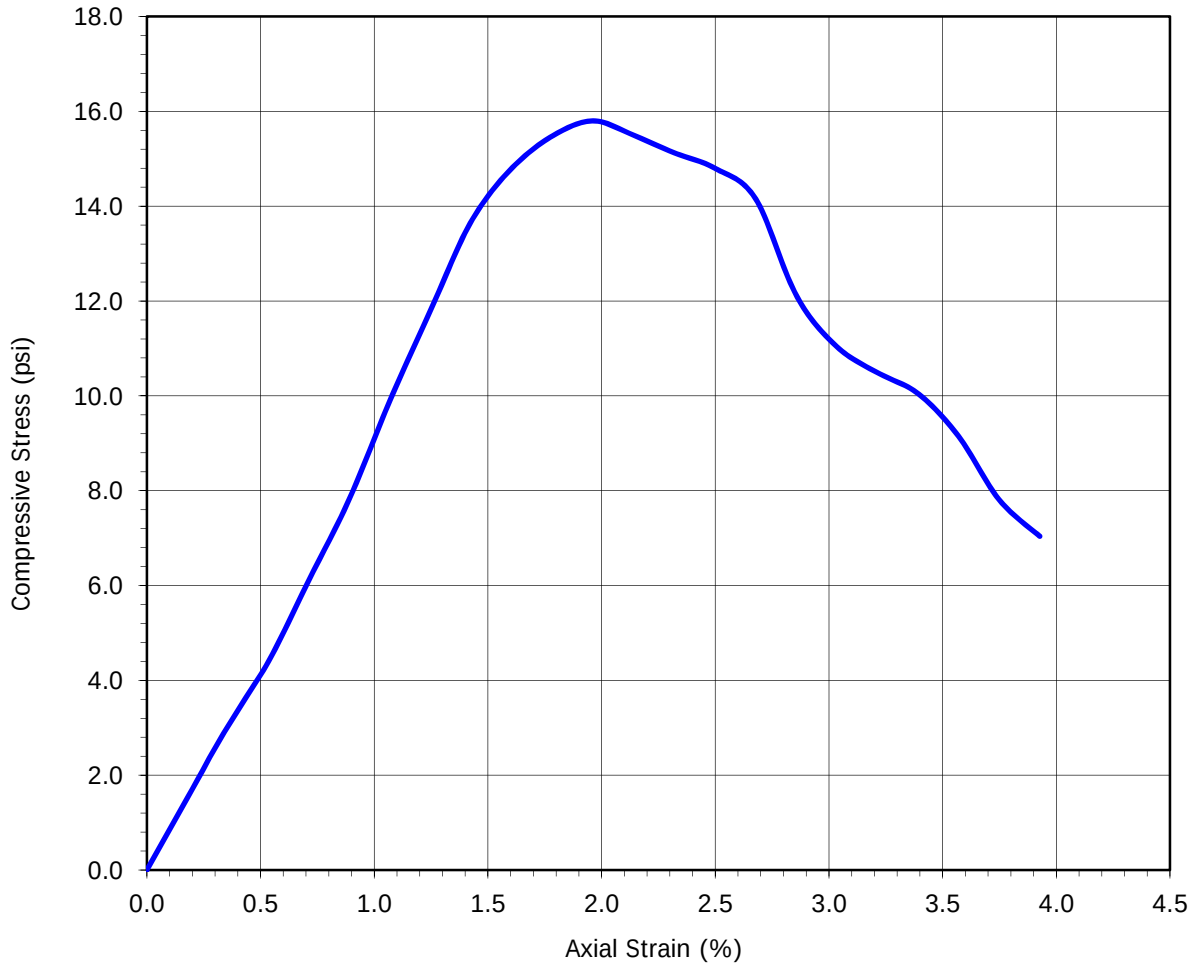
UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
ASTM D 2166

Project Name:	Atwater Bridge	Tested by:	A. Santos	Date:	02/16/12
Project No.:	603253-001	Checked by:	J. Ward	Date:	02/20/12
Boring No.:	LB-1	Sample Type:	Drive		
Sample No.:	R-5	Depth (ft):	60.0		
Sample Description:	Olive brown sandy silt'stone' s(ML)				

Weight of Sample + Tube / Rings (g)	858.70
Weight of Tube / Rings (g)	0.00
Wet Weight of Soil + Container (g)	964.80
Dry Weight of Soil + Container (g)	813.60
Weight of Container (g)	108.60
Load Surcharge (lb)	2.20
Rate of Deformation (in/min)	0.020
Specific Gravity (Assumed)	2.70

Sample Measurements	
Diameter (in)	2.415
	2.417
	2.417
Area (sq.in.)	4.586
Height (in)	5.600
	5.602
	5.604

Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)	Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)
0.0000	0.0	0.00	0.000				
0.0100	4.8	1.52	0.179				
0.0200	11.8	3.04	0.357				
0.0300	18.1	4.40	0.536				
0.0400	26.1	6.13	0.714				
0.0500	34.1	7.85	0.893				
0.0600	43.8	9.92	1.071				
0.0700	52.7	11.82	1.250				
0.0800	61.5	13.69	1.428				
0.0900	66.8	14.81	1.607				
0.1000	70.1	15.48	1.785				
0.1100	71.7	15.80	1.964				
0.1200	70.4	15.49	2.142				
0.1300	68.8	15.12	2.321				
0.1400	67.4	14.80	2.499				
0.1500	64.5	14.16	2.678				
0.1600	55.0	12.12	2.856				
0.1700	50.0	11.04	3.035				
0.1800	47.5	10.49	3.213				
0.1900	45.5	10.05	3.392				
0.2000	41.3	9.15	3.570				
0.2100	35.0	7.81	3.749				
0.2200	31.4	7.04	3.927				



Boring No.:	LB-1
Sample No.:	R-5
Depth (ft):	60
Soil Type:	Drive
Sample Description:	Olive brown sandy silt'stone' s(ML)

Sample Diameter (in.)	2.416
Sample Height (in.)	5.602
Initial Moisture Content (%)	21.45
Dry Density (pcf)	104.9
Specific Gravity (assumed)	2.7
Saturation (%)	95.4
Rate of Deformation (in/min)	0.0200
Height / Diameter Ratio	2.32

At Failure

Compressive Strength (psi)	**15.80**
Axial Strain (%)	1.96

Leighton

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project No.: **603253-001**

Atwater Bridge

02/16/12

Leighton

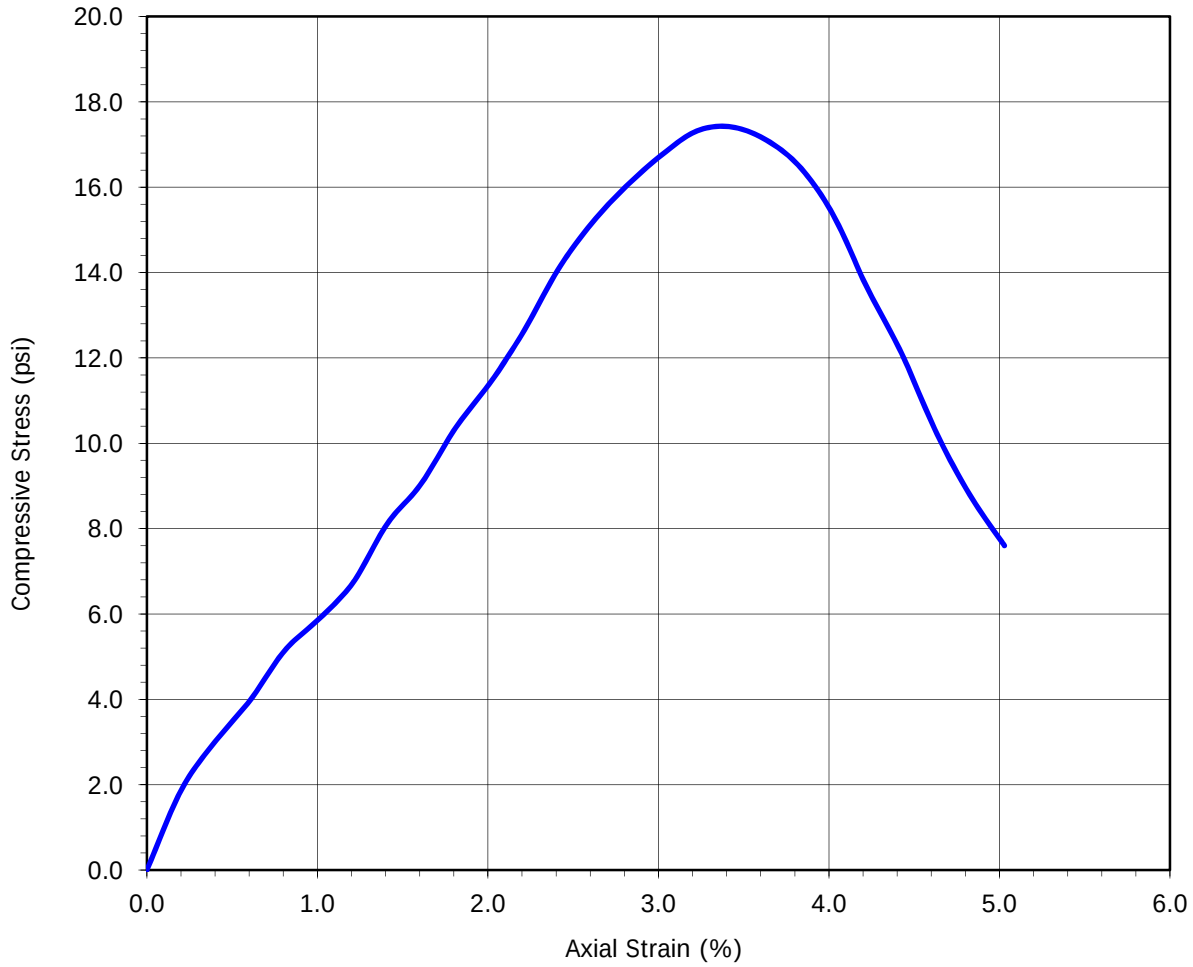
UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
ASTM D 2166

Project Name:	Atwater Bridge	Tested by:	A. Santos	Date:	02/16/12
Project No.:	603253-001	Checked by:	J. Ward	Date:	02/20/12
Boring No.:	LB-1	Sample Type:	Drive		
Sample No.:	R-6	Depth (ft):	70.0		
Sample Description:	Dark olive silty sand'stone' (SM)				

Weight of Sample + Tube / Rings (g)	726.60
Weight of Tube / Rings (g)	0.00
Wet Weight of Soil + Container (g)	835.50
Dry Weight of Soil + Container (g)	689.00
Weight of Container (g)	108.90
Load Surcharge (lb)	2.20
Rate of Deformation (in/min)	0.020
Specific Gravity (Assumed)	2.70

Sample Measurements	
Diameter (in)	2.416
	2.416
	2.417
Area (sq.in.)	4.586
Height (in)	4.972
	4.971
	4.970

Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)	Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)
0.0000	0.0	0.00	0.000				
0.0100	6.4	1.87	0.201				
0.0200	11.7	3.02	0.402				
0.0300	16.1	3.97	0.604				
0.0400	21.5	5.13	0.805				
0.0500	25.0	5.87	1.006				
0.0600	29.0	6.72	1.207				
0.0700	35.5	8.11	1.408				
0.0800	40.0	9.05	1.609				
0.0900	46.2	10.36	1.811				
0.1000	51.2	11.41	2.012				
0.1100	57.1	12.65	2.213				
0.1200	64.0	14.09	2.414				
0.1300	69.3	15.18	2.615				
0.1400	73.5	16.04	2.816				
0.1500	77.0	16.75	3.018				
0.1600	79.8	17.31	3.219				
0.1700	80.5	17.42	3.420				
0.1800	79.3	17.13	3.621				
0.1900	76.5	16.51	3.822				
0.2000	71.2	15.36	4.023				
0.2100	63.1	13.64	4.225				
0.2200	55.9	12.11	4.426				
0.2300	47.2	10.27	4.627				
0.2400	40.1	8.78	4.828				
0.2500	34.5	7.60	5.029				



Boring No.:	LB-1
Sample No.:	R-6
Depth (ft):	70
Soil Type:	Drive
Sample Description:	Dark olive silty sand'stone' (SM)

Sample Diameter (in.)	2.416
Sample Height (in.)	4.971
Initial Moisture Content (%)	25.25
Dry Density (pcf)	96.9
Specific Gravity (assumed)	2.7
Saturation (%)	92.4
Rate of Deformation (in/min)	0.0200
Height / Diameter Ratio	2.06

At Failure

Compressive Strength (psi)	**17.42**
Axial Strain (%)	3.42

Leighton

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

Project No.: **603253-001**

Atwater Bridge

02/16/12

UNCONFINED COMPRESSIVE STRENGTH of COHESIVE SOIL
ASTM D 2166

Leighton

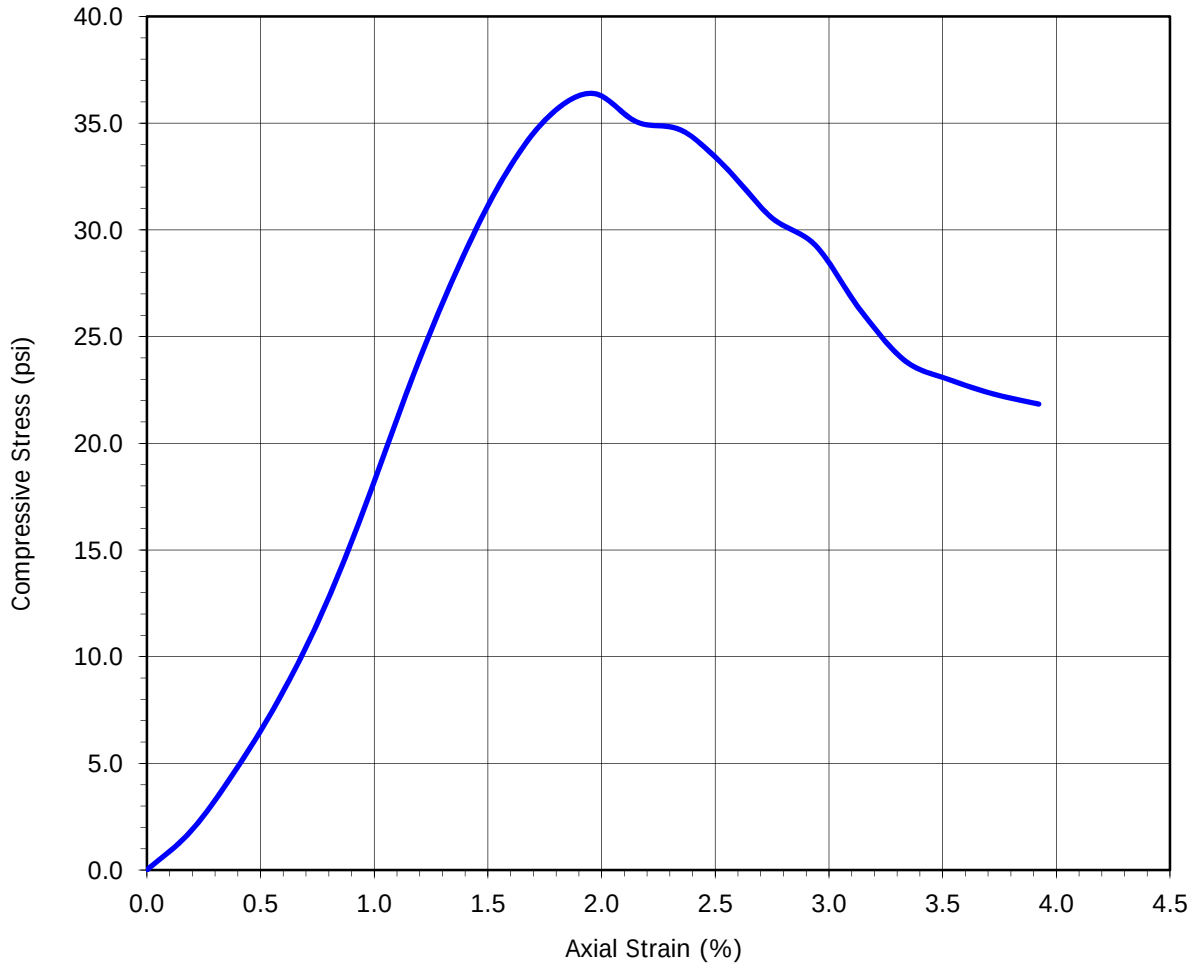
Project Name:	Atwater Bridge	Tested by:	A. Santos	Date:	04/11/12
Project No.:	603253-001	Checked by:	J. Ward	Date:	04/17/12
Boring No.:	LB-1A	Sample Type:	Drive		
Sample No.:	R-5	Depth (ft):	60.0		
Sample Description:	Dark olive silty sand'stone' (SM)				

Weight of Sample + Tube / Rings (g)	811.60
Weight of Tube / Rings (g)	0.00
Wet Weight of Soil + Container (g)	919.50
Dry Weight of Soil + Container (g)	826.80
Weight of Container (g)	110.50
Load Surcharge (lb)	2.20
Rate of Deformation (in/min)	0.045
Specific Gravity (Assumed)	2.70

Sample Measurements	
Diameter (in)	2.420
	2.411
	2.417
Area (sq.in.)	4.584
Height (in)	5.100
	5.103
	5.093

Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)
0.0000	0.0	0.00	0.000
0.0100	6.3	1.85	0.196
0.0200	19.5	4.71	0.392
0.0300	35.4	8.15	0.588
0.0400	55.0	12.38	0.785
0.0500	79.5	17.65	0.981
0.0600	106.0	23.32	1.177
0.0700	129.5	28.33	1.373
0.0800	149.0	32.46	1.569
0.0900	162.5	35.29	1.765
0.1000	168.0	36.40	1.961
0.1100	162.0	35.04	2.157
0.1200	160.5	34.65	2.354
0.1300	152.5	32.88	2.550
0.1400	142.0	30.59	2.746
0.1500	136.0	29.26	2.942
0.1600	122.0	26.24	3.138
0.1700	111.0	23.87	3.334
0.1800	107.0	22.98	3.530
0.1900	104.0	22.30	3.726
0.2000	102.0	21.84	3.923

Axial Deformation (in.)	Load (lb.)	Compressive Stress (psi)	Axial Strain (%)



Boring No.:	LB-1A
Sample No.:	R-5
Depth (ft):	60
Soil Type:	Drive
Sample Description:	Dark olive silty sand'stone' (SM)

Sample Diameter (in.)	2.416
Sample Height (in.)	5.099
Initial Moisture Content (%)	12.94
Dry Density (pcf)	117.1
Specific Gravity (assumed)	2.7
Saturation (%)	79.7
Rate of Deformation (in/min)	0.0450
Height / Diameter Ratio	2.11

At Failure

Compressive Strength (psi)	**36.40**
Axial Strain (%)	1.96

Leighton

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Project No.: **603253-001**

Atwater Bridge

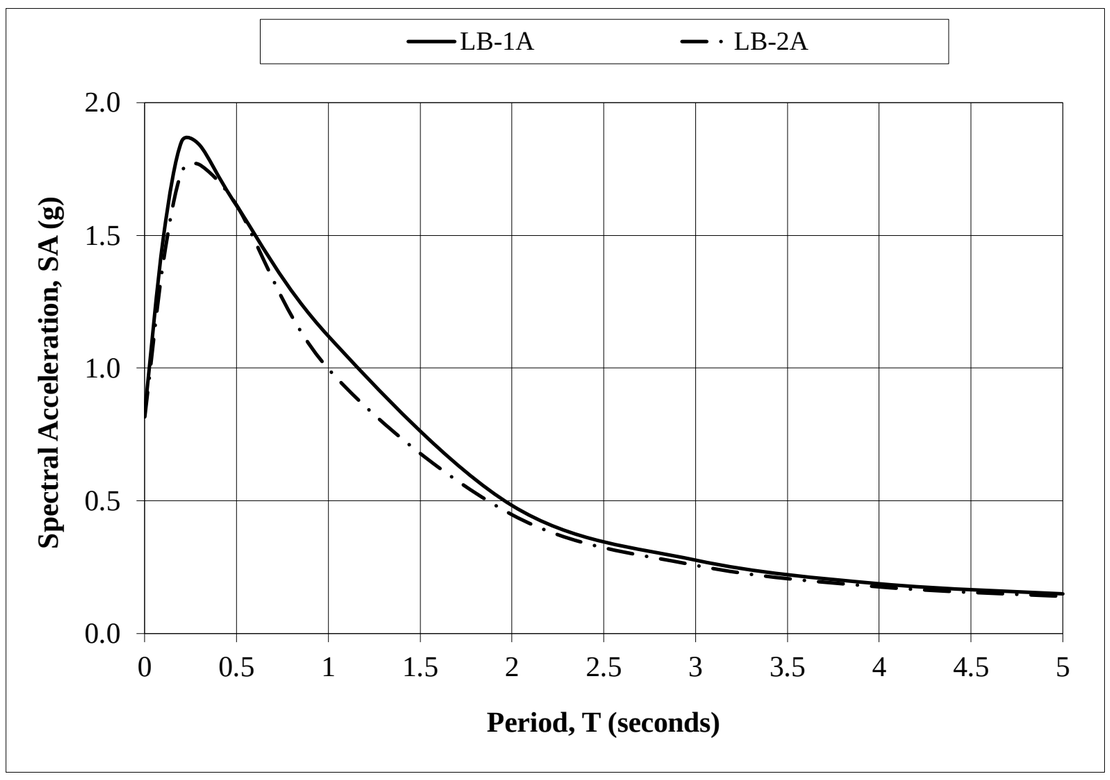
04/11/12

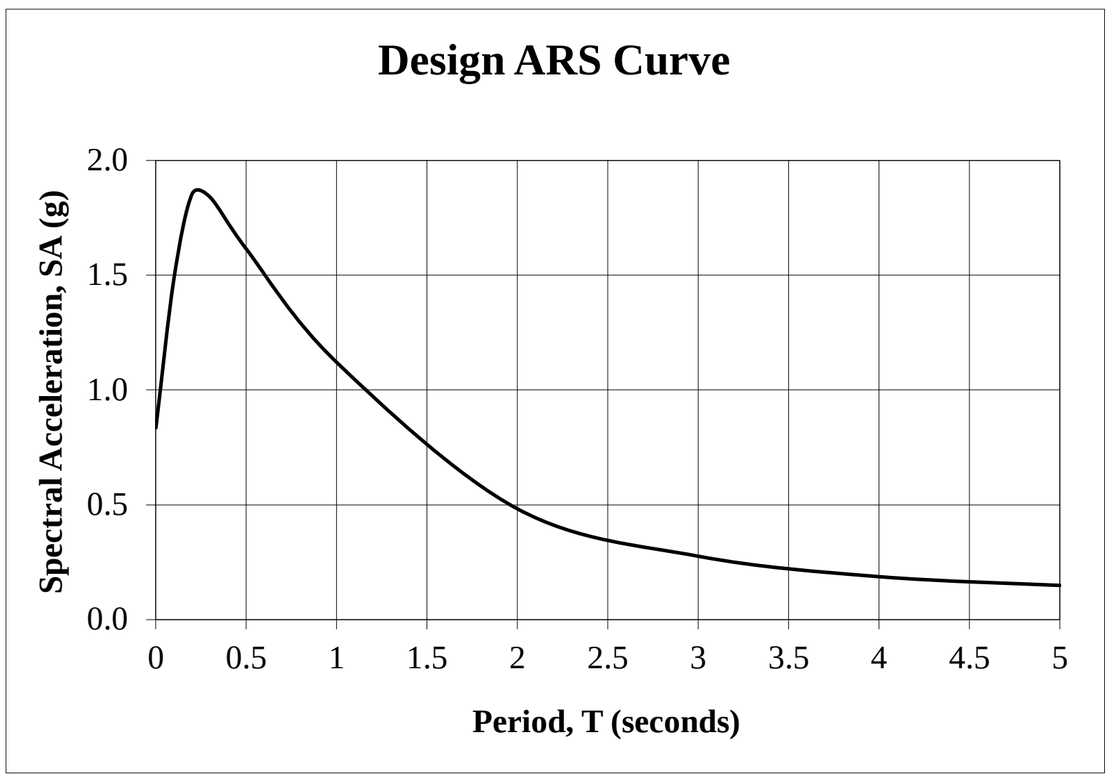
APPENDIX D

PROJECT INFORMATION	
Project Name:	Atwater Park Multimodal Crossing
Project Number:	603253-001
Location:	City of Los Angeles, California

SITE DATA		
Shear Wave Velocity, V_{S30}:	LB-1A / LB-2A : 400/340	m/s
Latitude:	34.130500	°
Longitude:	-118.273400	°
Depth to V_S = 1.0 km/s:	400	m
Depth to V_S = 2.5 km/s:	2.00	km

Period T (sec)	LB-1A SA_{1A} (g)	LB-2A SA_{2A} (g)	Envelope SA_E (g)
0	0.835	0.816	0.835
0.1	1.486	1.395	1.486
0.2	1.853	1.739	1.853
0.3	1.839	1.766	1.839
0.5	1.612	1.614	1.614
1	1.120	0.997	1.120
2	0.482	0.447	0.482
3	0.276	0.256	0.276
4	0.187	0.175	0.187
5	0.149	0.140	0.149





Leighton Consulting, Inc.
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Recommended ARS Curve

Atwater Bridge Crossing, Los Angeles California	Project No. 603253-001	Date 5-2-12

GeoLogismiki
Geotechnical Engineering Software
Merarhias 56, 621 25 - Serrai, Greece
url: http://www.geologismiki.gr - email: info@geologismiki.gr

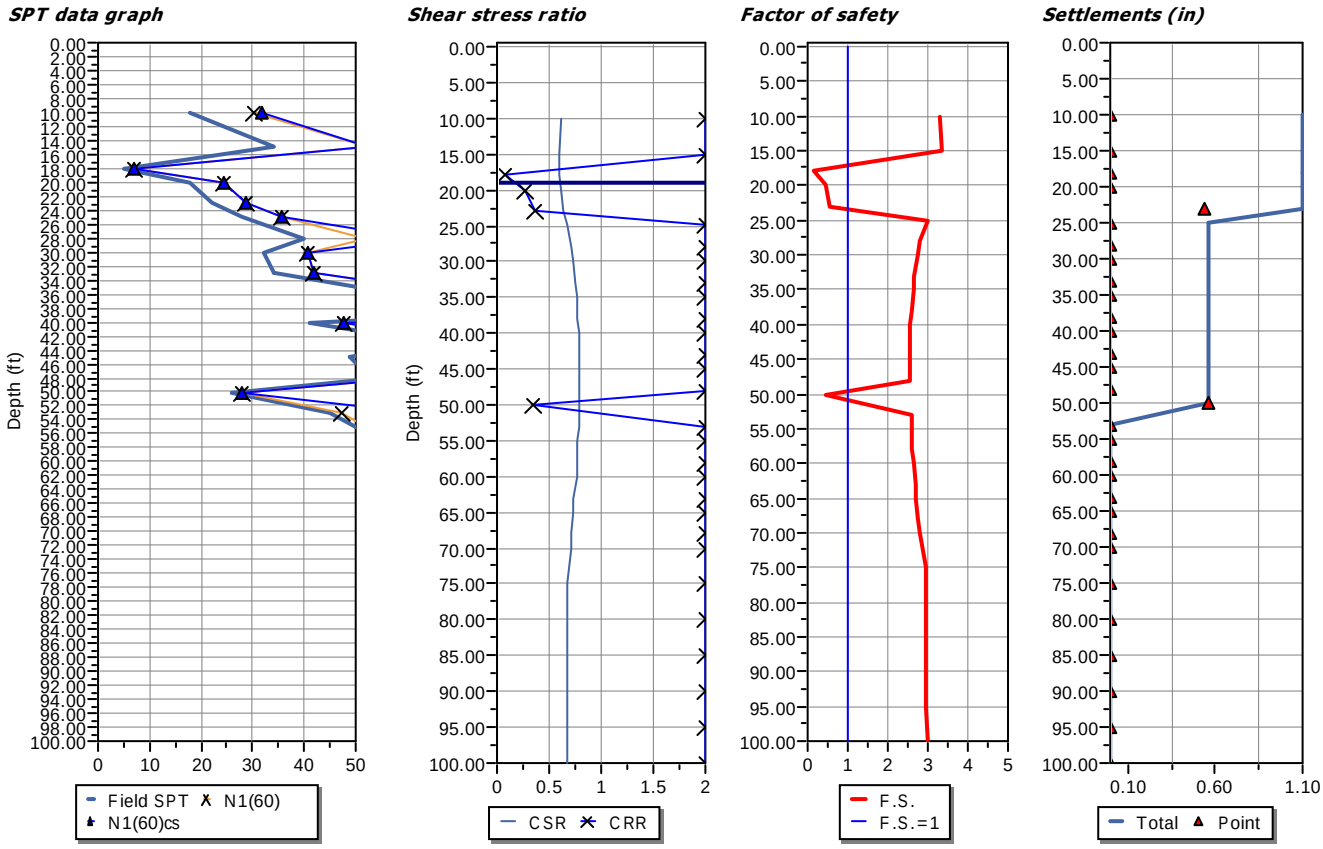
LIQUEFACTION ANALYSIS REPORT

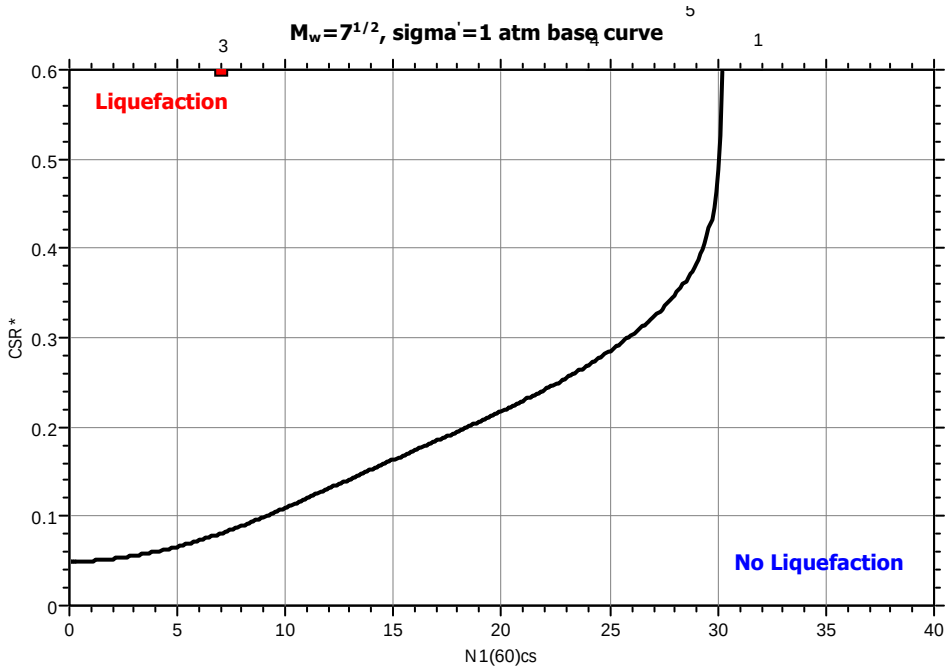
Project title : Atwater Bridge

Project subtitle : Boring LB-2A (East Abutment)

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	19.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.60
Analysis method:	NCEER 1998	Peak ground accelaration:	1.02 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.30





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	10.00	18.00	120.00	10.00
2	15.00	34.00	120.00	0.00
3	18.00	5.00	120.00	0.00
4	20.00	18.00	120.00	0.00
5	23.00	22.00	120.00	0.00
6	25.00	28.00	120.00	0.00
7	28.00	40.00	120.00	25.00
8	30.00	32.00	120.00	0.00
9	33.00	34.00	120.00	0.00
10	35.00	50.00	120.00	0.00
11	38.00	95.00	120.00	0.00
12	40.00	41.00	120.00	0.00
13	43.00	65.00	120.00	0.00
14	45.00	49.00	120.00	0.00
15	48.00	53.00	120.00	0.00
16	50.00	26.00	120.00	0.00
17	53.00	45.00	120.00	90.00
18	55.00	50.00	120.00	0.00
19	58.00	100.00	120.00	0.00
20	60.00	76.00	120.00	0.00
21	63.00	100.00	120.00	0.00
22	65.00	72.00	120.00	0.00
23	68.00	58.00	120.00	0.00
24	70.00	89.00	120.00	0.00
25	75.00	105.00	120.00	0.00
26	80.00	62.00	120.00	0.00
27	85.00	70.00	120.00	0.00
28	90.00	72.00	120.00	0.00
29	95.00	100.00	120.00	0.00
30	100.00	100.00	120.00	0.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	10.00	0.60	0.00	0.60	0.98	0.65	1.39	0.47	1.00	0.47
2	15.00	0.90	0.00	0.90	0.97	0.64	1.39	0.46	1.00	0.46
3	18.00	1.08	0.00	1.08	0.96	0.64	1.39	0.46	0.99	0.46
4	20.00	1.20	0.00	1.20	0.95	0.63	1.39	0.46	0.98	0.47
5	23.00	1.38	0.06	1.32	0.95	0.66	1.39	0.47	0.96	0.49
6	25.00	1.50	0.12	1.38	0.94	0.68	1.39	0.49	0.96	0.51
7	28.00	1.68	0.22	1.46	0.93	0.71	1.39	0.51	0.94	0.54
8	30.00	1.80	0.28	1.52	0.93	0.73	1.39	0.53	0.94	0.56
9	33.00	1.98	0.37	1.61	0.91	0.74	1.39	0.53	0.92	0.58
10	35.00	2.10	0.44	1.66	0.89	0.75	1.39	0.54	0.92	0.59
11	38.00	2.28	0.53	1.75	0.87	0.75	1.39	0.54	0.91	0.59
12	40.00	2.40	0.59	1.81	0.85	0.75	1.39	0.54	0.90	0.60
13	43.00	2.58	0.69	1.89	0.83	0.75	1.39	0.54	0.89	0.60
14	45.00	2.70	0.75	1.95	0.81	0.74	1.39	0.54	0.89	0.60
15	48.00	2.88	0.84	2.04	0.78	0.74	1.39	0.53	0.88	0.60
16	50.00	3.00	0.91	2.09	0.77	0.73	1.39	0.53	0.88	0.60
17	53.00	3.18	1.00	2.18	0.74	0.72	1.39	0.52	0.87	0.60

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
18	55.00	3.30	1.06	2.24	0.73	0.71	1.39	0.51	0.86	0.59
19	58.00	3.48	1.16	2.32	0.70	0.70	1.39	0.50	0.86	0.59
20	60.00	3.60	1.22	2.38	0.69	0.69	1.39	0.50	0.85	0.58
21	63.00	3.78	1.31	2.47	0.66	0.67	1.39	0.48	0.85	0.57
22	65.00	3.90	1.37	2.53	0.65	0.66	1.39	0.48	0.84	0.57
23	68.00	4.08	1.47	2.61	0.62	0.64	1.39	0.46	0.84	0.55
24	70.00	4.20	1.53	2.67	0.61	0.63	1.39	0.46	0.83	0.55
25	75.00	4.50	1.69	2.81	0.56	0.60	1.39	0.43	0.82	0.52
26	80.00	4.80	1.84	2.96	0.55	0.59	1.39	0.43	0.82	0.52
27	85.00	5.10	2.00	3.10	0.54	0.59	1.39	0.42	0.81	0.52
28	90.00	5.40	2.15	3.25	0.52	0.58	1.39	0.42	0.80	0.52
29	95.00	5.70	2.31	3.39	0.51	0.57	1.39	0.41	0.79	0.52
30	100.00	6.00	2.47	3.53	0.50	0.56	1.39	0.41	0.79	0.52

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	18.00	1.32	1.25	1.00	0.85	1.20	30.28	1.52	31.80	2.00
2	34.00	1.08	1.25	1.00	0.95	1.20	52.19	0.00	52.19	2.00
3	5.00	0.98	1.25	1.00	0.95	1.20	7.01	0.00	7.01	0.08
4	18.00	0.95	1.25	1.00	0.95	1.20	24.24	0.00	24.24	0.27
5	22.00	0.91	1.25	1.00	0.95	1.20	28.59	0.00	28.59	0.37
6	28.00	0.89	1.25	1.00	0.95	1.20	35.59	0.00	35.59	2.00
7	40.00	0.86	1.25	1.00	1.00	1.20	51.84	10.25	62.09	2.00
8	32.00	0.85	1.25	1.00	1.00	1.20	40.64	0.00	40.64	2.00
9	34.00	0.82	1.25	1.00	1.00	1.20	41.96	0.00	41.96	2.00
10	50.00	0.81	1.25	1.00	1.00	1.20	60.58	0.00	60.58	2.00
11	95.00	0.79	1.25	1.00	1.00	1.20	112.12	0.00	112.12	2.00
12	41.00	0.77	1.25	1.00	1.00	1.20	47.58	0.00	47.58	2.00
13	65.00	0.76	1.25	1.00	1.00	1.20	73.64	0.00	73.64	2.00
14	49.00	0.74	1.25	1.00	1.00	1.20	54.66	0.00	54.66	2.00
15	53.00	0.73	1.25	1.00	1.00	1.20	57.81	0.00	57.81	2.00
16	26.00	0.72	1.25	1.00	1.00	1.20	27.96	0.00	27.96	0.35
17	45.00	0.70	1.25	1.00	1.00	1.20	47.39	14.48	61.87	2.00
18	50.00	0.69	1.25	1.00	1.00	1.20	51.95	0.00	51.95	2.00
19	100.00	0.68	1.25	1.00	1.00	1.20	101.91	0.00	101.91	2.00
20	76.00	0.67	1.25	1.00	1.00	1.20	76.48	0.00	76.48	2.00
21	100.00	0.66	1.25	1.00	1.00	1.20	98.81	0.00	98.81	2.00
22	72.00	0.65	1.25	1.00	1.00	1.20	70.31	0.00	70.31	2.00
23	58.00	0.64	1.25	1.00	1.00	1.20	55.67	0.00	55.67	2.00
24	89.00	0.63	1.25	1.00	1.00	1.20	84.48	0.00	84.48	2.00
25	105.00	0.62	1.25	1.00	1.00	1.20	97.02	0.00	97.02	2.00
26	62.00	0.60	1.25	1.00	1.00	1.20	55.85	0.00	55.85	2.00
27	70.00	0.59	1.25	1.00	1.00	1.20	61.54	0.00	61.54	2.00
28	72.00	0.57	1.25	1.00	1.00	1.20	61.86	0.00	61.86	2.00
29	100.00	0.56	1.25	1.00	1.00	1.20	84.03	0.00	84.03	2.00
30	100.00	0.55	1.25	1.00	1.00	1.20	82.27	0.00	82.27	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	31.80	26.50	3.29	0.00	0.00
2	52.19	43.49	3.33	0.00	0.00
3	7.01	5.84	0.13	4.46	0.00
4	24.24	20.20	0.45	2.13	0.00
5	28.59	23.83	0.57	1.81	0.54
6	35.59	29.66	2.99	0.00	0.00
7	62.09	51.74	2.82	0.00	0.00
8	40.64	33.87	2.73	0.00	0.00
9	41.96	34.96	2.66	0.00	0.00
10	60.58	50.48	2.63	0.00	0.00
11	112.12	93.43	2.59	0.00	0.00
12	47.58	39.65	2.57	0.00	0.00
13	73.64	61.36	2.56	0.00	0.00
14	54.66	45.55	2.55	0.00	0.00
15	57.81	48.18	2.55	0.00	0.00
16	27.96	23.30	0.44	1.85	0.56
17	61.87	51.56	2.58	0.00	0.00
18	51.95	43.30	2.59	0.00	0.00
19	101.91	84.92	2.62	0.00	0.00
20	76.48	63.74	2.64	0.00	0.00
21	98.81	82.34	2.69	0.00	0.00
22	70.31	58.59	2.72	0.00	0.00
23	55.67	46.39	2.77	0.00	0.00
24	84.48	70.40	2.81	0.00	0.00
25	97.02	80.85	2.94	0.00	0.00
26	55.85	46.54	2.95	0.00	0.00
27	61.54	51.29	2.94	0.00	0.00
28	61.86	51.55	2.95	0.00	0.00
29	84.03	70.03	2.96	0.00	0.00
30	82.27	68.56	2.98	0.00	0.00

Total settlement : 1.10

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	8.48	0.00
2	0.00	7.71	0.00
3	0.87	7.26	5.74
4	0.55	6.95	2.33

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
5	0.43	6.49	2.53
6	0.00	6.19	0.00
7	0.00	5.73	0.00
8	0.00	5.43	0.00
9	0.00	4.97	0.00
10	0.00	4.67	0.00
11	0.00	4.21	0.00
12	0.00	3.90	0.00
13	0.00	3.45	0.00
14	0.00	3.14	0.00
15	0.00	2.68	0.00
16	0.56	2.38	0.81
17	0.00	1.92	0.00
18	0.00	1.62	0.00
19	0.00	1.16	0.00
20	0.00	0.86	0.00
21	0.00	0.40	0.00
22	0.00	0.09	0.00

Overall potential I_L : 11.41

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

GeoLogismiki LiqIT

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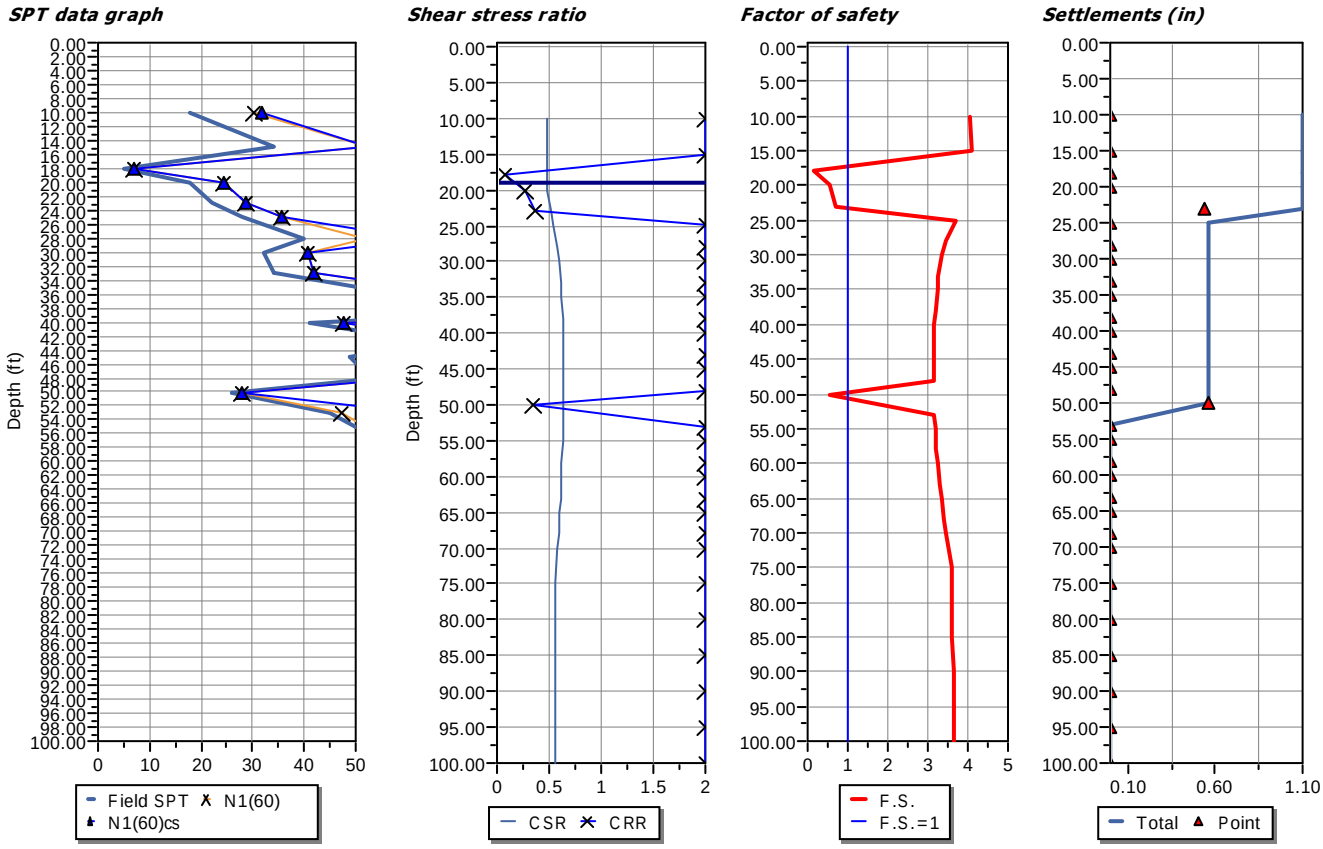
LIQUEFACTION ANALYSIS REPORT

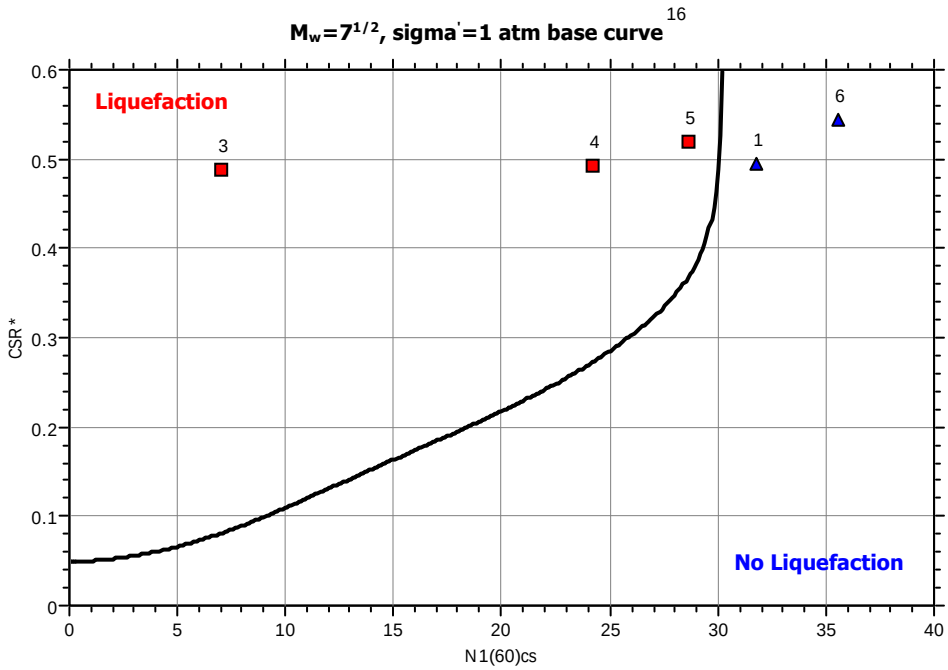
Project title : Atwater Bridge

Project subtitle : Boring LB-2A (East Abutment)

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	19.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	6.60
Analysis method:	NCEER 1998	Peak ground accelaration:	0.83 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.30





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	10.00	18.00	120.00	10.00
2	15.00	34.00	120.00	0.00
3	18.00	5.00	120.00	0.00
4	20.00	18.00	120.00	0.00
5	23.00	22.00	120.00	0.00
6	25.00	28.00	120.00	0.00
7	28.00	40.00	120.00	25.00
8	30.00	32.00	120.00	0.00
9	33.00	34.00	120.00	0.00
10	35.00	50.00	120.00	0.00
11	38.00	95.00	120.00	0.00
12	40.00	41.00	120.00	0.00
13	43.00	65.00	120.00	0.00
14	45.00	49.00	120.00	0.00
15	48.00	53.00	120.00	0.00
16	50.00	26.00	120.00	0.00
17	53.00	45.00	120.00	90.00
18	55.00	50.00	120.00	0.00
19	58.00	100.00	120.00	0.00
20	60.00	76.00	120.00	0.00
21	63.00	100.00	120.00	0.00
22	65.00	72.00	120.00	0.00
23	68.00	58.00	120.00	0.00
24	70.00	89.00	120.00	0.00
25	75.00	105.00	120.00	0.00
26	80.00	62.00	120.00	0.00
27	85.00	70.00	120.00	0.00
28	90.00	72.00	120.00	0.00
29	95.00	100.00	120.00	0.00
30	100.00	100.00	120.00	0.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	10.00	0.60	0.00	0.60	0.98	0.53	1.39	0.38	1.00	0.38
2	15.00	0.90	0.00	0.90	0.97	0.52	1.39	0.38	1.00	0.38
3	18.00	1.08	0.00	1.08	0.96	0.52	1.39	0.37	0.99	0.38
4	20.00	1.20	0.00	1.20	0.95	0.51	1.39	0.37	0.98	0.38
5	23.00	1.38	0.06	1.32	0.95	0.53	1.39	0.39	0.96	0.40
6	25.00	1.50	0.12	1.38	0.94	0.55	1.39	0.40	0.96	0.42
7	28.00	1.68	0.22	1.46	0.93	0.58	1.39	0.42	0.94	0.44
8	30.00	1.80	0.28	1.52	0.93	0.59	1.39	0.43	0.94	0.46
9	33.00	1.98	0.37	1.61	0.91	0.60	1.39	0.43	0.92	0.47
10	35.00	2.10	0.44	1.66	0.89	0.61	1.39	0.44	0.92	0.48
11	38.00	2.28	0.53	1.75	0.87	0.61	1.39	0.44	0.91	0.48
12	40.00	2.40	0.59	1.81	0.85	0.61	1.39	0.44	0.90	0.49
13	43.00	2.58	0.69	1.89	0.83	0.61	1.39	0.44	0.89	0.49
14	45.00	2.70	0.75	1.95	0.81	0.60	1.39	0.44	0.89	0.49
15	48.00	2.88	0.84	2.04	0.78	0.60	1.39	0.43	0.88	0.49
16	50.00	3.00	0.91	2.09	0.77	0.59	1.39	0.43	0.88	0.49
17	53.00	3.18	1.00	2.18	0.74	0.59	1.39	0.42	0.87	0.49

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
18	55.00	3.30	1.06	2.24	0.73	0.58	1.39	0.42	0.86	0.48
19	58.00	3.48	1.16	2.32	0.70	0.57	1.39	0.41	0.86	0.48
20	60.00	3.60	1.22	2.38	0.69	0.56	1.39	0.40	0.85	0.47
21	63.00	3.78	1.31	2.47	0.66	0.55	1.39	0.39	0.85	0.47
22	65.00	3.90	1.37	2.53	0.65	0.54	1.39	0.39	0.84	0.46
23	68.00	4.08	1.47	2.61	0.62	0.52	1.39	0.38	0.84	0.45
24	70.00	4.20	1.53	2.67	0.61	0.51	1.39	0.37	0.83	0.44
25	75.00	4.50	1.69	2.81	0.56	0.49	1.39	0.35	0.82	0.43
26	80.00	4.80	1.84	2.96	0.55	0.48	1.39	0.35	0.82	0.42
27	85.00	5.10	2.00	3.10	0.54	0.48	1.39	0.34	0.81	0.43
28	90.00	5.40	2.15	3.25	0.52	0.47	1.39	0.34	0.80	0.42
29	95.00	5.70	2.31	3.39	0.51	0.46	1.39	0.34	0.79	0.42
30	100.00	6.00	2.47	3.53	0.50	0.46	1.39	0.33	0.79	0.42

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	18.00	1.32	1.25	1.00	0.85	1.20	30.28	1.52	31.80	2.00
2	34.00	1.08	1.25	1.00	0.95	1.20	52.19	0.00	52.19	2.00
3	5.00	0.98	1.25	1.00	0.95	1.20	7.01	0.00	7.01	0.08
4	18.00	0.95	1.25	1.00	0.95	1.20	24.24	0.00	24.24	0.27
5	22.00	0.91	1.25	1.00	0.95	1.20	28.59	0.00	28.59	0.37
6	28.00	0.89	1.25	1.00	0.95	1.20	35.59	0.00	35.59	2.00
7	40.00	0.86	1.25	1.00	1.00	1.20	51.84	10.25	62.09	2.00
8	32.00	0.85	1.25	1.00	1.00	1.20	40.64	0.00	40.64	2.00
9	34.00	0.82	1.25	1.00	1.00	1.20	41.96	0.00	41.96	2.00
10	50.00	0.81	1.25	1.00	1.00	1.20	60.58	0.00	60.58	2.00
11	95.00	0.79	1.25	1.00	1.00	1.20	112.12	0.00	112.12	2.00
12	41.00	0.77	1.25	1.00	1.00	1.20	47.58	0.00	47.58	2.00
13	65.00	0.76	1.25	1.00	1.00	1.20	73.64	0.00	73.64	2.00
14	49.00	0.74	1.25	1.00	1.00	1.20	54.66	0.00	54.66	2.00
15	53.00	0.73	1.25	1.00	1.00	1.20	57.81	0.00	57.81	2.00
16	26.00	0.72	1.25	1.00	1.00	1.20	27.96	0.00	27.96	0.35
17	45.00	0.70	1.25	1.00	1.00	1.20	47.39	14.48	61.87	2.00
18	50.00	0.69	1.25	1.00	1.00	1.20	51.95	0.00	51.95	2.00
19	100.00	0.68	1.25	1.00	1.00	1.20	101.91	0.00	101.91	2.00
20	76.00	0.67	1.25	1.00	1.00	1.20	76.48	0.00	76.48	2.00
21	100.00	0.66	1.25	1.00	1.00	1.20	98.81	0.00	98.81	2.00
22	72.00	0.65	1.25	1.00	1.00	1.20	70.31	0.00	70.31	2.00
23	58.00	0.64	1.25	1.00	1.00	1.20	55.67	0.00	55.67	2.00
24	89.00	0.63	1.25	1.00	1.00	1.20	84.48	0.00	84.48	2.00
25	105.00	0.62	1.25	1.00	1.00	1.20	97.02	0.00	97.02	2.00
26	62.00	0.60	1.25	1.00	1.00	1.20	55.85	0.00	55.85	2.00
27	70.00	0.59	1.25	1.00	1.00	1.20	61.54	0.00	61.54	2.00
28	72.00	0.57	1.25	1.00	1.00	1.20	61.86	0.00	61.86	2.00
29	100.00	0.56	1.25	1.00	1.00	1.20	84.03	0.00	84.03	2.00
30	100.00	0.55	1.25	1.00	1.00	1.20	82.27	0.00	82.27	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	31.80	26.50	4.05	0.00	0.00
2	52.19	43.49	4.10	0.00	0.00
3	7.01	5.84	0.17	4.46	0.00
4	24.24	20.20	0.55	2.13	0.00
5	28.59	23.83	0.71	1.80	0.54
6	35.59	29.66	3.68	0.00	0.00
7	62.09	51.74	3.47	0.00	0.00
8	40.64	33.87	3.36	0.00	0.00
9	41.96	34.96	3.27	0.00	0.00
10	60.58	50.48	3.23	0.00	0.00
11	112.12	93.43	3.18	0.00	0.00
12	47.58	39.65	3.16	0.00	0.00
13	73.64	61.36	3.14	0.00	0.00
14	54.66	45.55	3.14	0.00	0.00
15	57.81	48.18	3.14	0.00	0.00
16	27.96	23.30	0.55	1.85	0.56
17	61.87	51.56	3.17	0.00	0.00
18	51.95	43.30	3.18	0.00	0.00
19	101.91	84.92	3.22	0.00	0.00
20	76.48	63.74	3.25	0.00	0.00
21	98.81	82.34	3.30	0.00	0.00
22	70.31	58.59	3.34	0.00	0.00
23	55.67	46.39	3.41	0.00	0.00
24	84.48	70.40	3.46	0.00	0.00
25	97.02	80.85	3.61	0.00	0.00
26	55.85	46.54	3.62	0.00	0.00
27	61.54	51.29	3.62	0.00	0.00
28	61.86	51.55	3.63	0.00	0.00
29	84.03	70.03	3.64	0.00	0.00
30	82.27	68.56	3.66	0.00	0.00

Total settlement : 1.10

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	8.48	0.00
2	0.00	7.71	0.00
3	0.83	7.26	5.54
4	0.45	6.95	1.89

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
5	0.29	6.49	1.75
6	0.00	6.19	0.00
7	0.00	5.73	0.00
8	0.00	5.43	0.00
9	0.00	4.97	0.00
10	0.00	4.67	0.00
11	0.00	4.21	0.00
12	0.00	3.90	0.00
13	0.00	3.45	0.00
14	0.00	3.14	0.00
15	0.00	2.68	0.00
16	0.45	2.38	0.66
17	0.00	1.92	0.00
18	0.00	1.62	0.00
19	0.00	1.16	0.00
20	0.00	0.86	0.00
21	0.00	0.40	0.00
22	0.00	0.09	0.00

Overall potential I_L : 9.84

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

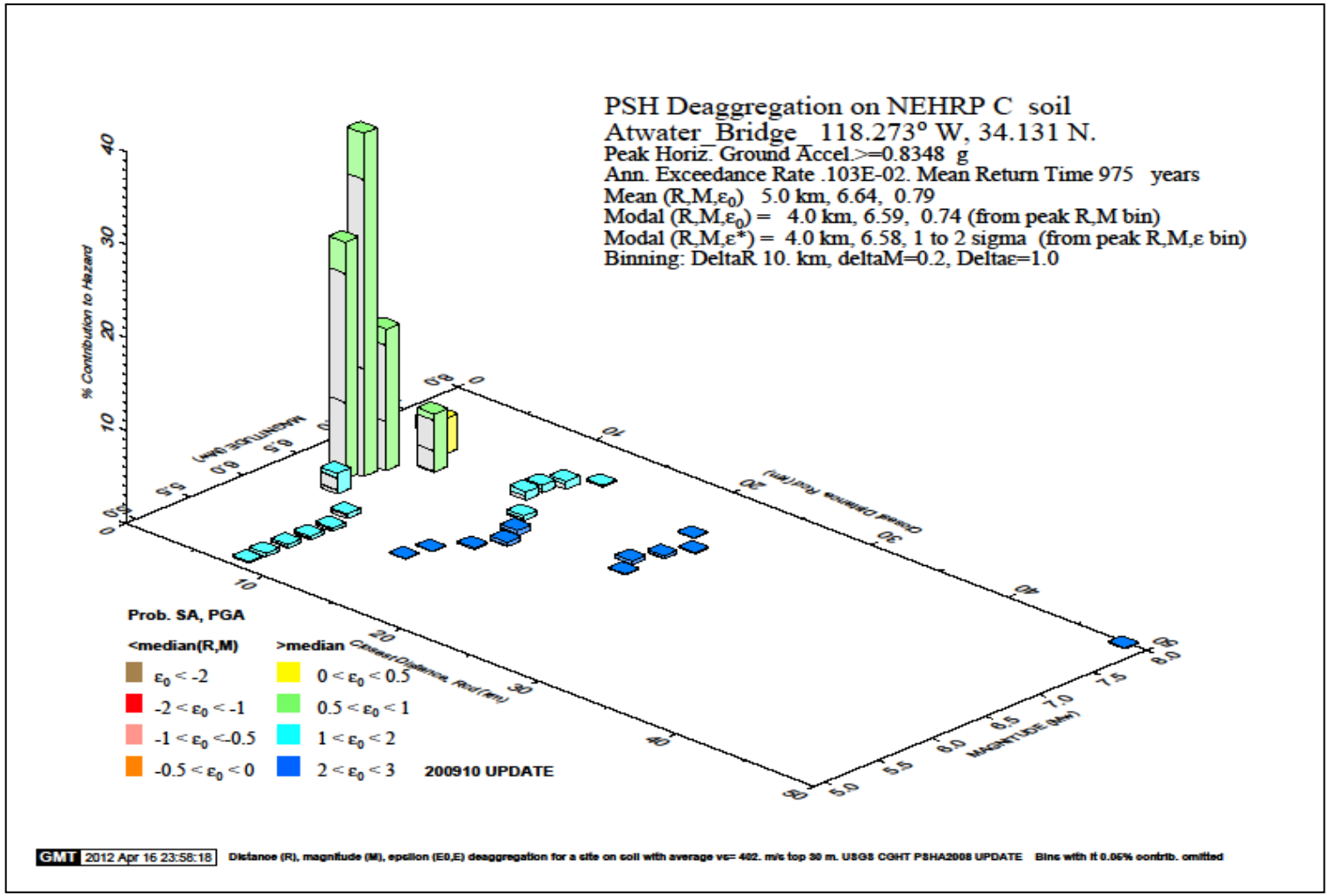


Figure D-1

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Ground Motion Analysis (LB-1A)
975-Year Return Period

Atwater Bridge Crossing, Los Angeles California	Project No. 603253-001	Date 5-1-12

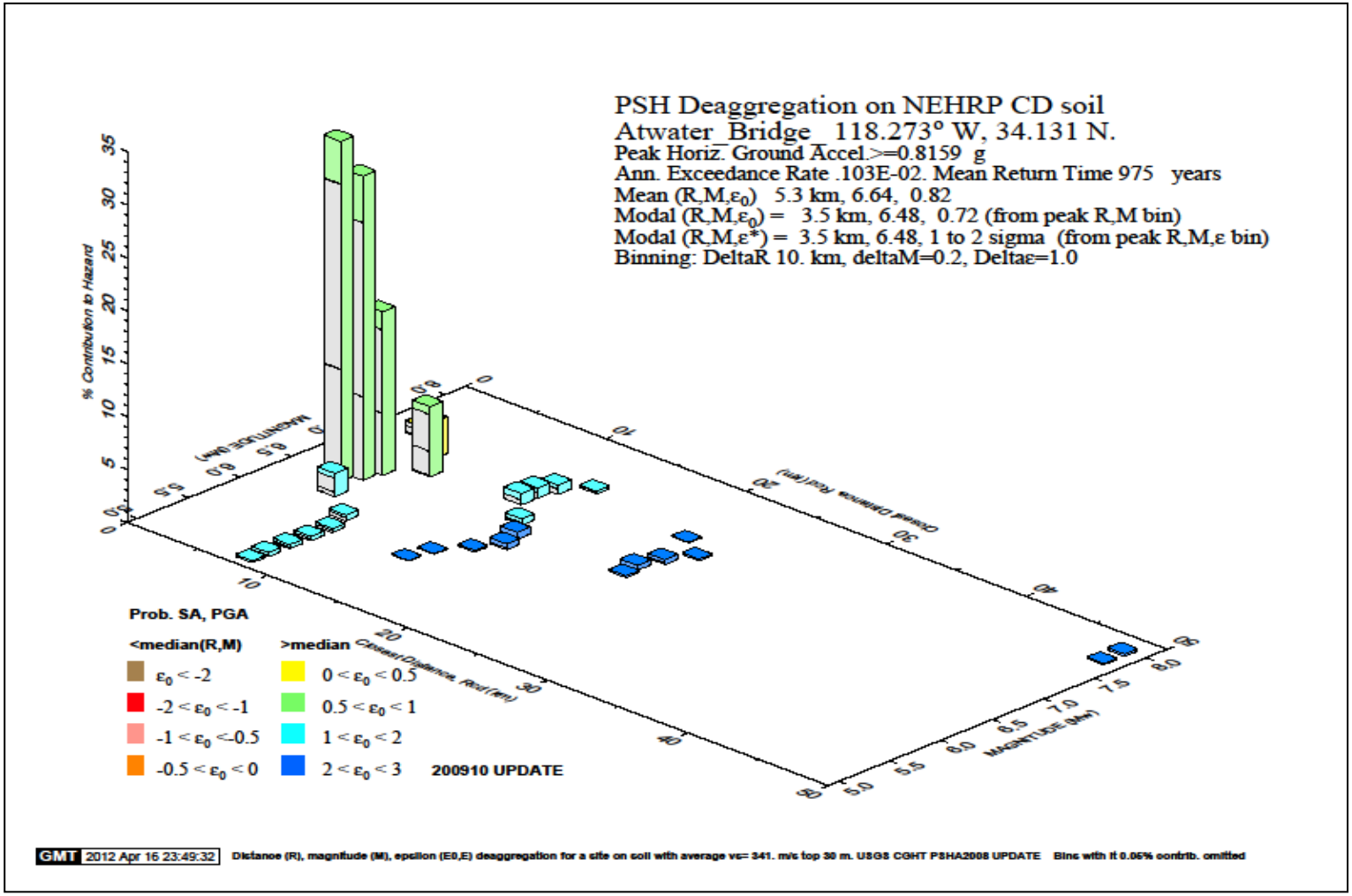


Figure D-2

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Ground Motion Analysis (LB-2A)
975-Year Return Period

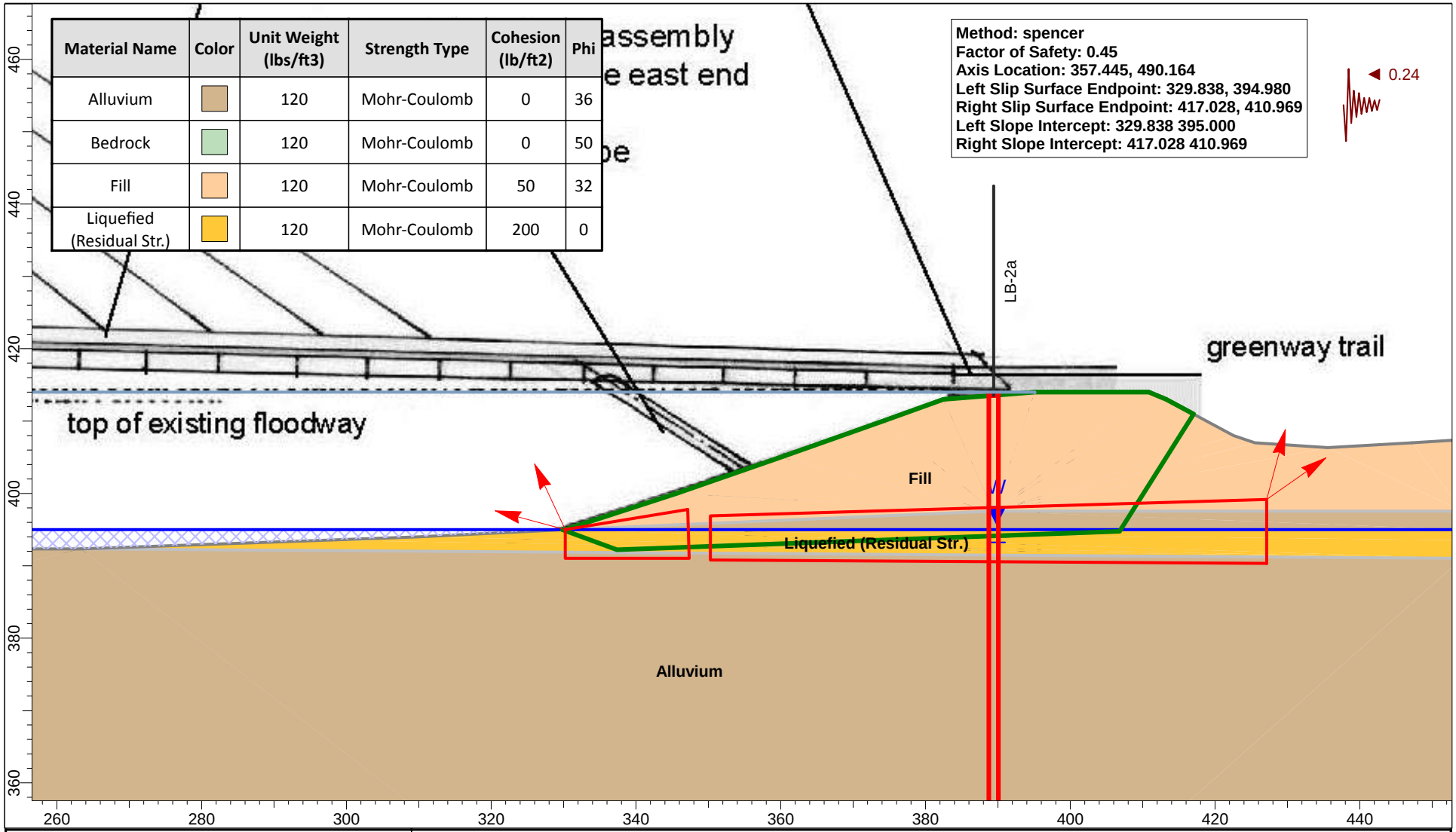
Atwater Bridge Crossing, Los Angeles California	Project No. 603253-001	Date 5-1-12

APPENDIX E

Atwater Bridge - East Abutment

Pseudostatic Stability With Liquefaction at Pseudostatic Acceleration at 0.24g

P:\Leighton Consulting\603000-603999\603253-001 Buro Happold (Work Folder - Main Project Folder on Santa Clarita)\Rancho-Only Files\Slope Stability\East Side Flow Min Wedge Yield 0.24g.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi
Alluvium		120	Mohr-Coulomb	0	36
Bedrock		120	Mohr-Coulomb	0	50
Fill		120	Mohr-Coulomb	50	32
Liquefied (Residual Str.)		120	Mohr-Coulomb	200	0

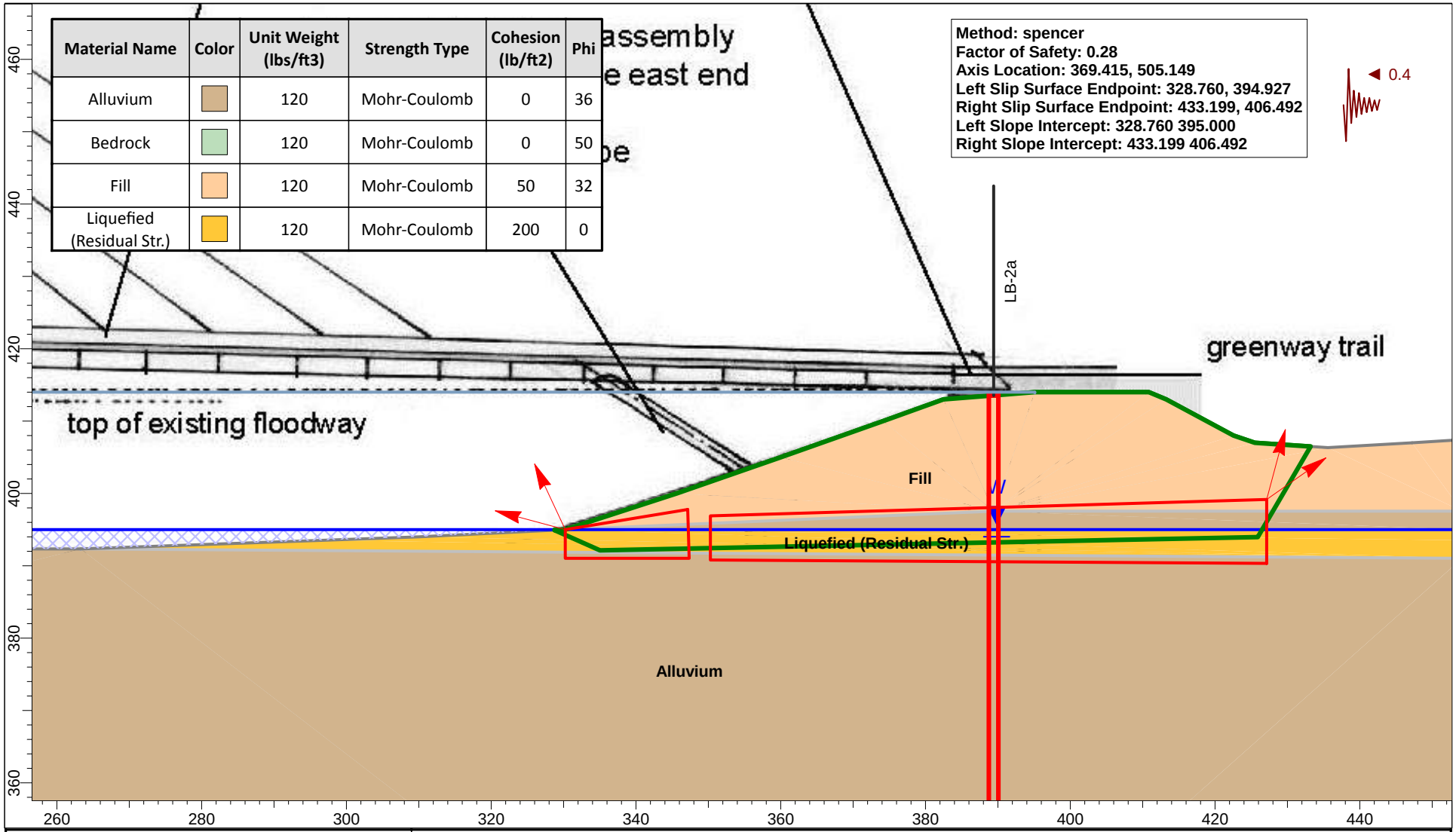
SLIDEINTERPRET 6.009

Project: Atwater Bridge			
Analyzed By: Micah Hintz	Units: feet	Scale: 1:240	Project No.: 603253-001
Date: May 2012	Condition: Pseudostatic		

Atwater Bridge - East Abutment

Pseudostatic Stability With Liquefaction at Pseudostatic Acceleration at 0.4g

P:\Leighton Consulting\603000-603999\603253-001 Buro Happold (Work Folder - Main Project Folder on Santa Clarita)\Rancho-Only Files\Slope Stability\East Side Flow Min Wedge Yield 0.4g.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi
Alluvium		120	Mohr-Coulomb	0	36
Bedrock		120	Mohr-Coulomb	0	50
Fill		120	Mohr-Coulomb	50	32
Liquefied (Residual Str.)		120	Mohr-Coulomb	200	0

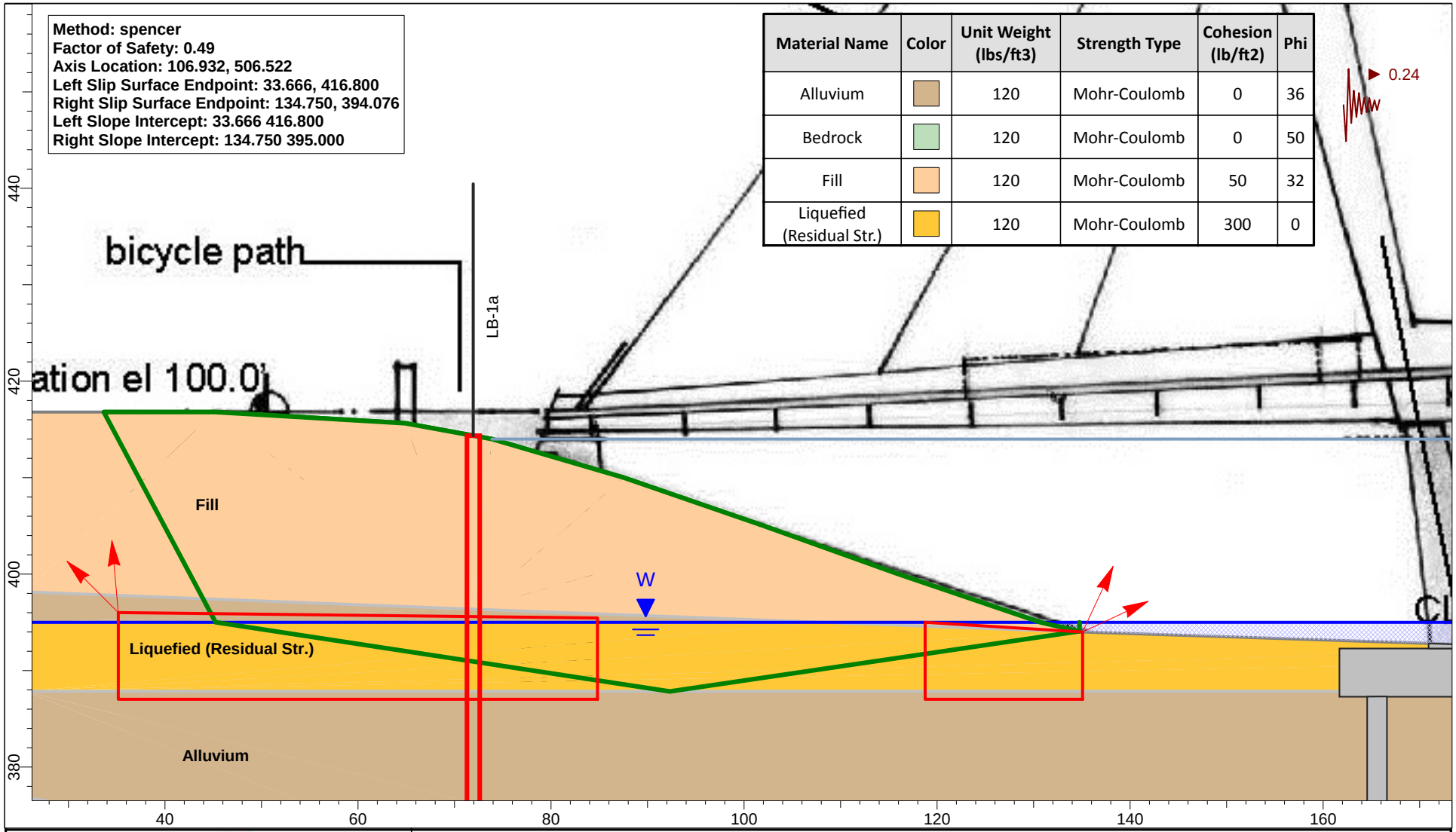
SLIDEINTERPRET 6.009

Project: Atwater Bridge			
Analyzed By: Micah Hintz	Units: feet	Scale: 1:240	Project No.: 603253-001
Date: May 2012	Condition: Pseudostatic		

Atwater Bridge - West Abutment

Pseudostatic Stability With Liquefaction at Pseudostatic Acceleration of 0.24g

P:\Leighton Consulting\603000-603999\603253-001 Buro Happold (Work Folder - Main Project Folder on Santa Clarita)\Rancho-Only Files\Slope Stability\West Side Flow Min Wedge Yield 0.24g.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi
Alluvium		120	Mohr-Coulomb	0	36
Bedrock		120	Mohr-Coulomb	0	50
Fill		120	Mohr-Coulomb	50	32
Liquefied (Residual Str.)		120	Mohr-Coulomb	300	0

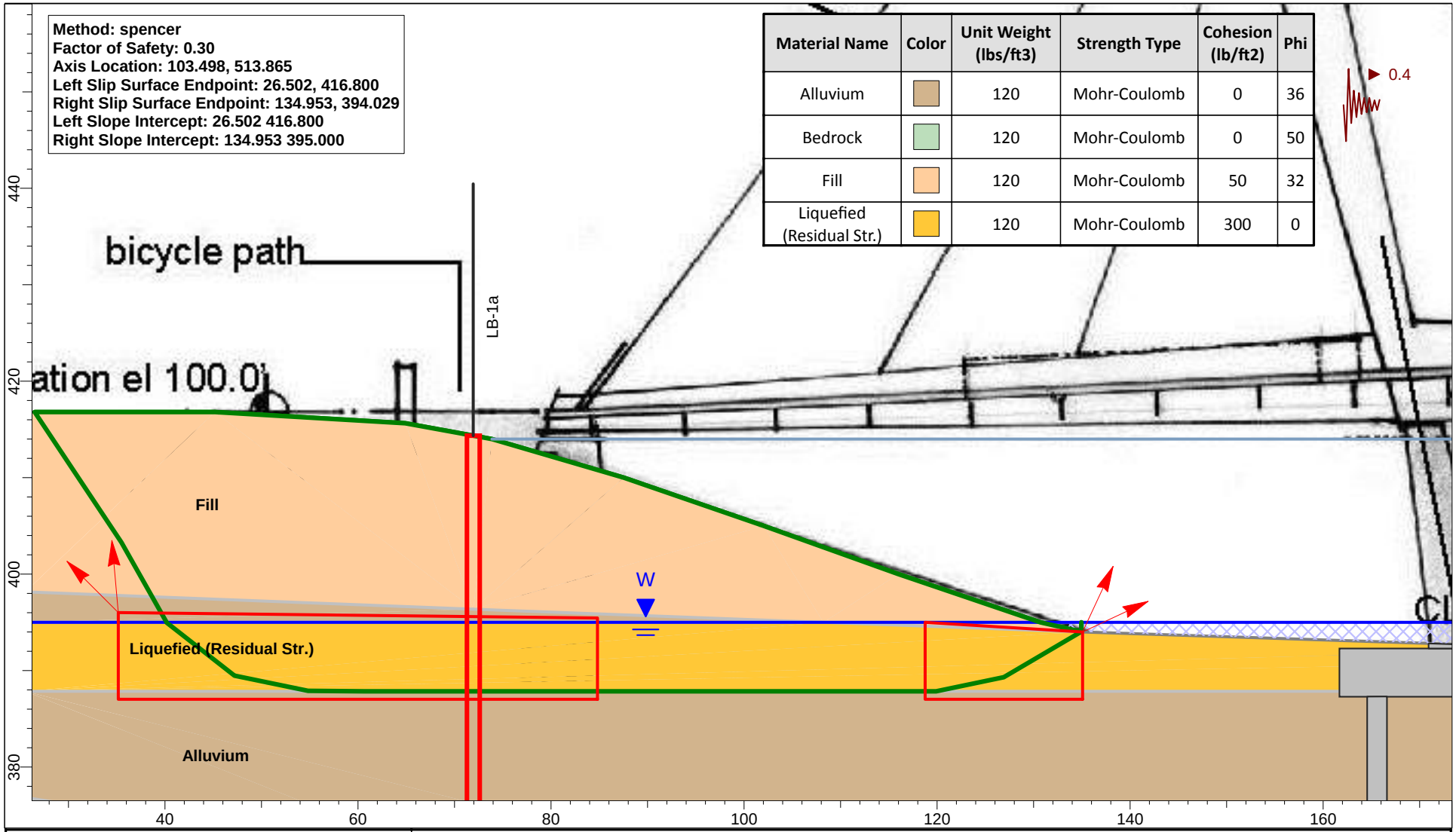
SLIDEINTERPRET 6.009

Project: Atwater Bridge			
Analyzed By: Micah Hintz	Units: feet	Scale: 1:180	Project No.: 603253-001
Date: May 2012	Condition: Pseudostatic		

Atwater Bridge - West Abutment

Pseudostatic Stability With Liquefaction at Pseudostatic Acceleration of 0.4g

P:\Leighton Consulting\603000-603999\603253-001 Buro Happold (Work Folder - Main Project Folder on Santa Clarita)\Rancho-Only Files\Slope Stability\West Side Flow Min Wedge Yield 0.4g.slim



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi
Alluvium		120	Mohr-Coulomb	0	36
Bedrock		120	Mohr-Coulomb	0	50
Fill		120	Mohr-Coulomb	50	32
Liquefied (Residual Str.)		120	Mohr-Coulomb	300	0

SLIDEINTERPRET 6.009

Project: Atwater Bridge			
Analyzed By: Micah Hintz	Units: feet	Scale: 1:180	Project No.: 603253-001
Date: May 2012	Condition: Pseudostatic		

ATWATER BRIDGE

HYDRAULICS AND WATER SURFACE ASSESSMENTS REPORT

Los Angeles County, CA

Prepared for:

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December 16, 2011
Revised April 11, 2012

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EXECUTIVE SUMMARY

The purpose of the hydraulics study is to analyze and assess the water surface impacts of the proposed Atwater Bridge facility within a specific segment of the Los Angeles River (LAR). Upon completion of the hydraulic modeling analysis (using HEC-RAS) and the identification of certain hydraulic impacts, the study then provides a 'Risk & Uncertainty" analysis without and with specific top of bank mitigations (using HEC-RDA) based upon study's hydraulic findings.

Based upon the results of the HEC-RAS hydraulic assessments, the impacts include an estimated 0.93 foot increase to the channel's design water surface elevation based upon the project's proposed bridge pier locations and configurations. The backwater effects are estimated to propagate some 2200 feet, but in terms of substantial increases (i.e. greater than 0.5 feet) the backwater propagation is more on the order of some 500 feet. These findings are significant in terms of the projected water surface increase; which in turn translate to resulting loss in "freeboard protection" along that portion of the LAR.

These findings as they relate to either the 'loss of freeboard protection' and/or the 'increased risk of flooding' suggests certain improvements must be considered so as to mitigate the negative hydraulic impacts of the proposed bridge improvements. To that end, the study has considered two specific hydraulic mitigation scenarios. The first mitigation scenario (i.e. Mitigation Type A – Provide Free Board Minimums), is defined as the needed mitigation located upstream of the bridge so to insure the amount free board provisions for the project meet or exceed the USACE required minimum free board requirements (i.e. 2.5 feet for west bank/non-leveed condition and 3.0 feet for the east bank/leveed condition). This mitigation specifically includes a new 6-inch curb element for a distance of 130 feet along the west (right) bank upstream; and a new 12-inch curb element for a distance of 200 feet along the east (left) bank.

The second mitigation scenario (i.e. Mitigation Type B – No Increased Flooding Risk), is defined as the needed mitigation located upstream of the bridge to insure the probability values of both the 'annual' and 'long term' exceedance analysis is not increased (along either side of channel) as a result of the proposed bridge improvements. This mitigation specifically includes a new 12-inch curb element and 6-inch curb element for distances of 650 feet and then 2,650 feet, respectively, along the length of the channel beginning immediately upstream of the proposed bridge location.

The project's proposed improvements to effectively raise the top of bank elevations thru new curb elements results in an increased "freeboard protection" for this reach of the channel as compared to existing conditions. And furthermore, the increased level of "freeboard protection" is well beyond the USACE minimum requirements when considering either of the mitigation options (i.e. Type 'A' or 'B'). Lastly, while Mitigation Type 'A' effectively reduces the long term risk (i.e. lower probability of "exceedance") for portions of the channel reach, Mitigation Type 'B' would substantially reduce the long term risk of flooding to a level well below the LAR's existing flooding condition.

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

The purpose of this hydraulics study is to hydraulically analyze and assess the water surface impacts of the proposed Atwater Bridge facility within a specific segment of the Los Angeles River (LAR). Upon completion of the hydraulic modeling assessment and the identification of certain hydraulic impacts, the study then provides a 'Risk & Uncertainty" analysis based upon these hydraulic findings.

The content of the study will be discussed in accordance with the following report framework:

- Section 1 discusses the objectives of the hydraulics study and identifies general site information.
- Section 2 analyzes and reports the existing and proposed hydrologic conditions within a specific reach of the LAR and discusses a water surface increase mitigation strategy for each of the localized channel banks.
- Section 3 analyzes and reports a hydraulic 'Risk & Uncertainty' including the comparison of risk regimes of the existing LAR hydraulics to the proposed (post) project LAR hydraulics with specific mitigations.
- Section 4 summarizes the key findings of the study and the study's limitations.

1.2 PROJECT SITE INFORMATION AND DESCRIPTION

1.2.1 Project Location

The Atwater Bridge project site is located in downtown Los Angeles vicinity, and more specifically within the County of Los Angeles' 400 foot wide rights-of-way for the LAR lying easterly and adjacent to Interstate 5 and some 3,260 feet north of the Los Feliz Bridge facility over the LAR. The proposed bridge facility would be constructed with a steel bridge frame including some 390 feet in nominal length and some 36 feet in nominal width that would span the LAR channel landform including two pier elements that would be supported via new concrete footings below the channel bottom. The bridge function would include accommodations for equestrian, pedestrian and bicycle modes of traffic across the single level bridge deck form.

Refer to **Figure** 1, Site Vicinity Map, for the location of the project site.

1.2.2 Existing Site Features

Currently the site area by its very nature and use is dominated by its land form as a significant river channel facility with associated top of bank shoulder features used jointly for access and maintenance purposes by the US Army Corps of Engineers (USACE) and to a lesser degree the County of Los Angeles and the City of Los Angeles' Department of Water & Power. Recognizing the USACE has the primary responsibility and charge of maintaining the channel's hydraulic performance for this segment of the LAR. The nominal river channel depth is 20.5 +/- with a channel bottom elevation of 394 +/- at the location of the proposed bridge feature. Currently the top of bank features are used for limited recreation uses;

wherein the easterly top of bank areas of the channel are used for equestrian travel up and down this segment of the LAR; and the westerly side of the channel is used jointly for equestrian travel and bike travel. The bicycle uses occur within an improved eight (8) foot wide City bike path that runs for several miles up and down the river's alignment. It should also be noted the "footprint" of the equestrian travel along the west side of the channel is limited in that the equestrian use is limited to an area of some 70 feet in length to allow for the horse riders to reach the existing equestrian tunnel/ramp entry feature running underneath Interstate 5 to the west. Within the channel landform itself is a 'dry weather' ramp feature of fractured concrete and soil worn into the channel's concrete rip-rap side walls that allows horse crossing movements up and down into and out of the channel as well as across the channel bottom itself.

The properties adjacent to the site include several residential structures with equestrian stables and paddock facilities along the channel's east side; and Interstate 5 and Griffith park beyond along the west side. The ground elevations along and beyond the west side areas of the channel generally lie at or above the top of bank elevations by some to 2 to 3 feet; however, the ground elevations along and beyond the east side areas are generally below the top of bank elevations by some 5 to 8 feet (i.e. a levee condition along east side).

Refer to **Figure 2** for an exhibit depicting ground elevations, existing site features, including locations of existing residential and non-residential buildings located easterly of the site.

1.2.3 Proposed Development

The proposed Atwater Bridge project is private project over the LAR in that it funded by a private donor, whose intent is to give the bridge facility upon construction completion to the City of Los Angeles. The proposed bridge facility will be constructed of structural steel with a single level deck supported via new concrete footing abutments on each side of the river channel top of bank and two (2) new concrete pier elements (including a 6.1 foot wide main pier element located some 93 feet east of the bridge's west abutment and a 1.0 foot wide secondary pier element located some 20 feet west of the bridge's east abutment) with associated concrete footing constructed below the channel's bottom surface. The proposed bridge abutment shape and form will be basically a longitudinal concrete 'above ground' shape (i.e. parallel with channel form) that will not encroach vertically into the channel's design flow water surface. The pier features will also be longitudinal in form and shaped parallel with channel water flow with an aspect much greater than the as modeled ratio of 8 to 1 (overall length to overall width). Also, for purposes of minimizing water surface increases, it is the project intent is provide pier shapes and features similar to the Los Feliz bridge pier treatments. Refer to **Figure 3** for a picture of the Los Feliz bridge upstream pier configurations. Like the upstream face of the Los Feliz bridge piers, the primary pier for this bridge will be extended vertically in form for the purpose of creating a backwater effect upstream of the bridge. Also, due consideration will be given to sloping the pier nose extensions in accordance with guidance documents (i.e. Section 2-3 (Flow Through Bridges) and Plate B-18 in EM 1110-2-1601, and the Los Angeles District Corps of Engineers Hydrology and Hydraulics Memorandum No. 4, Debris Loading on Bridges and Culverts, dated 4 August 2004 for pier shapes that minimize debris loading.)

The varying width of the bridge deck will include provisions for pedestrian, equestrian and bicycle uses. The channelization of the three modes/uses will be configured to offer adequate separation between the various travel paths.

Refer to **Appendix G** for a set of Preliminary Plans depicting the proposed project improvements.

1.3 STUDY OBJECTIVES

This report concentrates exclusively on the LAR's hydraulic performance for it given design flow by comparing the pre-project channel performance vs. post-project hydraulic performance based on specific bridge and pier geometries, with the following key objectives:

- **Hydraulic Analysis:** Based upon the given HEC-RAS modeling data provided by the USACE, the primary objective of this hydraulic analysis is compare the changes to the channels' hydraulic performance characteristics (e.g. water surface, flow rates, velocities) based on the proposed bridge improvements. Based on those reported findings propose suitable mitigations so as to not reduce the channel's 'level of protection' or increase the risk of flooding or otherwise negatively impact the USACE's ability to maintain the channel storm water conveyance.
- **Risk & Uncertainty Analysis:** Based on a prescribed methodology provided by the USACE, another key objective is to model and assess the risk and uncertainty associated of the study's findings as it relates to the channel's hydraulic performance characteristics.

2.0 HYDRAULIC ASSESSMENT

The purpose of this hydraulic analysis is to assess the potential hydraulic impacts to this specific segment or reach of the Los Angeles River (LAR). In general, the proposed bridge pier features located within and into the channel's design water surface will inherently alter theoretical water surface both upstream and immediately downstream of the proposed bridge facility. And as a result of the increased water surface upstream of the bridge piers (as compared to existing conditions), the project improvements may need to provide for an increase to the top of bank elevations so as to insure the USACE's 2.0 feet of freeboard protection requirement is strictly adhered to in recognizing any mitigated increases to the design water surfaces that could potentially cause flood control issues in the watershed.

2.1 HYDRAULIC METHODOLGY

For the purposes of this study, the hydraulic modeling procedures used in the modeling analyses were inherited and otherwise specified by USACE staff and customary practices. The exclusive design/modeling tool for this analysis was USACE's sanctioned hydraulic analytic tool HEC-RAS (v4.1.0 January 2010). And as provided by USACE staff, the base design input/analysis file, titled "Reach 2 11-08, Rev FINAL" with a last run date of April 2010 was used in the analysis of this study. This specific modeling reach of this segment of the Los Angeles River is named the Upper Los Angeles River Reach 2 Verdugo-Fletcher, which comprises about 3.6 miles of the LAR with the upper limits located some 8,200 feet upstream of the new bridge and the lower limits some 10,800 feet downstream. The three methods of analysis including the Energy method, the Momentum method and the Yarnell method were used in the HEC-RAS analysis.

We also duly recognize that prior to the USACE's adoption of the risk based design approach, the 2.5 feet freeboard was their minimum freeboard required for trapezoidal channels on a non-levee condition and minimum of 3.0 feet of freeboard in a leveed condition (RE: Reference Section 2-6a of Corps EM 1110-2-1601).

As instructed by USACE staff the relevant flow data including design flow rate, manning 'n' values, channel geometrics were not to be modified for this study. Additional cross sections were added to the USACE's HEC-RAS model at the proposed bridge face, and at 25' intervals for approximately 450 feet upstream of the proposed bridge location in order to be able to more closely view water surface impacts in the vicinity of the proposed bridge. Also, additional sections were added some 17 feet and 50' downstream of the bridge so as to observe the immediate downstream water surface impacts due to the proposed bridge pier effects. This base HEC-RAS model was then used for purposes of establishing the base line flow characteristics of the existing channel. Then subsequently, for the purposes of modeling the proposed bridge pier features, new pier/obstructions were modeled to determine the impacts to the design water surface. For the main pier modeling, a 6.1 foot wide "streamlined" elliptical pier was used. Per USACE's M Hydrology and Hydraulics Memorandum No. 4, Debris Loading on Bridges and Culverts, dated 4 August 2004, no debris loading was required for the main pier because of its 6.1 foot width and its "streamlined" modeling condition. The secondary pier was modeled as a 1 foot wide circular pier with 2 feet of debris (on each side) for its full pier height within the water depth. For the Momentum method, a pier shape (surface drag) coefficient value of Cd= 0.29 was used for

both pier elements. And for the Yarnell method, a pier shape coefficient value of K = 0.9 was used for both pier elements.

Basic hydraulic data were maintained and not modified for the HEC-RAS modeling including a design flow rate of 78,000 CFS (corresponding to an event slightly above a 50 Year Period or 2% design occurrence for given year); and a composite Manning's roughness coefficient value of 0.03 for the channel's cobble/earthen river bottom and concrete rip-rap side slopes. Finally, for the purposes of modeling the lowest bridge chord was modeled as one foot above the projected water surface.

2.2 HYDRAULIC HEC-RAS RESULTS

Based on our analysis the maximum "back water" surface increase due to the installation of the bridge is 0.93 feet occurring just immediately upstream of the proposed bridge main pier. The backwater effects propagate some feet upstream of the bridge some 2200 feet, but in terms of substantial increases (i.e. greater than 0.5), the backwater propagation is really on the order of some 500 feet.

The key results of the HEC-RAS analysis for comparing the existing and proposed effects to the channel's water surface are summarized in Tables 2.2.1 (west bank) & 2.2.2 (east bank). In reviewing the tabularized results, the most critical effects to the water surface measured both in terms of water surface "rise" and the associated reduction in available channel top of bank "freeboard" occurred immediately upstream of the proposed bridge and then dissipated somewhat linearly within 2000 feet of the proposed bridge location.

2.3 HYDRAULIC MITIGATION REQUIREMENTS

The resulting top of bank "freeboard protection" values for each side of the channel did reduce somewhat, and within these immediate reaches upstream of the proposed bridge location the resulting (un-mitigated) "free board protection" provisions fell below the USACE's prescribed level of protection minimum requirements. The minimum USACE "free board protection" requirements for the USACE design storm event is 2.5 feet for a non-leveed condition and 3.0 feet for a leveed condition. Because of these findings, certain mitigations were considered in the analysis.

These hydraulic mitigations include proposed adjustments to the effective top of bank though the construction new 6-inch wide curb elements of various heights placed continuously upstream of the new bridge element for certain specified distances. These mitigations, which deal exclusively in meeting the minimum free board provisions of the USACE, are referred as Mitigation Type 'A'. Type 'A' mitigations specifically include a new 6-inch high curb element for a distance of 130 feet along the west (right) bank upstream; and a new 12-inch high curb element for a distance of 200 feet along the east (left) bank. Based on these mitigations, the minimum levels of free board protection provided are 2.96 feet (> 2.5 feet) and 3.14 feet (> 3.0 feet) for the west and east banks, respectively.

Also, as modeled in the HEC-RAS hydraulic analysis, the project will also employs certain hydraulic "optimizations" including pier sloping nosing treatments (similar to the Los Feliz

Bridge pier treatments) that will effectively reduce the projected water surface increase as compared to other less hydraulically streamlined pier configurations used on other bridge facilities. Per USACE's Hydrology and Hydraulics Memorandum No. 4, Debris Loading on Bridges and Culverts, dated 4 August 2004, no debris loading is required for the primary pier because of its 6.1 width and its "streamlined" modeling condition. We believe the "no debris" modeling premise for the main pier is reasonable based both on the proposed pier's distance to side banks and the fact that it is one singular pier as oppose to multiple piers where debris build up is more likely.

Other project mitigations related to pier foundation construction and related construction related disturbances within the channel limits will be further defined by other technical studies and assessments.

Finally, in reviewing Tables 2.2.1 & 2.2.2 it is important to note the following table key notes:

1 The ground elevations of the existing top of bank within the first 600 feet upstream and some 200 feet downstream of the proposed bridge location were based off interpolations of the topographic survey data which in turn were obtained from a survey prepared by Fuscoe in September 2011. (Refer to Appendix Item 1 for full size copy of the Fuscoe Survey.) For ground elevations of the existing top of bank further upstream (i.e. beyond 600 feet), the top of bank elevation were extrapolated based on the channel's average bottom slope of 0.4%.

2 A brief study was made to compare the topo data per the Fuscoe Survey to that of the bottom of channel elevations contained in the HEC-RAS model and found that both sets of elevation data were consistently within 0.3 feet of each other; and more specifically the HEC-RAS model's elevations generally were at or below the corresponding topographic survey elevation data. In summary, we found the HEC-RAS model generally comports with the elevations from the Fuscoe survey with a somewhat conservative bias.

USACE DESIGN EVENT FLOW RATE 78,000 CFS								
WEST BANK (NON LEVEED CONDITION) STUDY - EXISTING FLOW REGIME VS. PROPOSED FLOW REGIME								
HEC-RAS SECTION STATIONS (FT)	DISTANCE UPSTREAM (DOWNSTREAM) FROM BRIDGE (FT)	HEC-RAS EXISTNG WATER SURFACE ELEVATION (FT)	HEC-RAS PROPOSED WATER SURFACE ELEVATION (FT)	HEC-RAS INCREASE (DECREASE) (FT)	APPROXIMATE EXISTING TOP OF BANK WEST SIDE (W/O MITIGATION) [1] (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/O MITIGATION (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/ MITIGATION 'A' (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/ MITIGATION 'B' (FT)
11,507.50	(103)	410.84	410.84	0	414.2	2.54	NO MITIGATION	NO MITIGATION
11,532.50	(78)	410.97	410.97	0	414.2	2.46	NO MITIGATION	NO MITIGATION
11,557.50	(53)	411.06	411.06	0	414.3	2.51	NO MITIGATION	NO MITIGATION
11,593.00	(17)	411.21	407.93	-3.28	414.4	2.49	NO MITIGATION	NO MITIGATION
11,610.00	BRIDGE LOCATION							
11,629.00	19	411.37	412.3	0.93	414.6	2.46	2.96	3.46
11,657.50	48	411.5	412.4	0.9	414.6	2.46	2.96	3.46
11,682.50	73	411.6	412.47	0.87	414.7	2.47	2.97	3.47
11,707.50	98	411.71	412.56	0.85	414.8	2.49	2.99	3.49
11,732.50	123	411.81	412.62	0.81	415	2.58	3.08	3.58
11,757.50	148	411.91	412.69	0.78	415.2	2.67	NO MITIGATION	3.67
11,782.50	173	412.01	412.77	0.76	415.3	2.76	NO MITIGATION	3.76
11,807.50	198	412.11	412.84	0.73	415.5	2.84	NO MITIGATION	3.84
11,832.50	223	412.21	412.91	0.7	415.6	2.88	NO MITIGATION	3.88
11,857.50	248	412.31	412.98	0.67	415.8	2.91	NO MITIGATION	3.91
11,882.50	273	412.4	413.05	0.65	415.9	2.94	NO MITIGATION	3.94
11,907.50	298	412.51	413.14	0.63	416	2.98	NO MITIGATION	3.98
11,932.50	323	412.61	413.23	0.62	416.1	2.94	NO MITIGATION	3.94
11,957.60	348	412.72	413.32	0.6	416.1	2.9	NO MITIGATION	3.9
11,982.60	373	412.83	413.42	0.59	416.2	2.86	NO MITIGATION	3.86
12,007.60	398	412.94	413.51	0.57	416.2	2.81	NO MITIGATION	3.81
12,032.60	423	413.04	413.6	0.56	416.3	2.82	NO MITIGATION	3.82
12,057.60	448	413.14	413.69	0.55	416.4	2.83	NO MITIGATION	3.83
12,279.90	670	414.06	414.39	0.33	417.3	2.99	NO MITIGATION	3.49
12,502.10	892	414.97	415.17	0.2	418.2	3.07	NO MITIGATION	3.57
12,724.40	1,114	415.86	415.98	0.12	419.1	3.14	NO MITIGATION	3.64
12,946.60	1,337	416.75	416.82	0.07	420	3.18	NO MITIGATION	3.68
13,168.90	1,559	417.66	417.7	0.04	420.8	3.2	NO MITIGATION	3.7
13,391.10	1,781	418.53	418.56	0.03	421.7	3.22	NO MITIGATION	3.72
13,613.40	2,003	419.41	419.43	0.02	422.6	3.23	NO MITIGATION	3.73
13,835.60	2,226	420.29	420.3	0.01	423.5	3.25	NO MITIGATION	3.75
14,057.90	2,448	421.16	421.17	0.01	424.4	3.27	NO MITIGATION	3.77
14,276.00	2,666	421.99	421.99	0	425.3	3.32	NO MITIGATION	3.82
14,494.10	2,884	422.86	422.86	0	426.1	3.37	NO MITIGATION	3.87
14,712.30	3,102	423.72	423.72	0	427	3.35	NO MITIGATION	3.85
14,930.40	3,320	424.58	424.59	0.01	427.9	3.35	NO MITIGATION	NO MITIGATION
15,148.50	3,539	425.47	425.47	0	428.8	3.34	NO MITIGATION	NO MITIGATION

Table 2.2.1 West Bank Comparison of Existing Flow Regime vs. Proposed Flow Regime

USACE DESIGN EVENT FLOW RATE 78,000 CFS								
EAST BANK (LEVEED CONDITION) STUDY - EXISTING FLOW REGIME VS. PROPOSED FLOW REGIME								
HEC-RAS SECTION STATIONS (FT)	DISTANCE UPSTREAM (DOWNSTREAM) FROM BRIDGE (FT)	HEC-RAS EXISTNG WATER SURFACE ELEVATION (FT)	HEC-RAS PROPOSED WATER SURFACE ELEVATION (FT)	HEC-RAS INCREASE (DECREASE) (FT)	APPROXIMATE EXISTING TOP OF BANK WEST SIDE (W/O MITIGATION) [1] (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/O MITIGATION (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/ MITIGATION 'A' (FT)	RESULTING 'FREEBOARD' PROVIDED WEST SIDE W/ MITIGATION 'B' (FT)
11,507.50	(103)	410.84	410.84	0	414.2	2.54	NO MITIGATION	NO MITIGATION
11,532.50	(78)	410.97	410.97	0	414.2	2.46	NO MITIGATION	NO MITIGATION
11,557.50	(53)	411.06	411.06	0	414.3	2.51	NO MITIGATION	NO MITIGATION
11,593.00	(17)	411.21	407.93	-3.28	414.4	2.49	NO MITIGATION	NO MITIGATION
11,610.00	BRIDGE LOCATION							
11,629.00	19	411.37	412.3	0.93	414.6	2.3	3.3	3.3
11,657.50	48	411.5	412.4	0.9	414.6	2.2	3.2	3.2
11,682.50	73	411.6	412.47	0.87	414.7	2.23	3.23	3.23
11,707.50	98	411.71	412.56	0.85	414.7	2.14	3.14	3.14
11,732.50	123	411.81	412.62	0.81	414.8	2.18	3.18	3.18
11,757.50	148	411.91	412.69	0.78	414.9	2.21	3.21	3.21
11,782.50	173	412.01	412.77	0.76	415	2.23	3.23	3.23
11,807.50	198	412.11	412.84	0.73	415.1	2.26	3.26	3.26
11,832.50	223	412.21	412.91	0.7	415.3	2.39	NO MITIGATION	3.39
11,857.50	248	412.31	412.98	0.67	415.4	2.42	NO MITIGATION	3.42
11,882.50	273	412.4	413.05	0.65	415.6	2.55	NO MITIGATION	3.55
11,907.50	298	412.51	413.14	0.63	415.7	2.56	NO MITIGATION	3.56
11,932.50	323	412.61	413.23	0.62	415.8	2.57	NO MITIGATION	3.57
11,957.60	348	412.72	413.32	0.6	415.9	2.58	NO MITIGATION	3.58
11,982.60	373	412.83	413.42	0.59	415.9	2.48	NO MITIGATION	3.48
12,007.60	398	412.94	413.51	0.57	416	2.49	NO MITIGATION	3.49
12,032.60	423	413.04	413.6	0.56	416.1	2.5	NO MITIGATION	3.5
12,057.60	448	413.14	413.69	0.55	416.2	2.51	NO MITIGATION	3.51
12,279.90	670	414.06	414.39	0.33	417.1	2.71	NO MITIGATION	3.21
12,502.10	892	414.97	415.17	0.2	418	2.83	NO MITIGATION	3.33
12,724.40	1,114	415.86	415.98	0.12	418.9	2.92	NO MITIGATION	3.42
12,946.60	1,337	416.75	416.82	0.07	419.8	2.98	NO MITIGATION	3.48
13,168.90	1,559	417.66	417.7	0.04	420.6	2.9	NO MITIGATION	3.4
13,391.10	1,781	418.53	418.56	0.03	421.5	2.94	NO MITIGATION	3.44
13,613.40	2,003	419.41	419.43	0.02	422.4	2.97	NO MITIGATION	3.47
13,835.60	2,226	420.29	420.3	0.01	423.3	3	NO MITIGATION	3.5
14,057.90	2,448	421.16	421.17	0.01	424.2	3.03	NO MITIGATION	3.53
14,276.00	2,666	421.99	421.99	0	425.1	3.11	NO MITIGATION	3.61
14,494.10	2,884	422.86	422.86	0	425.9	3.04	NO MITIGATION	3.54
14,712.30	3,102	423.72	423.72	0	426.8	3.08	NO MITIGATION	3.58
14,930.40	3,320	424.58	424.59	0.01	427.7	3.11	NO MITIGATION	NO MITIGATION
15,148.50	3,539	425.47	425.47	0	428.6	3.13	NO MITIGATION	NO MITIGATION

Table 2.2.2 East Bank Comparison of Existing Flow Regime vs. Proposed Flow Regime

3.0 RISK & UNCERTAINTY

In accordance with current USACE design criteria, a risk and uncertainty (R&U) analysis was performed for the proposed project. This R&U analysis was performed using the USACE Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) software, (v1.2.5a October 2010). Guidance for developing the input parameters and executing the analysis was taken from the USACE's *EM 1110-2-1619 Risk-Based Analysis for Flood Damage Reduction Studies (dated August 1996)*, and the *HEC-FDA Flood Damage Reduction Analysis User's Manual*. The following sections discuss the scenarios considered, the input parameters used, and the results for the project's R&U analysis.

3.1 RISK & UNCERTAINTY METHODOLGY & ANALYSIS

In order to assess the effect of the proposed project on the performance of the channel to reduce flood risk in the study reach of the existing LA River channel, it is necessary to perform an R&U analysis for both the existing and proposed conditions so that the pre- and post-project results can be compared. The existing conditions R&U analysis is based solely on the HEC-RAS model provided by the USACE. The proposed conditions R&U analysis is based on the HEC-RAS model which was developed for the hydraulic analysis of the proposed bridge, assuming no channel depth or bank modifications.

The following sections will outline the methodology used in developing the uncertainty functions for the project's R&U analysis.

Damage Reaches and Index Locations

HEC-FDA analyzes R&U for each segment of a channel which has uniform flood control and damage characteristics. These segments are referred to as damage reaches, and they are analyzed at a representative river station referred to as the index location. For purposes of this study, the Verdugo-Fletcher reach of the LA River was divided into three damage reaches upstream of the proposed bridge. These damage reaches have been labeled Control, Unmitigated, and Mitigated. The Control damage reach is located at RS 15+148.5, which is just beyond the upstream extent of water surface (backwater) impacts caused by the bridge. This damage reach is included as a reference point for that segment of the channel reach which is impacted (increased water surface) due to the proposed bridge.

The Unmitigated damage reach consists of RS's 12+057.6 through 14+930.4. These cross sections exhibit moderate water surface increases of less than 0.5' due to the bridge under the design discharge, and have greater than 2.5 feet of freeboard to the existing top of bank. The index location for this damage reach is RS 13+391.1. The Mitigated damage reach contains RS's 11+629 through 12+057.6. These cross sections exhibit a water surface increase of greater than 0.5' due to the proposed bridge piers under the design discharge. The index location for this damage reach is RS 11+682.5.

Discharge-Probability Function

The discharge-probability function defines the level of uncertainty in the peak flow for a given flood event. The level of uncertainty is directly linked to the length of the historical flow record

for the channel being analyzed. This function was calculated in HEC-FDA utilizing the "Compute Synthetic Statistics" tool of the program. This tool utilizes the discharge values for the 0.50, 0.10 and 0.01 exceedance probability flood events, and the equivalent record length in years. The values for these variables were obtained from the USACE for the Verdugo-Fletcher Reach of the Upper LA River, and are presented below:

Exceedance Probability	Discharge (cfs)
0.50 (2 Year)	21,600
0.10 (10 Year)	48,200
0.01 (100 Year)	94,600

Equivalent Record Length = 50 years

Table 3.1.1 R&U Discharge Frequency Relationship for the LA River for the Verdugo-Fletcher Reach

Since the upstream watershed is regulated by upstream dams, to confirm the accuracy of the synthetic statistics generated by HEC-FDA the calculated exceedance probability discharge values were compared to those presented in the USACE's LACDA Final Feasibility Interim Report, Part I Hydrology Technical Report, and Base Conditions, dated December 1991. The comparison in the table below shows that the discharge values are substantially similar.

Exceedance Probability	Discharge (cfs)	
	Synthetic Statistics	Published USACE Values
0.10 (10 Year)	47,924	48,200
0.04 (25 Year)	64,817	65,800
0.02 (50 Year)	79,010	77,500
0.01 (100 Year)	94,600	94,600
0.002 (500 Year)	137,000	125,000

Table 3.1.2 Exceedance Probability Discharge Values from Synthetic Statistics vs. Published USACE Values

Stage-Discharge Function

The stage-discharge function defines the level of uncertainty in the water surface elevation (stage) for a given discharge. This function is based on the standard deviation in the water surface based on a combination of natural and modeled uncertainty. The total uncertainty is given by Eqn. 5-6 on page 5-5 of EM 1110-2-1619:

$$S_{total} = (S_{natural}^2 + S_{model}^2)^{0.5}$$

$S_{natural}$ is calculated using Eqn. 5-5 on page 5-4 of EM 1110-2-1619:

$$S_{natural} = (0.07208 + 0.04936I_{bed} - 2.262\text{x}10^{-7}A_{basin} + 0.02164H_{range} + 1.4194\text{x}10^{-5}Q_{100})^2$$

The following parameters and values were utilized in this equation:

I_{bed}= stream identifier based on bed material = 2 (Cobbles, Table 5-1)
A_{basin}= 587 sq. miles = 1520.3 sq. kilometers (basin area of Upper LA River)
H_{range}= height of channel bank = 21.0 feet
Q_{100}= 94,600 cfs

As shown in **Appendix D**, based on this input the value of $S_{natural}$ is computed to be 0.40 feet. Compared to the values for $S_{natural}$ presented in Table 5-3 of EM 1110-2-1619, the computed value of 0.40 feet for a channel slope of 0.004 ft/ft, while being well below the conservative upper bound line, is towards the upper end of the observed data points, meaning that this a reasonable value of $S_{natural}$.

The model uncertainty, S_{model}, is defined as the standard deviation of the computed water surface elevation for a given discharge based on the lowest and highest expected water surface elevations. The lowest and highest expected water surface elevations were calculated in HEC-RAS by varying the Manning's n-values. To compute the highest expected water surface elevation, the n-values are increased by one standard deviation, while the n-values are decreased by one standard deviation to compute the lowest expected water surface elevation. The standard deviation of the n-value is taken from Figure 5-4 of EM 1110-2-1619. Based on this table, the standard deviation for an n-value of 0.030 is 0.008. The resulting high and low n-values for the cross sections modeled can be found in the Manning's "n" Value table included in **Appendix C**.

Once the high and low water surface elevations have been calculated using HEC-RAS, the model uncertainty is then calculated as:
S_{model}= (High Water Surface – Low Water Surface) / 4
The model uncertainty and natural uncertainty are then used to calculate the total uncertainty using equation 5-6 from EM 1110-2-1619. These calculations were performed for each river station within the damage reaches, and then averaged within each damage reach to develop the input for the index location. Spreadsheets containing the uncertainty calculations for the existing and proposed conditions can be found in **Appendix D**. In HEC-FDA, this data was input into the R&U model using a normal distribution and calculated uncertainty.

Stage-Damage Function
Since the project does not require economic calculations for the R&U analysis, a stage-damage function was not developed for the project. "Dummy" information was input in the HEC-FDA program as required for it to run, but this information does not impact the results analyzed in this report.

3.2 RISK & UNCERTAINTY MITIGATION MODELLED

As stated earlier the study has considered to two (2) hydraulic mitigation scenarios. The first mitigation scenario (i.e. Mitigation Type A – Free Board Minimums), is defined as the needed mitigation located upstream of the bridge to insure the amount free board provisions for the project meet or exceed the USACE required minimum free board requirements (i.e. 2.5 feet for west bank/non-leveed condition and 3.0 feet for the east bank/leveed condition). This mitigation specifically includes a new 6-inch curb element for a distance of 130 feet along the west (right) bank upstream; and a new 12-inch curb element for a distance of 200 feet along the east (left) bank.

The second mitigation scenario (i.e. Mitigation Type B – No Increased Risk), is defined as the needed mitigation located upstream of the bridge to insure the probability values of both the 'annual' and 'long term' exceedance analysis is not increased (along either side of channel) as a result of the proposed bridge improvements. This mitigation specifically includes a new

12-inch curb element and 6-inch curb element for distances of 650 feet and then 2,650 feet, respectively, along the west (right) bank upstream; and the same curb improvements along the east (left) bank.

Both mitigation types (Mitigation Types 'A' & 'B'), that were used in the R&U analysis are reflected in the R&U tabularized results.

3.3 RISK & UNCERTAINTY RESULTS

The following sections will present the R&U results from the HEC-FDA program. Screen captures from the program output can be found in **Appendix E**.

Annual Exceedance Probability

The following table presents the project performance by damage reach in terms of Target Stage Annual Exceedance Probability for the existing and proposed conditions. In this instance, the Target Stage as taken at the top of the channel. The Target Stage Annual Exceedance Probability is defined as the chance associated with a flood event exceeding the Target Stage in any given year.

	Existing Conditions		Proposed Conditions	
Damage Reach	Median	Expected	Median	Expected
Control - Left	0.0065	0.0093	0.0065	0.0093
Control - Right	0.0061	0.0086	0.0061	0.0086
Unmitigated - Left	0.0067	0.0098	0.0088	0.0125
Unmitigated - Right	0.0062	0.0090	0.0082	0.0117
Mitigated - Left	0.0075	0.0108	0.0075	0.0103
Mitigated - Right	0.0083	0.0120	0.0090	0.0121

Table 3.3.1 'Annual Exceedance' Probabilities for Each Damage Reach under **Mitigation Type A**

	Existing Conditions		Proposed Conditions	
Damage Reach	Median	Expected	Median	Expected
Control - Left	0.0065	0.0093	0.0065	0.0093
Control - Right	0.0061	0.0086	0.0061	0.0086
Unmitigated - Left	0.0067	0.0098	0.0068	0.0097
Unmitigated - Right	0.0062	0.0090	0.0063	0.0090
Mitigated - Left	0.0075	0.0108	0.0069	0.0095
Mitigated - Right	0.0083	0.0120	0.0069	0.0096

Table 3.3.2 'Annual Exceedance' Probabilities for Each Damage Reach under **Mitigation Type B**

Long-Term Risk

The following table presents the Long-Term Risk for the existing and proposed conditions. The Long-Term Risk is defined as the long term probability of an occurrence where one or more damaging flood events exceeding the Target Stage (top of channel bank) during a given time period.

Damage Reach	Existing Conditions			Proposed Conditions		
	10 years	30 years	50 years	10 years	30 years	50 years
Control - Left	0.0894	0.2449	0.3738	0.0894	0.2449	0.3738
Control - Right	0.0827	0.2281	0.3505	0.0827	0.2281	0.3505
Unmitigated - Left	0.0933	0.2547	0.3873	0.1180	0.3139	0.4662
Unmitigated - Right	0.0867	0.2382	0.3645	0.1109	0.2972	0.4445
Mitigated - Left	0.1032	0.2788	0.4200	0.0987	0.2679	0.4054
Mitigated - Right	0.1139	0.3043	0.4537	0.1151	0.3070	0.4573

Table 3.3.3 'Long Term Risk' Probabilities for Each Damage Reach under **Mitigation Type A**

Damage Reach	Existing Conditions			Proposed Conditions		
	10 years	30 years	50 years	10 years	30 years	50 years
Control - Left	0.0894	0.2449	0.3738	0.0894	0.2449	0.3738
Control - Right	0.0827	0.2281	0.3505	0.0827	0.2281	0.3505
Unmitigated - Left	0.0933	0.2547	0.3873	0.0927	0.2530	0.3850
Unmitigated - Right	0.0867	0.2382	0.3645	0.0864	0.2376	0.3637
Mitigated - Left	0.1032	0.2788	0.4200	0.0912	0.2495	0.3802
Mitigated - Right	0.1139	0.3043	0.4537	0.0918	0.2509	0.3821

Table 3.3.4 'Long Term Risk' Probabilities for Each Damage Reach under **Mitigation Type B**

Conditional Non-Exceedance Probability

The following table presents the Conditional Non-Exceedance Probability for the existing and proposed conditions. The Conditional Non-Exceedance Probability is defined the chance of **not exceeding** the capacity of the channel for a given flood event, i.e., the chance of containing the specific exceedance probability event (i.e. 10%, 4%, 2%, 1%, 0.4% & 0.2%) within the Target Stage, should that event occur.

Damage Reach	Existing Conditions						Proposed Conditions					
	10%	4%	2%	1%	0.4%	0.2%	10%	4%	2%	1%	0.4%	0.2%
Control - Left	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768
Control - Right	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
Unmitigated - Left	0.9999	0.9843	0.8777	0.6352	0.3014	0.1587	0.9999	0.9720	0.8133	0.5213	0.1955	0.0812
Unmitigated - Right	1.0000	0.9872	0.8936	0.6652	0.3337	0.1855	0.9999	0.9769	0.8336	0.5526	0.2196	0.0968
Mitigated - Left	0.9999	0.9800	0.8537	0.5895	0.2531	0.1192	1.0000	0.9887	0.8799	0.5998	0.2248	0.0815
Mitigated - Right	0.9999	0.9733	0.8248	0.5433	0.2135	0.0925	1.0000	0.9814	0.8332	0.5160	0.1635	0.0504

Table 3.3.5 'Conditional Non-Exceedance' Probabilities for Each Damage Reach under **Mitigation Type A**

Damage Reach	Existing Conditions						Proposed Conditions					
	10%	4%	2%	1%	0.4%	0.2%	10%	4%	2%	1%	0.4%	0.2%
Control - Left	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768
Control - Right	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
Unmitigated - Left	0.9999	0.9843	0.8777	0.6352	0.3014	0.1587	1.0000	0.9860	0.8818	0.6357	0.2960	0.1521
Unmitigated - Right	1.0000	0.9872	0.8936	0.6652	0.3337	0.1855	1.0000	0.9885	0.8966	0.6649	0.3274	0.1774
Mitigated - Left	0.9999	0.9800	0.8537	0.5895	0.2531	0.1192	1.0000	0.9914	0.8994	0.6397	0.2586	0.1015
Mitigated - Right	0.9999	0.9733	0.8248	0.5433	0.2135	0.0925	1.0000	0.9913	0.8986	0.6364	0.2538	0.0973

Table 3.3.6 'Conditional Non-Exceedance' Probabilities for Each Damage Reach under **Mitigation Type B**

3.4 RISK AND UNCERTAINTY CONCLUSIONS

Based on the R&U results presented above, the proposed Atwater Bridge project without any 'top of bank' mitigations will result in a dramatic increase for risk of flooding in terms of conditional non-exceedance probability when compared with the existing condition for the larger storm events (results not tabularized for this scenario).

When including the adjusted Target Stage elevations associated with Mitigation Type 'A', the increased risk of flooding is reduced when compared to the proposed un-mitigated condition, but still an increase in risk for portions of the damage reach when compared to existing condition. This is evidenced in Table 3.3.5 for example, for a 25 year event in the unmitigated portion of the damage reach, the conditional non-exceedance probability for the west bank was reduced from 98.72% to 97.69%; and from 98.43% to 97.20% for the east bank.

However, when including the adjusted Target Stage elevations associated with Mitigation 'B' the increased risk of flooding is reduced when comparing to the existing condition for all portions of the damage reach. This is evidenced in Table 3.3.6 for example, for a 25 year event, the conditional non-exceedance probability for the west bank was reduced from 97.33% to 99.13%; and from 98.00% to 99.14% for the east bank.

These R&U conclusions are based upon the provided HEC-RAS model with its given channel geometrics (i.e. channel elevations, top of bank elevations) for this segment of the channel; and more specifically the Target Stage elevations associated with each of the specific mitigation scenarios (types 'A' &'B') for each bank condition.

4.0 CONCLUSION

4.1 DISCUSSION

Based upon the results of the HEC-RAS hydraulic assessments, the project LAR hydraulic impacts include an estimated 0.93 foot increase to the channel's design water surface elevation based upon the project's proposed bridge pier locations and configurations. The backwater effects due to the new pier placements are estimated to propagate upstream some 2200 feet, but in terms of substantial increases (i.e. greater than 0.5 feet) the backwater propagation is more on the order of some 500 feet. These findings are significant in terms of the projected water surface increase; which in turn translate to a resulting loss in "freeboard protection" along that portion of the LAR.

These findings as they relate to either the 'loss of freeboard protection' and/or an 'increased risk of flooding' suggests certain improvements must be considered so as to mitigate the negative hydraulic impacts of the proposed bridge improvements. To that end, the study has considered two specific hydraulic mitigation scenarios. The first mitigation scenario (i.e. Mitigation Type A – Provide Free Board Minimums), is defined as the needed mitigation located upstream of the bridge so to insure the amount free board provisions for the project meet or exceed the USACE required minimum free board requirements (i.e. 2.5 feet for west bank/non-leveed condition and 3.0 feet for the east bank/leveed condition).

The second mitigation scenario (i.e. Mitigation Type B – No Increased Flooding Risk), is defined as the needed mitigation located upstream of the bridge so as to insure the probability values of both the 'annual' and 'long term' exceedance analysis is not increased (along either side of channel) as a result of the proposed bridge improvements.

The project's proposed Mitigation Type 'A' improvements to effectively raise the top of bank elevations thru new curb elements results in an increased "freeboard protection" for this reach of the channel as compared to existing conditions and well beyond the USACE minimum requirements. Employing Mitigation Type 'B' would also serve to further increase the "freeboard level of protection" well beyond the USACE's minimum levels, but also would serve to reduce the risk of flooding (i.e. lower probability of "exceedance") to a risk profile below the LAR's existing condition. It is our recommendation that Mitigation Type 'A' be employed at a minimum for the project. Further discussion with USACE staff is recommended before making final judgment to employ Mitigation Type 'B' for the project.

4.2 LIMITS OF STUDY

This study performs detailed HEC-RAS hydraulic analysis and assessments based in large part on input data provided by the USACE's staff and in similar fashion the R&U assessments are based in large part on USACE's recommended methodologies. To that end, we believe these findings to be both competent and reliable to the extent the provided data is reliable. This study does NOT include any hydrology assessments, any biological assessments or any structural assessments of the Los Angeles River or its adjoining watersheds as they related to the proposed Atwater Bridge project.

Figure 1: Project Vicinity Map

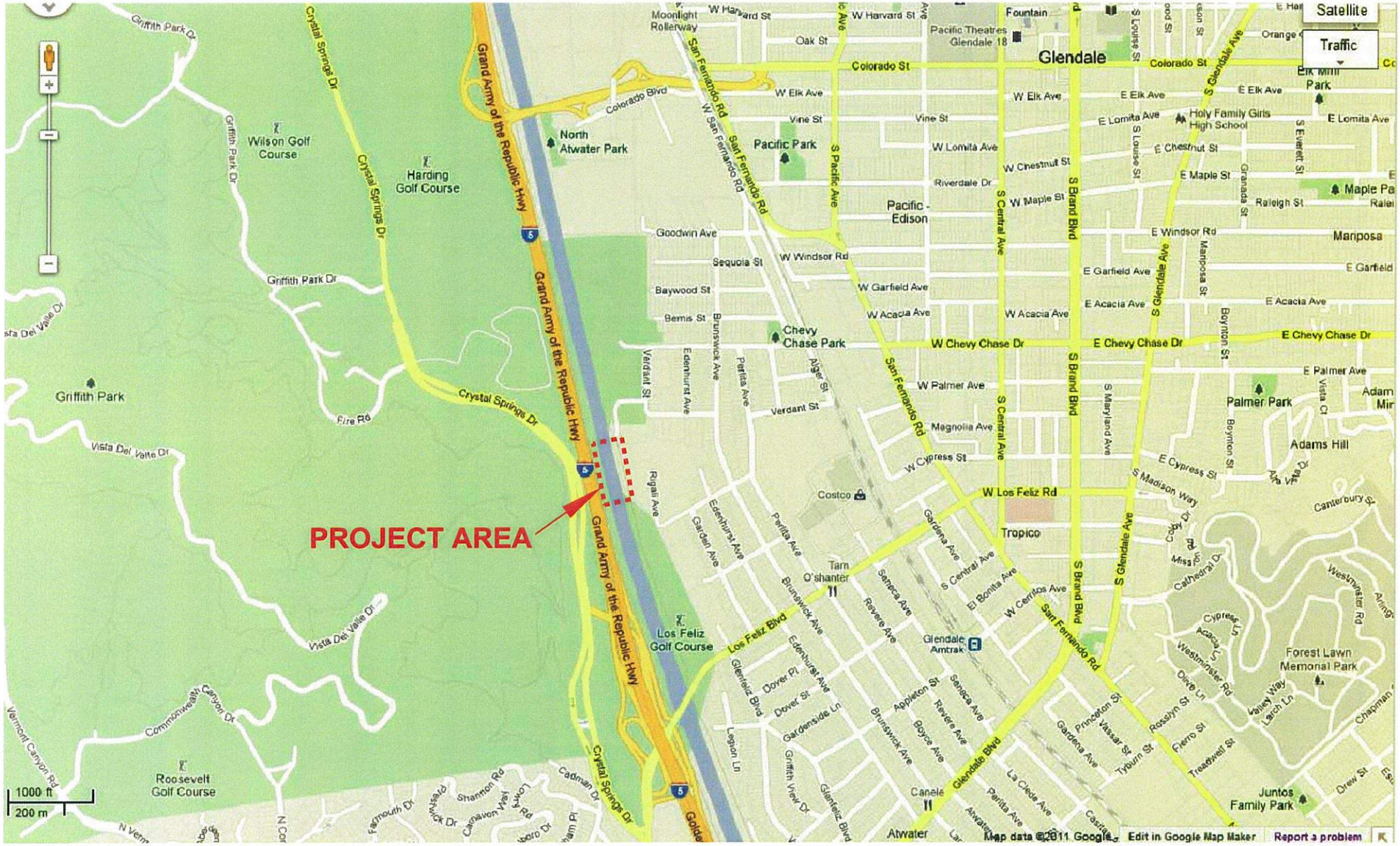

FIGURE 1
VICINITY MAP
ATWATER BRIDGE
DECEMBER 12, 2011

FUSCOE ENGINEERING
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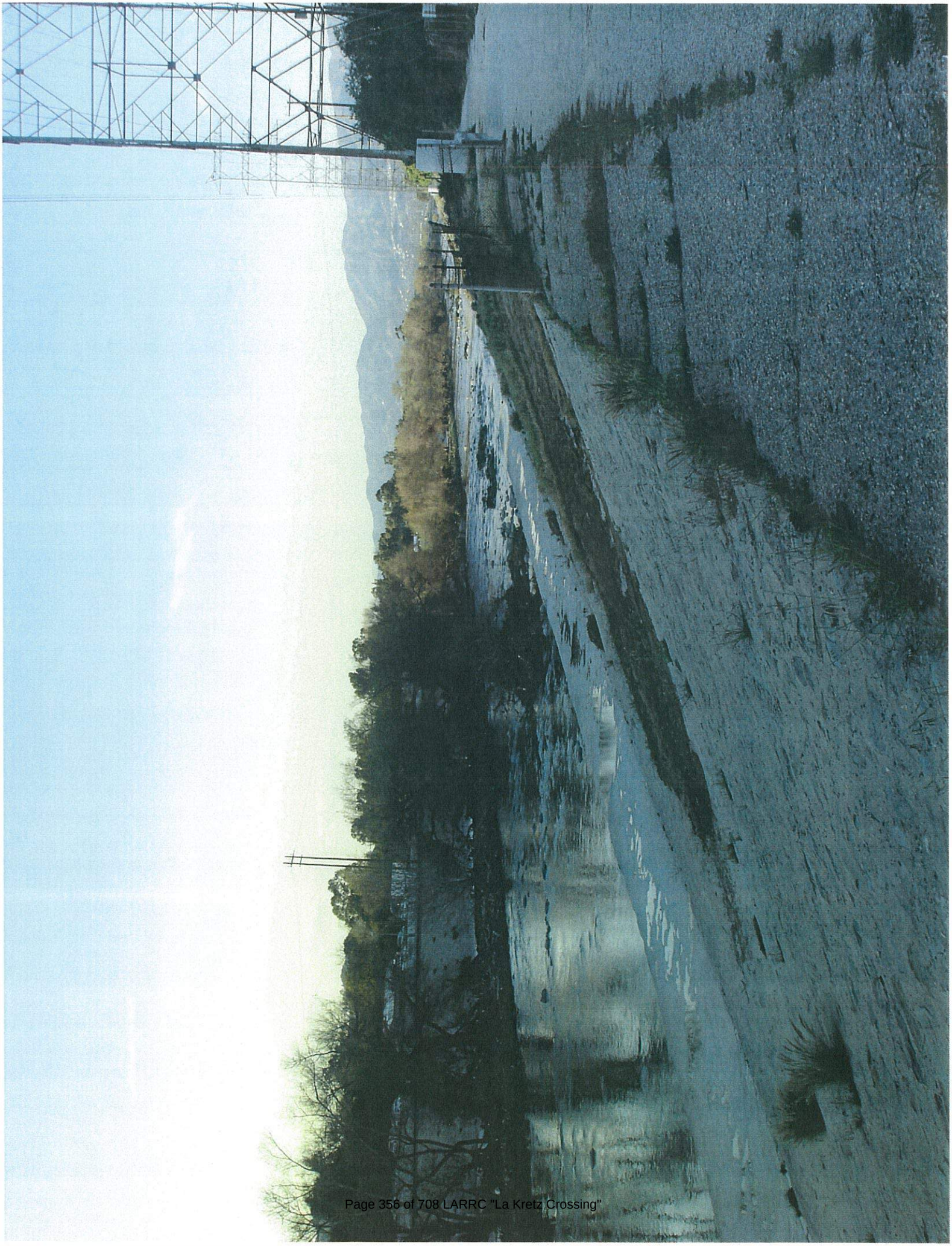
Los Angeles, California 90017
tel 213.988.8802 ∘ fax 213.988.8803
www.fuscoe.com

P:\PROJECTS\860\06\01\DWG\EXHIBITS\86006-EXHIBIT FIGURE 1.DWG (12-12-11 11:32:39AM) Plotted by: FUSCOE

Figure 2: Photos of Existing Site Conditions

FedEx



No Bicycles Allowed
Dogs on Leash
Colorado St
1/2 MIL
EQUESTRIANS PROHIBITED
PATH

Colorado St
1/2 MILE
EQUESTRIANS
PROHIBITED
PATH

Figure 3: Photos of Los Feliz Bridge Pier Treatments

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5.0 APPENDICIES

APPENDIX A	HEC-RAS HYDRAULIC OUTPUT (Existing & Proposed)
APPENDIX B	FUSCOE DESIGN SURVEY (SEPTEMBER 2011)
APPENDIX C	R&U – MANNING'S "n" VALUE RANGES
APPENDIX D	R&U – STAGE DISCHARGE UNCERTAINTY CALCULATIONS
APPENDIX E	R&U – HEC-FDA SCREEN CAPTURES
APPENDIX F	USACE MoR No. 4, AUGUST 4, 2004 - DEBRIS LOADING
APPENDIX G	PRELIMINARY PROJECT SITE PLANS & BRIDGE PLANS

APPENDIX A

HEC-RAS HYDRAULIC OUTPUT (Existing & Proposed)

Existing Conditions

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher

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)	
Verdugo-Fletcher	15148.5*	Design	78000.00	407.98	425.47	423.87	430.80	0.004087	18.53	4208.34	291.28	0.86
Verdugo-Fletcher	15148.5*	2 yr	21600.00	407.98	416.33	415.06	418.60	0.004109	12.08	1788.78	238.37	0.78
Verdugo-Fletcher	15148.5*	5 yr	40500.00	407.98	420.02	418.55	423.49	0.004095	14.97	2706.20	259.70	0.82
Verdugo-Fletcher	15148.5*	10 yr	48200.00	407.98	421.28	419.77	425.19	0.004091	15.86	3039.92	267.04	0.83
Verdugo-Fletcher	15148.5*	25 yr	65800.00	407.98	423.87	422.29	428.65	0.004087	17.55	3749.18	282.01	0.85
Verdugo-Fletcher	15148.5*	50 yr	77500.00	407.98	425.40	423.81	430.72	0.004087	18.50	4189.90	290.92	0.86
Verdugo-Fletcher	15148.5*	100 yr	94600.00	407.98	427.47	425.88	433.49	0.004082	19.69	4803.71	302.89	0.87
Verdugo-Fletcher	15148.5*	200 yr	109000.00	407.98	429.04	427.47	435.64	0.004083	20.63	5284.57	310.00	0.88
Verdugo-Fletcher	15148.5*	500 yr	125000.00	407.98	430.57	429.09	437.88	0.004085	21.71	5758.40	310.00	0.89
Verdugo-Fletcher	14930.4*	Design	78000.00	407.08	424.58	422.97	429.91	0.004073	18.51	4213.27	291.38	0.86
Verdugo-Fletcher	14930.4*	2 yr	21600.00	407.08	415.44		417.70	0.004099	12.07	1790.17	238.40	0.78
Verdugo-Fletcher	14930.4*	5 yr	40500.00	407.08	419.12		422.60	0.004084	14.95	2708.59	259.76	0.82
Verdugo-Fletcher	14930.4*	10 yr	48200.00	407.08	420.39		424.29	0.004081	15.84	3042.57	267.10	0.83
Verdugo-Fletcher	14930.4*	25 yr	65800.00	407.08	422.98		427.75	0.004072	17.53	3753.95	282.10	0.85
Verdugo-Fletcher	14930.4*	50 yr	77500.00	407.08	424.52	422.91	429.82	0.004073	18.48	4194.79	291.01	0.86
Verdugo-Fletcher	14930.4*	100 yr	94600.00	407.08	426.59	424.98	432.60	0.004068	19.67	4809.36	303.00	0.87
Verdugo-Fletcher	14930.4*	200 yr	109000.00	407.08	428.16	426.57	434.75	0.004069	20.60	5290.31	310.00	0.88
Verdugo-Fletcher	14930.4*	500 yr	125000.00	407.08	429.69	428.19	436.99	0.004068	21.68	5765.80	310.00	0.89
Verdugo-Fletcher	14712.3*	Design	78000.00	406.18	423.72	422.07	429.02	0.004042	18.47	4224.16	291.60	0.85
Verdugo-Fletcher	14712.3*	2 yr	21600.00	406.18	414.55		416.80	0.004075	12.04	1793.59	238.49	0.77
Verdugo-Fletcher	14712.3*	5 yr	40500.00	406.18	418.25		421.71	0.004054	14.92	2715.27	259.91	0.81
Verdugo-Fletcher	14712.3*	10 yr	48200.00	406.18	419.52		423.40	0.004052	15.80	3049.80	267.26	0.82
Verdugo-Fletcher	14712.3*	25 yr	65800.00	406.18	422.11		426.86	0.004044	17.49	3762.79	282.29	0.84
Verdugo-Fletcher	14712.3*	50 yr	77500.00	406.18	423.66	422.01	428.93	0.004042	18.43	4205.64	291.23	0.85
Verdugo-Fletcher	14712.3*	100 yr	94600.00	406.18	425.73	424.08	431.71	0.004038	19.62	4821.70	303.23	0.87
Verdugo-Fletcher	14712.3*	200 yr	109000.00	406.18	427.30	425.67	433.86	0.004037	20.55	5303.19	310.00	0.88
Verdugo-Fletcher	14712.3*	500 yr	125000.00	406.18	428.84	427.29	436.10	0.004034	21.62	5780.95	310.00	0.88
Verdugo-Fletcher	14494.1*	Design	78000.00	405.29	422.86	421.18	428.13	0.004021	18.43	4231.78	291.79	0.85
Verdugo-Fletcher	14494.1*	2 yr	21600.00	405.29	413.66		415.91	0.004071	12.04	1794.20	238.52	0.77
Verdugo-Fletcher	14494.1*	5 yr	40500.00	405.29	417.37		420.82	0.004043	14.90	2717.68	259.99	0.81
Verdugo-Fletcher	14494.1*	10 yr	48200.00	405.29	418.64		422.51	0.004036	15.78	3053.84	267.38	0.82
Verdugo-Fletcher	14494.1*	25 yr	65800.00	405.29	421.24		425.98	0.004028	17.46	3768.09	282.43	0.84
Verdugo-Fletcher	14494.1*	50 yr	77500.00	405.29	422.79	421.12	428.05	0.004022	18.39	4213.22	291.42	0.85
Verdugo-Fletcher	14494.1*	100 yr	94600.00	405.29	424.87	423.19	430.82	0.004017	19.58	4830.61	303.45	0.86
Verdugo-Fletcher	14494.1*	200 yr	109000.00	405.29	426.44	424.78	432.97	0.004009	20.51	5314.94	310.00	0.87
Verdugo-Fletcher	14494.1*	500 yr	125000.00	405.29	427.99	426.40	435.22	0.004007	21.58	5793.20	310.00	0.88
Verdugo-Fletcher	14276.0*	Design	78000.00	404.39	421.99	420.29	427.25	0.004002	18.41	4236.23	291.47	0.85
Verdugo-Fletcher	14276.0*	2 yr	21600.00	404.39	412.79		415.03	0.004027	12.00	1800.01	238.45	0.77
Verdugo-Fletcher	14276.0*	5 yr	40500.00	404.39	416.50		419.93	0.004007	14.86	2724.58	259.85	0.81
Verdugo-Fletcher	14276.0*	10 yr	48200.00	404.39	417.78		421.63	0.004004	15.75	3060.58	267.20	0.82
Verdugo-Fletcher	14276.0*	25 yr	65800.00	404.39	420.37		425.10	0.004004	17.44	3773.44	282.17	0.84

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	14276.0*	50 yr	77500.00	404.39	421.92	420.22	427.17	0.004002	18.37	4217.70	291.11	0.85
Verdugo-Fletcher	14276.0*	100 yr	94600.00	404.39	423.99	422.29	429.94	0.004004	19.57	4833.09	303.05	0.86
Verdugo-Fletcher	14276.0*	200 yr	109000.00	404.39	425.56	423.89	432.09	0.004008	20.51	5314.58	310.00	0.87
Verdugo-Fletcher	14276.0*	500 yr	125000.00	404.39	427.11	425.50	434.34	0.004002	21.57	5794.95	310.00	0.88
Verdugo-Fletcher	14057.90 28000	Design	78000.00	403.50	421.16		426.38	0.003950	18.33	4255.49	291.90	0.85
Verdugo-Fletcher	14057.90 28000	2 yr	21600.00	403.50	411.95		414.16	0.003945	11.92	1812.17	238.77	0.76
Verdugo-Fletcher	14057.90 28000	5 yr	40500.00	403.50	415.67		419.06	0.003947	14.79	2738.45	260.19	0.80
Verdugo-Fletcher	14057.90 28000	10 yr	48200.00	403.50	416.94		420.76	0.003947	15.67	3075.40	267.56	0.81
Verdugo-Fletcher	14057.90 28000	25 yr	65800.00	403.50	419.55		424.22	0.003950	17.36	3791.28	282.57	0.83
Verdugo-Fletcher	14057.90 28000	50 yr	77500.00	403.50	421.10		426.29	0.003950	18.29	4236.93	291.53	0.85
Verdugo-Fletcher	14057.90 28000	100 yr	94600.00	403.50	423.18	421.40	429.07	0.003951	19.48	4855.52	303.52	0.86
Verdugo-Fletcher	14057.90 28000	200 yr	109000.00	403.50	424.74	423.00	431.22	0.003953	20.42	5337.74	310.00	0.87
Verdugo-Fletcher	14057.90 28000	500 yr	125000.00	403.50	426.30	424.61	433.46	0.003948	21.48	5819.73	310.00	0.87
Verdugo-Fletcher	13835.6*	Design	78000.00	402.62	420.29		425.50	0.003945	18.32	4257.91	292.02	0.85
Verdugo-Fletcher	13835.6*	2 yr	21600.00	402.62	411.08		413.28	0.003935	11.91	1813.80	238.85	0.76
Verdugo-Fletcher	13835.6*	5 yr	40500.00	402.62	414.79		418.18	0.003940	14.78	2740.22	260.29	0.80
Verdugo-Fletcher	13835.6*	10 yr	48200.00	402.62	416.07		419.88	0.003941	15.66	3077.32	267.66	0.81
Verdugo-Fletcher	13835.6*	25 yr	65800.00	402.62	418.67		423.34	0.003944	17.35	3793.42	282.69	0.83
Verdugo-Fletcher	13835.6*	50 yr	77500.00	402.62	420.22		425.41	0.003945	18.28	4239.34	291.66	0.85
Verdugo-Fletcher	13835.6*	100 yr	94600.00	402.62	422.30		428.19	0.003946	19.47	4858.29	303.66	0.86
Verdugo-Fletcher	13835.6*	200 yr	109000.00	402.62	423.87		430.34	0.003947	20.41	5340.64	310.00	0.87
Verdugo-Fletcher	13835.6*	500 yr	125000.00	402.62	425.43		432.58	0.003942	21.47	5823.00	310.00	0.87
Verdugo-Fletcher	13613.4*	Design	78000.00	401.75	419.41		424.62	0.003951	18.33	4256.35	292.12	0.85
Verdugo-Fletcher	13613.4*	2 yr	21600.00	401.75	410.20		412.41	0.003950	11.92	1811.67	238.86	0.76
Verdugo-Fletcher	13613.4*	5 yr	40500.00	401.75	413.91		417.31	0.003951	14.79	2738.04	260.33	0.80
Verdugo-Fletcher	13613.4*	10 yr	48200.00	401.75	415.19		419.00	0.003950	15.67	3075.33	267.71	0.81
Verdugo-Fletcher	13613.4*	25 yr	65800.00	401.75	417.79		422.47	0.003952	17.35	3791.52	282.76	0.84
Verdugo-Fletcher	13613.4*	50 yr	77500.00	401.75	419.34		424.54	0.003951	18.29	4237.78	291.75	0.85
Verdugo-Fletcher	13613.4*	100 yr	94600.00	401.75	421.42	419.65	427.31	0.003950	19.48	4857.12	303.78	0.86
Verdugo-Fletcher	13613.4*	200 yr	109000.00	401.75	422.99	421.24	429.46	0.003949	20.41	5339.86	310.00	0.87
Verdugo-Fletcher	13613.4*	500 yr	125000.00	401.75	424.55	422.87	431.71	0.003942	21.47	5823.04	310.00	0.87
Verdugo-Fletcher	13391.1*	Design	78000.00	400.87	418.53		423.74	0.003946	18.32	4258.69	292.24	0.85
Verdugo-Fletcher	13391.1*	2 yr	21600.00	400.87	409.32		411.53	0.003943	11.91	1812.87	238.93	0.76
Verdugo-Fletcher	13391.1*	5 yr	40500.00	400.87	413.03		416.43	0.003946	14.78	2739.47	260.42	0.80
Verdugo-Fletcher	13391.1*	10 yr	48200.00	400.87	414.31		418.12	0.003945	15.66	3077.01	267.81	0.81
Verdugo-Fletcher	13391.1*	25 yr	65800.00	400.87	416.91		421.59	0.003947	17.35	3793.47	282.88	0.83
Verdugo-Fletcher	13391.1*	50 yr	77500.00	400.87	418.47		423.66	0.003946	18.28	4240.12	291.87	0.85
Verdugo-Fletcher	13391.1*	100 yr	94600.00	400.87	420.55	418.76	426.43	0.003945	19.47	4859.93	303.92	0.86
Verdugo-Fletcher	13391.1*	200 yr	109000.00	400.87	422.12	420.36	428.58	0.003942	20.40	5343.09	310.00	0.87
Verdugo-Fletcher	13391.1*	500 yr	125000.00	400.87	423.68	421.99	430.82	0.003934	21.45	5826.84	310.00	0.87

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	13168.9*	Design	78000.00	399.99	417.66		422.86	0.003940	18.30	4261.44	292.38	0.84
Verdugo-Fletcher	13168.9*	2 yr	21600.00	399.99	408.45		410.65	0.003932	11.90	1814.64	239.02	0.76
Verdugo-Fletcher	13168.9*	5 yr	40500.00	399.99	412.16		415.55	0.003939	14.77	2741.29	260.52	0.80
Verdugo-Fletcher	13168.9*	10 yr	48200.00	399.99	413.44		417.24	0.003938	15.65	3079.10	267.92	0.81
Verdugo-Fletcher	13168.9*	25 yr	65800.00	399.99	416.04		420.71	0.003941	17.33	3795.79	283.00	0.83
Verdugo-Fletcher	13168.9*	50 yr	77500.00	399.99	417.59		422.78	0.003940	18.27	4242.86	292.01	0.84
Verdugo-Fletcher	13168.9*	100 yr	94600.00	399.99	419.68		425.55	0.003939	19.45	4863.12	304.07	0.86
Verdugo-Fletcher	13168.9*	200 yr	109000.00	399.99	421.25		427.70	0.003933	20.39	5346.93	310.00	0.87
Verdugo-Fletcher	13168.9*	500 yr	125000.00	399.99	422.82		429.95	0.003921	21.43	5833.22	310.00	0.87
Verdugo-Fletcher	12946.6*	Design	78000.00	399.12	416.75		421.99	0.003977	18.37	4246.19	291.79	0.85
Verdugo-Fletcher	12946.6*	2 yr	21600.00	399.12	407.56		409.78	0.003957	11.93	1810.46	238.77	0.76
Verdugo-Fletcher	12946.6*	5 yr	40500.00	399.12	411.27		414.68	0.003965	14.81	2734.53	260.16	0.81
Verdugo-Fletcher	12946.6*	10 yr	48200.00	399.12	412.54		416.37	0.003968	15.70	3070.14	267.51	0.82
Verdugo-Fletcher	12946.6*	25 yr	65800.00	399.12	415.14		419.83	0.003973	17.39	3784.04	282.50	0.84
Verdugo-Fletcher	12946.6*	50 yr	77500.00	399.12	416.68		421.90	0.003977	18.33	4227.72	291.43	0.85
Verdugo-Fletcher	12946.6*	100 yr	94600.00	399.12	418.75		424.68	0.003982	19.53	4842.98	303.37	0.86
Verdugo-Fletcher	12946.6*	200 yr	109000.00	399.12	420.32		426.83	0.003983	20.47	5325.18	310.00	0.87
Verdugo-Fletcher	12946.6*	500 yr	125000.00	399.12	421.91	420.24	429.08	0.003953	21.49	5817.58	310.00	0.87
Verdugo-Fletcher	12724.4*	Design	78000.00	398.24	415.86		421.10	0.003981	18.37	4245.27	291.86	0.85
Verdugo-Fletcher	12724.4*	2 yr	21600.00	398.24	406.69		408.90	0.003954	11.93	1811.07	238.83	0.76
Verdugo-Fletcher	12724.4*	5 yr	40500.00	398.24	410.39		413.79	0.003966	14.81	2734.55	260.22	0.81
Verdugo-Fletcher	12724.4*	10 yr	48200.00	398.24	411.66		415.49	0.003971	15.70	3069.79	267.56	0.82
Verdugo-Fletcher	12724.4*	25 yr	65800.00	398.24	414.25		418.95	0.003977	17.39	3783.37	282.56	0.84
Verdugo-Fletcher	12724.4*	50 yr	77500.00	398.24	415.80		421.02	0.003980	18.34	4226.81	291.49	0.85
Verdugo-Fletcher	12724.4*	100 yr	94600.00	398.24	417.86		423.79	0.003987	19.54	4841.55	303.44	0.86
Verdugo-Fletcher	12724.4*	200 yr	109000.00	398.24	419.43		425.94	0.003987	20.47	5323.92	310.00	0.87
Verdugo-Fletcher	12724.4*	500 yr	125000.00	398.24	421.03	419.35	428.20	0.003947	21.48	5820.45	310.00	0.87
Verdugo-Fletcher	12502.1*	Design	78000.00	397.36	414.97		420.22	0.003988	18.38	4243.03	291.89	0.85
Verdugo-Fletcher	12502.1*	2 yr	21600.00	397.36	405.81		408.02	0.003951	11.92	1811.63	238.88	0.76
Verdugo-Fletcher	12502.1*	5 yr	40500.00	397.36	409.50		412.91	0.003971	14.81	2733.72	260.26	0.81
Verdugo-Fletcher	12502.1*	10 yr	48200.00	397.36	410.77		414.60	0.003978	15.71	3068.39	267.60	0.82
Verdugo-Fletcher	12502.1*	25 yr	65800.00	397.36	413.36		418.06	0.003984	17.40	3781.45	282.59	0.84
Verdugo-Fletcher	12502.1*	50 yr	77500.00	397.36	414.91		420.13	0.003988	18.34	4224.60	291.53	0.85
Verdugo-Fletcher	12502.1*	100 yr	94600.00	397.36	416.97		422.91	0.003995	19.55	4838.68	303.47	0.86
Verdugo-Fletcher	12502.1*	200 yr	109000.00	397.36	418.54		425.06	0.003993	20.48	5321.41	310.00	0.87
Verdugo-Fletcher	12502.1*	500 yr	125000.00	397.36	420.16		427.31	0.003941	21.46	5823.78	310.00	0.87
Verdugo-Fletcher	12279.9*	Design	78000.00	396.49	414.06		419.33	0.004021	18.43	4231.96	291.79	0.85
Verdugo-Fletcher	12279.9*	2 yr	21600.00	396.49	404.91		407.14	0.003988	11.96	1806.32	238.82	0.77
Verdugo-Fletcher	12279.9*	5 yr	40500.00	396.49	408.60		412.03	0.004005	14.85	2726.37	260.18	0.81
Verdugo-Fletcher	12279.9*	10 yr	48200.00	396.49	409.87		413.72	0.004011	15.75	3060.24	267.52	0.82
Verdugo-Fletcher	12279.9*	25 yr	65800.00	396.49	412.45		417.18	0.004018	17.45	3771.04	282.49	0.84

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	12279.9*	50 yr	77500.00	396.49	413.99		419.25	0.004021	18.39	4213.55	291.43	0.85
Verdugo-Fletcher	12279.9*	100 yr	94600.00	396.49	416.06		422.02	0.004027	19.60	4826.56	303.37	0.87
Verdugo-Fletcher	12279.9*	200 yr	109000.00	396.49	417.63		424.17	0.004021	20.53	5309.88	310.00	0.87
Verdugo-Fletcher	12279.9*	500 yr	125000.00	396.49	419.29	417.60	426.44	0.003941	21.46	5824.01	310.00	0.87
Verdugo-Fletcher	12057.66 26000	Design	78000.00	395.61	413.14		418.44	0.004049	18.47	4222.52	291.69	0.86
Verdugo-Fletcher	12057.66 26000	2 yr	21600.00	395.61	404.02		406.25	0.004015	11.98	1802.45	238.76	0.77
Verdugo-Fletcher	12057.66 26000	5 yr	40500.00	395.61	407.70		411.14	0.004031	14.89	2720.69	260.12	0.81
Verdugo-Fletcher	12057.66 26000	10 yr	48200.00	395.61	408.96		412.83	0.004038	15.78	3053.77	267.44	0.82
Verdugo-Fletcher	12057.66 26000	25 yr	65800.00	395.61	411.54		416.29	0.004043	17.48	3763.78	282.42	0.84
Verdugo-Fletcher	12057.66 26000	50 yr	77500.00	395.61	413.08		418.36	0.004048	18.43	4204.17	291.32	0.86
Verdugo-Fletcher	12057.66 26000	100 yr	94600.00	395.61	415.14		421.13	0.004053	19.64	4816.15	303.26	0.87
Verdugo-Fletcher	12057.66 26000	200 yr	109000.00	395.61	416.71		423.28	0.004044	20.56	5300.54	310.00	0.88
Verdugo-Fletcher	12057.66 26000	500 yr	125000.00	395.61	418.41	416.72	425.56	0.003932	21.45	5827.90	310.00	0.87
Verdugo-Fletcher	12032.6	Design	78000.00	395.51	413.04		418.34	0.004051	18.48	4221.76	291.67	0.86
Verdugo-Fletcher	12032.6	2 yr	21600.00	395.51	403.92		406.15	0.004017	11.99	1802.21	238.76	0.77
Verdugo-Fletcher	12032.6	5 yr	40500.00	395.51	407.60		411.04	0.004033	14.89	2720.24	260.11	0.81
Verdugo-Fletcher	12032.6	10 yr	48200.00	395.51	408.86		412.73	0.004040	15.79	3053.22	267.43	0.82
Verdugo-Fletcher	12032.6	25 yr	65800.00	395.51	411.44		416.19	0.004045	17.49	3763.12	282.40	0.84
Verdugo-Fletcher	12032.6	50 yr	77500.00	395.51	412.98		418.26	0.004050	18.44	4203.42	291.31	0.86
Verdugo-Fletcher	12032.6	100 yr	94600.00	395.51	415.03		421.03	0.004056	19.65	4815.29	303.25	0.87
Verdugo-Fletcher	12032.6	200 yr	109000.00	395.51	416.61		423.18	0.004046	20.57	5299.78	310.00	0.88
Verdugo-Fletcher	12032.6	500 yr	125000.00	395.51	418.32	416.62	425.46	0.003931	21.45	5828.37	310.00	0.87
Verdugo-Fletcher	12007.6	Design	78000.00	395.41	412.94		418.24	0.004053	18.48	4221.07	291.66	0.86
Verdugo-Fletcher	12007.6	2 yr	21600.00	395.41	403.82		406.05	0.004018	11.99	1802.04	238.75	0.77
Verdugo-Fletcher	12007.6	5 yr	40500.00	395.41	407.50		410.94	0.004035	14.89	2719.85	260.10	0.81
Verdugo-Fletcher	12007.6	10 yr	48200.00	395.41	408.76		412.63	0.004042	15.79	3052.74	267.42	0.82
Verdugo-Fletcher	12007.6	25 yr	65800.00	395.41	411.34		416.09	0.004047	17.49	3762.55	282.39	0.84
Verdugo-Fletcher	12007.6	50 yr	77500.00	395.41	412.87		418.15	0.004052	18.44	4202.75	291.29	0.86
Verdugo-Fletcher	12007.6	100 yr	94600.00	395.41	414.93		420.93	0.004057	19.65	4814.51	303.23	0.87
Verdugo-Fletcher	12007.6	200 yr	109000.00	395.41	416.51		423.08	0.004048	20.57	5299.09	310.00	0.88
Verdugo-Fletcher	12007.6	500 yr	125000.00	395.41	418.22		425.36	0.003930	21.44	5828.90	310.00	0.87
Verdugo-Fletcher	11982.6	Design	78000.00	395.31	412.83		418.14	0.004062	18.50	4216.59	291.37	0.86
Verdugo-Fletcher	11982.6	2 yr	21600.00	395.31	403.71		405.95	0.004023	11.99	1801.05	238.63	0.77
Verdugo-Fletcher	11982.6	5 yr	40500.00	395.31	407.39		410.84	0.004041	14.90	2717.73	259.91	0.81
Verdugo-Fletcher	11982.6	10 yr	48200.00	395.31	408.65		412.53	0.004049	15.80	3050.12	267.20	0.82
Verdugo-Fletcher	11982.6	25 yr	65800.00	395.31	411.23		415.99	0.004055	17.51	3758.88	282.13	0.85
Verdugo-Fletcher	11982.6	50 yr	77500.00	395.31	412.77		418.06	0.004062	18.46	4198.31	291.01	0.86
Verdugo-Fletcher	11982.6	100 yr	94600.00	395.31	414.82		420.83	0.004068	19.67	4808.99	302.91	0.87
Verdugo-Fletcher	11982.6	200 yr	109000.00	395.31	416.40		422.98	0.004062	20.59	5292.92	310.00	0.88
Verdugo-Fletcher	11982.6	500 yr	125000.00	395.31	418.11		425.26	0.003940	21.46	5824.12	310.00	0.87

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11957.6	Design	78000.00	395.21	412.72		418.05	0.004072	18.52	4211.92	291.07	0.86
Verdugo-Fletcher	11957.6	2 yr	21600.00	395.21	403.61		405.85	0.004028	12.00	1800.00	238.49	0.77
Verdugo-Fletcher	11957.6	5 yr	40500.00	395.21	407.29		410.74	0.004049	14.91	2715.49	259.71	0.81
Verdugo-Fletcher	11957.6	10 yr	48200.00	395.21	408.55		412.43	0.004057	15.82	3047.38	266.98	0.83
Verdugo-Fletcher	11957.6	25 yr	65800.00	395.21	411.13		415.89	0.004064	17.52	3755.04	281.87	0.85
Verdugo-Fletcher	11957.6	50 yr	77500.00	395.21	412.66		417.96	0.004071	18.48	4193.69	290.71	0.86
Verdugo-Fletcher	11957.6	100 yr	94600.00	395.21	414.71		420.74	0.004078	19.70	4803.22	302.57	0.87
Verdugo-Fletcher	11957.6	200 yr	109000.00	395.21	416.29		422.89	0.004077	20.62	5286.54	310.00	0.88
Verdugo-Fletcher	11957.6	500 yr	125000.00	395.21	418.01		425.17	0.003950	21.48	5819.24	310.00	0.87
Verdugo-Fletcher	11932.6	Design	78000.00	395.11	412.61		417.95	0.004082	18.54	4207.25	290.78	0.86
Verdugo-Fletcher	11932.6	2 yr	21600.00	395.11	403.51		405.75	0.004033	12.01	1798.92	238.37	0.77
Verdugo-Fletcher	11932.6	5 yr	40500.00	395.11	407.18		410.64	0.004056	14.93	2713.25	259.52	0.81
Verdugo-Fletcher	11932.6	10 yr	48200.00	395.11	408.44		412.33	0.004065	15.83	3044.60	266.77	0.83
Verdugo-Fletcher	11932.6	25 yr	65800.00	395.11	411.02		415.80	0.004073	17.54	3751.18	281.61	0.85
Verdugo-Fletcher	11932.6	50 yr	77500.00	395.11	412.55		417.86	0.004081	18.50	4189.05	290.42	0.86
Verdugo-Fletcher	11932.6	100 yr	94600.00	395.11	414.60		420.64	0.004089	19.72	4797.47	302.25	0.87
Verdugo-Fletcher	11932.6	200 yr	109000.00	395.11	416.18		422.79	0.004092	20.64	5279.97	310.00	0.88
Verdugo-Fletcher	11932.6	500 yr	125000.00	395.11	417.90	416.23	425.08	0.003959	21.50	5814.29	310.00	0.87
Verdugo-Fletcher	11907.6	Design	78000.00	395.01	412.51		417.85	0.004085	18.54	4206.16	290.76	0.86
Verdugo-Fletcher	11907.6	2 yr	21600.00	395.01	403.41		405.65	0.004035	12.01	1798.58	238.36	0.77
Verdugo-Fletcher	11907.6	5 yr	40500.00	395.01	407.08		410.54	0.004059	14.93	2712.60	259.50	0.81
Verdugo-Fletcher	11907.6	10 yr	48200.00	395.01	408.34		412.23	0.004068	15.84	3043.83	266.75	0.83
Verdugo-Fletcher	11907.6	25 yr	65800.00	395.01	410.91		415.70	0.004076	17.55	3750.25	281.59	0.85
Verdugo-Fletcher	11907.6	50 yr	77500.00	395.01	412.45		417.76	0.004084	18.51	4187.98	290.40	0.86
Verdugo-Fletcher	11907.6	100 yr	94600.00	395.01	414.50		420.54	0.004092	19.72	4796.25	302.22	0.87
Verdugo-Fletcher	11907.6	200 yr	109000.00	395.01	416.07		422.69	0.004096	20.65	5278.65	310.00	0.88
Verdugo-Fletcher	11907.6	500 yr	125000.00	395.01	417.80	416.13	424.98	0.003959	21.50	5814.61	310.00	0.87
Verdugo-Fletcher	11882.6	Design	78000.00	394.91	412.40	410.81	417.75	0.004088	18.55	4205.08	290.74	0.86
Verdugo-Fletcher	11882.6	2 yr	21600.00	394.91	403.31		405.55	0.004038	12.01	1798.23	238.35	0.77
Verdugo-Fletcher	11882.6	5 yr	40500.00	394.91	406.98		410.44	0.004062	14.93	2711.95	259.49	0.81
Verdugo-Fletcher	11882.6	10 yr	48200.00	394.91	408.24		412.13	0.004072	15.84	3043.03	266.73	0.83
Verdugo-Fletcher	11882.6	25 yr	65800.00	394.91	410.81		415.59	0.004079	17.55	3749.32	281.57	0.85
Verdugo-Fletcher	11882.6	50 yr	77500.00	394.91	412.34	410.75	417.66	0.004087	18.51	4186.89	290.38	0.86
Verdugo-Fletcher	11882.6	100 yr	94600.00	394.91	414.39	412.80	420.44	0.004095	19.73	4795.00	302.20	0.87
Verdugo-Fletcher	11882.6	200 yr	109000.00	394.91	415.97	414.41	422.59	0.004099	20.65	5277.33	310.00	0.88
Verdugo-Fletcher	11882.6	500 yr	125000.00	394.91	417.70	416.03	424.88	0.003958	21.50	5814.94	310.00	0.87
Verdugo-Fletcher	11857.6*	Design	78000.00	394.81	412.31	410.71	417.64	0.004084	18.54	4207.78	291.00	0.86
Verdugo-Fletcher	11857.6*	2 yr	21600.00	394.81	403.21		405.45	0.004037	12.01	1798.67	238.47	0.77
Verdugo-Fletcher	11857.6*	5 yr	40500.00	394.81	406.88		410.34	0.004060	14.93	2713.01	259.66	0.81
Verdugo-Fletcher	11857.6*	10 yr	48200.00	394.81	408.14		412.03	0.004069	15.83	3044.37	266.92	0.83
Verdugo-Fletcher	11857.6*	25 yr	65800.00	394.81	410.71		415.49	0.004076	17.54	3751.47	281.80	0.85

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11857.6*	50 yr	77500.00	394.81	412.24	410.64	417.56	0.004083	18.50	4189.57	290.64	0.86
Verdugo-Fletcher	11857.6*	100 yr	94600.00	394.81	414.30	412.70	420.33	0.004090	19.71	4798.53	302.49	0.87
Verdugo-Fletcher	11857.6*	200 yr	109000.00	394.81	415.87	414.31	422.48	0.004089	20.64	5281.45	310.00	0.88
Verdugo-Fletcher	11857.6*	500 yr	125000.00	394.81	417.61	415.92	424.77	0.003947	21.48	5820.63	310.00	0.87
Verdugo-Fletcher	11832.5	Design	78000.00	394.71	412.21	410.60	417.54	0.004080	18.53	4210.21	291.24	0.86
Verdugo-Fletcher	11832.5	2 yr	21600.00	394.71	403.11		405.34	0.004037	12.01	1798.94	238.58	0.77
Verdugo-Fletcher	11832.5	5 yr	40500.00	394.71	406.78		410.23	0.004059	14.92	2713.87	259.82	0.81
Verdugo-Fletcher	11832.5	10 yr	48200.00	394.71	408.04		411.92	0.004068	15.83	3045.47	267.10	0.83
Verdugo-Fletcher	11832.5	25 yr	65800.00	394.71	410.61		415.39	0.004073	17.53	3753.38	282.02	0.85
Verdugo-Fletcher	11832.5	50 yr	77500.00	394.71	412.14	410.54	417.45	0.004080	18.49	4191.98	290.88	0.86
Verdugo-Fletcher	11832.5	100 yr	94600.00	394.71	414.20	412.59	420.23	0.004085	19.70	4801.75	302.77	0.87
Verdugo-Fletcher	11832.5	200 yr	109000.00	394.71	415.77	414.20	422.38	0.004080	20.62	5285.46	310.00	0.88
Verdugo-Fletcher	11832.5	500 yr	125000.00	394.71	417.52	415.82	424.67	0.003935	21.45	5826.26	310.00	0.87
Verdugo-Fletcher	11807.5	Design	78000.00	394.61	412.11	410.50	417.43	0.004076	18.51	4213.05	291.50	0.86
Verdugo-Fletcher	11807.5	2 yr	21600.00	394.61	403.00		405.24	0.004036	12.00	1799.41	238.69	0.77
Verdugo-Fletcher	11807.5	5 yr	40500.00	394.61	406.68		410.13	0.004057	14.92	2714.99	259.99	0.81
Verdugo-Fletcher	11807.5	10 yr	48200.00	394.61	407.94		411.82	0.004065	15.82	3046.87	267.29	0.83
Verdugo-Fletcher	11807.5	25 yr	65800.00	394.61	410.52		415.28	0.004069	17.52	3755.65	282.26	0.85
Verdugo-Fletcher	11807.5	50 yr	77500.00	394.61	412.05	410.44	417.35	0.004075	18.48	4194.80	291.14	0.86
Verdugo-Fletcher	11807.5	100 yr	94600.00	394.61	414.10	412.49	420.12	0.004080	19.69	4805.45	303.06	0.87
Verdugo-Fletcher	11807.5	200 yr	109000.00	394.61	415.68	414.10	422.27	0.004070	20.61	5289.82	310.00	0.88
Verdugo-Fletcher	11807.5	500 yr	125000.00	394.61	417.43	415.72	424.56	0.003923	21.43	5832.12	310.00	0.87
Verdugo-Fletcher	11782.5	Design	78000.00	394.51	412.01		417.33	0.004071	18.50	4215.81	291.76	0.86
Verdugo-Fletcher	11782.5	2 yr	21600.00	394.51	402.90		405.14	0.004035	12.00	1799.84	238.81	0.77
Verdugo-Fletcher	11782.5	5 yr	40500.00	394.51	406.58		410.03	0.004054	14.91	2716.06	260.16	0.81
Verdugo-Fletcher	11782.5	10 yr	48200.00	394.51	407.84		411.72	0.004063	15.81	3048.22	267.48	0.83
Verdugo-Fletcher	11782.5	25 yr	65800.00	394.51	410.42		415.18	0.004065	17.51	3757.85	282.49	0.85
Verdugo-Fletcher	11782.5	50 yr	77500.00	394.51	411.95		417.24	0.004071	18.46	4197.53	291.40	0.86
Verdugo-Fletcher	11782.5	100 yr	94600.00	394.51	414.01		420.01	0.004075	19.67	4809.06	303.35	0.87
Verdugo-Fletcher	11782.5	200 yr	109000.00	394.51	415.58		422.17	0.004060	20.59	5294.27	310.00	0.88
Verdugo-Fletcher	11782.5	500 yr	125000.00	394.51	417.34	415.62	424.46	0.003912	21.41	5838.05	310.00	0.87
Verdugo-Fletcher	11757.5	Design	78000.00	394.41	411.91	410.30	417.23	0.004074	18.51	4214.89	291.74	0.86
Verdugo-Fletcher	11757.5	2 yr	21600.00	394.41	402.80		405.04	0.004038	12.00	1799.49	238.80	0.77
Verdugo-Fletcher	11757.5	5 yr	40500.00	394.41	406.47		409.93	0.004057	14.91	2715.45	260.15	0.81
Verdugo-Fletcher	11757.5	10 yr	48200.00	394.41	407.73		411.62	0.004066	15.82	3047.48	267.47	0.83
Verdugo-Fletcher	11757.5	25 yr	65800.00	394.41	410.31		415.08	0.004067	17.51	3757.05	282.47	0.85
Verdugo-Fletcher	11757.5	50 yr	77500.00	394.41	411.85	410.24	417.14	0.004073	18.47	4196.62	291.38	0.86
Verdugo-Fletcher	11757.5	100 yr	94600.00	394.41	413.90	412.28	419.91	0.004077	19.68	4808.06	303.33	0.87
Verdugo-Fletcher	11757.5	200 yr	109000.00	394.41	415.48	413.90	422.06	0.004062	20.59	5293.44	310.00	0.88
Verdugo-Fletcher	11757.5	500 yr	125000.00	394.41	417.24	415.52	424.36	0.003910	21.41	5838.75	310.00	0.87

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HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11732.5	Design	78000.00	394.31	411.81	410.19	417.12	0.004069	18.49	4217.74	292.00	0.86
Verdugo-Fletcher	11732.5	2 yr	21600.00	394.31	402.70		404.94	0.004037	12.00	1799.93	238.92	0.77
Verdugo-Fletcher	11732.5	5 yr	40500.00	394.31	406.38		409.83	0.004055	14.91	2716.55	260.32	0.81
Verdugo-Fletcher	11732.5	10 yr	48200.00	394.31	407.63		411.51	0.004063	15.81	3048.86	267.65	0.83
Verdugo-Fletcher	11732.5	25 yr	65800.00	394.31	410.22		414.97	0.004063	17.50	3759.33	282.70	0.85
Verdugo-Fletcher	11732.5	50 yr	77500.00	394.31	411.75	410.13	417.04	0.004069	18.45	4199.45	291.63	0.86
Verdugo-Fletcher	11732.5	100 yr	94600.00	394.31	413.81	412.18	419.81	0.004071	19.66	4811.77	303.62	0.87
Verdugo-Fletcher	11732.5	200 yr	109000.00	394.31	415.39	413.79	421.96	0.004052	20.57	5298.05	310.00	0.88
Verdugo-Fletcher	11732.5	500 yr	125000.00	394.31	417.15	415.43	424.25	0.003898	21.39	5844.77	310.00	0.87
Verdugo-Fletcher	11707.5	Design	78000.00	394.21	411.71		417.02	0.004064	18.48	4220.65	292.26	0.86
Verdugo-Fletcher	11707.5	2 yr	21600.00	394.21	402.60		404.84	0.004036	12.00	1800.37	239.03	0.77
Verdugo-Fletcher	11707.5	5 yr	40500.00	394.21	406.28		409.72	0.004053	14.90	2717.67	260.49	0.81
Verdugo-Fletcher	11707.5	10 yr	48200.00	394.21	407.53		411.41	0.004060	15.80	3050.26	267.85	0.83
Verdugo-Fletcher	11707.5	25 yr	65800.00	394.21	410.12		414.87	0.004059	17.49	3761.63	282.94	0.85
Verdugo-Fletcher	11707.5	50 yr	77500.00	394.21	411.65		416.93	0.004064	18.44	4202.33	291.89	0.86
Verdugo-Fletcher	11707.5	100 yr	94600.00	394.21	413.71		419.70	0.004066	19.64	4815.57	303.92	0.87
Verdugo-Fletcher	11707.5	200 yr	109000.00	394.21	415.29		421.85	0.004041	20.56	5302.74	310.00	0.88
Verdugo-Fletcher	11707.5	500 yr	125000.00	394.21	417.06		424.15	0.003882	21.36	5852.55	310.00	0.87
Verdugo-Fletcher	11682.5	Design	78000.00	394.11	411.60		416.92	0.004074	18.50	4215.94	291.96	0.86
Verdugo-Fletcher	11682.5	2 yr	21600.00	394.11	402.50		404.74	0.004042	12.01	1799.18	238.90	0.77
Verdugo-Fletcher	11682.5	5 yr	40500.00	394.11	406.17		409.62	0.004061	14.92	2715.30	260.29	0.81
Verdugo-Fletcher	11682.5	10 yr	48200.00	394.11	407.43		411.31	0.004069	15.82	3047.38	267.62	0.83
Verdugo-Fletcher	11682.5	25 yr	65800.00	394.11	410.01		414.77	0.004068	17.51	3757.73	282.67	0.85
Verdugo-Fletcher	11682.5	50 yr	77500.00	394.11	411.54		416.84	0.004074	18.46	4197.66	291.60	0.86
Verdugo-Fletcher	11682.5	100 yr	94600.00	394.11	413.60		419.61	0.004076	19.67	4809.82	303.59	0.87
Verdugo-Fletcher	11682.5	200 yr	109000.00	394.11	415.18		421.76	0.004055	20.58	5296.69	310.00	0.88
Verdugo-Fletcher	11682.5	500 yr	125000.00	394.11	416.96	415.23	424.05	0.003891	21.37	5848.17	310.00	0.87
Verdugo-Fletcher	11657.5*	Design	78000.00	394.01	411.50		416.82	0.004077	18.51	4214.90	291.94	0.86
Verdugo-Fletcher	11657.5*	2 yr	21600.00	394.01	402.40		404.64	0.004045	12.01	1798.71	238.89	0.77
Verdugo-Fletcher	11657.5*	5 yr	40500.00	394.01	406.07		409.52	0.004064	14.92	2714.56	260.27	0.81
Verdugo-Fletcher	11657.5*	10 yr	48200.00	394.01	407.33		411.21	0.004072	15.82	3046.51	267.60	0.83
Verdugo-Fletcher	11657.5*	25 yr	65800.00	394.01	409.91		414.67	0.004071	17.51	3756.82	282.65	0.85
Verdugo-Fletcher	11657.5*	50 yr	77500.00	394.01	411.44		416.73	0.004077	18.47	4196.63	291.58	0.86
Verdugo-Fletcher	11657.5*	100 yr	94600.00	394.01	413.50		419.51	0.004079	19.67	4808.68	303.56	0.87
Verdugo-Fletcher	11657.5*	200 yr	109000.00	394.01	415.08		421.66	0.004057	20.58	5295.79	310.00	0.88
Verdugo-Fletcher	11657.5*	500 yr	125000.00	394.01	416.86		423.96	0.003889	21.37	5849.02	310.00	0.87
Verdugo-Fletcher	11629	Design	78000.00	393.90	411.37		416.71	0.004100	18.55	4205.25	291.50	0.86
Verdugo-Fletcher	11629	2 yr	21600.00	393.90	402.28		404.52	0.004065	12.03	1795.54	238.68	0.77
Verdugo-Fletcher	11629	5 yr	40500.00	393.90	405.94		409.41	0.004082	14.95	2709.78	259.99	0.82
Verdugo-Fletcher	11629	10 yr	48200.00	393.90	407.20		411.10	0.004091	15.85	3041.03	267.29	0.83
Verdugo-Fletcher	11629	25 yr	65800.00	393.90	409.78		414.56	0.004094	17.55	3748.51	282.25	0.85

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11629	50 yr	77500.00	393.90	411.30		416.62	0.004100	18.51	4187.04	291.14	0.86
Verdugo-Fletcher	11629	100 yr	94600.00	393.90	413.35		419.40	0.004108	19.73	4795.42	303.04	0.87
Verdugo-Fletcher	11629	200 yr	109000.00	393.90	414.93		421.55	0.004091	20.64	5281.60	310.00	0.88
Verdugo-Fletcher	11629	500 yr	125000.00	393.90	416.74	415.05	423.85	0.003903	21.40	5842.09	310.00	0.87
Verdugo-Fletcher	11593	Design	78000.00	393.76	411.21	409.65	416.57	0.004110	18.56	4201.99	291.48	0.86
Verdugo-Fletcher	11593	2 yr	21600.00	393.76	402.13		404.38	0.004082	12.05	1793.19	238.64	0.77
Verdugo-Fletcher	11593	5 yr	40500.00	393.76	405.79		409.27	0.004095	14.96	2706.98	259.95	0.82
Verdugo-Fletcher	11593	10 yr	48200.00	393.76	407.05		410.96	0.004103	15.87	3038.05	267.26	0.83
Verdugo-Fletcher	11593	25 yr	65800.00	393.76	409.62		414.42	0.004105	17.57	3745.38	282.23	0.85
Verdugo-Fletcher	11593	50 yr	77500.00	393.76	411.15	409.58	416.48	0.004110	18.52	4183.77	291.12	0.86
Verdugo-Fletcher	11593	100 yr	94600.00	393.76	413.20	411.63	419.25	0.004117	19.74	4791.99	303.02	0.87
Verdugo-Fletcher	11593	200 yr	109000.00	393.76	414.78	413.25	421.40	0.004099	20.65	5278.50	310.00	0.88
Verdugo-Fletcher	11593	500 yr	125000.00	393.76	416.60	414.91	423.71	0.003901	21.39	5842.93	310.00	0.87
Verdugo-Fletcher	11557.5	Design	78000.00	393.60	411.06	409.49	416.41	0.004107	18.56	4201.66	291.23	0.86
Verdugo-Fletcher	11557.5	2 yr	21600.00	393.60	401.99		404.23	0.004041	12.01	1798.62	238.65	0.77
Verdugo-Fletcher	11557.5	5 yr	40500.00	393.60	405.65		409.12	0.004077	14.94	2710.35	259.85	0.82
Verdugo-Fletcher	11557.5	10 yr	48200.00	393.60	406.90		410.81	0.004088	15.85	3040.90	267.13	0.83
Verdugo-Fletcher	11557.5	25 yr	65800.00	393.60	409.47		414.26	0.004099	17.57	3745.83	282.01	0.85
Verdugo-Fletcher	11557.5	50 yr	77500.00	393.60	411.00	409.43	416.33	0.004107	18.53	4183.48	290.87	0.86
Verdugo-Fletcher	11557.5	100 yr	94600.00	393.60	413.05	411.48	419.10	0.004116	19.75	4790.60	302.73	0.87
Verdugo-Fletcher	11557.5	200 yr	109000.00	393.60	414.63	413.09	421.25	0.004103	20.66	5276.59	310.00	0.88
Verdugo-Fletcher	11557.5	500 yr	125000.00	393.60	416.47	414.74	423.56	0.003891	21.38	5847.32	310.00	0.87
Verdugo-Fletcher	11532.5	Design	78000.00	393.50	410.97		416.30	0.004096	18.54	4207.86	291.76	0.86
Verdugo-Fletcher	11532.5	2 yr	21600.00	393.50	401.89		404.13	0.004037	12.00	1799.84	238.89	0.77
Verdugo-Fletcher	11532.5	5 yr	40500.00	393.50	405.55		409.01	0.004071	14.93	2712.97	260.21	0.81
Verdugo-Fletcher	11532.5	10 yr	48200.00	393.50	406.81		410.70	0.004081	15.83	3044.17	267.52	0.83
Verdugo-Fletcher	11532.5	25 yr	65800.00	393.50	409.38		414.16	0.004090	17.54	3750.79	282.49	0.85
Verdugo-Fletcher	11532.5	50 yr	77500.00	393.50	410.91		416.22	0.004096	18.50	4189.63	291.40	0.86
Verdugo-Fletcher	11532.5	100 yr	94600.00	393.50	412.96		418.99	0.004099	19.71	4800.46	303.36	0.87
Verdugo-Fletcher	11532.5	200 yr	109000.00	393.50	414.55		421.14	0.004071	20.60	5290.21	310.00	0.88
Verdugo-Fletcher	11532.5	500 yr	125000.00	393.50	416.41		423.46	0.003853	21.31	5866.10	310.00	0.86
Verdugo-Fletcher	11507.5	Design	78000.00	393.40	410.84		416.21	0.004126	18.59	4195.25	291.10	0.86
Verdugo-Fletcher	11507.5	2 yr	21600.00	393.40	401.79		404.03	0.004047	12.01	1797.83	238.63	0.77
Verdugo-Fletcher	11507.5	5 yr	40500.00	393.40	405.44		408.91	0.004084	14.95	2708.68	259.82	0.82
Verdugo-Fletcher	11507.5	10 yr	48200.00	393.40	406.70		410.60	0.004097	15.86	3038.89	267.08	0.83
Verdugo-Fletcher	11507.5	25 yr	65800.00	393.40	409.26		414.06	0.004113	17.59	3741.80	281.93	0.85
Verdugo-Fletcher	11507.5	50 yr	77500.00	393.40	410.78		416.12	0.004125	18.55	4177.12	290.74	0.86
Verdugo-Fletcher	11507.5	100 yr	94600.00	393.40	412.82		418.89	0.004136	19.78	4782.84	302.58	0.88
Verdugo-Fletcher	11507.5	200 yr	109000.00	393.40	414.40		421.05	0.004122	20.69	5268.91	310.00	0.88
Verdugo-Fletcher	11507.5	500 yr	125000.00	393.40	416.29	414.54	423.37	0.003875	21.35	5854.83	310.00	0.87

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11482.5	Design	78000.00	393.30	410.73		416.11	0.004131	18.60	4193.56	291.07	0.86
Verdugo-Fletcher	11482.5	2 yr	21600.00	393.30	401.69		403.93	0.004050	12.02	1797.35	238.62	0.77
Verdugo-Fletcher	11482.5	5 yr	40500.00	393.30	405.34		408.81	0.004089	14.96	2707.71	259.80	0.82
Verdugo-Fletcher	11482.5	10 yr	48200.00	393.30	406.59		410.50	0.004101	15.87	3037.74	267.06	0.83
Verdugo-Fletcher	11482.5	25 yr	65800.00	393.30	409.15		413.96	0.004117	17.59	3740.35	281.90	0.85
Verdugo-Fletcher	11482.5	50 yr	77500.00	393.30	410.67		416.02	0.004130	18.56	4175.46	290.71	0.86
Verdugo-Fletcher	11482.5	100 yr	94600.00	393.30	412.71		418.79	0.004140	19.79	4780.93	302.54	0.88
Verdugo-Fletcher	11482.5	200 yr	109000.00	393.30	414.30		420.95	0.004127	20.69	5267.11	310.00	0.88
Verdugo-Fletcher	11482.5	500 yr	125000.00	393.30	416.20		423.27	0.003873	21.35	5855.81	310.00	0.87
Verdugo-Fletcher	11457.5*	Design	78000.00	393.20	410.62	409.09	416.01	0.004145	18.63	4187.50	290.75	0.86
Verdugo-Fletcher	11457.5*	2 yr	21600.00	393.20	401.58		403.83	0.004058	12.03	1795.90	238.48	0.77
Verdugo-Fletcher	11457.5*	5 yr	40500.00	393.20	405.23		408.71	0.004100	14.97	2704.74	259.59	0.82
Verdugo-Fletcher	11457.5*	10 yr	48200.00	393.20	406.48		410.40	0.004113	15.89	3034.14	266.82	0.83
Verdugo-Fletcher	11457.5*	25 yr	65800.00	393.20	409.04	407.51	413.86	0.004130	17.62	3735.32	281.61	0.85
Verdugo-Fletcher	11457.5*	50 yr	77500.00	393.20	410.56	409.03	415.92	0.004144	18.59	4169.43	290.39	0.86
Verdugo-Fletcher	11457.5*	100 yr	94600.00	393.20	412.60	411.08	418.70	0.004156	19.82	4773.52	302.18	0.88
Verdugo-Fletcher	11457.5*	200 yr	109000.00	393.20	414.18	412.69	420.85	0.004146	20.73	5258.84	310.00	0.89
Verdugo-Fletcher	11457.5*	500 yr	125000.00	393.20	416.09	414.37	423.18	0.003881	21.36	5851.51	310.00	0.87
Verdugo-Fletcher	11257.4*	Design	78000.00	392.40	409.57	408.30	415.16	0.004363	18.96	4113.90	289.08	0.89
Verdugo-Fletcher	11257.4*	2 yr	21600.00	392.40	400.74		403.01	0.004135	12.10	1784.65	238.10	0.78
Verdugo-Fletcher	11257.4*	5 yr	40500.00	392.40	404.34		407.89	0.004209	15.11	2680.52	258.90	0.83
Verdugo-Fletcher	11257.4*	10 yr	48200.00	392.40	405.57		409.57	0.004238	16.05	3003.11	265.99	0.84
Verdugo-Fletcher	11257.4*	25 yr	65800.00	392.40	408.05	406.72	413.01	0.004317	17.89	3679.00	280.27	0.87
Verdugo-Fletcher	11257.4*	50 yr	77500.00	392.40	409.51	408.23	415.07	0.004361	18.92	4096.58	288.74	0.89
Verdugo-Fletcher	11257.4*	100 yr	94600.00	392.40	411.47	410.29	417.84	0.004417	20.24	4673.46	300.04	0.90
Verdugo-Fletcher	11257.4*	200 yr	109000.00	392.40	412.99	411.90	419.99	0.004458	21.23	5134.65	308.78	0.92
Verdugo-Fletcher	11257.4*	500 yr	125000.00	392.40	415.35	413.57	422.40	0.003852	21.31	5864.99	310.00	0.86
Verdugo-Fletcher	11057.40 25000	Design	78000.00	391.60	408.92		414.30	0.004186	18.61	4191.78	293.94	0.87
Verdugo-Fletcher	11057.40 25000	2 yr	21600.00	391.60	399.91		402.18	0.004167	12.10	1785.27	239.84	0.78
Verdugo-Fletcher	11057.40 25000	5 yr	40500.00	391.60	403.54		407.04	0.004178	15.02	2697.25	261.66	0.82
Verdugo-Fletcher	11057.40 25000	10 yr	48200.00	391.60	404.79		408.73	0.004181	15.91	3028.72	269.16	0.84
Verdugo-Fletcher	11057.40 25000	25 yr	65800.00	391.60	407.34		412.16	0.004184	17.62	3734.37	284.45	0.86
Verdugo-Fletcher	11057.40 25000	50 yr	77500.00	391.60	408.86		414.22	0.004185	18.57	4173.53	293.57	0.87
Verdugo-Fletcher	11057.40 25000	100 yr	94600.00	391.60	410.92		416.98	0.004168	19.75	4790.60	305.92	0.88
Verdugo-Fletcher	11057.40 25000	200 yr	109000.00	391.60	412.53	411.04	419.13	0.004085	20.61	5288.64	310.00	0.88
Verdugo-Fletcher	11057.40 25000	500 yr	125000.00	391.60	415.16		421.67	0.003403	20.47	6105.04	310.00	0.81
Verdugo-Fletcher	10857.3*	Design	78000.00	390.77	408.08	406.64	413.47	0.004202	18.63	4186.33	293.82	0.87
Verdugo-Fletcher	10857.3*	2 yr	21600.00	390.77	399.07		401.35	0.004186	12.12	1782.71	239.77	0.78
Verdugo-Fletcher	10857.3*	5 yr	40500.00	390.77	402.70		406.21	0.004196	15.04	2693.21	261.56	0.83
Verdugo-Fletcher	10857.3*	10 yr	48200.00	390.77	403.95		407.89	0.004200	15.94	3024.14	269.05	0.84
Verdugo-Fletcher	10857.3*	25 yr	65800.00	390.77	406.49	405.06	411.33	0.004201	17.64	3729.20	284.34	0.86

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	10857.3*	50 yr	77500.00	390.77	408.01	406.57	413.38	0.004201	18.59	4168.13	293.45	0.87
Verdugo-Fletcher	10857.3*	100 yr	94600.00	390.77	410.08	408.61	416.14	0.004176	19.76	4787.68	305.86	0.88
Verdugo-Fletcher	10857.3*	200 yr	109000.00	390.77	411.75	410.21	418.31	0.004054	20.55	5304.95	310.77	0.88
Verdugo-Fletcher	10857.3*	500 yr	125000.00	390.77	414.82		421.01	0.003152	19.97	6258.85	310.77	0.78
Verdugo-Fletcher	10657.2*	Design	78000.00	389.93	407.23		412.62	0.004206	18.64	4184.71	293.78	0.87
Verdugo-Fletcher	10657.2*	2 yr	21600.00	389.93	398.23		400.51	0.004181	12.11	1783.40	239.79	0.78
Verdugo-Fletcher	10657.2*	5 yr	40500.00	389.93	401.86		405.37	0.004200	15.04	2692.41	261.54	0.83
Verdugo-Fletcher	10657.2*	10 yr	48200.00	389.93	403.10		407.05	0.004205	15.95	3022.85	269.01	0.84
Verdugo-Fletcher	10657.2*	25 yr	65800.00	389.93	405.65		410.49	0.004207	17.65	3727.57	284.29	0.86
Verdugo-Fletcher	10657.2*	50 yr	77500.00	389.93	407.17		412.54	0.004206	18.60	4166.57	293.40	0.87
Verdugo-Fletcher	10657.2*	100 yr	94600.00	389.93	409.25		415.30	0.004172	19.75	4789.15	305.87	0.88
Verdugo-Fletcher	10657.2*	200 yr	109000.00	389.93	411.08	409.37	417.51	0.003936	20.34	5358.28	311.53	0.86
Verdugo-Fletcher	10657.2*	500 yr	125000.00	389.93	414.56		420.41	0.002882	19.40	6442.40	311.53	0.75
Verdugo-Fletcher	10457.1*	Design	78000.00	389.10	406.36		411.78	0.004244	18.70	4171.79	293.50	0.87
Verdugo-Fletcher	10457.1*	2 yr	21600.00	389.10	397.37		399.67	0.004234	12.16	1775.97	239.59	0.79
Verdugo-Fletcher	10457.1*	5 yr	40500.00	389.10	400.99		404.53	0.004246	15.10	2682.67	261.30	0.83
Verdugo-Fletcher	10457.1*	10 yr	48200.00	389.10	402.23		406.21	0.004248	16.00	3012.44	268.76	0.84
Verdugo-Fletcher	10457.1*	25 yr	65800.00	389.10	404.77		409.65	0.004249	17.71	3714.73	284.00	0.86
Verdugo-Fletcher	10457.1*	50 yr	77500.00	389.10	406.30		411.70	0.004243	18.66	4153.79	293.13	0.87
Verdugo-Fletcher	10457.1*	100 yr	94600.00	389.10	408.40		414.47	0.004182	19.77	4784.93	305.77	0.88
Verdugo-Fletcher	10457.1*	200 yr	109000.00	389.10	410.47		416.73	0.003791	20.09	5425.33	312.29	0.85
Verdugo-Fletcher	10457.1*	500 yr	125000.00	389.10	414.34		419.85	0.002630	18.84	6636.40	312.29	0.72
Verdugo-Fletcher	10257.07 24200	Design	78000.00	388.27	405.44	404.14	410.93	0.004322	18.81	4146.14	293.01	0.88
Verdugo-Fletcher	10257.07 24200	2 yr	21600.00	388.27	396.47		398.81	0.004361	12.28	1759.04	239.18	0.80
Verdugo-Fletcher	10257.07 24200	5 yr	40500.00	388.27	400.08		403.67	0.004350	15.22	2661.29	260.84	0.84
Verdugo-Fletcher	10257.07 24200	10 yr	48200.00	388.27	401.32	400.06	405.35	0.004345	16.12	2990.00	268.29	0.85
Verdugo-Fletcher	10257.07 24200	25 yr	65800.00	388.27	403.85	402.56	408.79	0.004340	17.84	3688.38	283.48	0.87
Verdugo-Fletcher	10257.07 24200	50 yr	77500.00	388.27	405.38	404.08	410.85	0.004321	18.77	4128.40	292.64	0.88
Verdugo-Fletcher	10257.07 24200	100 yr	94600.00	388.27	407.56	406.11	413.64	0.004192	19.79	4781.35	305.74	0.88
Verdugo-Fletcher	10257.07 24200	200 yr	109000.00	388.27	409.95		415.99	0.003587	19.73	5524.34	313.06	0.83
Verdugo-Fletcher	10257.07 24200	500 yr	125000.00	388.27	414.17		419.35	0.002388	18.26	6846.52	313.06	0.69
Verdugo-Fletcher	10218.80 24161.92	Design	78000.00	388.10	405.27	403.97	410.76	0.004318	18.81	4147.54	293.04	0.88
Verdugo-Fletcher	10218.80 24161.92	2 yr	21600.00	388.10	396.30		398.64	0.004355	12.27	1759.85	239.20	0.80
Verdugo-Fletcher	10218.80 24161.92	5 yr	40500.00	388.10	399.91		403.50	0.004345	15.21	2662.27	260.86	0.84
Verdugo-Fletcher	10218.80 24161.92	10 yr	48200.00	388.10	401.15		405.18	0.004340	16.11	2991.05	268.31	0.85
Verdugo-Fletcher	10218.80 24161.92	25 yr	65800.00	388.10	403.68	402.39	408.62	0.004336	17.83	3689.54	283.50	0.87
Verdugo-Fletcher	10218.80 24161.92	50 yr	77500.00	388.10	405.21	403.91	410.68	0.004317	18.77	4129.81	292.67	0.88
Verdugo-Fletcher	10218.80 24161.92	100 yr	94600.00	388.10	407.40	405.94	413.47	0.004184	19.77	4784.37	305.80	0.88
Verdugo-Fletcher	10218.80 24161.92	200 yr	109000.00	388.10	409.86		415.85	0.003532	19.63	5551.71	313.18	0.82
Verdugo-Fletcher	10218.80 24161.92	500 yr	125000.00	388.10	414.15		419.26	0.002337	18.13	6894.50	313.18	0.68

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	9978.273 23920.23	Design	78000.00	387.05	404.27	402.92	409.73	0.004272	18.74	4162.75	293.35	0.88
Verdugo-Fletcher	9978.273 23920.23	2 yr	21600.00	387.05	395.25		397.59	0.004347	12.27	1760.89	239.23	0.80
Verdugo-Fletcher	9978.273 23920.23	5 yr	40500.00	387.05	398.87		402.46	0.004336	15.20	2664.13	260.90	0.84
Verdugo-Fletcher	9978.273 23920.23	10 yr	48200.00	387.05	400.11		404.14	0.004331	16.10	2993.29	268.36	0.85
Verdugo-Fletcher	9978.273 23920.23	25 yr	65800.00	387.05	402.65	401.34	407.58	0.004321	17.81	3693.92	283.60	0.87
Verdugo-Fletcher	9978.273 23920.23	50 yr	77500.00	387.05	404.21	402.86	409.64	0.004277	18.71	4142.86	292.94	0.88
Verdugo-Fletcher	9978.273 23920.23	100 yr	94600.00	387.05	406.63	404.89	412.49	0.003976	19.43	4869.11	307.46	0.86
Verdugo-Fletcher	9978.273 23920.23	200 yr	109000.00	387.05	409.51		415.05	0.003128	18.88	5772.68	314.08	0.78
Verdugo-Fletcher	9978.273 23920.23	500 yr	125000.00	387.05	414.04		418.73	0.002048	17.37	7195.32	314.08	0.64
Verdugo-Fletcher	9748.10*	Design	78000.00	386.05	403.36	401.93	408.75	0.004199	18.63	4187.46	293.87	0.87
Verdugo-Fletcher	9748.10*	2 yr	21600.00	386.05	394.25		396.59	0.004349	12.27	1760.75	239.24	0.80
Verdugo-Fletcher	9748.10*	5 yr	40500.00	386.05	397.87		401.46	0.004331	15.20	2665.09	260.94	0.84
Verdugo-Fletcher	9748.10*	10 yr	48200.00	386.05	399.12		403.14	0.004325	16.10	2994.70	268.41	0.85
Verdugo-Fletcher	9748.10*	25 yr	65800.00	386.05	401.66	400.35	406.58	0.004313	17.80	3696.26	283.66	0.87
Verdugo-Fletcher	9748.10*	50 yr	77500.00	386.05	403.29	401.86	408.66	0.004208	18.60	4166.01	293.43	0.87
Verdugo-Fletcher	9748.10*	100 yr	94600.00	386.05	406.03		411.60	0.003695	18.94	4993.66	309.90	0.83
Verdugo-Fletcher	9748.10*	200 yr	109000.00	386.05	409.29		414.38	0.002755	18.10	6022.71	316.81	0.73
Verdugo-Fletcher	9748.10*	500 yr	125000.00	386.05	413.99		418.29	0.001802	16.64	7511.47	316.81	0.60
Verdugo-Fletcher	9517.93*	Design	78000.00	385.04	402.59		407.80	0.003994	18.31	4259.10	295.27	0.85
Verdugo-Fletcher	9517.93*	2 yr	21600.00	385.04	393.28		395.59	0.004290	12.21	1768.46	239.40	0.79
Verdugo-Fletcher	9517.93*	5 yr	40500.00	385.04	396.91		400.46	0.004271	15.13	2677.29	261.18	0.83
Verdugo-Fletcher	9517.93*	10 yr	48200.00	385.04	398.16		402.14	0.004266	16.02	3008.23	268.67	0.84
Verdugo-Fletcher	9517.93*	25 yr	65800.00	385.04	400.72	399.34	405.59	0.004248	17.71	3715.25	284.01	0.86
Verdugo-Fletcher	9517.93*	50 yr	77500.00	385.04	402.51	400.86	407.71	0.004009	18.30	4234.96	294.78	0.85
Verdugo-Fletcher	9517.93*	100 yr	94600.00	385.04	405.61		410.79	0.003327	18.27	5176.75	313.36	0.79
Verdugo-Fletcher	9517.93*	200 yr	109000.00	385.04	409.14		413.78	0.002406	17.30	6300.58	319.54	0.69
Verdugo-Fletcher	9517.93*	500 yr	125000.00	385.04	413.95		417.90	0.001587	15.95	7838.00	319.54	0.57
Verdugo-Fletcher	9287.77*	Design	78000.00	384.04	401.96		406.91	0.003707	17.85	4369.03	297.52	0.82
Verdugo-Fletcher	9287.77*	2 yr	21600.00	384.04	392.35		394.62	0.004163	12.09	1785.91	239.85	0.78
Verdugo-Fletcher	9287.77*	5 yr	40500.00	384.04	396.01		399.49	0.004149	14.98	2703.43	261.79	0.82
Verdugo-Fletcher	9287.77*	10 yr	48200.00	384.04	397.27		401.18	0.004144	15.87	3037.84	269.35	0.83
Verdugo-Fletcher	9287.77*	25 yr	65800.00	384.04	399.86		404.62	0.004113	17.52	3756.19	284.89	0.85
Verdugo-Fletcher	9287.77*	50 yr	77500.00	384.04	401.87		406.82	0.003728	17.85	4341.59	296.96	0.82
Verdugo-Fletcher	9287.77*	100 yr	94600.00	384.04	405.30		410.07	0.002954	17.54	5394.43	317.52	0.75
Verdugo-Fletcher	9287.77*	200 yr	109000.00	384.04	409.02		413.27	0.002100	16.53	6592.74	322.27	0.64
Verdugo-Fletcher	9287.77*	500 yr	125000.00	384.04	413.92		417.55	0.001404	15.30	8170.01	322.27	0.54
Verdugo-Fletcher	9057.604 23000	Design	78000.00	383.04	401.48		406.10	0.003350	17.24	4523.40	300.63	0.78
Verdugo-Fletcher	9057.604 23000	2 yr	21600.00	383.04	391.54		393.70	0.003853	11.79	1831.34	240.99	0.75
Verdugo-Fletcher	9057.604 23000	5 yr	40500.00	383.04	395.22		398.57	0.003903	14.68	2759.09	263.08	0.80
Verdugo-Fletcher	9057.604 23000	10 yr	48200.00	383.04	396.49		400.25	0.003907	15.56	3098.28	270.70	0.81
Verdugo-Fletcher	9057.604 23000	25 yr	65800.00	383.04	399.13		403.70	0.003876	17.17	3832.73	286.52	0.83

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	9057.604 23000	50 yr	77500.00	383.04	401.38		406.00	0.003373	17.25	4492.81	300.02	0.79
Verdugo-Fletcher	9057.604 23000	100 yr	94600.00	383.04	405.07		409.44	0.002595	16.77	5641.78	322.18	0.71
Verdugo-Fletcher	9057.604 23000	200 yr	109000.00	383.04	408.94		412.82	0.001833	15.80	6898.24	325.00	0.60
Verdugo-Fletcher	9057.604 23000	500 yr	125000.00	383.04	413.89		417.25	0.001244	14.69	8508.83	325.00	0.51
Verdugo-Fletcher	8885.58*	Design	78000.00	382.39	401.04		405.53	0.003216	17.01	4586.71	301.87	0.77
Verdugo-Fletcher	8885.58*	2 yr	21600.00	382.39	390.84		393.03	0.003922	11.86	1820.82	240.71	0.76
Verdugo-Fletcher	8885.58*	5 yr	40500.00	382.39	394.51		397.89	0.003974	14.77	2742.34	262.68	0.81
Verdugo-Fletcher	8885.58*	10 yr	48200.00	382.39	395.77		399.57	0.003981	15.66	3078.80	270.25	0.82
Verdugo-Fletcher	8885.58*	25 yr	65800.00	382.39	398.43		403.04	0.003919	17.23	3818.18	286.19	0.83
Verdugo-Fletcher	8885.58*	50 yr	77500.00	382.39	400.93		405.43	0.003244	17.02	4553.33	301.20	0.77
Verdugo-Fletcher	8885.58*	100 yr	94600.00	382.39	404.84		409.00	0.002424	16.38	5776.74	324.65	0.68
Verdugo-Fletcher	8885.58*	200 yr	109000.00	382.39	408.84		412.51	0.001696	15.38	7085.53	327.60	0.58
Verdugo-Fletcher	8885.58*	500 yr	125000.00	382.39	413.85		417.04	0.001156	14.32	8729.51	327.60	0.49
Verdugo-Fletcher	8713.55*	Design	78000.00	381.75	400.64		404.99	0.003074	16.74	4658.70	303.35	0.75
Verdugo-Fletcher	8713.55*	2 yr	21600.00	381.75	390.08	388.84	392.34	0.004135	12.07	1789.87	239.97	0.78
Verdugo-Fletcher	8713.55*	5 yr	40500.00	381.75	393.67	392.32	397.19	0.004211	15.06	2690.09	261.52	0.83
Verdugo-Fletcher	8713.55*	10 yr	48200.00	381.75	394.91	393.54	398.86	0.004220	15.96	3019.54	268.97	0.84
Verdugo-Fletcher	8713.55*	25 yr	65800.00	381.75	397.67		402.36	0.004023	17.39	3784.50	285.53	0.84
Verdugo-Fletcher	8713.55*	50 yr	77500.00	381.75	400.52		404.88	0.003105	16.77	4622.36	302.63	0.76
Verdugo-Fletcher	8713.55*	100 yr	94600.00	381.75	404.63		408.60	0.002260	15.98	5919.03	327.34	0.66
Verdugo-Fletcher	8713.55*	200 yr	109000.00	381.75	408.74		412.23	0.001570	14.98	7276.09	330.20	0.56
Verdugo-Fletcher	8713.55*	500 yr	125000.00	381.75	413.82		416.85	0.001076	13.96	8951.39	330.20	0.47
Verdugo-Fletcher	8541.532 22485	Design	78000.00	381.10	400.29		404.47	0.002906	16.42	4749.46	305.11	0.73
Verdugo-Fletcher	8541.532 22485	2 yr	21600.00	381.10	388.19	388.19	391.42	0.007163	14.42	1498.07	232.54	1.00
Verdugo-Fletcher	8541.532 22485	5 yr	40500.00	381.10	391.68	391.68	396.31	0.006366	17.26	2345.85	253.48	1.00
Verdugo-Fletcher	8541.532 22485	10 yr	48200.00	381.10	392.90	392.90	398.00	0.006173	18.12	2659.57	260.80	1.00
Verdugo-Fletcher	8541.532 22485	25 yr	65800.00	381.10	396.79	395.40	401.65	0.004232	17.69	3720.09	284.15	0.86
Verdugo-Fletcher	8541.532 22485	50 yr	77500.00	381.10	400.16		404.36	0.002939	16.45	4710.19	304.34	0.74
Verdugo-Fletcher	8541.532 22485	100 yr	94600.00	381.10	404.46		408.22	0.002098	15.57	6074.56	330.14	0.64
Verdugo-Fletcher	8541.532 22485	200 yr	109000.00	381.10	408.67		411.97	0.001452	14.58	7474.99	332.80	0.54
Verdugo-Fletcher	8541.532 22485	500 yr	125000.00	381.10	413.79		416.67	0.001001	13.62	9179.16	332.80	0.46
Verdugo-Fletcher	8310.036 22254	Design	78000.00	377.91	400.42		404.14	0.000871	15.47	5042.47	224.00	0.57
Verdugo-Fletcher	8310.036 22254	2 yr	21600.00	377.91	387.08	384.52	388.80	0.001158	10.51	2054.86	224.00	0.61
Verdugo-Fletcher	8310.036 22254	5 yr	40500.00	377.91	392.33	387.95	394.77	0.000954	12.54	3229.69	224.00	0.58
Verdugo-Fletcher	8310.036 22254	10 yr	48200.00	377.91	394.22	389.18	396.92	0.000915	13.20	3652.41	224.00	0.58
Verdugo-Fletcher	8310.036 22254	25 yr	65800.00	377.91	397.91		401.26	0.000896	14.69	4480.07	224.00	0.58
Verdugo-Fletcher	8310.036 22254	50 yr	77500.00	377.91	400.32		404.02	0.000872	15.44	5020.03	224.00	0.57
Verdugo-Fletcher	8310.036 22254	100 yr	94600.00	377.91	403.80		407.93	0.000831	16.31	5799.32	224.00	0.56
Verdugo-Fletcher	8310.036 22254	200 yr	109000.00	377.91	407.55		411.74	0.000728	16.42	6640.12	224.00	0.53
Verdugo-Fletcher	8310.036 22254	500 yr	125000.00	377.91	412.43		416.49	0.000602	16.16	7733.22	224.00	0.48

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	8206.965 22151.25	Design	78000.00	377.20	400.62	392.73	404.05	0.000770	14.87	5245.90	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	2 yr	21600.00	377.20	387.27	383.81	388.70	0.000856	9.57	2256.65	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	5 yr	40500.00	377.20	392.52	387.24	394.68	0.000787	11.80	3431.07	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	10 yr	48200.00	377.20	394.40	388.47	396.83	0.000772	12.51	3853.69	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	25 yr	65800.00	377.20	398.11	391.07	401.17	0.000780	14.05	4683.60	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	50 yr	77500.00	377.20	400.52	392.66	403.94	0.000770	14.84	5223.46	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	100 yr	94600.00	377.20	403.99	394.84	407.85	0.000747	15.76	6001.47	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	200 yr	109000.00	377.20	407.71	396.62	411.66	0.000666	15.95	6835.31	224.00	0.51
Verdugo-Fletcher	8206.965 22151.25	500 yr	125000.00	377.20	412.56	398.50	416.43	0.000560	15.78	7921.05	224.00	0.47
Verdugo-Fletcher	8151.212		Bridge									
Verdugo-Fletcher	8095.458 22039.75	Design	78000.00	376.43	387.35	391.97	403.13	0.008599	31.88	2446.82	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	2 yr	21600.00	376.43	381.55	383.04	387.06	0.007752	18.85	1145.84	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	5 yr	40500.00	376.43	384.20	386.48	392.61	0.006964	23.26	1741.00	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	10 yr	48200.00	376.43	385.16	387.71	394.60	0.006774	24.66	1954.89	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	25 yr	65800.00	376.43	386.17	390.31	400.28	0.008840	30.14	2182.83	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	50 yr	77500.00	376.43	387.31	391.90	403.02	0.008607	31.81	2436.42	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	100 yr	94600.00	376.43	389.06	394.10	406.42	0.007937	33.43	2829.54	224.00	1.66
Verdugo-Fletcher	8095.458 22039.75	200 yr	109000.00	376.43	390.02	395.85	409.93	0.008344	35.81	3044.04	224.00	1.71
Verdugo-Fletcher	8095.458 22039.75	500 yr	125000.00	376.43	390.58	397.74	414.72	0.009638	39.42	3170.58	224.00	1.85
Verdugo-Fletcher	7999.417 21944	Design	78000.00	375.77	386.78	391.30	402.31	0.008387	31.63	2465.96	224.00	1.68
Verdugo-Fletcher	7999.417 21944	2 yr	21600.00	375.77	380.94	382.38	386.34	0.007467	18.64	1159.02	224.00	1.44
Verdugo-Fletcher	7999.417 21944	5 yr	40500.00	375.77	383.54	385.81	391.95	0.006964	23.26	1741.00	224.00	1.47
Verdugo-Fletcher	7999.417 21944	10 yr	48200.00	375.77	384.49	387.04	393.95	0.006793	24.68	1953.23	224.00	1.47
Verdugo-Fletcher	7999.417 21944	25 yr	65800.00	375.77	385.61	389.64	399.45	0.008563	29.85	2204.41	224.00	1.68
Verdugo-Fletcher	7999.417 21944	50 yr	77500.00	375.77	386.73	391.23	402.20	0.008392	31.56	2455.63	224.00	1.68
Verdugo-Fletcher	7999.417 21944	100 yr	94600.00	375.77	388.46	393.41	405.66	0.007823	33.28	2842.47	224.00	1.65
Verdugo-Fletcher	7999.417 21944	200 yr	109000.00	375.77	389.43	395.19	409.13	0.008205	35.62	3060.14	224.00	1.70
Verdugo-Fletcher	7999.417 21944	500 yr	125000.00	375.77	390.03	397.03	413.80	0.009408	39.13	3194.78	224.00	1.83
Verdugo-Fletcher	7855.044 21800	Design	78000.00	375.12	386.71	391.00	400.64	0.017205	29.95	2604.56	259.41	1.67
Verdugo-Fletcher	7855.044 21800	2 yr	21600.00	375.12	383.24	382.21	385.63	0.004513	12.42	1739.40	238.60	0.81
Verdugo-Fletcher	7855.044 21800	5 yr	40500.00	375.12	384.24	385.70	390.72	0.010630	20.44	1981.89	244.61	1.27
Verdugo-Fletcher	7855.044 21800	10 yr	48200.00	375.12	384.97	386.92	392.69	0.011562	22.30	2161.08	248.96	1.33
Verdugo-Fletcher	7855.044 21800	25 yr	65800.00	375.12	385.79	389.42	397.78	0.016336	27.79	2367.39	253.88	1.60
Verdugo-Fletcher	7855.044 21800	50 yr	77500.00	375.12	386.67	390.94	400.52	0.017171	29.86	2595.16	259.19	1.66
Verdugo-Fletcher	7855.044 21800	100 yr	94600.00	375.12	388.00	392.97	404.04	0.017531	32.14	2943.43	267.12	1.71
Verdugo-Fletcher	7855.044 21800	200 yr	109000.00	375.12	388.74	394.57	407.40	0.019110	34.67	3144.32	271.58	1.80
Verdugo-Fletcher	7855.044 21800	500 yr	125000.00	375.12	389.24	396.12	411.81	0.022193	38.13	3278.45	274.52	1.94
Verdugo-Fletcher	7628.42*	Design	78000.00	374.10	387.31	389.98	397.58	0.010891	25.71	3033.65	269.16	1.35
Verdugo-Fletcher	7628.42*	2 yr	21600.00	374.10	382.21		384.61	0.004526	12.43	1737.74	238.58	0.81
Verdugo-Fletcher	7628.42*	5 yr	40500.00	374.10	385.79	384.68	389.47	0.004508	15.40	2629.41	260.01	0.85

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	7628.42*	10 yr	48200.00	374.10	387.02	385.90	391.15	0.004497	16.31	2955.40	267.42	0.86
Verdugo-Fletcher	7628.42*	25 yr	65800.00	374.10	386.49	388.40	394.98	0.009714	23.39	2813.23	264.21	1.26
Verdugo-Fletcher	7628.42*	50 yr	77500.00	374.10	387.28	389.92	397.47	0.010846	25.62	3024.79	268.97	1.35
Verdugo-Fletcher	7628.42*	100 yr	94600.00	374.10	388.52	391.95	400.81	0.011799	28.14	3361.83	276.37	1.42
Verdugo-Fletcher	7628.42*	200 yr	109000.00	374.10	389.20	393.55	403.82	0.013305	30.69	3552.20	280.47	1.52
Verdugo-Fletcher	7628.42*	500 yr	125000.00	374.10	389.64	395.14	407.60	0.015812	34.00	3676.01	283.10	1.66
Verdugo-Fletcher	7401.80*	Design	78000.00	373.07	390.40	388.94	395.77	0.004184	18.61	4191.64	293.85	0.87
Verdugo-Fletcher	7401.80*	2 yr	21600.00	373.07	381.19		383.58	0.004511	12.42	1739.71	238.65	0.81
Verdugo-Fletcher	7401.80*	5 yr	40500.00	373.07	384.79		388.45	0.004457	15.34	2639.60	260.27	0.85
Verdugo-Fletcher	7401.80*	10 yr	48200.00	373.07	386.04	384.86	390.13	0.004438	16.24	2968.60	267.74	0.86
Verdugo-Fletcher	7401.80*	25 yr	65800.00	373.07	388.69	387.37	393.60	0.004301	17.79	3699.16	283.62	0.87
Verdugo-Fletcher	7401.80*	50 yr	77500.00	373.07	390.33	388.88	395.69	0.004190	18.58	4171.33	293.43	0.87
Verdugo-Fletcher	7401.80*	100 yr	94600.00	373.07	389.14	390.92	398.63	0.008041	24.72	3827.29	286.32	1.19
Verdugo-Fletcher	7401.80*	200 yr	109000.00	373.07	389.70	392.51	401.30	0.009459	27.33	3987.87	289.66	1.30
Verdugo-Fletcher	7401.80*	500 yr	125000.00	373.07	390.05	394.17	404.55	0.011547	30.56	4090.23	291.77	1.44
Verdugo-Fletcher	7175.18*	Design	78000.00	372.05	389.76		394.86	0.003870	18.12	4305.28	296.18	0.84
Verdugo-Fletcher	7175.18*	2 yr	21600.00	372.05	380.16		382.56	0.004518	12.42	1738.90	238.64	0.81
Verdugo-Fletcher	7175.18*	5 yr	40500.00	372.05	383.82		387.44	0.004399	15.28	2651.15	260.56	0.84
Verdugo-Fletcher	7175.18*	10 yr	48200.00	372.05	385.13		389.14	0.004313	16.08	2997.14	268.40	0.85
Verdugo-Fletcher	7175.18*	25 yr	65800.00	372.05	387.94		392.66	0.004045	17.42	3777.23	285.29	0.84
Verdugo-Fletcher	7175.18*	50 yr	77500.00	372.05	389.69		394.77	0.003877	18.09	4283.49	295.74	0.84
Verdugo-Fletcher	7175.18*	100 yr	94600.00	372.05	391.90	389.89	397.56	0.003786	19.11	4951.34	308.98	0.84
Verdugo-Fletcher	7175.18*	200 yr	109000.00	372.05	393.77	391.49	399.78	0.003626	19.67	5542.01	320.24	0.83
Verdugo-Fletcher	7175.18*	500 yr	125000.00	372.05	390.54	393.15	402.32	0.008512	27.54	4539.41	300.89	1.25
Verdugo-Fletcher	6948.56*	Design	78000.00	371.02	389.34		394.03	0.003428	17.38	4487.73	299.89	0.79
Verdugo-Fletcher	6948.56*	2 yr	21600.00	371.02	379.18		381.55	0.004428	12.34	1750.29	238.95	0.80
Verdugo-Fletcher	6948.56*	5 yr	40500.00	371.02	382.99		386.47	0.004148	14.98	2703.57	261.78	0.82
Verdugo-Fletcher	6948.56*	10 yr	48200.00	371.02	384.38		388.20	0.003998	15.68	3074.38	270.15	0.82
Verdugo-Fletcher	6948.56*	25 yr	65800.00	371.02	387.40		391.78	0.003636	16.80	3916.52	288.24	0.80
Verdugo-Fletcher	6948.56*	50 yr	77500.00	371.02	389.26		393.94	0.003436	17.36	4464.46	299.42	0.79
Verdugo-Fletcher	6948.56*	100 yr	94600.00	371.02	391.54		396.76	0.003355	18.33	5161.85	313.08	0.80
Verdugo-Fletcher	6948.56*	200 yr	109000.00	371.02	393.49		399.01	0.003205	18.84	5784.70	324.79	0.79
Verdugo-Fletcher	6948.56*	500 yr	125000.00	371.02	395.41	392.12	401.31	0.003057	19.50	6410.14	326.81	0.78
Verdugo-Fletcher	6721.944 20665.67	Design	78000.00	370.00	389.04		393.31	0.002986	16.58	4705.45	304.25	0.74
Verdugo-Fletcher	6721.944 20665.67	2 yr	21600.00	370.00	378.26		380.56	0.004241	12.17	1775.07	239.58	0.79
Verdugo-Fletcher	6721.944 20665.67	5 yr	40500.00	370.00	382.32		385.58	0.003753	14.49	2795.14	263.90	0.78
Verdugo-Fletcher	6721.944 20665.67	10 yr	48200.00	370.00	383.80		387.34	0.003567	15.09	3194.59	272.83	0.78
Verdugo-Fletcher	6721.944 20665.67	25 yr	65800.00	370.00	387.02		391.01	0.003174	16.04	4101.89	292.10	0.75
Verdugo-Fletcher	6721.944 20665.67	50 yr	77500.00	370.00	388.96		393.22	0.002993	16.56	4680.94	303.76	0.74
Verdugo-Fletcher	6721.944 20665.67	100 yr	94600.00	370.00	391.29		396.04	0.002940	17.51	5403.46	317.71	0.75
Verdugo-Fletcher	6721.944 20665.67	200 yr	109000.00	370.00	393.29		398.33	0.002814	18.01	6052.56	329.74	0.74

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	6721.944 20665.67	500 yr	125000.00	370.00	395.27		400.67	0.002675	18.63	6708.54	330.70	0.73
Verdugo-Fletcher	6524.88*	Design	78000.00	369.11	388.86		392.76	0.002620	15.85	4921.91	308.49	0.70
Verdugo-Fletcher	6524.88*	2 yr	21600.00	369.11	377.60		379.76	0.003868	11.81	1829.13	240.94	0.76
Verdugo-Fletcher	6524.88*	5 yr	40500.00	369.11	381.89		384.88	0.003303	13.88	2916.90	266.66	0.74
Verdugo-Fletcher	6524.88*	10 yr	48200.00	369.11	383.45		386.68	0.003116	14.42	3342.90	276.08	0.73
Verdugo-Fletcher	6524.88*	25 yr	65800.00	369.11	386.78		390.43	0.002773	15.32	4295.31	296.05	0.71
Verdugo-Fletcher	6524.88*	50 yr	77500.00	369.11	388.77		392.66	0.002625	15.83	4896.55	308.00	0.70
Verdugo-Fletcher	6524.88*	100 yr	94600.00	369.11	391.13		395.50	0.002600	16.78	5638.27	322.12	0.71
Verdugo-Fletcher	6524.88*	200 yr	109000.00	369.11	393.17		397.80	0.002501	17.28	6306.75	334.34	0.70
Verdugo-Fletcher	6524.88*	500 yr	125000.00	369.11	395.20		400.17	0.002376	17.89	6987.40	334.67	0.69
Verdugo-Fletcher	6327.82*	Design	78000.00	368.23	388.71		392.27	0.002295	15.14	5151.50	312.97	0.66
Verdugo-Fletcher	6327.82*	2 yr	21600.00	368.23	377.08		379.05	0.003349	11.27	1917.23	243.14	0.71
Verdugo-Fletcher	6327.82*	5 yr	40500.00	368.23	381.57		384.28	0.002837	13.19	3069.46	270.10	0.69
Verdugo-Fletcher	6327.82*	10 yr	48200.00	368.23	383.19		386.11	0.002685	13.71	3515.46	279.84	0.68
Verdugo-Fletcher	6327.82*	25 yr	65800.00	368.23	386.61		389.92	0.002413	14.61	4505.20	300.32	0.66
Verdugo-Fletcher	6327.82*	50 yr	77500.00	368.23	388.63		392.18	0.002300	15.12	5125.37	312.47	0.66
Verdugo-Fletcher	6327.82*	100 yr	94600.00	368.23	391.01		395.02	0.002299	16.08	5884.43	326.73	0.67
Verdugo-Fletcher	6327.82*	200 yr	109000.00	368.23	393.07		397.34	0.002221	16.59	6570.39	338.64	0.66
Verdugo-Fletcher	6327.82*	500 yr	125000.00	368.23	395.14		399.73	0.002116	17.19	7272.69	338.64	0.65
Verdugo-Fletcher	6130.76*	Design	78000.00	367.34	388.61		391.85	0.002003	14.45	5399.20	317.65	0.62
Verdugo-Fletcher	6130.76*	2 yr	21600.00	367.34	376.74		378.46	0.002728	10.54	2050.03	246.38	0.64
Verdugo-Fletcher	6130.76*	5 yr	40500.00	367.34	381.36		383.76	0.002387	12.45	3252.67	274.12	0.64
Verdugo-Fletcher	6130.76*	10 yr	48200.00	367.34	383.01		385.63	0.002280	12.97	3714.86	284.05	0.63
Verdugo-Fletcher	6130.76*	25 yr	65800.00	367.34	386.48		389.48	0.002086	13.89	4735.76	304.86	0.62
Verdugo-Fletcher	6130.76*	50 yr	77500.00	367.34	388.53		391.76	0.002006	14.43	5372.42	317.15	0.62
Verdugo-Fletcher	6130.76*	100 yr	94600.00	367.34	390.92		394.59	0.002027	15.39	6147.51	331.49	0.63
Verdugo-Fletcher	6130.76*	200 yr	109000.00	367.34	393.00		396.93	0.001967	15.91	6849.50	342.61	0.63
Verdugo-Fletcher	6130.76*	500 yr	125000.00	367.34	395.10		399.33	0.001883	16.51	7570.89	342.61	0.62
Verdugo-Fletcher	5933.705 19876.71	Design	78000.00	366.45	388.53	382.31	391.48	0.001749	13.78	5659.12	322.53	0.58
Verdugo-Fletcher	5933.705 19876.71	2 yr	21600.00	366.45	376.50	373.54	377.98	0.002161	9.76	2212.97	250.32	0.58
Verdugo-Fletcher	5933.705 19876.71	5 yr	40500.00	366.45	381.20	377.01	383.33	0.001994	11.72	3455.58	278.53	0.59
Verdugo-Fletcher	5933.705 19876.71	10 yr	48200.00	366.45	382.88	378.23	385.21	0.001930	12.26	3931.54	288.60	0.59
Verdugo-Fletcher	5933.705 19876.71	25 yr	65800.00	366.45	386.38	380.74	389.10	0.001802	13.21	4979.93	309.64	0.58
Verdugo-Fletcher	5933.705 19876.71	50 yr	77500.00	366.45	388.45	382.25	391.39	0.001751	13.76	5631.75	322.02	0.58
Verdugo-Fletcher	5933.705 19876.71	100 yr	94600.00	366.45	390.85	384.27	394.22	0.001789	14.73	6421.48	336.42	0.59
Verdugo-Fletcher	5933.705 19876.71	200 yr	109000.00	366.45	392.94	385.86	396.56	0.001743	15.27	7138.84	346.58	0.59
Verdugo-Fletcher	5933.705 19876.71	500 yr	125000.00	366.45	395.07	387.56	398.98	0.001678	15.87	7877.58	346.58	0.59
Verdugo-Fletcher	5929.973		Bridge									
Verdugo-Fletcher	5926.240 19869.29	Design	78000.00	366.41	379.50	382.28	389.99	0.011266	26.00	2999.95	268.52	1.37

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	5926.240 19869.29	2 yr	21600.00	366.41	372.19	373.49	377.23	0.014349	18.02	1198.89	224.69	1.37
Verdugo-Fletcher	5926.240 19869.29	5 yr	40500.00	366.41	375.12	376.99	382.31	0.012459	21.52	1882.01	242.25	1.36
Verdugo-Fletcher	5926.240 19869.29	10 yr	48200.00	366.41	376.13	378.20	384.08	0.012100	22.64	2129.35	248.30	1.36
Verdugo-Fletcher	5926.240 19869.29	25 yr	65800.00	366.41	378.19	380.71	387.73	0.011577	24.79	2653.98	260.67	1.37
Verdugo-Fletcher	5926.240 19869.29	50 yr	77500.00	366.41	379.44	382.22	389.90	0.011278	25.95	2986.00	268.21	1.37
Verdugo-Fletcher	5926.240 19869.29	100 yr	94600.00	366.41	380.01	384.26	394.11	0.014474	30.14	3139.14	271.61	1.56
Verdugo-Fletcher	5926.240 19869.29	200 yr	109000.00	366.41	381.27	385.86	396.46	0.014083	31.27	3485.22	279.15	1.56
Verdugo-Fletcher	5926.240 19869.29	500 yr	125000.00	366.41	382.59	387.52	398.88	0.013699	32.38	3859.88	287.09	1.56
Verdugo-Fletcher	5896.920 19840	Design	78000.00	366.28	385.47	382.15	389.66	0.002903	16.42	4750.79	305.14	0.73
Verdugo-Fletcher	5896.920 19840	2 yr	21600.00	366.28	374.54	373.37	376.84	0.004252	12.18	1773.65	239.55	0.79
Verdugo-Fletcher	5896.920 19840	5 yr	40500.00	366.28	378.74	376.85	381.91	0.003606	14.30	2832.68	264.75	0.77
Verdugo-Fletcher	5896.920 19840	10 yr	48200.00	366.28	380.27	378.07	383.70	0.003400	14.85	3246.24	273.96	0.76
Verdugo-Fletcher	5896.920 19840	25 yr	65800.00	366.28	383.47	380.58	387.37	0.003063	15.85	4151.87	293.13	0.74
Verdugo-Fletcher	5896.920 19840	50 yr	77500.00	366.28	385.39	382.09	389.57	0.002909	16.40	4726.65	304.66	0.73
Verdugo-Fletcher	5896.920 19840	100 yr	94600.00	366.28	380.08	384.12	393.70	0.013738	29.61	3194.62	272.83	1.53
Verdugo-Fletcher	5896.920 19840	200 yr	109000.00	366.28	381.33	385.72	396.05	0.013444	30.79	3540.34	280.33	1.53
Verdugo-Fletcher	5896.920 19840	500 yr	125000.00	366.28	382.65	387.38	398.48	0.013141	31.93	3914.73	288.23	1.53
Verdugo-Fletcher	5856.732 19800	Design	78000.00	366.10	385.43		389.54	0.002830	16.27	4792.87	305.96	0.72
Verdugo-Fletcher	5856.732 19800	2 yr	21600.00	366.10	374.37		376.66	0.004235	12.16	1775.99	239.61	0.79
Verdugo-Fletcher	5856.732 19800	5 yr	40500.00	366.10	378.65		381.77	0.003518	14.18	2856.13	265.28	0.76
Verdugo-Fletcher	5856.732 19800	10 yr	48200.00	366.10	380.20		383.56	0.003313	14.72	3274.90	274.59	0.75
Verdugo-Fletcher	5856.732 19800	25 yr	65800.00	366.10	383.42		387.25	0.002984	15.71	4189.36	293.89	0.73
Verdugo-Fletcher	5856.732 19800	50 yr	77500.00	366.10	385.35		389.45	0.002835	16.25	4768.55	305.49	0.72
Verdugo-Fletcher	5856.732 19800	100 yr	94600.00	366.10	380.18	383.94	393.17	0.012806	28.92	3270.95	274.50	1.48
Verdugo-Fletcher	5856.732 19800	200 yr	109000.00	366.10	381.42	385.54	395.53	0.012628	30.14	3616.05	281.94	1.48
Verdugo-Fletcher	5856.732 19800	500 yr	125000.00	366.10	382.73	387.20	397.97	0.012425	31.33	3989.97	289.79	1.49
Verdugo-Fletcher	5557.142 19500	Design	78000.00	364.73	385.22		388.78	0.002293	15.14	5152.60	312.94	0.66
Verdugo-Fletcher	5557.142 19500	2 yr	21600.00	364.73	373.53		375.53	0.003416	11.34	1904.67	242.81	0.71
Verdugo-Fletcher	5557.142 19500	5 yr	40500.00	364.73	378.19		380.84	0.002750	13.06	3101.52	270.77	0.68
Verdugo-Fletcher	5557.142 19500	10 yr	48200.00	364.73	379.82		382.68	0.002605	13.57	3551.23	280.56	0.67
Verdugo-Fletcher	5557.142 19500	25 yr	65800.00	364.73	383.16		386.45	0.002390	14.56	4519.67	300.56	0.66
Verdugo-Fletcher	5557.142 19500	50 yr	77500.00	364.73	385.14		388.69	0.002297	15.12	5127.18	312.45	0.66
Verdugo-Fletcher	5557.142 19500	100 yr	94600.00	364.73	387.78	382.57	391.68	0.002200	15.83	5974.65	328.32	0.65
Verdugo-Fletcher	5557.142 19500	200 yr	109000.00	364.73	389.77	384.17	393.97	0.002109	16.43	6632.32	330.70	0.65
Verdugo-Fletcher	5557.142 19500	500 yr	125000.00	364.73	391.66	385.83	396.27	0.002086	17.23	7255.77	330.70	0.65
Verdugo-Fletcher	5332.98*	Design	78000.00	363.72	385.11		388.30	0.001964	14.35	5436.03	318.37	0.61
Verdugo-Fletcher	5332.98*	2 yr	21600.00	363.72	373.13		374.85	0.002713	10.52	2053.78	246.49	0.64
Verdugo-Fletcher	5332.98*	5 yr	40500.00	363.72	377.97		380.28	0.002254	12.21	3316.11	275.52	0.62
Verdugo-Fletcher	5332.98*	10 yr	48200.00	363.72	379.63		382.15	0.002161	12.74	3783.54	285.52	0.62
Verdugo-Fletcher	5332.98*	25 yr	65800.00	363.72	383.02		385.96	0.002024	13.75	4784.47	305.84	0.61
Verdugo-Fletcher	5332.98*	50 yr	77500.00	363.72	385.02		388.21	0.001967	14.33	5409.89	317.88	0.61

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	5332.98*	100 yr	94600.00	363.72	387.69		391.22	0.001907	15.06	6280.31	333.91	0.61
Verdugo-Fletcher	5332.98*	200 yr	109000.00	363.72	389.72		393.53	0.001833	15.67	6956.99	334.84	0.61
Verdugo-Fletcher	5332.98*	500 yr	125000.00	363.72	391.63		395.83	0.001824	16.45	7596.80	334.84	0.61
Verdugo-Fletcher	5108.826 19051.36	Design	78000.00	362.70	385.03		387.90	0.001681	13.59	5737.43	323.96	0.57
Verdugo-Fletcher	5108.826 19051.36	2 yr	21600.00	362.70	372.88		374.32	0.002066	9.62	2245.94	251.10	0.57
Verdugo-Fletcher	5108.826 19051.36	5 yr	40500.00	362.70	377.82		379.83	0.001829	11.38	3557.79	280.70	0.56
Verdugo-Fletcher	5108.826 19051.36	10 yr	48200.00	362.70	379.50		381.71	0.001781	11.93	4039.95	290.83	0.56
Verdugo-Fletcher	5108.826 19051.36	25 yr	65800.00	362.70	382.92		385.54	0.001711	12.98	5069.12	311.33	0.57
Verdugo-Fletcher	5108.826 19051.36	50 yr	77500.00	362.70	384.94		387.80	0.001682	13.57	5710.63	323.46	0.57
Verdugo-Fletcher	5108.826 19051.36	100 yr	94600.00	362.70	387.63		390.82	0.001649	14.33	6602.17	338.98	0.57
Verdugo-Fletcher	5108.826 19051.36	200 yr	109000.00	362.70	389.68		393.14	0.001594	14.94	7295.73	338.98	0.57
Verdugo-Fletcher	5108.826 19051.36	500 yr	125000.00	362.70	391.61		395.45	0.001597	15.72	7950.33	338.98	0.57
Verdugo-Fletcher	5007.183 18950	Design	78000.00	362.24	385.00		387.73	0.001568	13.27	5876.98	326.53	0.55
Verdugo-Fletcher	5007.183 18950	2 yr	21600.00	362.24	372.80		374.12	0.001823	9.23	2340.82	253.36	0.53
Verdugo-Fletcher	5007.183 18950	5 yr	40500.00	362.24	377.76		379.65	0.001666	11.03	3672.02	283.13	0.54
Verdugo-Fletcher	5007.183 18950	10 yr	48200.00	362.24	379.46		381.54	0.001634	11.59	4160.28	293.30	0.54
Verdugo-Fletcher	5007.183 18950	25 yr	65800.00	362.24	382.89		385.37	0.001588	12.65	5201.42	313.87	0.55
Verdugo-Fletcher	5007.183 18950	50 yr	77500.00	362.24	384.91		387.64	0.001569	13.25	5849.90	326.03	0.55
Verdugo-Fletcher	5007.183 18950	100 yr	94600.00	362.24	387.61		390.66	0.001545	14.01	6750.62	340.90	0.55
Verdugo-Fletcher	5007.183 18950	200 yr	109000.00	362.24	389.66		392.99	0.001499	14.63	7451.47	340.90	0.55
Verdugo-Fletcher	5007.183 18950	500 yr	125000.00	362.24	391.60		395.29	0.001506	15.41	8112.51	340.90	0.56
Verdugo-Fletcher	4953.960 18897.24	Design	78000.00	362.00	384.98		387.65	0.001513	13.11	5950.66	327.88	0.54
Verdugo-Fletcher	4953.960 18897.24	2 yr	21600.00	362.00	372.76		374.03	0.001707	9.03	2392.13	254.57	0.52
Verdugo-Fletcher	4953.960 18897.24	5 yr	40500.00	362.00	377.74		379.56	0.001587	10.85	3732.84	284.42	0.53
Verdugo-Fletcher	4953.960 18897.24	10 yr	48200.00	362.00	379.43		381.46	0.001563	11.41	4224.17	294.60	0.53
Verdugo-Fletcher	4953.960 18897.24	25 yr	65800.00	362.00	382.87		385.29	0.001528	12.48	5271.40	315.21	0.54
Verdugo-Fletcher	4953.960 18897.24	50 yr	77500.00	362.00	384.90		387.56	0.001514	13.08	5923.44	327.39	0.54
Verdugo-Fletcher	4953.960 18897.24	100 yr	94600.00	362.00	387.60		390.58	0.001485	13.86	6827.59	339.76	0.54
Verdugo-Fletcher	4953.960 18897.24	200 yr	109000.00	362.00	389.65		392.91	0.001448	14.48	7525.82	339.76	0.54
Verdugo-Fletcher	4953.960 18897.24	500 yr	125000.00	362.00	391.59		395.21	0.001461	15.27	8184.08	339.76	0.55
Verdugo-Fletcher	4952.999 18896.24	Design	78000.00	362.00	384.66		387.65	0.002059	13.87	5623.36	315.99	0.58
Verdugo-Fletcher	4952.999 18896.24	2 yr	21600.00	362.00	372.59		374.03	0.002192	9.61	2246.99	243.55	0.56
Verdugo-Fletcher	4952.999 18896.24	5 yr	40500.00	362.00	377.50		379.56	0.002097	11.52	3515.37	273.03	0.57
Verdugo-Fletcher	4952.999 18896.24	10 yr	48200.00	362.00	379.18		381.45	0.002081	12.11	3981.46	283.09	0.57
Verdugo-Fletcher	4952.999 18896.24	25 yr	65800.00	362.00	382.57		385.29	0.002063	13.22	4976.71	303.46	0.58
Verdugo-Fletcher	4952.999 18896.24	50 yr	77500.00	362.00	384.58		387.55	0.002059	13.85	5597.44	315.50	0.58
Verdugo-Fletcher	4952.999 18896.24	100 yr	94600.00	362.00	387.25		390.58	0.002110	14.63	6465.18	339.74	0.59
Verdugo-Fletcher	4952.999 18896.24	200 yr	109000.00	362.00	389.31		392.91	0.002015	15.21	7166.32	339.74	0.58
Verdugo-Fletcher	4952.999 18896.24	500 yr	125000.00	362.00	391.24		395.21	0.002005	15.98	7821.65	339.74	0.59
Verdugo-Fletcher	4938.000 18881.24	Design	78000.00	361.93	384.23		387.61	0.002822	14.75	5287.31	303.82	0.62

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4938.000 18881.24	2 yr	21600.00	361.93	372.35		373.99	0.002875	10.28	2100.20	232.49	0.60
Verdugo-Fletcher	4938.000 18881.24	5 yr	40500.00	361.93	377.18		379.53	0.002815	12.30	3293.89	261.50	0.61
Verdugo-Fletcher	4938.000 18881.24	10 yr	48200.00	361.93	378.83		381.42	0.002811	12.91	3733.77	271.40	0.61
Verdugo-Fletcher	4938.000 18881.24	25 yr	65800.00	361.93	382.17		385.25	0.002814	14.08	4674.81	291.47	0.62
Verdugo-Fletcher	4938.000 18881.24	50 yr	77500.00	361.93	384.15		387.52	0.002822	14.73	5262.75	303.34	0.62
Verdugo-Fletcher	4938.000 18881.24	100 yr	94600.00	361.93	386.78		390.54	0.002836	15.56	6081.63	319.13	0.63
Verdugo-Fletcher	4938.000 18881.24	200 yr	109000.00	361.93	388.87		392.87	0.002812	16.06	6789.02	339.42	0.63
Verdugo-Fletcher	4938.000 18881.24	500 yr	125000.00	361.93	390.79		395.17	0.002754	16.80	7442.56	339.42	0.63
Verdugo-Fletcher	4923.007 18866.24	Design	78000.00	361.86	383.68		387.58	0.001746	15.84	4922.75	290.90	0.68
Verdugo-Fletcher	4923.007 18866.24	2 yr	21600.00	361.86	372.03		373.95	0.001721	11.12	1942.61	221.04	0.66
Verdugo-Fletcher	4923.007 18866.24	5 yr	40500.00	361.86	376.76		379.49	0.001716	13.26	3054.85	249.41	0.67
Verdugo-Fletcher	4923.007 18866.24	10 yr	48200.00	361.86	378.38		381.38	0.001721	13.91	3466.09	259.12	0.67
Verdugo-Fletcher	4923.007 18866.24	25 yr	65800.00	361.86	381.66		385.22	0.001735	15.13	4347.74	278.79	0.68
Verdugo-Fletcher	4923.007 18866.24	50 yr	77500.00	361.86	383.60		387.48	0.001746	15.82	4899.69	290.43	0.68
Verdugo-Fletcher	4923.007 18866.24	100 yr	94600.00	361.86	386.18		390.50	0.001760	16.69	5669.70	305.92	0.68
Verdugo-Fletcher	4923.007 18866.24	200 yr	109000.00	361.86	388.28		392.84	0.001774	17.12	6366.15	339.10	0.70
Verdugo-Fletcher	4923.007 18866.24	500 yr	125000.00	361.86	390.22		395.14	0.001699	17.80	7023.19	339.10	0.69
Verdugo-Fletcher	4908 18851.24	Design	78000.00	361.79	382.89		387.54	0.002522	17.32	4503.37	276.55	0.76
Verdugo-Fletcher	4908 18851.24	2 yr	21600.00	361.79	371.59		373.92	0.002441	12.26	1761.13	208.75	0.74
Verdugo-Fletcher	4908 18851.24	5 yr	40500.00	361.79	376.17		379.46	0.002461	14.56	2780.92	236.25	0.75
Verdugo-Fletcher	4908 18851.24	10 yr	48200.00	361.79	377.74		381.35	0.002473	15.26	3159.08	245.66	0.75
Verdugo-Fletcher	4908 18851.24	25 yr	65800.00	361.79	380.92		385.18	0.002503	16.57	3971.95	264.77	0.75
Verdugo-Fletcher	4908 18851.24	50 yr	77500.00	361.79	382.81		387.45	0.002521	17.29	4482.04	276.09	0.76
Verdugo-Fletcher	4908 18851.24	100 yr	94600.00	361.79	385.32		390.47	0.002545	18.21	5195.04	291.17	0.76
Verdugo-Fletcher	4908 18851.24	200 yr	109000.00	361.79	387.40		392.80	0.002666	18.65	5843.43	338.77	0.79
Verdugo-Fletcher	4908 18851.24	500 yr	125000.00	361.79	389.41	385.37	395.11	0.002452	19.16	6523.73	338.77	0.77
Verdugo-Fletcher	4892.987 18836.24	Design	78000.00	361.72	381.20	380.16	387.50	0.004214	20.14	3873.61	256.84	0.91
Verdugo-Fletcher	4892.987 18836.24	2 yr	21600.00	361.72	370.61	370.15	373.87	0.004117	14.49	1490.62	193.33	0.92
Verdugo-Fletcher	4892.987 18836.24	5 yr	40500.00	361.72	374.88	374.18	379.42	0.004141	17.08	2370.73	218.95	0.91
Verdugo-Fletcher	4892.987 18836.24	10 yr	48200.00	361.72	376.36	375.56	381.31	0.004155	17.86	2699.46	227.77	0.91
Verdugo-Fletcher	4892.987 18836.24	25 yr	65800.00	361.72	379.35	378.40	385.14	0.004190	19.30	3408.78	245.75	0.91
Verdugo-Fletcher	4892.987 18836.24	50 yr	77500.00	361.72	381.13	380.09	387.40	0.004213	20.10	3854.94	256.41	0.91
Verdugo-Fletcher	4892.987 18836.24	100 yr	94600.00	361.72	383.50	382.36	390.42	0.004243	21.11	4480.23	270.64	0.91
Verdugo-Fletcher	4892.987 18836.24	200 yr	109000.00	361.72	385.34	384.16	392.75	0.004264	21.86	4987.16	281.65	0.92
Verdugo-Fletcher	4892.987 18836.24	500 yr	125000.00	361.72	386.03	386.03	395.06	0.005076	24.12	5182.50	285.78	1.00
Verdugo-Fletcher	4841.999 18785.24	Design	78000.00	361.49	381.03	379.94	387.28	0.004173	20.06	3888.32	257.21	0.91
Verdugo-Fletcher	4841.999 18785.24	2 yr	21600.00	361.49	370.48	369.92	373.66	0.003979	14.31	1509.41	193.93	0.90
Verdugo-Fletcher	4841.999 18785.24	5 yr	40500.00	361.49	374.73	373.95	379.20	0.004061	16.96	2388.22	219.44	0.91
Verdugo-Fletcher	4841.999 18785.24	10 yr	48200.00	361.49	376.20	375.33	381.09	0.004086	17.74	2716.83	228.25	0.91
Verdugo-Fletcher	4841.999 18785.24	25 yr	65800.00	361.49	379.18	378.17	384.92	0.004141	19.22	3424.02	246.14	0.91
Verdugo-Fletcher	4841.999 18785.24	50 yr	77500.00	361.49	380.95	379.87	387.18	0.004172	20.03	3869.66	256.77	0.91

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4841.999 18785.24	100 yr	94600.00	361.49	383.32	382.14	390.20	0.004209	21.05	4494.26	270.98	0.91
Verdugo-Fletcher	4841.999 18785.24	200 yr	109000.00	361.49	385.15	383.92	392.53	0.004238	21.80	4999.07	281.93	0.91
Verdugo-Fletcher	4841.999 18785.24	500 yr	125000.00	361.49	387.04	386.66	394.80	0.004505	22.36	5591.32	337.35	0.97
Verdugo-Fletcher	4621.872 18583.24	Design	78000.00	360.58	379.03	379.03	386.27	0.005056	21.59	3612.91	250.72	1.00
Verdugo-Fletcher	4621.872 18583.24	2 yr	21600.00	360.58	369.02	369.02	372.70	0.004865	15.40	1402.66	190.60	1.00
Verdugo-Fletcher	4621.872 18583.24	5 yr	40500.00	360.58	373.04	373.04	378.22	0.004938	18.25	2219.26	214.78	1.00
Verdugo-Fletcher	4621.872 18583.24	10 yr	48200.00	360.58	374.42	374.42	380.10	0.004980	19.12	2521.29	223.06	1.00
Verdugo-Fletcher	4621.872 18583.24	25 yr	65800.00	360.58	377.27	377.27	383.92	0.005030	20.69	3179.65	240.13	1.00
Verdugo-Fletcher	4621.872 18583.24	50 yr	77500.00	360.58	378.96	378.96	386.18	0.005055	21.56	3595.45	250.30	1.00
Verdugo-Fletcher	4621.872 18583.24	100 yr	94600.00	360.58	381.23	381.23	389.19	0.005085	22.63	4179.49	263.94	1.00
Verdugo-Fletcher	4621.872 18583.24	200 yr	109000.00	360.58	383.02	383.02	391.51	0.005088	23.39	4659.39	274.63	1.00
Verdugo-Fletcher	4621.872 18583.24	500 yr	125000.00	360.58	385.58	385.58	393.79	0.004816	22.99	5437.19	333.00	1.00
Verdugo-Fletcher	4571.869 18533.24	Design	78000.00	360.35	375.90	378.22	385.97	0.007035	25.46	3063.31	243.35	1.26
Verdugo-Fletcher	4571.869 18533.24	2 yr	21600.00	360.35	367.30	368.47	372.40	0.007314	18.12	1192.34	191.73	1.28
Verdugo-Fletcher	4571.869 18533.24	5 yr	40500.00	360.35	370.71	372.37	377.92	0.007172	21.55	1879.07	212.14	1.28
Verdugo-Fletcher	4571.869 18533.24	10 yr	48200.00	360.35	371.90	373.73	379.80	0.007136	22.56	2136.50	219.30	1.27
Verdugo-Fletcher	4571.869 18533.24	25 yr	65800.00	360.35	374.36	376.50	383.62	0.007072	24.42	2694.75	234.08	1.27
Verdugo-Fletcher	4571.869 18533.24	50 yr	77500.00	360.35	375.84	378.15	385.88	0.007037	25.42	3048.46	242.98	1.26
Verdugo-Fletcher	4571.869 18533.24	100 yr	94600.00	360.35	377.84	380.37	388.89	0.006992	26.67	3546.70	254.99	1.26
Verdugo-Fletcher	4571.869 18533.24	200 yr	109000.00	360.35	379.42	382.02	391.21	0.006941	27.55	3956.12	264.45	1.26
Verdugo-Fletcher	4571.869 18533.24	500 yr	125000.00	360.35	381.26	384.56	393.50	0.006675	28.08	4452.31	275.48	1.23
Verdugo-Fletcher	4521.727 18483.24	Design	78000.00	360.12	374.42	377.43	385.61	0.007309	26.85	2905.10	245.77	1.38
Verdugo-Fletcher	4521.727 18483.24	2 yr	21600.00	360.12	366.48	367.95	372.02	0.007907	18.89	1143.38	198.16	1.39
Verdugo-Fletcher	4521.727 18483.24	5 yr	40500.00	360.12	369.59	371.73	377.56	0.007651	22.65	1787.90	216.79	1.39
Verdugo-Fletcher	4521.727 18483.24	10 yr	48200.00	360.12	370.70	373.05	379.43	0.007545	23.72	2032.16	223.45	1.39
Verdugo-Fletcher	4521.727 18483.24	25 yr	65800.00	360.12	372.98	375.75	383.26	0.007394	25.72	2557.83	237.14	1.38
Verdugo-Fletcher	4521.727 18483.24	50 yr	77500.00	360.12	374.36	377.37	385.52	0.007312	26.81	2891.09	245.43	1.38
Verdugo-Fletcher	4521.727 18483.24	100 yr	94600.00	360.12	376.23	379.54	388.54	0.007211	28.15	3360.79	256.65	1.37
Verdugo-Fletcher	4521.727 18483.24	200 yr	109000.00	360.12	377.71	381.27	390.86	0.007126	29.10	3745.74	265.50	1.37
Verdugo-Fletcher	4521.727 18483.24	500 yr	125000.00	360.12	379.37	383.10	393.16	0.006900	29.80	4194.14	275.44	1.35
Verdugo-Fletcher	4471.730 18433.24	Design	78000.00	359.90	373.37	376.69	385.09	0.015865	27.48	2838.86	250.84	1.44
Verdugo-Fletcher	4471.730 18433.24	2 yr	21600.00	359.90	365.99	367.44	371.46	0.016909	18.78	1149.94	206.52	1.40
Verdugo-Fletcher	4471.730 18433.24	5 yr	40500.00	359.90	368.86	371.13	377.01	0.016656	22.91	1767.80	223.75	1.44
Verdugo-Fletcher	4471.730 18433.24	10 yr	48200.00	359.90	369.89	372.41	378.89	0.016440	24.08	2001.98	229.95	1.44
Verdugo-Fletcher	4471.730 18433.24	25 yr	65800.00	359.90	372.03	375.05	382.72	0.016060	26.24	2507.29	242.78	1.44
Verdugo-Fletcher	4471.730 18433.24	50 yr	77500.00	359.90	373.32	376.63	385.00	0.015874	27.43	2825.40	250.52	1.44
Verdugo-Fletcher	4471.730 18433.24	100 yr	94600.00	359.90	375.08	378.76	388.03	0.015588	28.87	3276.63	261.11	1.44
Verdugo-Fletcher	4471.730 18433.24	200 yr	109000.00	359.90	376.47	380.42	390.35	0.015357	29.90	3646.08	269.47	1.43
Verdugo-Fletcher	4471.730 18433.24	500 yr	125000.00	359.90	378.02	382.07	392.67	0.014887	30.72	4069.54	278.74	1.42
Verdugo-Fletcher	4421.838 18383.24	Design	78000.00	359.67	372.63	375.98	384.34	0.014398	27.46	2840.14	257.73	1.46

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4421.838 18383.24	2 yr	21600.00	359.67	365.76	366.96	370.70	0.014061	17.84	1210.77	216.51	1.33
Verdugo-Fletcher	4421.838 18383.24	5 yr	40500.00	359.67	368.40	370.54	376.22	0.014764	22.44	1805.05	232.39	1.42
Verdugo-Fletcher	4421.838 18383.24	10 yr	48200.00	359.67	369.36	371.79	378.12	0.014742	23.75	2029.82	238.12	1.43
Verdugo-Fletcher	4421.838 18383.24	25 yr	65800.00	359.67	371.36	374.37	381.96	0.014546	26.13	2518.60	250.13	1.45
Verdugo-Fletcher	4421.838 18383.24	50 yr	77500.00	359.67	372.58	375.91	384.25	0.014405	27.41	2827.09	257.43	1.46
Verdugo-Fletcher	4421.838 18383.24	100 yr	94600.00	359.67	374.24	378.00	387.28	0.014154	28.98	3264.59	267.43	1.46
Verdugo-Fletcher	4421.838 18383.24	200 yr	109000.00	359.67	375.56	379.62	389.62	0.013935	30.09	3622.74	275.35	1.46
Verdugo-Fletcher	4421.838 18383.24	500 yr	125000.00	359.67	377.02	381.31	391.96	0.013524	31.02	4029.85	284.08	1.45
Verdugo-Fletcher	4420.793 18382.24	Design	78000.00	359.67	371.80	375.53	384.33	0.014676	28.40	2746.52	262.80	1.55
Verdugo-Fletcher	4420.793 18382.24	2 yr	21600.00	359.67	365.26	366.74	370.69	0.016115	18.70	1155.35	223.53	1.45
Verdugo-Fletcher	4420.793 18382.24	5 yr	40500.00	359.67	367.78	370.23	376.21	0.015888	23.29	1738.85	238.68	1.52
Verdugo-Fletcher	4420.793 18382.24	10 yr	48200.00	359.67	368.69	371.45	378.10	0.015633	24.62	1958.00	244.13	1.53
Verdugo-Fletcher	4420.793 18382.24	25 yr	65800.00	359.67	370.59	373.96	381.95	0.015036	27.04	2433.67	255.55	1.54
Verdugo-Fletcher	4420.793 18382.24	50 yr	77500.00	359.67	371.75	375.47	384.23	0.014691	28.35	2733.85	262.51	1.55
Verdugo-Fletcher	4420.793 18382.24	100 yr	94600.00	359.67	373.34	377.51	387.27	0.014206	29.95	3158.97	272.05	1.55
Verdugo-Fletcher	4420.793 18382.24	200 yr	109000.00	359.67	374.60	379.11	389.61	0.013830	31.08	3506.69	279.62	1.55
Verdugo-Fletcher	4420.793 18382.24	500 yr	125000.00	359.67	375.99	380.76	391.95	0.013298	32.06	3899.07	287.92	1.54
Verdugo-Fletcher	4215.917 18178.06	Design	78000.00	358.74	372.38	374.60	381.90	0.009744	24.77	3149.48	271.83	1.28
Verdugo-Fletcher	4215.917 18178.06	2 yr	21600.00	358.74	366.73	365.81	369.21	0.004770	12.64	1708.66	237.92	0.83
Verdugo-Fletcher	4215.917 18178.06	5 yr	40500.00	358.74	370.24	369.30	374.06	0.004773	15.69	2580.45	258.97	0.88
Verdugo-Fletcher	4215.917 18178.06	10 yr	48200.00	358.74	369.52	370.52	375.80	0.008453	20.11	2396.40	254.67	1.16
Verdugo-Fletcher	4215.917 18178.06	25 yr	65800.00	358.74	371.25	373.03	379.55	0.009390	23.12	2845.65	265.04	1.24
Verdugo-Fletcher	4215.917 18178.06	50 yr	77500.00	358.74	372.33	374.54	381.81	0.009733	24.70	3137.12	271.56	1.28
Verdugo-Fletcher	4215.917 18178.06	100 yr	94600.00	358.74	373.84	376.58	384.85	0.010012	26.62	3553.96	280.62	1.32
Verdugo-Fletcher	4215.917 18178.06	200 yr	109000.00	358.74	375.05	378.18	387.20	0.010126	27.97	3897.15	287.86	1.34
Verdugo-Fletcher	4215.917 18178.06	500 yr	125000.00	358.74	376.39	379.83	389.59	0.010064	29.16	4287.08	295.88	1.35
Verdugo-Fletcher	3957.652 17907.7	Design	78000.00	357.51	373.93	373.38	380.05	0.005067	19.86	3927.67	288.50	0.95
Verdugo-Fletcher	3957.652 17907.7	2 yr	21600.00	357.51	365.33	364.60	367.93	0.005136	12.95	1668.10	236.89	0.86
Verdugo-Fletcher	3957.652 17907.7	5 yr	40500.00	357.51	368.81	368.08	372.79	0.005062	16.00	2530.63	257.81	0.90
Verdugo-Fletcher	3957.652 17907.7	10 yr	48200.00	357.51	370.01	369.29	374.47	0.005054	16.96	2842.69	264.98	0.91
Verdugo-Fletcher	3957.652 17907.7	25 yr	65800.00	357.51	372.43	371.80	377.91	0.005057	18.79	3502.53	279.52	0.94
Verdugo-Fletcher	3957.652 17907.7	50 yr	77500.00	357.51	373.87	373.31	379.97	0.005067	19.82	3910.70	288.15	0.95
Verdugo-Fletcher	3957.652 17907.7	100 yr	94600.00	357.51	374.54	375.35	382.78	0.006540	23.04	4106.36	292.19	1.08
Verdugo-Fletcher	3957.652 17907.7	200 yr	109000.00	357.51	375.61	376.94	385.05	0.006990	24.65	4421.91	298.60	1.13
Verdugo-Fletcher	3957.652 17907.7	500 yr	125000.00	357.51	376.85	378.60	387.40	0.007256	26.07	4795.58	306.02	1.16
Verdugo-Fletcher	3727.154 17637.4	Design	78000.00	356.29	373.59	372.16	378.98	0.004210	18.64	4183.47	293.77	0.87
Verdugo-Fletcher	3727.154 17637.4	2 yr	21600.00	356.29	364.56		366.86	0.004223	12.15	1777.58	239.65	0.79
Verdugo-Fletcher	3727.154 17637.4	5 yr	40500.00	356.29	368.21		371.73	0.004211	15.05	2690.21	261.50	0.83
Verdugo-Fletcher	3727.154 17637.4	10 yr	48200.00	356.29	369.46		373.41	0.004211	15.95	3021.40	268.99	0.84
Verdugo-Fletcher	3727.154 17637.4	25 yr	65800.00	356.29	372.00	370.58	376.84	0.004214	17.66	3725.55	284.27	0.86
Verdugo-Fletcher	3727.154 17637.4	50 yr	77500.00	356.29	373.52	372.09	378.90	0.004210	18.61	4165.14	293.40	0.87

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	3727.154 17637.4	100 yr	94600.00	356.29	375.56	374.13	381.65	0.004206	19.81	4775.72	305.63	0.88
Verdugo-Fletcher	3727.154 17637.4	200 yr	109000.00	356.29	377.14	375.72	383.79	0.004204	20.70	5266.37	315.11	0.89
Verdugo-Fletcher	3727.154 17637.4	500 yr	125000.00	356.29	378.74	377.39	386.01	0.004208	21.63	5778.80	323.08	0.90
Verdugo-Fletcher	3437.429 17367	Design	78000.00	355.06	372.40		377.76	0.004175	18.59	4195.60	294.02	0.87
Verdugo-Fletcher	3437.429 17367	2 yr	21600.00	355.06	363.38		365.65	0.004140	12.07	1789.03	239.93	0.78
Verdugo-Fletcher	3437.429 17367	5 yr	40500.00	355.06	367.01		370.51	0.004166	15.00	2699.71	261.72	0.82
Verdugo-Fletcher	3437.429 17367	10 yr	48200.00	355.06	368.26		372.19	0.004174	15.90	3030.52	269.20	0.84
Verdugo-Fletcher	3437.429 17367	25 yr	65800.00	355.06	370.81		375.62	0.004178	17.61	3736.28	284.49	0.86
Verdugo-Fletcher	3437.429 17367	50 yr	77500.00	355.06	372.33		377.68	0.004175	18.55	4177.21	293.64	0.87
Verdugo-Fletcher	3437.429 17367	100 yr	94600.00	355.06	374.38		380.43	0.004171	19.75	4789.44	305.90	0.88
Verdugo-Fletcher	3437.429 17367	200 yr	109000.00	355.06	375.97		382.58	0.004163	20.63	5284.31	315.45	0.89
Verdugo-Fletcher	3437.429 17367	500 yr	125000.00	355.06	377.57		384.79	0.004159	21.56	5797.02	322.48	0.90
Verdugo-Fletcher	3283.58*	Design	78000.00	354.45	371.63	370.32	377.12	0.004310	18.80	4150.04	293.09	0.88
Verdugo-Fletcher	3283.58*	2 yr	21600.00	354.45	362.68		365.00	0.004297	12.22	1767.58	239.40	0.79
Verdugo-Fletcher	3283.58*	5 yr	40500.00	354.45	366.28		369.86	0.004318	15.18	2667.80	260.99	0.84
Verdugo-Fletcher	3283.58*	10 yr	48200.00	354.45	367.52		371.54	0.004319	16.09	2995.97	268.42	0.85
Verdugo-Fletcher	3283.58*	25 yr	65800.00	354.45	370.05	368.74	374.98	0.004317	17.81	3695.06	283.62	0.87
Verdugo-Fletcher	3283.58*	50 yr	77500.00	354.45	371.57	370.26	377.03	0.004311	18.76	4131.76	292.71	0.88
Verdugo-Fletcher	3283.58*	100 yr	94600.00	354.45	373.61	372.29	379.79	0.004297	19.95	4740.88	304.94	0.89
Verdugo-Fletcher	3283.58*	200 yr	109000.00	354.45	375.19	373.89	381.93	0.004284	20.83	5232.02	314.46	0.90
Verdugo-Fletcher	3283.58*	500 yr	125000.00	354.45	376.79	375.58	384.15	0.004287	21.78	5740.41	322.18	0.91
Verdugo-Fletcher	3129.733 17096.7	Design	78000.00	353.83	370.63	369.70	376.42	0.004670	19.32	4038.01	290.75	0.91
Verdugo-Fletcher	3129.733 17096.7	2 yr	21600.00	353.83	361.86		364.31	0.004680	12.56	1719.11	238.16	0.82
Verdugo-Fletcher	3129.733 17096.7	5 yr	40500.00	353.83	365.40	364.40	369.17	0.004672	15.58	2598.78	259.37	0.87
Verdugo-Fletcher	3129.733 17096.7	10 yr	48200.00	353.83	366.61	365.62	370.85	0.004670	16.51	2918.60	266.66	0.88
Verdugo-Fletcher	3129.733 17096.7	25 yr	65800.00	353.83	369.09	368.13	374.28	0.004672	18.29	3597.41	281.51	0.90
Verdugo-Fletcher	3129.733 17096.7	50 yr	77500.00	353.83	370.57	369.64	376.34	0.004670	19.28	4020.39	290.38	0.91
Verdugo-Fletcher	3129.733 17096.7	100 yr	94600.00	353.83	372.55	371.67	379.10	0.004665	20.53	4608.87	302.29	0.93
Verdugo-Fletcher	3129.733 17096.7	200 yr	109000.00	353.83	374.09	373.27	381.24	0.004666	21.46	5080.03	311.50	0.94
Verdugo-Fletcher	3129.733 17096.7	500 yr	125000.00	353.83	375.66	374.96	383.46	0.004681	22.41	5578.13	320.95	0.95
Verdugo-Fletcher	2870.441 16826.4	Design	78000.00	352.61	369.58		375.23	0.004503	19.08	4088.56	291.83	0.90
Verdugo-Fletcher	2870.441 16826.4	2 yr	21600.00	352.61	360.73		363.12	0.004512	12.42	1739.77	238.70	0.81
Verdugo-Fletcher	2870.441 16826.4	5 yr	40500.00	352.61	364.29		367.98	0.004517	15.41	2628.06	260.07	0.85
Verdugo-Fletcher	2870.441 16826.4	10 yr	48200.00	352.61	365.52		369.66	0.004514	16.33	2952.09	267.44	0.87
Verdugo-Fletcher	2870.441 16826.4	25 yr	65800.00	352.61	368.01		373.09	0.004517	18.08	3638.75	282.43	0.89
Verdugo-Fletcher	2870.441 16826.4	50 yr	77500.00	352.61	369.52		375.15	0.004504	19.04	4070.45	291.45	0.90
Verdugo-Fletcher	2870.441 16826.4	100 yr	94600.00	352.61	371.56	370.46	377.91	0.004470	20.23	4677.03	303.68	0.91
Verdugo-Fletcher	2870.441 16826.4	200 yr	109000.00	352.61	373.13	372.08	380.05	0.004457	21.12	5161.20	313.10	0.92
Verdugo-Fletcher	2870.441 16826.4	500 yr	125000.00	352.61	374.71	373.74	382.27	0.004460	22.06	5665.10	321.28	0.93
Verdugo-Fletcher	2596.813 16556	Design	78000.00	351.38	368.35	367.25	374.00	0.004506	19.08	4087.66	291.81	0.90

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (Continued)

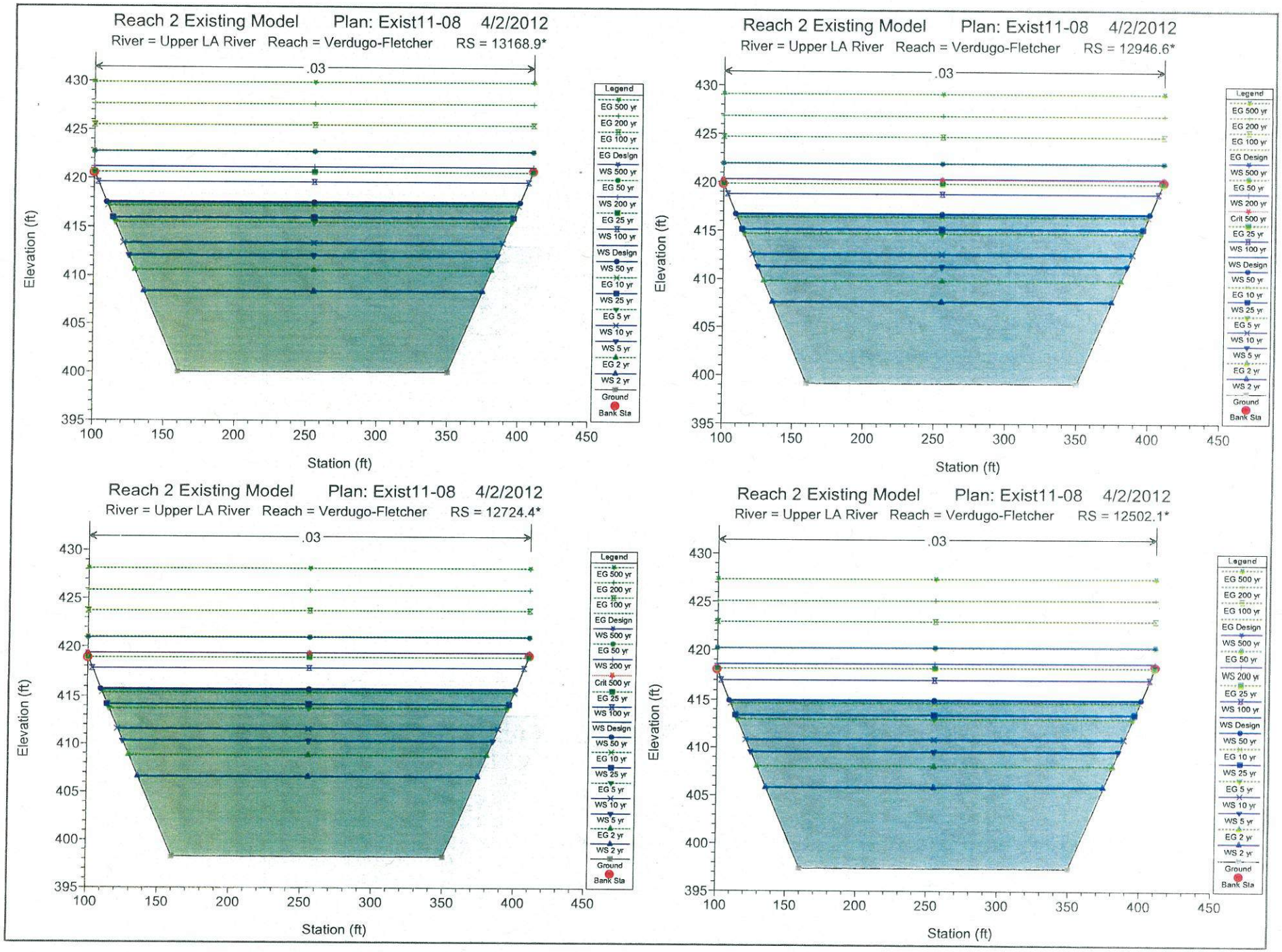
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Verdugo-Fletcher	2596.813 16556	2 yr	21600.00	351.38	359.48		361.88	0.004551	12.45	1734.84	238.58	0.81
Verdugo-Fletcher	2596.813 16556	5 yr	40500.00	351.38	363.05	361.95	366.74	0.004532	15.43	2625.22	260.01	0.86
Verdugo-Fletcher	2596.813 16556	10 yr	48200.00	351.38	364.28	363.17	368.42	0.004523	16.34	2950.02	267.40	0.87
Verdugo-Fletcher	2596.813 16556	25 yr	65800.00	351.38	366.78	365.68	371.86	0.004526	18.10	3636.34	282.38	0.89
Verdugo-Fletcher	2596.813 16556	50 yr	77500.00	351.38	368.29	367.19	373.92	0.004507	19.04	4069.47	291.43	0.90
Verdugo-Fletcher	2596.813 16556	100 yr	94600.00	351.38	370.34	369.23	376.68	0.004462	20.21	4679.74	303.74	0.91
Verdugo-Fletcher	2596.813 16556	200 yr	109000.00	351.38	371.95	370.85	378.83	0.004412	21.05	5179.12	313.45	0.91
Verdugo-Fletcher	2596.813 16556	500 yr	125000.00	351.38	373.57	372.51	381.06	0.004383	21.96	5692.83	320.68	0.92
Verdugo-Fletcher	2329.572 16285.7	Design	78000.00	350.16	367.31	366.03	372.82	0.004341	18.84	4139.95	292.88	0.88
Verdugo-Fletcher	2329.572 16285.7	2 yr	21600.00	350.16	358.30		360.68	0.004471	12.38	1744.90	238.83	0.81
Verdugo-Fletcher	2329.572 16285.7	5 yr	40500.00	350.16	361.87		365.54	0.004469	15.36	2637.38	260.29	0.85
Verdugo-Fletcher	2329.572 16285.7	10 yr	48200.00	350.16	363.13	361.95	367.22	0.004441	16.24	2968.17	267.80	0.86
Verdugo-Fletcher	2329.572 16285.7	25 yr	65800.00	350.16	365.68	364.46	370.67	0.004404	17.93	3670.36	283.10	0.88
Verdugo-Fletcher	2329.572 16285.7	50 yr	77500.00	350.16	367.24	365.97	372.73	0.004345	18.81	4120.78	292.49	0.88
Verdugo-Fletcher	2329.572 16285.7	100 yr	94600.00	350.16	369.40	368.01	375.52	0.004228	19.84	4767.35	305.46	0.89
Verdugo-Fletcher	2329.572 16285.7	200 yr	109000.00	350.16	371.12	369.63	377.69	0.004124	20.56	5301.65	315.78	0.88
Verdugo-Fletcher	2329.572 16285.7	500 yr	125000.00	350.16	372.87	371.29	379.94	0.003990	21.33	5860.25	320.08	0.88
Verdugo-Fletcher	2053.312 16015.41	Design	78000.00	348.93	366.33	364.81	371.65	0.004125	18.51	4212.83	294.37	0.86
Verdugo-Fletcher	2053.312 16015.41	2 yr	21600.00	348.93	357.04		359.44	0.004521	12.42	1738.62	238.67	0.81
Verdugo-Fletcher	2053.312 16015.41	5 yr	40500.00	348.93	360.64	359.51	364.30	0.004479	15.37	2635.45	260.24	0.85
Verdugo-Fletcher	2053.312 16015.41	10 yr	48200.00	348.93	361.90	360.73	365.99	0.004436	16.23	2969.40	267.83	0.86
Verdugo-Fletcher	2053.312 16015.41	25 yr	65800.00	348.93	364.57	363.23	369.47	0.004279	17.75	3706.14	283.86	0.87
Verdugo-Fletcher	2053.312 16015.41	50 yr	77500.00	348.93	366.26	364.74	371.56	0.004131	18.49	4192.27	293.95	0.86
Verdugo-Fletcher	2053.312 16015.41	100 yr	94600.00	348.93	368.59	366.79	374.39	0.003915	19.33	4894.90	307.96	0.85
Verdugo-Fletcher	2053.312 16015.41	200 yr	109000.00	348.93	370.47		376.60	0.003739	19.87	5484.28	319.24	0.85
Verdugo-Fletcher	2053.312 16015.41	500 yr	125000.00	348.93	372.35		378.90	0.003535	20.54	6084.25	319.48	0.83
Verdugo-Fletcher	1810.09*	Design	78000.00	347.83	365.71		370.69	0.003742	17.91	4355.40	297.28	0.82
Verdugo-Fletcher	1810.09*	2 yr	21600.00	347.83	355.94		358.34	0.004520	12.42	1738.77	238.68	0.81
Verdugo-Fletcher	1810.09*	5 yr	40500.00	347.83	359.62		363.23	0.004370	15.24	2657.31	260.76	0.84
Verdugo-Fletcher	1810.09*	10 yr	48200.00	347.83	360.96		364.94	0.004255	16.01	3010.97	268.77	0.84
Verdugo-Fletcher	1810.09*	25 yr	65800.00	347.83	363.82		368.46	0.003960	17.29	3804.88	285.95	0.84
Verdugo-Fletcher	1810.09*	50 yr	77500.00	347.83	365.63		370.60	0.003750	17.88	4333.25	296.83	0.82
Verdugo-Fletcher	1810.09*	100 yr	94600.00	347.83	368.15		373.49	0.003478	18.55	5098.67	311.93	0.81
Verdugo-Fletcher	1810.09*	200 yr	109000.00	347.83	370.13		375.75	0.003294	19.03	5727.79	323.29	0.80
Verdugo-Fletcher	1810.09*	500 yr	125000.00	347.83	372.13		378.10	0.003079	19.61	6375.83	323.29	0.78
Verdugo-Fletcher	1566.886 15529.1	Design	78000.00	346.72	365.32		369.84	0.003248	17.06	4571.63	301.60	0.77
Verdugo-Fletcher	1566.886 15529.1	2 yr	21600.00	346.72	354.92		357.26	0.004358	12.28	1759.44	239.19	0.80
Verdugo-Fletcher	1566.886 15529.1	5 yr	40500.00	346.72	358.79		362.21	0.004033	14.84	2729.16	262.39	0.81
Verdugo-Fletcher	1566.886 15529.1	10 yr	48200.00	346.72	360.23		363.95	0.003851	15.48	3113.40	271.04	0.80
Verdugo-Fletcher	1566.886 15529.1	25 yr	65800.00	346.72	363.32		367.56	0.003468	16.53	3979.98	289.59	0.79
Verdugo-Fletcher	1566.886 15529.1	50 yr	77500.00	346.72	365.24		369.75	0.003255	17.04	4548.05	301.13	0.77

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	1566.886 15529.1	100 yr	94600.00	346.72	367.87		372.71	0.003009	17.65	5360.24	316.90	0.76
Verdugo-Fletcher	1566.886 15529.1	200 yr	109000.00	346.72	369.92		375.01	0.002839	18.10	6021.85	327.10	0.74
Verdugo-Fletcher	1566.886 15529.1	500 yr	125000.00	346.72	372.01		377.40	0.002652	18.64	6705.33	327.10	0.73
Verdugo-Fletcher	1323.64*	Design	78000.00	345.62	364.75		369.08	0.002989	16.70	4670.58	298.38	0.74
Verdugo-Fletcher	1323.64*	2 yr	21600.00	345.62	353.84		356.20	0.004356	12.32	1752.54	236.56	0.80
Verdugo-Fletcher	1323.64*	5 yr	40500.00	345.62	357.92		361.25	0.003811	14.64	2765.85	259.70	0.79
Verdugo-Fletcher	1323.64*	10 yr	48200.00	345.62	359.45		363.04	0.003585	15.20	3170.29	268.38	0.78
Verdugo-Fletcher	1323.64*	25 yr	65800.00	345.62	362.69		366.75	0.003190	16.18	4067.68	286.70	0.76
Verdugo-Fletcher	1323.64*	50 yr	77500.00	345.62	364.67		368.99	0.002995	16.68	4646.85	297.93	0.74
Verdugo-Fletcher	1323.64*	100 yr	94600.00	345.62	367.34		372.00	0.002784	17.31	5464.86	313.10	0.73
Verdugo-Fletcher	1323.64*	200 yr	109000.00	345.62	369.42		374.34	0.002631	17.79	6126.24	321.40	0.72
Verdugo-Fletcher	1323.64*	500 yr	125000.00	345.62	371.54		376.78	0.002476	18.36	6807.78	321.40	0.70
Verdugo-Fletcher	1080.39*	Design	78000.00	344.52	364.27		368.38	0.002712	16.27	4793.99	295.46	0.71
Verdugo-Fletcher	1080.39*	2 yr	21600.00	344.52	352.77		355.14	0.004334	12.36	1748.22	234.03	0.80
Verdugo-Fletcher	1080.39*	5 yr	40500.00	344.52	357.21		360.36	0.003460	14.26	2840.46	257.75	0.76
Verdugo-Fletcher	1080.39*	10 yr	48200.00	344.52	358.83		362.21	0.003227	14.76	3264.67	266.39	0.74
Verdugo-Fletcher	1080.39*	25 yr	65800.00	344.52	362.17		366.01	0.002876	15.72	4185.23	284.25	0.72
Verdugo-Fletcher	1080.39*	50 yr	77500.00	344.52	364.19		368.29	0.002717	16.25	4770.28	295.03	0.71
Verdugo-Fletcher	1080.39*	100 yr	94600.00	344.52	366.90		371.35	0.002553	16.93	5587.95	309.48	0.70
Verdugo-Fletcher	1080.39*	200 yr	109000.00	344.52	368.99		373.72	0.002423	17.45	6245.47	315.70	0.69
Verdugo-Fletcher	1080.39*	500 yr	125000.00	344.52	371.13		376.19	0.002303	18.06	6920.06	315.70	0.68
Verdugo-Fletcher	837.1499 14802	Design	78000.00	343.42	363.89		367.76	0.002431	15.79	4941.36	292.85	0.68
Verdugo-Fletcher	837.1499 14802	2 yr	21600.00	343.42	351.75		354.10	0.004218	12.30	1756.65	231.85	0.79
Verdugo-Fletcher	837.1499 14802	5 yr	40500.00	343.42	356.67		359.58	0.003008	13.69	2959.03	256.59	0.71
Verdugo-Fletcher	837.1499 14802	10 yr	48200.00	343.42	358.35		361.48	0.002812	14.18	3397.99	265.05	0.70
Verdugo-Fletcher	837.1499 14802	25 yr	65800.00	343.42	361.77		365.35	0.002548	15.19	4331.76	282.20	0.68
Verdugo-Fletcher	837.1499 14802	50 yr	77500.00	343.42	363.81		367.66	0.002434	15.76	4917.80	292.45	0.68
Verdugo-Fletcher	837.1499 14802	100 yr	94600.00	343.42	366.51		370.75	0.002325	16.52	5727.54	306.04	0.67
Verdugo-Fletcher	837.1499 14802	200 yr	109000.00	343.42	368.62		373.15	0.002220	17.09	6377.86	310.00	0.66
Verdugo-Fletcher	837.1499 14802	500 yr	125000.00	343.42	370.76		375.65	0.002136	17.75	7041.49	310.00	0.66
Verdugo-Fletcher	660.8601 14625.7	Design	78000.00	342.00	364.82	357.46	367.43	0.001444	12.97	6015.31	324.37	0.53
Verdugo-Fletcher	660.8601 14625.7	2 yr	21600.00	342.00	352.37	348.82	353.64	0.001744	9.03	2390.75	258.11	0.52
Verdugo-Fletcher	660.8601 14625.7	5 yr	40500.00	342.00	357.40	352.24	359.21	0.001560	10.78	3757.13	284.91	0.52
Verdugo-Fletcher	660.8601 14625.7	10 yr	48200.00	342.00	359.13	353.43	361.12	0.001523	11.32	4257.39	294.10	0.52
Verdugo-Fletcher	660.8601 14625.7	25 yr	65800.00	342.00	362.64	355.91	365.02	0.001469	12.36	5322.51	312.79	0.53
Verdugo-Fletcher	660.8601 14625.7	50 yr	77500.00	342.00	364.73	357.40	367.33	0.001444	12.94	5988.23	323.92	0.53
Verdugo-Fletcher	660.8601 14625.7	100 yr	94600.00	342.00	367.51	359.44	370.43	0.001386	13.72	6895.11	326.78	0.53
Verdugo-Fletcher	660.8601 14625.7	200 yr	109000.00	342.00	369.65	361.02	372.85	0.001357	14.36	7593.06	326.78	0.52
Verdugo-Fletcher	660.8601 14625.7	500 yr	125000.00	342.00	371.84	362.68	375.35	0.001344	15.04	8309.24	326.78	0.53
Verdugo-Fletcher	607.0587		Bridge									

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	553.2573 14519.28	Design	78000.00	341.14	352.99	356.24	364.35	0.013321	27.05	2883.53	275.98	1.47
Verdugo-Fletcher	553.2573 14519.28	2 yr	21600.00	341.14	346.29	347.80	351.69	0.017450	18.64	1158.62	239.08	1.49
Verdugo-Fletcher	553.2573 14519.28	5 yr	40500.00	341.14	348.90	351.14	356.76	0.015326	22.50	1800.23	253.43	1.49
Verdugo-Fletcher	553.2573 14519.28	10 yr	48200.00	341.14	349.82	352.31	358.52	0.014795	23.67	2036.60	258.52	1.49
Verdugo-Fletcher	553.2573 14519.28	25 yr	65800.00	341.14	351.76	354.72	362.11	0.013828	25.82	2548.06	269.20	1.48
Verdugo-Fletcher	553.2573 14519.28	50 yr	77500.00	341.14	352.94	356.18	364.26	0.013341	27.00	2869.97	275.71	1.47
Verdugo-Fletcher	553.2573 14519.28	100 yr	94600.00	341.14	354.56	358.16	367.14	0.012748	28.47	3323.10	284.62	1.47
Verdugo-Fletcher	553.2573 14519.28	200 yr	109000.00	341.14	355.83	359.71	369.38	0.012340	29.53	3690.94	291.65	1.46
Verdugo-Fletcher	553.2573 14519.28	500 yr	125000.00	341.14	357.19	361.33	371.69	0.011935	30.56	4090.28	299.10	1.46
Verdugo-Fletcher	0 14519.28	Design	78000.00	339.01	356.84	353.31	360.54	0.002684	15.43	5054.62	336.98	0.70
Verdugo-Fletcher	0 14519.28	2 yr	21600.00	339.01	346.62	345.32	348.58	0.003902	11.23	1923.28	275.64	0.75
Verdugo-Fletcher	0 14519.28	5 yr	40500.00	339.01	349.99	348.46	353.05	0.003905	14.02	2887.92	295.90	0.79
Verdugo-Fletcher	0 14519.28	10 yr	48200.00	339.01	351.16	349.57	354.60	0.003903	14.89	3237.92	302.91	0.80
Verdugo-Fletcher	0 14519.28	25 yr	65800.00	339.01	353.55	351.87	357.80	0.003901	16.54	3979.23	317.26	0.82
Verdugo-Fletcher	0 14519.28	50 yr	77500.00	339.01	354.98	353.25	359.71	0.003904	17.47	4437.36	325.80	0.83
Verdugo-Fletcher	0 14519.28	100 yr	94600.00	339.01	356.90	355.14	362.30	0.003901	18.64	5075.20	337.35	0.85
Verdugo-Fletcher	0 14519.28	200 yr	109000.00	339.01	358.40	356.61	364.31	0.003900	19.51	5586.33	346.32	0.86
Verdugo-Fletcher	0 14519.28	500 yr	125000.00	339.01	356.35	358.16	366.49	0.007599	25.56	4891.33	334.06	1.18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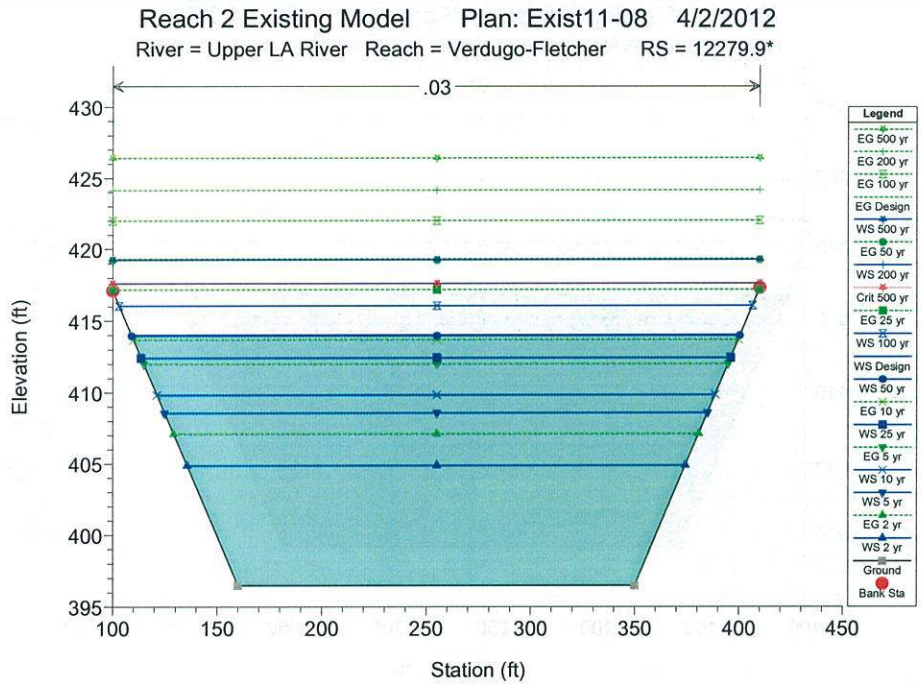
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12946.6*
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12724.4*
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12502.1*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
WS 200 yr
Crit 500 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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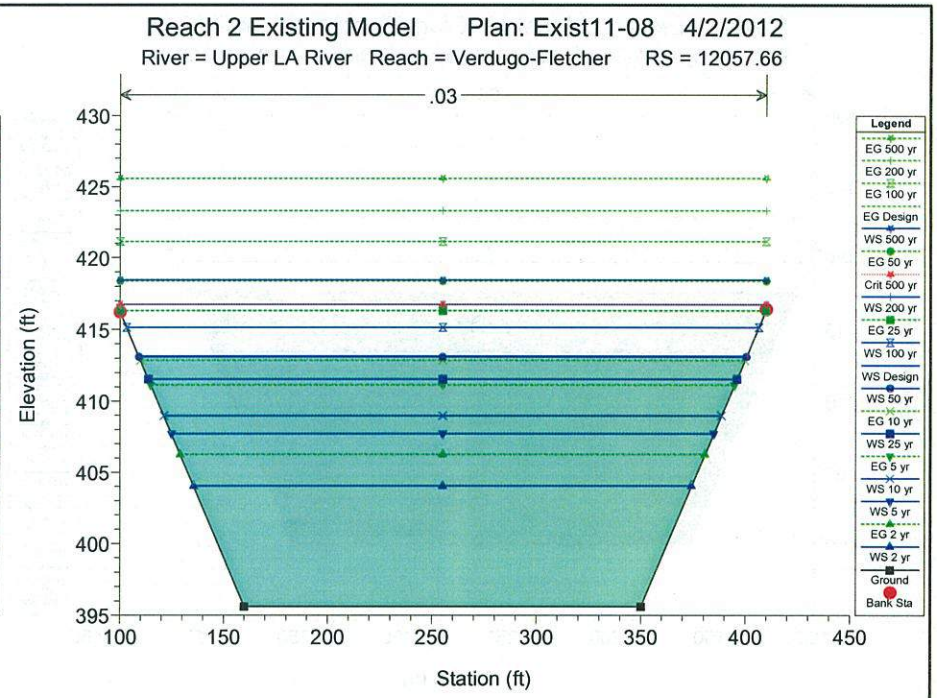
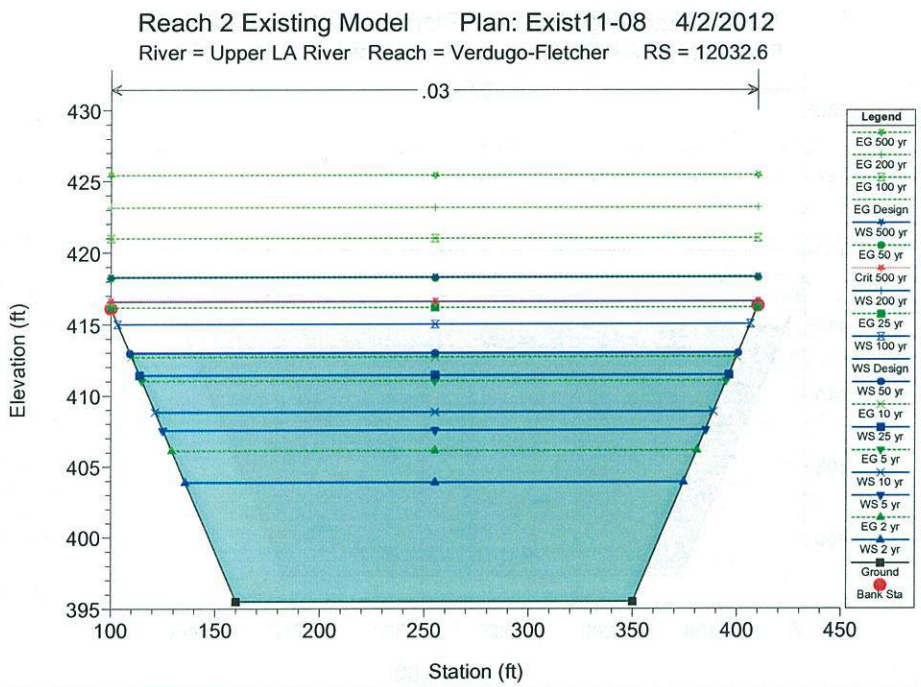
River = Upper LA River Reach = Verdugo-Fletcher RS = 12279.9*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
WS 200 yr
Crit 500 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12057.66
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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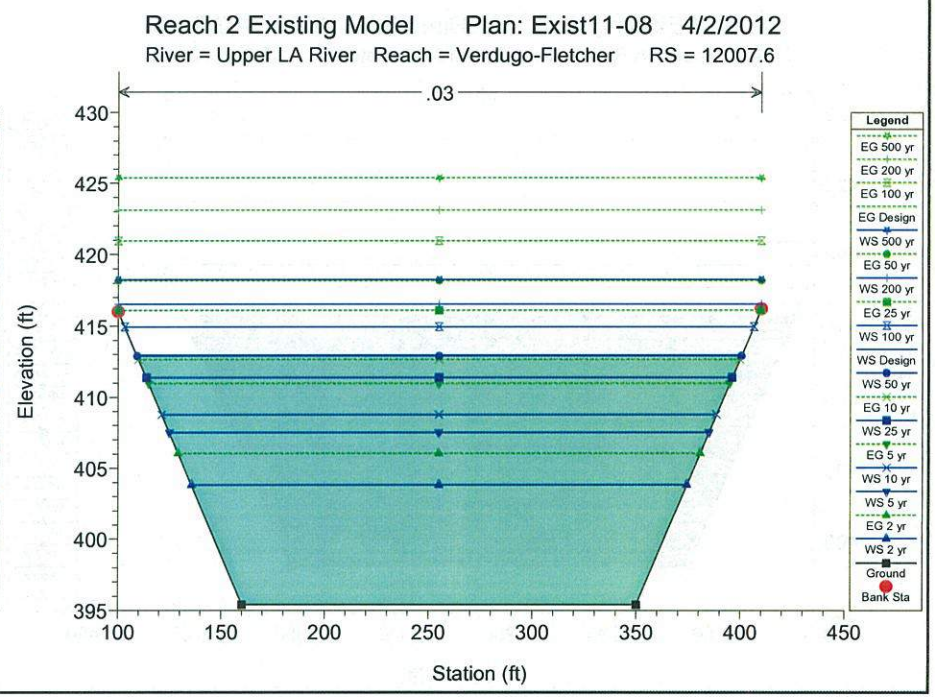
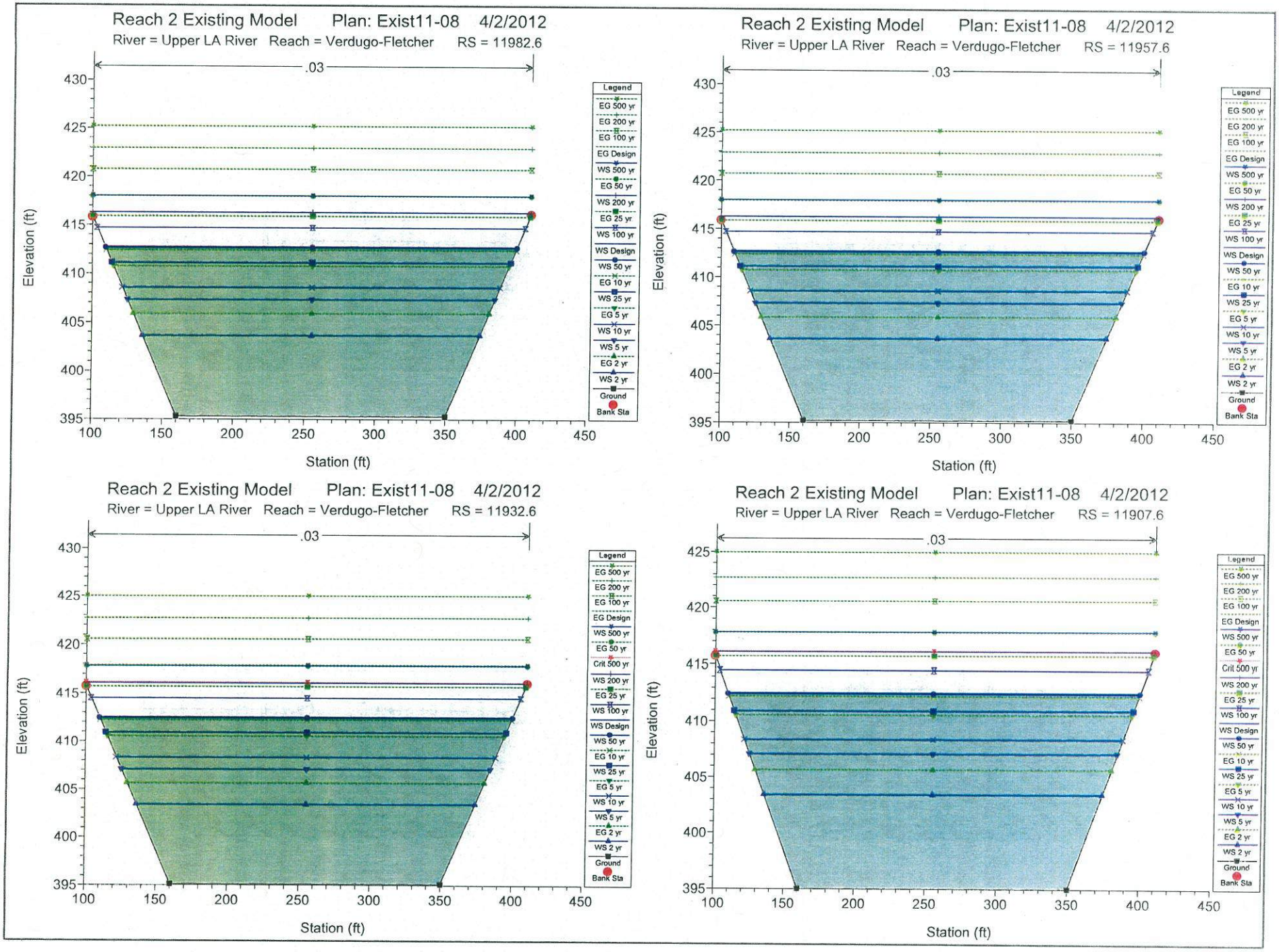
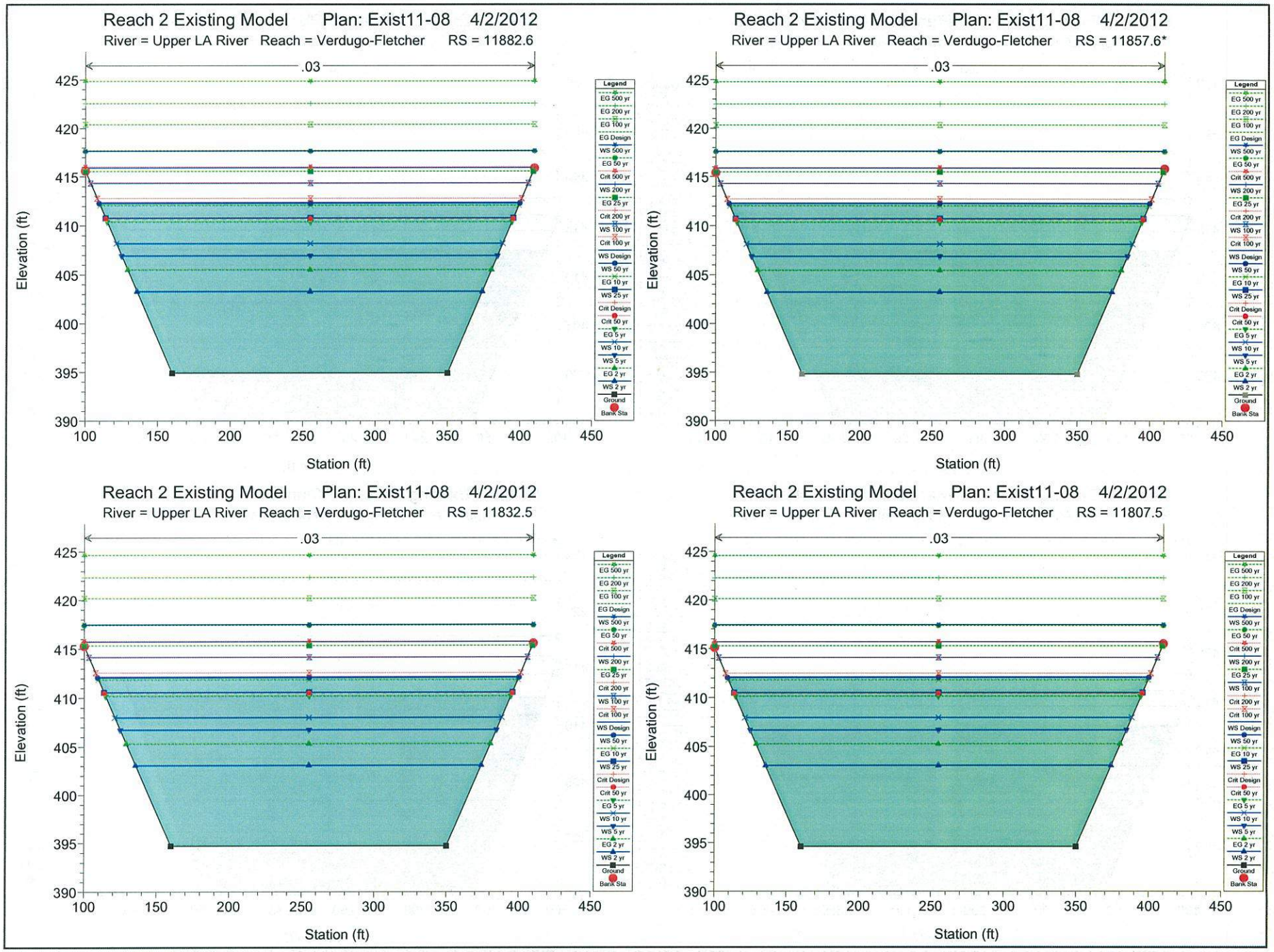
River = Upper LA River Reach = Verdugo-Fletcher RS = 12032.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12007.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11982.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11957.6
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11932.6
Crit 500 yr
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11907.6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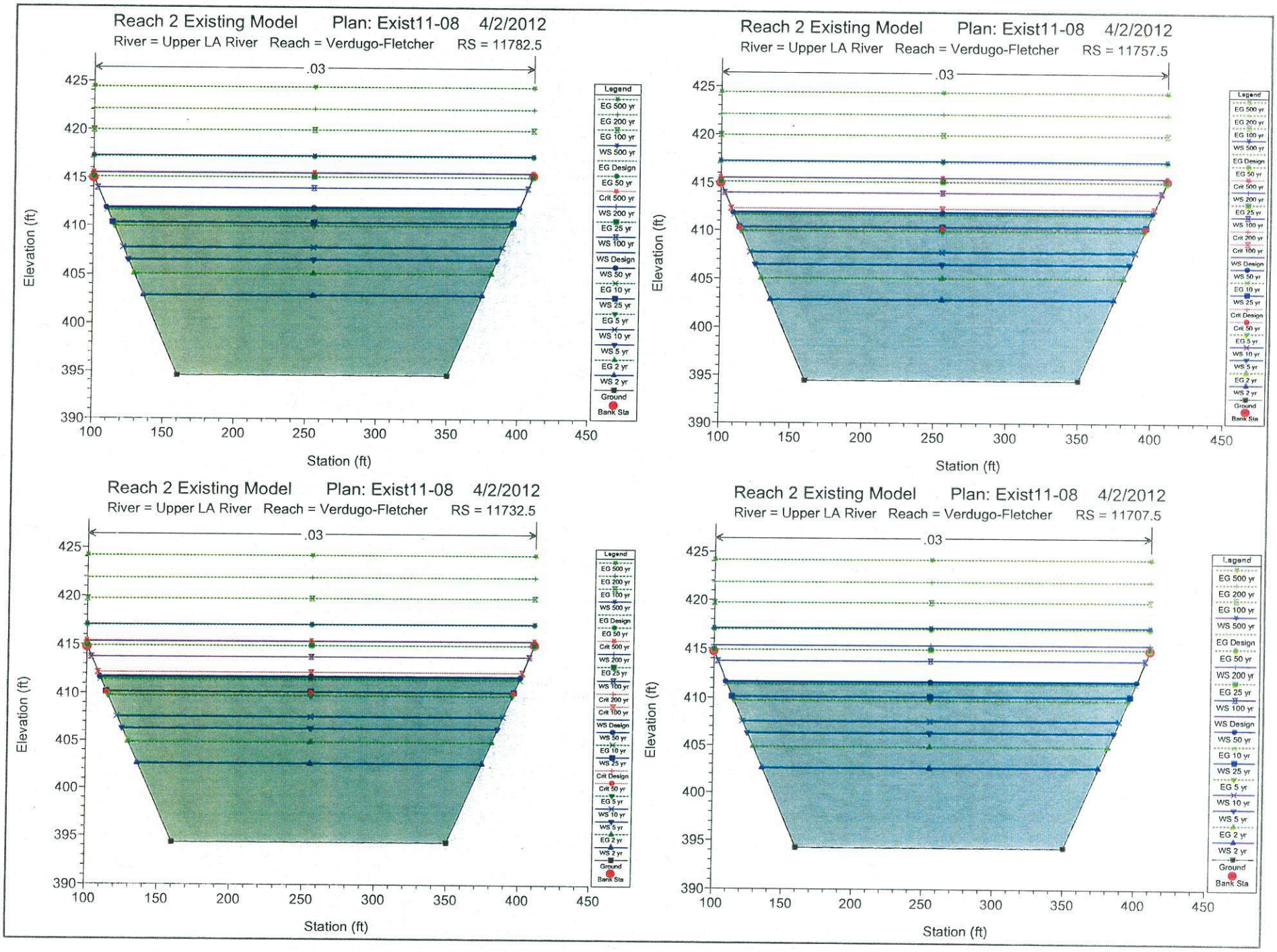
River = Upper LA River Reach = Verdugo-Fletcher RS = 11882.6
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11857.6*
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11832.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11807.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
WS 500 yr
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
Crit 200 yr
WS 100 yr
Crit 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
Crit Design
Crit 50 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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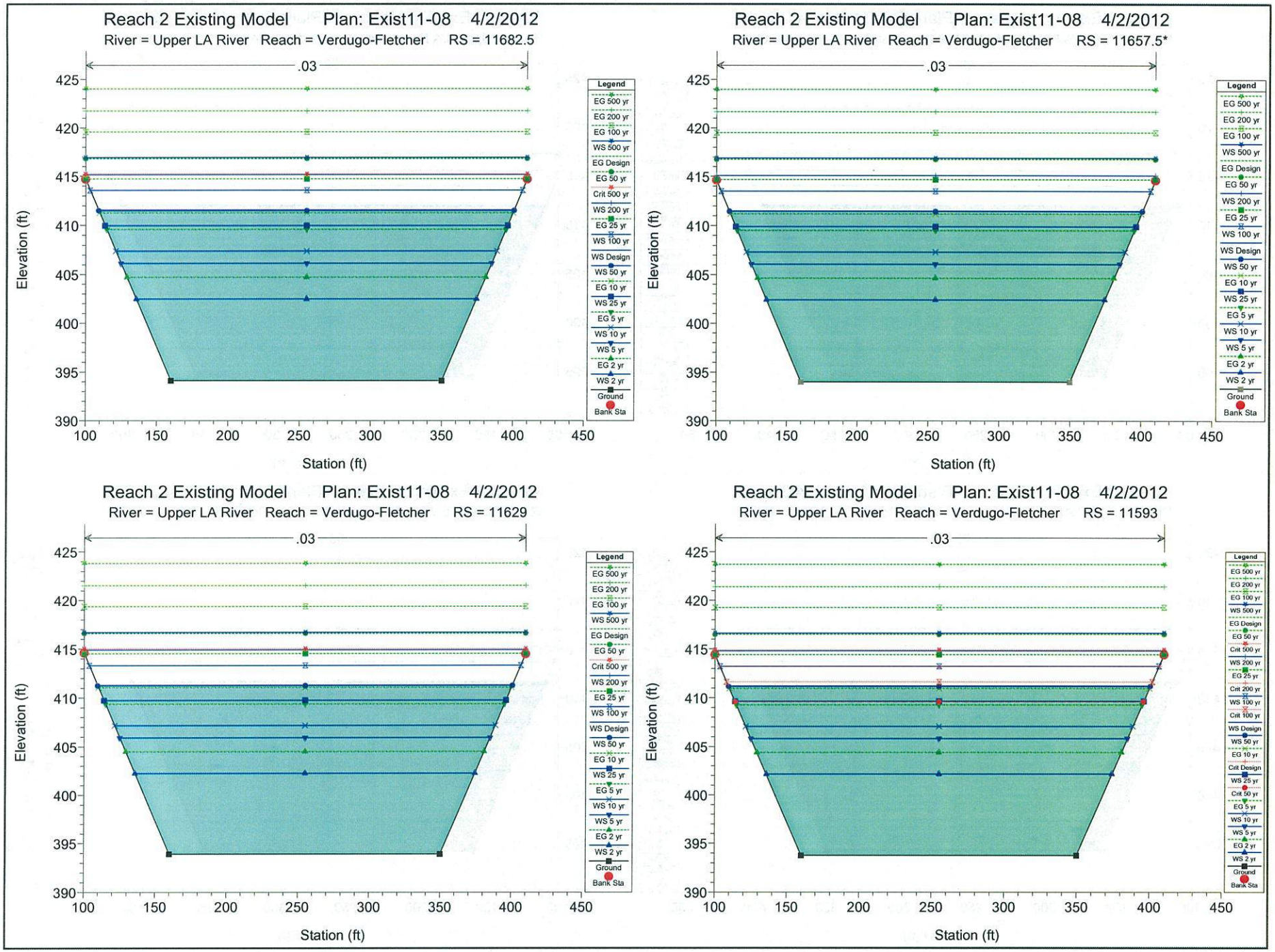
River = Upper LA River Reach = Verdugo-Fletcher RS = 11782.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11757.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11732.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11707.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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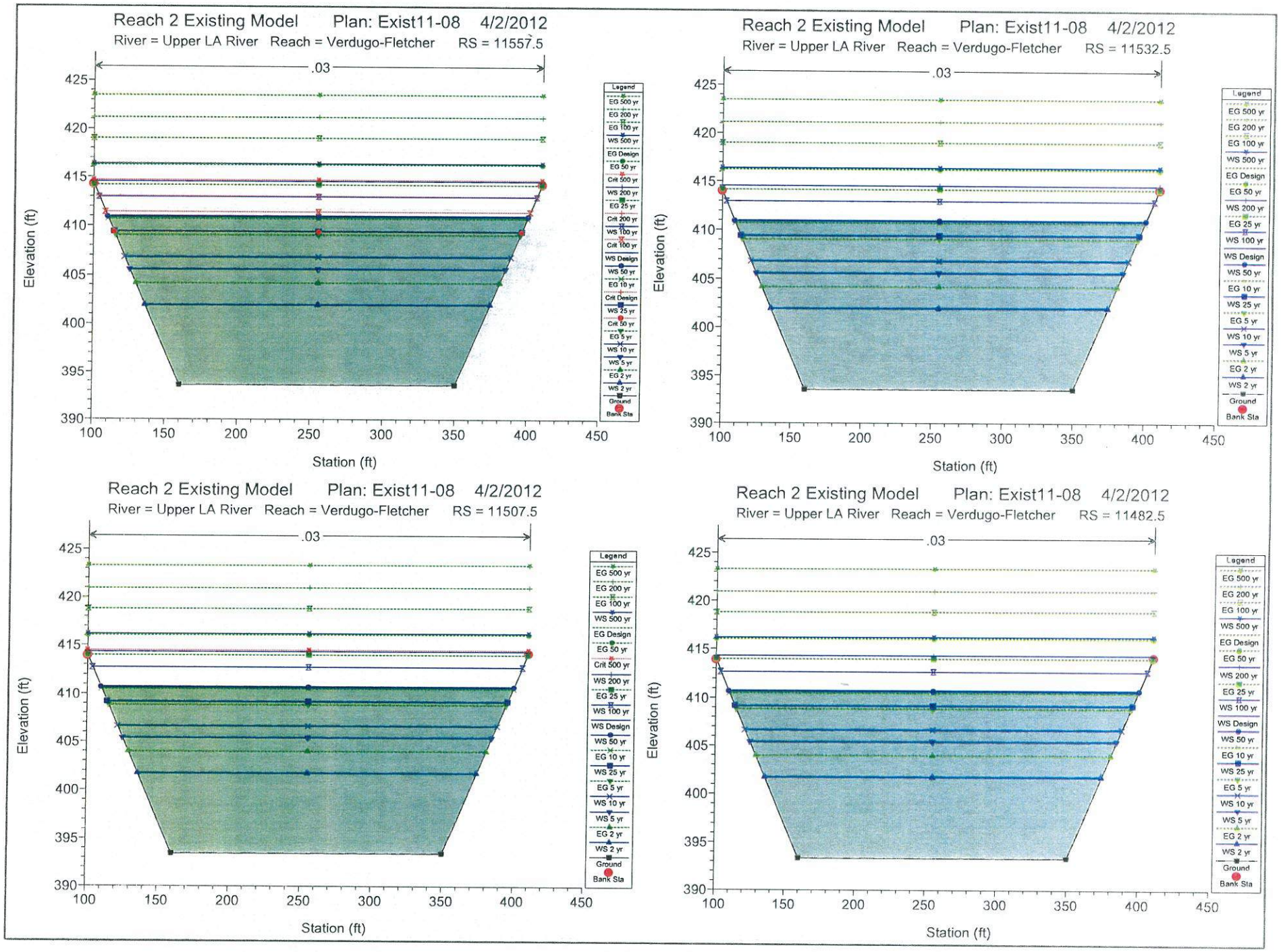
River = Upper LA River Reach = Verdugo-Fletcher RS = 11682.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11657.5*
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11629
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11593
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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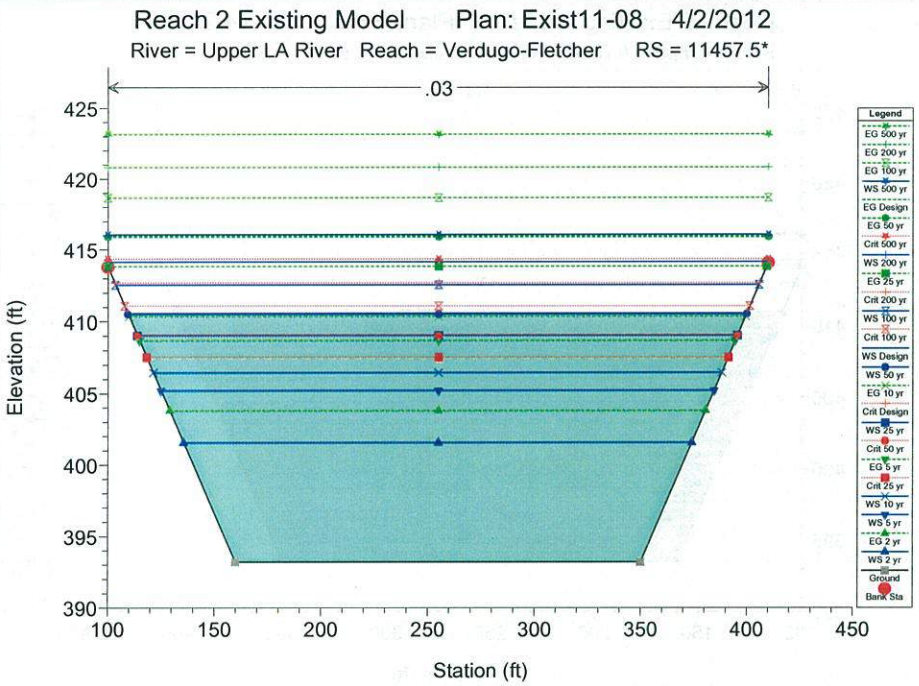
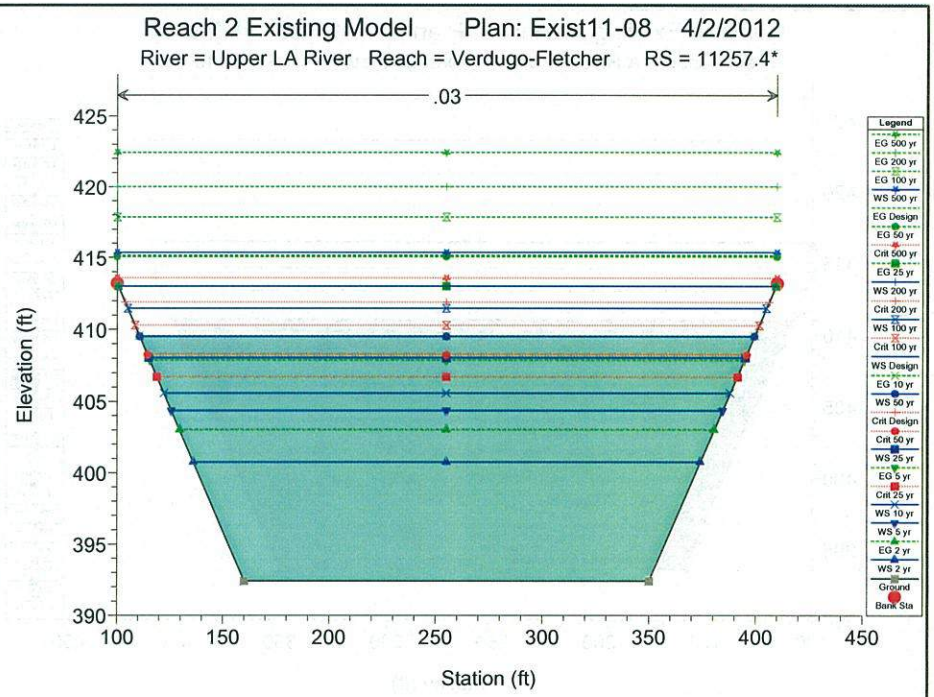
River = Upper LA River Reach = Verdugo-Fletcher RS = 11557.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11532.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11507.5
Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11482.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
WS 100 yr
Crit 200 yr
WS Design
WS 50 yr
EG 10 yr
Crit Design
WS 25 yr
Crit 50 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11457.5*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
WS 200 yr
EG 25 yr
Crit 200 yr
WS 100 yr
Crit 100 yr
WS Design
WS 50 yr
EG 10 yr
Crit Design
WS 25 yr
Crit 50 yr
EG 5 yr
Crit 25 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Reach 2 Existing Model Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11257.4*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
EG 25 yr
WS 200 yr
Crit 200 yr
WS 100 yr
Crit 100 yr
WS Design
EG 10 yr
WS 50 yr
Crit Design
Crit 50 yr
WS 25 yr
EG 5 yr
Crit 25 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta

Proposed Conditions

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher

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)	
Verdugo-Fletcher	15148.5*	Design	78000.00	407.98	425.47	423.87	430.80	0.004087	18.53	4208.41	291.29	0.86
Verdugo-Fletcher	15148.5*	2 yr	21600.00	407.98	416.33	415.06	418.60	0.004109	12.08	1788.78	238.37	0.78
Verdugo-Fletcher	15148.5*	5 yr	40500.00	407.98	420.01	418.55	423.49	0.004096	14.97	2705.79	259.70	0.82
Verdugo-Fletcher	15148.5*	10 yr	48200.00	407.98	421.28	419.77	425.19	0.004095	15.86	3039.08	267.03	0.83
Verdugo-Fletcher	15148.5*	25 yr	65800.00	407.98	423.87	422.29	428.65	0.004087	17.55	3749.18	282.01	0.85
Verdugo-Fletcher	15148.5*	50 yr	77500.00	407.98	425.40	423.81	430.72	0.004087	18.50	4189.98	290.92	0.86
Verdugo-Fletcher	15148.5*	100 yr	94600.00	407.98	427.47	425.86	433.49	0.004084	19.70	4803.03	302.88	0.87
Verdugo-Fletcher	15148.5*	200 yr	109000.00	407.98	429.04	427.47	435.64	0.004083	20.63	5284.60	310.00	0.88
Verdugo-Fletcher	15148.5*	500 yr	125000.00	407.98	430.57	429.10	437.88	0.004084	21.71	5758.93	310.00	0.89
Verdugo-Fletcher	14930.4*	Design	78000.00	407.08	424.59	422.97	429.91	0.004073	18.51	4213.35	291.38	0.86
Verdugo-Fletcher	14930.4*	2 yr	21600.00	407.08	415.44		417.70	0.004099	12.07	1790.19	238.40	0.78
Verdugo-Fletcher	14930.4*	5 yr	40500.00	407.08	419.12		422.60	0.004086	14.96	2708.06	259.75	0.82
Verdugo-Fletcher	14930.4*	10 yr	48200.00	407.08	420.39		424.29	0.004079	15.84	3042.91	267.11	0.83
Verdugo-Fletcher	14930.4*	25 yr	65800.00	407.08	422.98		427.75	0.004072	17.53	3753.95	282.10	0.85
Verdugo-Fletcher	14930.4*	50 yr	77500.00	407.08	424.52	422.91	429.82	0.004073	18.47	4194.91	291.02	0.86
Verdugo-Fletcher	14930.4*	100 yr	94600.00	407.08	426.59	424.96	432.60	0.004065	19.67	4810.41	303.02	0.87
Verdugo-Fletcher	14930.4*	200 yr	109000.00	407.08	428.16	426.57	434.75	0.004069	20.60	5290.35	310.00	0.88
Verdugo-Fletcher	14930.4*	500 yr	125000.00	407.08	429.69	428.20	436.99	0.004066	21.68	5766.57	310.00	0.89
Verdugo-Fletcher	14712.3*	Design	78000.00	406.18	423.72	422.07	429.02	0.004042	18.46	4224.32	291.60	0.85
Verdugo-Fletcher	14712.3*	2 yr	21600.00	406.18	414.55		416.80	0.004075	12.04	1793.62	238.49	0.77
Verdugo-Fletcher	14712.3*	5 yr	40500.00	406.18	418.25		421.70	0.004057	14.92	2714.39	259.89	0.81
Verdugo-Fletcher	14712.3*	10 yr	48200.00	406.18	419.52		423.40	0.004050	15.80	3050.34	267.27	0.82
Verdugo-Fletcher	14712.3*	25 yr	65800.00	406.18	422.11		426.86	0.004044	17.49	3762.77	282.29	0.84
Verdugo-Fletcher	14712.3*	50 yr	77500.00	406.18	423.66	422.01	428.93	0.004042	18.43	4205.83	291.23	0.85
Verdugo-Fletcher	14712.3*	100 yr	94600.00	406.18	425.74	424.06	431.71	0.004034	19.61	4823.26	303.26	0.87
Verdugo-Fletcher	14712.3*	200 yr	109000.00	406.18	427.30	425.67	433.86	0.004037	20.55	5303.23	310.00	0.88
Verdugo-Fletcher	14712.3*	500 yr	125000.00	406.18	428.84	427.31	436.10	0.004032	21.62	5782.13	310.00	0.88
Verdugo-Fletcher	14494.1*	Design	78000.00	405.29	422.86	421.18	428.13	0.004021	18.43	4231.99	291.79	0.85
Verdugo-Fletcher	14494.1*	2 yr	21600.00	405.29	413.66		415.91	0.004071	12.04	1794.24	238.52	0.77
Verdugo-Fletcher	14494.1*	5 yr	40500.00	405.29	417.36		420.82	0.004049	14.91	2716.51	259.96	0.81
Verdugo-Fletcher	14494.1*	10 yr	48200.00	405.29	418.64		422.51	0.004039	15.79	3053.14	267.36	0.82
Verdugo-Fletcher	14494.1*	25 yr	65800.00	405.29	421.24		425.98	0.004028	17.46	3768.08	282.43	0.84
Verdugo-Fletcher	14494.1*	50 yr	77500.00	405.29	422.79	421.12	428.05	0.004021	18.39	4213.50	291.43	0.85
Verdugo-Fletcher	14494.1*	100 yr	94600.00	405.29	424.88	423.17	430.83	0.004012	19.57	4832.77	303.49	0.86
Verdugo-Fletcher	14494.1*	200 yr	109000.00	405.29	426.44	424.78	432.97	0.004009	20.51	5315.00	310.00	0.87
Verdugo-Fletcher	14494.1*	500 yr	125000.00	405.29	427.99	426.46	435.22	0.004004	21.57	5794.94	310.00	0.88
Verdugo-Fletcher	14276.0*	Design	78000.00	404.39	421.99		427.25	0.003996	18.40	4238.44	291.52	0.85
Verdugo-Fletcher	14276.0*	2 yr	21600.00	404.39	412.79		415.03	0.004026	12.00	1800.08	238.45	0.77
Verdugo-Fletcher	14276.0*	5 yr	40500.00	404.39	416.50		419.93	0.004016	14.88	2722.60	259.81	0.81
Verdugo-Fletcher	14276.0*	10 yr	48200.00	404.39	417.78		421.63	0.004002	15.75	3061.19	267.22	0.82
Verdugo-Fletcher	14276.0*	25 yr	65800.00	404.39	420.38		425.10	0.003999	17.43	3775.29	282.21	0.84

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	14276.0*	50 yr	77500.00	404.39	421.93		427.17	0.003996	18.36	4220.04	291.15	0.85
Verdugo-Fletcher	14276.0*	100 yr	94600.00	404.39	424.00	422.28	429.95	0.003996	19.56	4836.16	303.11	0.86
Verdugo-Fletcher	14276.0*	200 yr	109000.00	404.39	425.57	423.89	432.09	0.004003	20.50	5316.68	310.00	0.87
Verdugo-Fletcher	14276.0*	500 yr	125000.00	404.39	427.12	425.56	434.34	0.003997	21.56	5797.38	310.00	0.88
Verdugo-Fletcher	14057.90 28000	Design	78000.00	403.50	421.17		426.38	0.003940	18.31	4259.01	291.97	0.85
Verdugo-Fletcher	14057.90 28000	2 yr	21600.00	403.50	411.95		414.16	0.003943	11.92	1812.33	238.77	0.76
Verdugo-Fletcher	14057.90 28000	5 yr	40500.00	403.50	415.67		419.06	0.003942	14.78	2739.57	260.21	0.80
Verdugo-Fletcher	14057.90 28000	10 yr	48200.00	403.50	416.95		420.76	0.003943	15.67	3076.40	267.58	0.81
Verdugo-Fletcher	14057.90 28000	25 yr	65800.00	403.50	419.56		424.23	0.003940	17.34	3794.32	282.63	0.83
Verdugo-Fletcher	14057.90 28000	50 yr	77500.00	403.50	421.11		426.30	0.003940	18.28	4240.67	291.60	0.84
Verdugo-Fletcher	14057.90 28000	100 yr	94600.00	403.50	423.19	421.39	429.08	0.003939	19.46	4860.45	303.62	0.86
Verdugo-Fletcher	14057.90 28000	200 yr	109000.00	403.50	424.76	423.00	431.22	0.003945	20.41	5341.16	310.00	0.87
Verdugo-Fletcher	14057.90 28000	500 yr	125000.00	403.50	426.31	424.67	433.47	0.003940	21.46	5823.53	310.00	0.87
Verdugo-Fletcher	13835.6*	Design	78000.00	402.62	420.30		425.50	0.003933	18.30	4262.19	292.11	0.84
Verdugo-Fletcher	13835.6*	2 yr	21600.00	402.62	411.08		413.28	0.003933	11.91	1814.04	238.86	0.76
Verdugo-Fletcher	13835.6*	5 yr	40500.00	402.62	414.80		418.19	0.003934	14.77	2741.72	260.32	0.80
Verdugo-Fletcher	13835.6*	10 yr	48200.00	402.62	416.07		419.88	0.003936	15.66	3078.62	267.69	0.81
Verdugo-Fletcher	13835.6*	25 yr	65800.00	402.62	418.68		423.35	0.003933	17.33	3797.19	282.77	0.83
Verdugo-Fletcher	13835.6*	50 yr	77500.00	402.62	420.24		425.42	0.003932	18.26	4243.88	291.75	0.84
Verdugo-Fletcher	13835.6*	100 yr	94600.00	402.62	422.32	420.50	428.20	0.003932	19.45	4864.16	303.78	0.86
Verdugo-Fletcher	13835.6*	200 yr	109000.00	402.62	423.88	422.12	430.34	0.003937	20.39	5344.70	310.00	0.87
Verdugo-Fletcher	13835.6*	500 yr	125000.00	402.62	425.44	423.78	432.58	0.003932	21.45	5827.47	310.00	0.87
Verdugo-Fletcher	13613.4*	Design	78000.00	401.75	419.43		424.63	0.003934	18.30	4262.44	292.24	0.84
Verdugo-Fletcher	13613.4*	2 yr	21600.00	401.75	410.20		412.41	0.003946	11.92	1812.24	238.88	0.76
Verdugo-Fletcher	13613.4*	5 yr	40500.00	401.75	413.92		417.31	0.003940	14.78	2740.57	260.38	0.80
Verdugo-Fletcher	13613.4*	10 yr	48200.00	401.75	415.20		419.00	0.003942	15.66	3077.40	267.76	0.81
Verdugo-Fletcher	13613.4*	25 yr	65800.00	401.75	417.81		422.47	0.003935	17.33	3797.07	282.88	0.83
Verdugo-Fletcher	13613.4*	50 yr	77500.00	401.75	419.37		424.54	0.003933	18.26	4244.25	291.88	0.84
Verdugo-Fletcher	13613.4*	100 yr	94600.00	401.75	421.45	419.63	427.32	0.003931	19.44	4865.37	303.93	0.86
Verdugo-Fletcher	13613.4*	200 yr	109000.00	401.75	423.01	421.24	429.47	0.003935	20.39	5345.65	310.00	0.87
Verdugo-Fletcher	13613.4*	500 yr	125000.00	401.75	424.57	422.91	431.71	0.003928	21.44	5829.36	310.00	0.87
Verdugo-Fletcher	13391.1*	Design	78000.00	400.87	418.56		423.75	0.003926	18.28	4266.09	292.39	0.84
Verdugo-Fletcher	13391.1*	2 yr	21600.00	400.87	409.33		411.53	0.003937	11.91	1813.74	238.95	0.76
Verdugo-Fletcher	13391.1*	5 yr	40500.00	400.87	413.05		416.43	0.003932	14.77	2742.85	260.49	0.80
Verdugo-Fletcher	13391.1*	10 yr	48200.00	400.87	414.32		418.13	0.003935	15.65	3079.69	267.87	0.81
Verdugo-Fletcher	13391.1*	25 yr	65800.00	400.87	416.94		421.59	0.003926	17.31	3800.36	283.02	0.83
Verdugo-Fletcher	13391.1*	50 yr	77500.00	400.87	418.50		423.66	0.003924	18.24	4247.97	292.03	0.84
Verdugo-Fletcher	13391.1*	100 yr	94600.00	400.87	420.59	418.75	426.44	0.003918	19.42	4871.68	304.14	0.86
Verdugo-Fletcher	13391.1*	200 yr	109000.00	400.87	422.15	420.36	428.59	0.003921	20.37	5351.92	310.00	0.86
Verdugo-Fletcher	13391.1*	500 yr	125000.00	400.87	423.72	422.03	430.83	0.003909	21.41	5838.53	310.00	0.87

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	13168.9*	Design	78000.00	399.99	417.70		422.87	0.003905	18.25	4274.17	292.63	0.84
Verdugo-Fletcher	13168.9*	2 yr	21600.00	399.99	408.46		410.65	0.003923	11.89	1815.99	239.05	0.76
Verdugo-Fletcher	13168.9*	5 yr	40500.00	399.99	412.18		415.56	0.003914	14.74	2747.18	260.65	0.80
Verdugo-Fletcher	13168.9*	10 yr	48200.00	399.99	413.46		417.25	0.003920	15.63	3083.91	268.03	0.81
Verdugo-Fletcher	13168.9*	25 yr	65800.00	399.99	416.08		420.72	0.003910	17.29	3806.19	283.21	0.83
Verdugo-Fletcher	13168.9*	50 yr	77500.00	399.99	417.64		422.79	0.003903	18.21	4256.28	292.28	0.84
Verdugo-Fletcher	13168.9*	100 yr	94600.00	399.99	419.74		425.57	0.003895	19.38	4881.99	304.43	0.85
Verdugo-Fletcher	13168.9*	200 yr	109000.00	399.99	421.30		427.71	0.003892	20.32	5364.48	310.00	0.86
Verdugo-Fletcher	13168.9*	500 yr	125000.00	399.99	422.88		429.96	0.003878	21.35	5853.48	310.00	0.87
Verdugo-Fletcher	12946.6*	Design	78000.00	399.12	416.82		422.01	0.003915	18.27	4269.05	292.24	0.84
Verdugo-Fletcher	12946.6*	2 yr	21600.00	399.12	407.58		409.78	0.003937	11.91	1813.39	238.84	0.76
Verdugo-Fletcher	12946.6*	5 yr	40500.00	399.12	411.31		414.69	0.003922	14.76	2744.44	260.38	0.80
Verdugo-Fletcher	12946.6*	10 yr	48200.00	399.12	412.58		416.38	0.003932	15.65	3079.60	267.71	0.81
Verdugo-Fletcher	12946.6*	25 yr	65800.00	399.12	415.20		419.85	0.003919	17.31	3801.74	282.86	0.83
Verdugo-Fletcher	12946.6*	50 yr	77500.00	399.12	416.76		421.92	0.003912	18.23	4251.38	291.90	0.84
Verdugo-Fletcher	12946.6*	100 yr	94600.00	399.12	418.86	417.01	424.71	0.003903	19.40	4876.31	304.01	0.85
Verdugo-Fletcher	12946.6*	200 yr	109000.00	399.12	420.43	418.62	426.85	0.003906	20.34	5358.04	310.00	0.86
Verdugo-Fletcher	12946.6*	500 yr	125000.00	399.12	422.01	420.28	429.10	0.003888	21.37	5848.23	310.00	0.87
Verdugo-Fletcher	12724.4*	Design	78000.00	398.24	415.98		421.14	0.003885	18.22	4280.76	292.56	0.84
Verdugo-Fletcher	12724.4*	2 yr	21600.00	398.24	406.71		408.90	0.003923	11.90	1815.61	238.94	0.76
Verdugo-Fletcher	12724.4*	5 yr	40500.00	398.24	410.45		413.81	0.003900	14.73	2749.88	260.56	0.80
Verdugo-Fletcher	12724.4*	10 yr	48200.00	398.24	411.71		415.50	0.003922	15.64	3082.67	267.84	0.81
Verdugo-Fletcher	12724.4*	25 yr	65800.00	398.24	414.35		418.98	0.003894	17.27	3810.29	283.11	0.83
Verdugo-Fletcher	12724.4*	50 yr	77500.00	398.24	415.92		421.05	0.003886	18.19	4261.67	292.18	0.84
Verdugo-Fletcher	12724.4*	100 yr	94600.00	398.24	418.03		423.84	0.003865	19.33	4893.40	304.42	0.85
Verdugo-Fletcher	12724.4*	200 yr	109000.00	398.24	419.60	417.74	425.98	0.003865	20.28	5375.97	310.00	0.86
Verdugo-Fletcher	12724.4*	500 yr	125000.00	398.24	421.20	419.39	428.24	0.003837	21.29	5872.62	310.00	0.86
Verdugo-Fletcher	12502.1*	Design	78000.00	397.36	415.17		420.27	0.003834	18.14	4300.34	293.03	0.83
Verdugo-Fletcher	12502.1*	2 yr	21600.00	397.36	405.85		408.03	0.003883	11.86	1821.82	239.13	0.76
Verdugo-Fletcher	12502.1*	5 yr	40500.00	397.36	409.61		412.95	0.003851	14.66	2761.75	260.88	0.79
Verdugo-Fletcher	12502.1*	10 yr	48200.00	397.36	410.85		414.63	0.003895	15.60	3089.97	268.06	0.81
Verdugo-Fletcher	12502.1*	25 yr	65800.00	397.36	413.52		418.11	0.003852	17.20	3824.92	283.48	0.83
Verdugo-Fletcher	12502.1*	50 yr	77500.00	397.36	415.10		420.19	0.003836	18.10	4280.99	292.64	0.83
Verdugo-Fletcher	12502.1*	100 yr	94600.00	397.36	417.24		422.98	0.003803	19.22	4921.27	305.04	0.84
Verdugo-Fletcher	12502.1*	200 yr	109000.00	397.36	418.84		425.13	0.003777	20.13	5415.14	310.00	0.85
Verdugo-Fletcher	12502.1*	500 yr	125000.00	397.36	420.47	418.51	427.39	0.003739	21.11	5920.89	310.00	0.85
Verdugo-Fletcher	12279.9*	Design	78000.00	396.49	414.39		419.43	0.003762	18.02	4328.96	293.71	0.83
Verdugo-Fletcher	12279.9*	2 yr	21600.00	396.49	405.00		407.17	0.003855	11.83	1826.39	239.30	0.75
Verdugo-Fletcher	12279.9*	5 yr	40500.00	396.49	408.79		412.10	0.003798	14.60	2774.73	261.26	0.79
Verdugo-Fletcher	12279.9*	10 yr	48200.00	396.49	409.99		413.76	0.003886	15.58	3092.91	268.22	0.81
Verdugo-Fletcher	12279.9*	25 yr	65800.00	396.49	412.70		417.26	0.003809	17.14	3840.04	283.90	0.82

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	12279.9*	50 yr	77500.00	396.49	414.32		419.34	0.003764	17.98	4309.20	293.32	0.83
Verdugo-Fletcher	12279.9*	100 yr	94600.00	396.49	416.50		422.14	0.003714	19.06	4962.24	305.95	0.83
Verdugo-Fletcher	12279.9*	200 yr	109000.00	396.49	418.13		424.31	0.003665	19.94	5466.83	310.00	0.84
Verdugo-Fletcher	12279.9*	500 yr	125000.00	396.49	419.80		426.58	0.003617	20.89	5983.09	310.00	0.84
Verdugo-Fletcher	12057.66 26000	Design	78000.00	395.61	413.69		418.61	0.003626	17.79	4384.22	294.89	0.81
Verdugo-Fletcher	12057.66 26000	2 yr	21600.00	395.61	404.21		406.33	0.003720	11.69	1847.75	239.86	0.74
Verdugo-Fletcher	12057.66 26000	5 yr	40500.00	395.61	408.04		411.27	0.003656	14.41	2810.60	262.11	0.78
Verdugo-Fletcher	12057.66 26000	10 yr	48200.00	395.61	409.18		412.91	0.003812	15.48	3113.04	268.72	0.80
Verdugo-Fletcher	12057.66 26000	25 yr	65800.00	395.61	411.96		416.42	0.003692	16.95	3881.41	284.82	0.81
Verdugo-Fletcher	12057.66 26000	50 yr	77500.00	395.61	413.62		418.52	0.003629	17.76	4363.83	294.48	0.81
Verdugo-Fletcher	12057.66 26000	100 yr	94600.00	395.61	415.85		421.33	0.003564	18.79	5033.63	307.39	0.82
Verdugo-Fletcher	12057.66 26000	200 yr	109000.00	395.61	417.53		423.51	0.003487	19.63	5552.84	310.00	0.82
Verdugo-Fletcher	12057.66 26000	500 yr	125000.00	395.61	419.23		425.79	0.003438	20.56	6079.83	310.00	0.82
Verdugo-Fletcher	12032.6	Design	78000.00	395.51	413.60		418.51	0.003620	17.78	4386.96	294.94	0.81
Verdugo-Fletcher	12032.6	2 yr	21600.00	395.51	404.11		406.23	0.003710	11.68	1849.44	239.90	0.74
Verdugo-Fletcher	12032.6	5 yr	40500.00	395.51	407.95		411.17	0.003647	14.40	2812.86	262.16	0.77
Verdugo-Fletcher	12032.6	10 yr	48200.00	395.51	409.09		412.81	0.003808	15.48	3114.27	268.75	0.80
Verdugo-Fletcher	12032.6	25 yr	65800.00	395.51	411.87		416.32	0.003685	16.94	3883.59	284.87	0.81
Verdugo-Fletcher	12032.6	50 yr	77500.00	395.51	413.53		418.43	0.003622	17.75	4366.55	294.54	0.81
Verdugo-Fletcher	12032.6	100 yr	94600.00	395.51	415.77		421.24	0.003554	18.78	5038.55	307.49	0.82
Verdugo-Fletcher	12032.6	200 yr	109000.00	395.51	417.45		423.42	0.003476	19.61	5558.69	310.00	0.82
Verdugo-Fletcher	12032.6	500 yr	125000.00	395.51	419.15		425.70	0.003424	20.53	6087.84	310.00	0.82
Verdugo-Fletcher	12007.6	Design	78000.00	395.41	413.51		418.41	0.003613	17.77	4389.82	295.00	0.81
Verdugo-Fletcher	12007.6	2 yr	21600.00	395.41	404.02		406.14	0.003698	11.67	1851.25	239.95	0.74
Verdugo-Fletcher	12007.6	5 yr	40500.00	395.41	407.86		411.07	0.003637	14.39	2815.24	262.22	0.77
Verdugo-Fletcher	12007.6	10 yr	48200.00	395.41	408.99		412.71	0.003803	15.47	3115.60	268.78	0.80
Verdugo-Fletcher	12007.6	25 yr	65800.00	395.41	411.77		416.23	0.003679	16.93	3885.87	284.91	0.81
Verdugo-Fletcher	12007.6	50 yr	77500.00	395.41	413.44		418.33	0.003616	17.74	4369.38	294.59	0.81
Verdugo-Fletcher	12007.6	100 yr	94600.00	395.41	415.68		421.15	0.003544	18.76	5043.68	307.58	0.82
Verdugo-Fletcher	12007.6	200 yr	109000.00	395.41	417.37		423.32	0.003461	19.58	5566.25	310.00	0.81
Verdugo-Fletcher	12007.6	500 yr	125000.00	395.41	419.08		425.61	0.003409	20.50	6096.13	310.00	0.81
Verdugo-Fletcher	11982.6	Design	78000.00	395.31	413.42		418.32	0.003612	17.77	4388.95	294.77	0.81
Verdugo-Fletcher	11982.6	2 yr	21600.00	395.31	403.93		406.04	0.003690	11.66	1852.32	239.87	0.74
Verdugo-Fletcher	11982.6	5 yr	40500.00	395.31	407.77		410.98	0.003632	14.38	2815.94	262.08	0.77
Verdugo-Fletcher	11982.6	10 yr	48200.00	395.31	408.89		412.61	0.003803	15.47	3114.83	268.60	0.80
Verdugo-Fletcher	11982.6	25 yr	65800.00	395.31	411.68		416.13	0.003678	16.94	3885.12	284.71	0.81
Verdugo-Fletcher	11982.6	50 yr	77500.00	395.31	413.35		418.24	0.003615	17.74	4368.50	294.37	0.81
Verdugo-Fletcher	11982.6	100 yr	94600.00	395.31	415.59		421.05	0.003543	18.76	5042.47	307.33	0.82
Verdugo-Fletcher	11982.6	200 yr	109000.00	395.31	417.28		423.23	0.003461	19.59	5565.47	310.00	0.81
Verdugo-Fletcher	11982.6	500 yr	125000.00	395.31	418.99		425.52	0.003409	20.51	6095.74	310.00	0.81

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11957.6	Design	78000.00	395.21	413.32		418.23	0.003611	17.78	4387.99	294.54	0.81
Verdugo-Fletcher	11957.6	2 yr	21600.00	395.21	403.83		405.94	0.003681	11.65	1853.43	239.78	0.74
Verdugo-Fletcher	11957.6	5 yr	40500.00	395.21	407.67		410.88	0.003627	14.38	2816.64	261.95	0.77
Verdugo-Fletcher	11957.6	10 yr	48200.00	395.21	408.80		412.52	0.003803	15.48	3114.03	268.42	0.80
Verdugo-Fletcher	11957.6	25 yr	65800.00	395.21	411.58		416.04	0.003678	16.94	3884.30	284.50	0.81
Verdugo-Fletcher	11957.6	50 yr	77500.00	395.21	413.25		418.14	0.003614	17.74	4367.55	294.14	0.81
Verdugo-Fletcher	11957.6	100 yr	94600.00	395.21	415.49		420.96	0.003543	18.77	5041.17	307.08	0.82
Verdugo-Fletcher	11957.6	200 yr	109000.00	395.21	417.18		423.14	0.003462	19.59	5564.66	310.00	0.81
Verdugo-Fletcher	11957.6	500 yr	125000.00	395.21	418.90		425.43	0.003409	20.51	6095.35	310.00	0.82
Verdugo-Fletcher	11932.6	Design	78000.00	395.11	413.23		418.14	0.003610	17.78	4387.16	294.32	0.81
Verdugo-Fletcher	11932.6	2 yr	21600.00	395.11	403.74		405.85	0.003672	11.65	1854.61	239.71	0.74
Verdugo-Fletcher	11932.6	5 yr	40500.00	395.11	407.58		410.79	0.003621	14.37	2817.42	261.82	0.77
Verdugo-Fletcher	11932.6	10 yr	48200.00	395.11	408.70		412.42	0.003803	15.48	3113.29	268.25	0.80
Verdugo-Fletcher	11932.6	25 yr	65800.00	395.11	411.49		415.94	0.003677	16.94	3883.57	284.30	0.81
Verdugo-Fletcher	11932.6	50 yr	77500.00	395.11	413.16		418.05	0.003613	17.75	4366.71	293.92	0.81
Verdugo-Fletcher	11932.6	100 yr	94600.00	395.11	415.40		420.87	0.003542	18.77	5040.01	306.83	0.82
Verdugo-Fletcher	11932.6	200 yr	109000.00	395.11	417.09		423.05	0.003463	19.59	5563.86	310.00	0.81
Verdugo-Fletcher	11932.6	500 yr	125000.00	395.11	418.80		425.34	0.003409	20.51	6094.96	310.00	0.82
Verdugo-Fletcher	11907.6	Design	78000.00	395.01	413.14		418.04	0.003603	17.77	4390.07	294.38	0.81
Verdugo-Fletcher	11907.6	2 yr	21600.00	395.01	403.65		405.75	0.003660	11.63	1856.64	239.76	0.74
Verdugo-Fletcher	11907.6	5 yr	40500.00	395.01	407.49		410.69	0.003612	14.36	2819.96	261.87	0.77
Verdugo-Fletcher	11907.6	10 yr	48200.00	395.01	408.60		412.32	0.003798	15.48	3114.64	268.27	0.80
Verdugo-Fletcher	11907.6	25 yr	65800.00	395.01	411.39		415.85	0.003670	16.93	3885.91	284.35	0.81
Verdugo-Fletcher	11907.6	50 yr	77500.00	395.01	413.07		417.95	0.003606	17.74	4369.60	293.98	0.81
Verdugo-Fletcher	11907.6	100 yr	94600.00	395.01	415.32		420.77	0.003531	18.75	5045.25	306.93	0.82
Verdugo-Fletcher	11907.6	200 yr	109000.00	395.01	417.02		422.96	0.003448	19.56	5571.56	310.00	0.81
Verdugo-Fletcher	11907.6	500 yr	125000.00	395.01	418.73		425.25	0.003394	20.48	6103.43	310.00	0.81
Verdugo-Fletcher	11882.6	Design	78000.00	394.91	413.05		417.94	0.003592	17.75	4394.43	294.47	0.81
Verdugo-Fletcher	11882.6	2 yr	21600.00	394.91	403.56		405.66	0.003647	11.62	1858.76	239.81	0.74
Verdugo-Fletcher	11882.6	5 yr	40500.00	394.91	407.40		410.60	0.003602	14.35	2822.56	261.93	0.77
Verdugo-Fletcher	11882.6	10 yr	48200.00	394.91	408.51		412.22	0.003793	15.47	3116.03	268.30	0.80
Verdugo-Fletcher	11882.6	25 yr	65800.00	394.91	411.30		415.75	0.003663	16.92	3888.30	284.40	0.81
Verdugo-Fletcher	11882.6	50 yr	77500.00	394.91	412.98		417.86	0.003595	17.72	4373.94	294.07	0.81
Verdugo-Fletcher	11882.6	100 yr	94600.00	394.91	415.23		420.68	0.003520	18.73	5050.63	307.03	0.81
Verdugo-Fletcher	11882.6	200 yr	109000.00	394.91	416.94		422.87	0.003432	19.54	5579.49	310.00	0.81
Verdugo-Fletcher	11882.6	500 yr	125000.00	394.91	418.66		425.15	0.003379	20.45	6112.11	310.00	0.81
Verdugo-Fletcher	11857.6*	Design	78000.00	394.81	412.98		417.85	0.003570	17.71	4405.11	294.89	0.81
Verdugo-Fletcher	11857.6*	2 yr	21600.00	394.81	403.47		405.56	0.003625	11.60	1862.75	240.01	0.73
Verdugo-Fletcher	11857.6*	5 yr	40500.00	394.81	407.32		410.50	0.003582	14.32	2828.42	262.21	0.77
Verdugo-Fletcher	11857.6*	10 yr	48200.00	394.81	408.42		412.12	0.003783	15.45	3119.62	268.54	0.80
Verdugo-Fletcher	11857.6*	25 yr	65800.00	394.81	411.22		415.65	0.003646	16.89	3895.61	284.74	0.80

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11857.6*	50 yr	77500.00	394.81	412.91		417.76	0.003573	17.68	4384.55	294.48	0.81
Verdugo-Fletcher	11857.6*	100 yr	94600.00	394.81	415.17		420.59	0.003494	18.68	5065.51	307.54	0.81
Verdugo-Fletcher	11857.6*	200 yr	109000.00	394.81	416.89		422.78	0.003401	19.48	5596.00	310.00	0.81
Verdugo-Fletcher	11857.6*	500 yr	125000.00	394.81	418.61		425.06	0.003349	20.39	6129.46	310.00	0.81
Verdugo-Fletcher	11832.5	Design	78000.00	394.71	412.91		417.75	0.003548	17.66	4415.75	295.30	0.80
Verdugo-Fletcher	11832.5	2 yr	21600.00	394.71	403.39		405.47	0.003603	11.57	1866.77	240.21	0.73
Verdugo-Fletcher	11832.5	5 yr	40500.00	394.71	407.24		410.41	0.003562	14.29	2834.26	262.49	0.77
Verdugo-Fletcher	11832.5	10 yr	48200.00	394.71	408.32		412.02	0.003773	15.43	3123.11	268.78	0.80
Verdugo-Fletcher	11832.5	25 yr	65800.00	394.71	411.14		415.55	0.003629	16.86	3902.84	285.07	0.80
Verdugo-Fletcher	11832.5	50 yr	77500.00	394.71	412.84		417.67	0.003551	17.63	4395.09	294.89	0.80
Verdugo-Fletcher	11832.5	100 yr	94600.00	394.71	415.11		420.50	0.003467	18.62	5080.34	308.05	0.81
Verdugo-Fletcher	11832.5	200 yr	109000.00	394.71	416.83		422.69	0.003370	19.42	5612.69	310.00	0.80
Verdugo-Fletcher	11832.5	500 yr	125000.00	394.71	418.55		424.97	0.003320	20.34	6146.96	310.00	0.80
Verdugo-Fletcher	11807.5	Design	78000.00	394.61	412.84		417.66	0.003524	17.62	4427.06	295.73	0.80
Verdugo-Fletcher	11807.5	2 yr	21600.00	394.61	403.30		405.37	0.003579	11.54	1871.14	240.43	0.73
Verdugo-Fletcher	11807.5	5 yr	40500.00	394.61	407.16		410.31	0.003541	14.26	2840.50	262.78	0.76
Verdugo-Fletcher	11807.5	10 yr	48200.00	394.61	408.23		411.92	0.003762	15.41	3126.86	269.02	0.80
Verdugo-Fletcher	11807.5	25 yr	65800.00	394.61	411.07		415.46	0.003607	16.82	3911.90	285.45	0.80
Verdugo-Fletcher	11807.5	50 yr	77500.00	394.61	412.77		417.57	0.003528	17.59	4406.30	295.33	0.80
Verdugo-Fletcher	11807.5	100 yr	94600.00	394.61	415.05		420.40	0.003439	18.56	5096.03	308.57	0.80
Verdugo-Fletcher	11807.5	200 yr	109000.00	394.61	416.78		422.60	0.003337	19.36	5629.94	310.00	0.80
Verdugo-Fletcher	11807.5	500 yr	125000.00	394.61	418.51		424.89	0.003287	20.27	6166.42	310.00	0.80
Verdugo-Fletcher	11782.5	Design	78000.00	394.51	412.77		417.56	0.003501	17.57	4438.49	296.16	0.80
Verdugo-Fletcher	11782.5	2 yr	21600.00	394.51	403.22		405.28	0.003555	11.52	1875.67	240.65	0.73
Verdugo-Fletcher	11782.5	5 yr	40500.00	394.51	407.08		410.22	0.003516	14.22	2847.96	263.09	0.76
Verdugo-Fletcher	11782.5	10 yr	48200.00	394.51	408.14		411.82	0.003752	15.40	3130.62	269.27	0.80
Verdugo-Fletcher	11782.5	25 yr	65800.00	394.51	410.99		415.36	0.003585	16.78	3921.09	285.83	0.80
Verdugo-Fletcher	11782.5	50 yr	77500.00	394.51	412.70		417.48	0.003504	17.54	4417.64	295.75	0.80
Verdugo-Fletcher	11782.5	100 yr	94600.00	394.51	414.99		420.31	0.003411	18.51	5111.88	309.10	0.80
Verdugo-Fletcher	11782.5	200 yr	109000.00	394.51	416.72		422.51	0.003305	19.30	5647.56	310.00	0.80
Verdugo-Fletcher	11782.5	500 yr	125000.00	394.51	418.46		424.80	0.003255	20.21	6186.24	310.00	0.80
Verdugo-Fletcher	11757.5	Design	78000.00	394.41	412.69		417.47	0.003488	17.55	4443.95	296.27	0.80
Verdugo-Fletcher	11757.5	2 yr	21600.00	394.41	403.14		405.19	0.003532	11.49	1879.49	240.74	0.72
Verdugo-Fletcher	11757.5	5 yr	40500.00	394.41	407.00		410.13	0.003499	14.20	2852.57	263.19	0.76
Verdugo-Fletcher	11757.5	10 yr	48200.00	394.41	408.05		411.73	0.003745	15.39	3132.34	269.30	0.80
Verdugo-Fletcher	11757.5	25 yr	65800.00	394.41	410.91		415.27	0.003574	16.76	3925.47	285.92	0.80
Verdugo-Fletcher	11757.5	50 yr	77500.00	394.41	412.62		417.38	0.003492	17.52	4423.07	295.86	0.80
Verdugo-Fletcher	11757.5	100 yr	94600.00	394.41	414.92		420.22	0.003395	18.48	5120.18	309.20	0.80
Verdugo-Fletcher	11757.5	200 yr	109000.00	394.41	416.65		422.42	0.003287	19.27	5657.28	310.00	0.79
Verdugo-Fletcher	11757.5	500 yr	125000.00	394.41	418.40		424.71	0.003235	20.17	6198.10	310.00	0.79

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11732.5	Design	78000.00	394.31	412.62		417.38	0.003461	17.50	4457.23	296.74	0.80
Verdugo-Fletcher	11732.5	2 yr	21600.00	394.31	403.06		405.10	0.003506	11.46	1884.42	240.97	0.72
Verdugo-Fletcher	11732.5	5 yr	40500.00	394.31	406.92		410.04	0.003472	14.16	2860.55	263.52	0.76
Verdugo-Fletcher	11732.5	10 yr	48200.00	394.31	407.96		411.63	0.003734	15.37	3136.23	269.55	0.79
Verdugo-Fletcher	11732.5	25 yr	65800.00	394.31	410.83		415.18	0.003551	16.72	3935.13	286.30	0.79
Verdugo-Fletcher	11732.5	50 yr	77500.00	394.31	412.55		417.29	0.003464	17.47	4436.26	296.33	0.80
Verdugo-Fletcher	11732.5	100 yr	94600.00	394.31	414.87		420.13	0.003365	18.42	5136.73	309.61	0.80
Verdugo-Fletcher	11732.5	200 yr	109000.00	394.31	416.60		422.33	0.003254	19.21	5675.48	310.00	0.79
Verdugo-Fletcher	11732.5	500 yr	125000.00	394.31	418.35		424.63	0.003202	20.10	6218.52	310.00	0.79
Verdugo-Fletcher	11707.5	Design	78000.00	394.21	412.56		417.29	0.003433	17.45	4470.93	297.22	0.79
Verdugo-Fletcher	11707.5	2 yr	21600.00	394.21	402.97		405.00	0.003479	11.43	1889.58	241.20	0.72
Verdugo-Fletcher	11707.5	5 yr	40500.00	394.21	406.85		409.95	0.003445	14.12	2868.81	263.86	0.75
Verdugo-Fletcher	11707.5	10 yr	48200.00	394.21	407.87		411.53	0.003723	15.35	3140.23	269.80	0.79
Verdugo-Fletcher	11707.5	25 yr	65800.00	394.21	410.76		415.08	0.003527	16.68	3945.10	286.70	0.79
Verdugo-Fletcher	11707.5	50 yr	77500.00	394.21	412.49		417.20	0.003436	17.42	4449.86	296.81	0.79
Verdugo-Fletcher	11707.5	100 yr	94600.00	394.21	414.81		420.04	0.003334	18.36	5153.75	310.00	0.79
Verdugo-Fletcher	11707.5	200 yr	109000.00	394.21	416.55		422.24	0.003221	19.14	5694.04	310.00	0.79
Verdugo-Fletcher	11707.5	500 yr	125000.00	394.21	418.31		424.54	0.003169	20.03	6239.28	310.00	0.79
Verdugo-Fletcher	11682.5	Design	78000.00	394.11	412.47		417.20	0.003429	17.44	4471.28	297.01	0.79
Verdugo-Fletcher	11682.5	2 yr	21600.00	394.11	402.89		404.91	0.003457	11.41	1893.09	241.18	0.72
Verdugo-Fletcher	11682.5	5 yr	40500.00	394.11	406.77		409.86	0.003431	14.10	2872.01	263.77	0.75
Verdugo-Fletcher	11682.5	10 yr	48200.00	394.11	407.77		411.43	0.003721	15.35	3139.96	269.63	0.79
Verdugo-Fletcher	11682.5	25 yr	65800.00	394.11	410.67		414.99	0.003524	16.68	3945.35	286.51	0.79
Verdugo-Fletcher	11682.5	50 yr	77500.00	394.11	412.40		417.11	0.003433	17.41	4450.21	296.60	0.79
Verdugo-Fletcher	11682.5	100 yr	94600.00	394.11	414.73		419.95	0.003330	18.35	5155.53	310.00	0.79
Verdugo-Fletcher	11682.5	200 yr	109000.00	394.11	416.48		422.16	0.003213	19.13	5698.47	310.00	0.79
Verdugo-Fletcher	11682.5	500 yr	125000.00	394.11	418.24		424.46	0.003160	20.02	6244.43	310.00	0.79
Verdugo-Fletcher	11657.5*	Design	78000.00	394.01	412.40		417.11	0.003412	17.41	4478.91	297.16	0.79
Verdugo-Fletcher	11657.5*	2 yr	21600.00	394.01	402.81		404.82	0.003431	11.38	1897.70	241.29	0.72
Verdugo-Fletcher	11657.5*	5 yr	40500.00	394.01	406.69		409.77	0.003408	14.07	2878.45	263.92	0.75
Verdugo-Fletcher	11657.5*	10 yr	48200.00	394.01	407.68		411.33	0.003714	15.34	3141.88	269.67	0.79
Verdugo-Fletcher	11657.5*	25 yr	65800.00	394.01	410.59		414.90	0.003511	16.66	3950.36	286.61	0.79
Verdugo-Fletcher	11657.5*	50 yr	77500.00	394.01	412.33		417.02	0.003415	17.39	4457.77	296.75	0.79
Verdugo-Fletcher	11657.5*	100 yr	94600.00	394.01	414.66		419.87	0.003310	18.32	5164.88	310.00	0.79
Verdugo-Fletcher	11657.5*	200 yr	109000.00	394.01	416.42		422.07	0.003191	19.09	5710.75	310.00	0.78
Verdugo-Fletcher	11657.5*	500 yr	125000.00	394.01	418.18		424.38	0.003139	19.98	6257.49	310.00	0.78
Verdugo-Fletcher	11629	Design	78000.00	393.90	412.30	409.79	417.01	0.003404	17.41	4481.15	296.95	0.79
Verdugo-Fletcher	11629	2 yr	21600.00	393.90	402.71	401.00	404.72	0.003414	11.37	1900.37	241.22	0.71
Verdugo-Fletcher	11629	5 yr	40500.00	393.90	406.60	404.46	409.67	0.003389	14.05	2882.90	263.83	0.75
Verdugo-Fletcher	11629	10 yr	48200.00	393.90	407.57	405.69	411.23	0.003717	15.35	3140.29	269.44	0.79
Verdugo-Fletcher	11629	25 yr	65800.00	393.90	410.49	408.21	414.79	0.003504	16.65	3951.50	286.40	0.79

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11629	50 yr	77500.00	393.90	412.23	409.73	416.92	0.003407	17.38	4459.99	296.54	0.79
Verdugo-Fletcher	11629	100 yr	94600.00	393.90	414.57	411.77	419.77	0.003302	18.31	5167.96	309.91	0.79
Verdugo-Fletcher	11629	200 yr	109000.00	393.90	416.34	413.39	421.98	0.003180	19.07	5716.49	310.00	0.78
Verdugo-Fletcher	11629	500 yr	125000.00	393.90	418.10	415.04	424.29	0.003128	19.95	6264.41	310.00	0.78
Verdugo-Fletcher	11610		Bridge									
Verdugo-Fletcher	11593	Design	78000.00	393.76	407.93	409.65	416.73	0.008583	23.81	3275.75	272.38	1.21
Verdugo-Fletcher	11593	2 yr	21600.00	393.76	402.13		404.38	0.004082	12.05	1793.19	238.64	0.77
Verdugo-Fletcher	11593	5 yr	40500.00	393.76	405.79		409.27	0.004095	14.96	2706.98	259.95	0.82
Verdugo-Fletcher	11593	10 yr	48200.00	393.76	404.22	405.55	411.01	0.009440	20.92	2304.29	250.79	1.22
Verdugo-Fletcher	11593	25 yr	65800.00	393.76	406.49	408.07	414.54	0.008878	22.77	2890.40	264.03	1.21
Verdugo-Fletcher	11593	50 yr	77500.00	393.76	407.87	409.58	416.65	0.008595	23.77	3260.06	272.04	1.21
Verdugo-Fletcher	11593	100 yr	94600.00	393.76	409.67	411.63	419.50	0.008388	25.16	3759.91	282.52	1.22
Verdugo-Fletcher	11593	200 yr	109000.00	393.76	411.09	413.25	421.72	0.008230	26.16	4166.34	290.77	1.22
Verdugo-Fletcher	11593	500 yr	125000.00	393.76	412.57	414.92	424.03	0.008093	27.17	4601.14	299.34	1.22
Verdugo-Fletcher	11557.5	Design	78000.00	393.60	411.06	409.49	416.41	0.004107	18.56	4201.66	291.23	0.86
Verdugo-Fletcher	11557.5	2 yr	21600.00	393.60	401.99		404.23	0.004041	12.01	1798.62	238.65	0.77
Verdugo-Fletcher	11557.5	5 yr	40500.00	393.60	405.65		409.12	0.004077	14.94	2710.35	259.85	0.82
Verdugo-Fletcher	11557.5	10 yr	48200.00	393.60	406.90	405.39	410.81	0.004088	15.85	3040.90	267.13	0.83
Verdugo-Fletcher	11557.5	25 yr	65800.00	393.60	409.47	407.91	414.26	0.004099	17.57	3745.83	282.01	0.85
Verdugo-Fletcher	11557.5	50 yr	77500.00	393.60	411.00	409.43	416.33	0.004107	18.53	4183.48	290.87	0.86
Verdugo-Fletcher	11557.5	100 yr	94600.00	393.60	409.83	411.48	419.22	0.007828	24.59	3847.61	284.10	1.18
Verdugo-Fletcher	11557.5	200 yr	109000.00	393.60	411.24	413.09	421.44	0.007742	25.63	4252.49	292.24	1.18
Verdugo-Fletcher	11557.5	500 yr	125000.00	393.60	412.70	414.71	423.75	0.007664	26.68	4686.01	300.72	1.19
Verdugo-Fletcher	11532.5	Design	78000.00	393.50	410.97		416.30	0.004096	18.54	4207.86	291.76	0.86
Verdugo-Fletcher	11532.5	2 yr	21600.00	393.50	401.89		404.13	0.004037	12.00	1799.84	238.89	0.77
Verdugo-Fletcher	11532.5	5 yr	40500.00	393.50	405.55		409.01	0.004071	14.93	2712.97	260.21	0.81
Verdugo-Fletcher	11532.5	10 yr	48200.00	393.50	406.81		410.70	0.004081	15.83	3044.17	267.52	0.83
Verdugo-Fletcher	11532.5	25 yr	65800.00	393.50	409.38		414.16	0.004090	17.54	3750.79	282.49	0.85
Verdugo-Fletcher	11532.5	50 yr	77500.00	393.50	410.91		416.22	0.004096	18.50	4189.63	291.40	0.86
Verdugo-Fletcher	11532.5	100 yr	94600.00	393.50	409.92	411.37	419.03	0.007507	24.23	3904.79	285.65	1.15
Verdugo-Fletcher	11532.5	200 yr	109000.00	393.50	411.31	412.99	421.25	0.007473	25.31	4306.64	293.73	1.16
Verdugo-Fletcher	11532.5	500 yr	125000.00	393.50	412.75	414.60	423.56	0.007438	26.39	4737.23	302.15	1.17
Verdugo-Fletcher	11507.5	Design	78000.00	393.40	410.84		416.21	0.004126	18.59	4195.25	291.10	0.86
Verdugo-Fletcher	11507.5	2 yr	21600.00	393.40	401.79		404.03	0.004047	12.01	1797.83	238.63	0.77
Verdugo-Fletcher	11507.5	5 yr	40500.00	393.40	405.44		408.91	0.004084	14.95	2708.68	259.82	0.82
Verdugo-Fletcher	11507.5	10 yr	48200.00	393.40	406.70		410.60	0.004097	15.86	3038.89	267.08	0.83
Verdugo-Fletcher	11507.5	25 yr	65800.00	393.40	409.26		414.06	0.004113	17.59	3741.80	281.93	0.85
Verdugo-Fletcher	11507.5	50 yr	77500.00	393.40	410.78		416.12	0.004125	18.55	4177.12	290.74	0.86
Verdugo-Fletcher	11507.5	100 yr	94600.00	393.40	412.82	411.28	418.89	0.004136	19.78	4782.84	302.58	0.88
Verdugo-Fletcher	11507.5	200 yr	109000.00	393.40	411.52	412.89	421.07	0.007033	24.81	4394.17	295.04	1.13

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	11507.5	500 yr	125000.00	393.40	416.29	414.51	423.37	0.003875	21.35	5854.83	310.00	0.87
Verdugo-Fletcher	11482.5	Design	78000.00	393.30	410.73		416.11	0.004131	18.60	4193.56	291.07	0.86
Verdugo-Fletcher	11482.5	2 yr	21600.00	393.30	401.69		403.93	0.004050	12.02	1797.35	238.62	0.77
Verdugo-Fletcher	11482.5	5 yr	40500.00	393.30	405.34		408.81	0.004089	14.96	2707.71	259.80	0.82
Verdugo-Fletcher	11482.5	10 yr	48200.00	393.30	406.59		410.50	0.004101	15.87	3037.74	267.06	0.83
Verdugo-Fletcher	11482.5	25 yr	65800.00	393.30	409.15		413.96	0.004117	17.59	3740.35	281.90	0.85
Verdugo-Fletcher	11482.5	50 yr	77500.00	393.30	410.67		416.02	0.004130	18.56	4175.46	290.71	0.86
Verdugo-Fletcher	11482.5	100 yr	94600.00	393.30	412.71		418.79	0.004140	19.79	4780.93	302.54	0.88
Verdugo-Fletcher	11482.5	200 yr	109000.00	393.30	414.30	412.79	420.95	0.004127	20.69	5267.11	310.00	0.88
Verdugo-Fletcher	11482.5	500 yr	125000.00	393.30	416.20		423.27	0.003873	21.35	5855.81	310.00	0.87
Verdugo-Fletcher	11457.5*	Design	78000.00	393.20	410.62	409.09	416.01	0.004145	18.63	4187.50	290.75	0.86
Verdugo-Fletcher	11457.5*	2 yr	21600.00	393.20	401.58		403.83	0.004058	12.03	1795.90	238.48	0.77
Verdugo-Fletcher	11457.5*	5 yr	40500.00	393.20	405.23		408.71	0.004100	14.97	2704.74	259.59	0.82
Verdugo-Fletcher	11457.5*	10 yr	48200.00	393.20	406.48		410.40	0.004113	15.89	3034.14	266.82	0.83
Verdugo-Fletcher	11457.5*	25 yr	65800.00	393.20	409.04	407.51	413.86	0.004130	17.62	3735.32	281.61	0.85
Verdugo-Fletcher	11457.5*	50 yr	77500.00	393.20	410.56	409.03	415.92	0.004144	18.59	4169.43	290.39	0.86
Verdugo-Fletcher	11457.5*	100 yr	94600.00	393.20	412.60	411.08	418.70	0.004156	19.82	4773.52	302.18	0.88
Verdugo-Fletcher	11457.5*	200 yr	109000.00	393.20	414.18	412.69	420.85	0.004146	20.73	5258.84	310.00	0.89
Verdugo-Fletcher	11457.5*	500 yr	125000.00	393.20	416.09	414.37	423.18	0.003881	21.36	5851.51	310.00	0.87
Verdugo-Fletcher	11257.4*	Design	78000.00	392.40	409.57	408.30	415.16	0.004363	18.96	4113.90	289.08	0.89
Verdugo-Fletcher	11257.4*	2 yr	21600.00	392.40	400.74		403.01	0.004135	12.10	1784.65	238.10	0.78
Verdugo-Fletcher	11257.4*	5 yr	40500.00	392.40	404.34		407.89	0.004209	15.11	2680.52	258.90	0.83
Verdugo-Fletcher	11257.4*	10 yr	48200.00	392.40	405.57		409.57	0.004238	16.05	3003.11	265.99	0.84
Verdugo-Fletcher	11257.4*	25 yr	65800.00	392.40	408.05	406.72	413.01	0.004317	17.89	3679.00	280.27	0.87
Verdugo-Fletcher	11257.4*	50 yr	77500.00	392.40	409.51	408.23	415.07	0.004361	18.92	4096.58	288.74	0.89
Verdugo-Fletcher	11257.4*	100 yr	94600.00	392.40	411.47	410.29	417.84	0.004417	20.24	4673.46	300.04	0.90
Verdugo-Fletcher	11257.4*	200 yr	109000.00	392.40	412.99	411.90	419.99	0.004458	21.23	5134.65	308.78	0.92
Verdugo-Fletcher	11257.4*	500 yr	125000.00	392.40	415.35	413.57	422.40	0.003852	21.31	5864.99	310.00	0.86
Verdugo-Fletcher	11057.40 25000	Design	78000.00	391.60	408.92		414.30	0.004186	18.61	4191.78	293.94	0.87
Verdugo-Fletcher	11057.40 25000	2 yr	21600.00	391.60	399.91		402.18	0.004167	12.10	1785.27	239.84	0.78
Verdugo-Fletcher	11057.40 25000	5 yr	40500.00	391.60	403.54		407.04	0.004178	15.02	2697.25	261.66	0.82
Verdugo-Fletcher	11057.40 25000	10 yr	48200.00	391.60	404.79		408.73	0.004181	15.91	3028.72	269.16	0.84
Verdugo-Fletcher	11057.40 25000	25 yr	65800.00	391.60	407.34		412.16	0.004184	17.62	3734.37	284.45	0.86
Verdugo-Fletcher	11057.40 25000	50 yr	77500.00	391.60	408.86		414.22	0.004185	18.57	4173.53	293.57	0.87
Verdugo-Fletcher	11057.40 25000	100 yr	94600.00	391.60	410.92		416.98	0.004168	19.75	4790.60	305.92	0.88
Verdugo-Fletcher	11057.40 25000	200 yr	109000.00	391.60	412.53	411.04	419.13	0.004085	20.61	5288.64	310.00	0.88
Verdugo-Fletcher	11057.40 25000	500 yr	125000.00	391.60	415.16		421.67	0.003403	20.47	6105.04	310.00	0.81
Verdugo-Fletcher	10857.3*	Design	78000.00	390.77	408.08	406.64	413.47	0.004202	18.63	4186.33	293.82	0.87
Verdugo-Fletcher	10857.3*	2 yr	21600.00	390.77	399.07		401.35	0.004186	12.12	1782.71	239.77	0.78
Verdugo-Fletcher	10857.3*	5 yr	40500.00	390.77	402.70		406.21	0.004196	15.04	2693.21	261.56	0.83

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	10857.3*	10 yr	48200.00	390.77	403.95		407.89	0.004200	15.94	3024.14	269.05	0.84
Verdugo-Fletcher	10857.3*	25 yr	65800.00	390.77	406.49	405.06	411.33	0.004201	17.64	3729.20	284.34	0.86
Verdugo-Fletcher	10857.3*	50 yr	77500.00	390.77	408.01	406.57	413.38	0.004201	18.59	4168.13	293.45	0.87
Verdugo-Fletcher	10857.3*	100 yr	94600.00	390.77	410.08	408.61	416.14	0.004176	19.76	4787.68	305.86	0.88
Verdugo-Fletcher	10857.3*	200 yr	109000.00	390.77	411.75	410.21	418.31	0.004054	20.55	5304.95	310.77	0.88
Verdugo-Fletcher	10857.3*	500 yr	125000.00	390.77	414.82		421.01	0.003152	19.97	6258.85	310.77	0.78
Verdugo-Fletcher	10657.2*	Design	78000.00	389.93	407.23		412.62	0.004206	18.64	4184.71	293.78	0.87
Verdugo-Fletcher	10657.2*	2 yr	21600.00	389.93	398.23		400.51	0.004181	12.11	1783.40	239.79	0.78
Verdugo-Fletcher	10657.2*	5 yr	40500.00	389.93	401.86		405.37	0.004200	15.04	2692.41	261.54	0.83
Verdugo-Fletcher	10657.2*	10 yr	48200.00	389.93	403.10		407.05	0.004205	15.95	3022.85	269.01	0.84
Verdugo-Fletcher	10657.2*	25 yr	65800.00	389.93	405.65		410.49	0.004207	17.65	3727.57	284.29	0.86
Verdugo-Fletcher	10657.2*	50 yr	77500.00	389.93	407.17		412.54	0.004206	18.60	4166.57	293.40	0.87
Verdugo-Fletcher	10657.2*	100 yr	94600.00	389.93	409.25		415.30	0.004172	19.75	4789.15	305.87	0.88
Verdugo-Fletcher	10657.2*	200 yr	109000.00	389.93	411.08	409.37	417.51	0.003936	20.34	5358.28	311.53	0.86
Verdugo-Fletcher	10657.2*	500 yr	125000.00	389.93	414.56		420.41	0.002882	19.40	6442.40	311.53	0.75
Verdugo-Fletcher	10457.1*	Design	78000.00	389.10	406.36		411.78	0.004244	18.70	4171.79	293.50	0.87
Verdugo-Fletcher	10457.1*	2 yr	21600.00	389.10	397.37		399.67	0.004234	12.16	1775.97	239.59	0.79
Verdugo-Fletcher	10457.1*	5 yr	40500.00	389.10	400.99		404.53	0.004246	15.10	2682.67	261.30	0.83
Verdugo-Fletcher	10457.1*	10 yr	48200.00	389.10	402.23		406.21	0.004248	16.00	3012.44	268.76	0.84
Verdugo-Fletcher	10457.1*	25 yr	65800.00	389.10	404.77		409.65	0.004249	17.71	3714.73	284.00	0.86
Verdugo-Fletcher	10457.1*	50 yr	77500.00	389.10	406.30		411.70	0.004243	18.66	4153.79	293.13	0.87
Verdugo-Fletcher	10457.1*	100 yr	94600.00	389.10	408.40		414.47	0.004182	19.77	4784.93	305.77	0.88
Verdugo-Fletcher	10457.1*	200 yr	109000.00	389.10	410.47		416.73	0.003791	20.09	5425.33	312.29	0.85
Verdugo-Fletcher	10457.1*	500 yr	125000.00	389.10	414.34		419.85	0.002630	18.84	6636.40	312.29	0.72
Verdugo-Fletcher	10257.07 24200	Design	78000.00	388.27	405.44	404.14	410.93	0.004322	18.81	4146.14	293.01	0.88
Verdugo-Fletcher	10257.07 24200	2 yr	21600.00	388.27	396.47		398.81	0.004361	12.28	1759.04	239.18	0.80
Verdugo-Fletcher	10257.07 24200	5 yr	40500.00	388.27	400.08		403.67	0.004350	15.22	2661.29	260.84	0.84
Verdugo-Fletcher	10257.07 24200	10 yr	48200.00	388.27	401.32	400.06	405.35	0.004345	16.12	2990.00	268.29	0.85
Verdugo-Fletcher	10257.07 24200	25 yr	65800.00	388.27	403.85	402.56	408.79	0.004340	17.84	3688.38	283.48	0.87
Verdugo-Fletcher	10257.07 24200	50 yr	77500.00	388.27	405.38	404.08	410.85	0.004321	18.77	4128.40	292.64	0.88
Verdugo-Fletcher	10257.07 24200	100 yr	94600.00	388.27	407.56	406.11	413.64	0.004192	19.79	4781.35	305.74	0.88
Verdugo-Fletcher	10257.07 24200	200 yr	109000.00	388.27	409.95		415.99	0.003587	19.73	5524.34	313.06	0.83
Verdugo-Fletcher	10257.07 24200	500 yr	125000.00	388.27	414.17		419.35	0.002388	18.26	6846.52	313.06	0.69
Verdugo-Fletcher	10218.80 24161.92	Design	78000.00	388.10	405.27	403.97	410.76	0.004318	18.81	4147.54	293.04	0.88
Verdugo-Fletcher	10218.80 24161.92	2 yr	21600.00	388.10	396.30		398.64	0.004355	12.27	1759.85	239.20	0.80
Verdugo-Fletcher	10218.80 24161.92	5 yr	40500.00	388.10	399.91		403.50	0.004345	15.21	2662.27	260.86	0.84
Verdugo-Fletcher	10218.80 24161.92	10 yr	48200.00	388.10	401.15		405.18	0.004340	16.11	2991.05	268.31	0.85
Verdugo-Fletcher	10218.80 24161.92	25 yr	65800.00	388.10	403.68	402.39	408.62	0.004336	17.83	3689.54	283.50	0.87
Verdugo-Fletcher	10218.80 24161.92	50 yr	77500.00	388.10	405.21	403.91	410.68	0.004317	18.77	4129.81	292.67	0.88
Verdugo-Fletcher	10218.80 24161.92	100 yr	94600.00	388.10	407.40	405.94	413.47	0.004184	19.77	4784.37	305.80	0.88
Verdugo-Fletcher	10218.80 24161.92	200 yr	109000.00	388.10	409.86		415.85	0.003532	19.63	5551.71	313.18	0.82

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	10218.80 24161.92	500 yr	125000.00	388.10	414.15		419.26	0.002337	18.13	6894.50	313.18	0.68
Verdugo-Fletcher	9978.273 23920.23	Design	78000.00	387.05	404.27	402.92	409.73	0.004272	18.74	4162.75	293.35	0.88
Verdugo-Fletcher	9978.273 23920.23	2 yr	21600.00	387.05	395.25		397.59	0.004347	12.27	1760.89	239.23	0.80
Verdugo-Fletcher	9978.273 23920.23	5 yr	40500.00	387.05	398.87		402.46	0.004336	15.20	2664.13	260.90	0.84
Verdugo-Fletcher	9978.273 23920.23	10 yr	48200.00	387.05	400.11		404.14	0.004331	16.10	2993.29	268.36	0.85
Verdugo-Fletcher	9978.273 23920.23	25 yr	65800.00	387.05	402.65	401.34	407.58	0.004321	17.81	3693.92	283.60	0.87
Verdugo-Fletcher	9978.273 23920.23	50 yr	77500.00	387.05	404.21	402.86	409.64	0.004277	18.71	4142.86	292.94	0.88
Verdugo-Fletcher	9978.273 23920.23	100 yr	94600.00	387.05	406.63	404.89	412.49	0.003976	19.43	4869.11	307.46	0.86
Verdugo-Fletcher	9978.273 23920.23	200 yr	109000.00	387.05	409.51		415.05	0.003128	18.88	5772.68	314.08	0.78
Verdugo-Fletcher	9978.273 23920.23	500 yr	125000.00	387.05	414.04		418.73	0.002048	17.37	7195.32	314.08	0.64
Verdugo-Fletcher	9748.10*	Design	78000.00	386.05	403.36	401.93	408.75	0.004199	18.63	4187.46	293.87	0.87
Verdugo-Fletcher	9748.10*	2 yr	21600.00	386.05	394.25		396.59	0.004349	12.27	1760.75	239.24	0.80
Verdugo-Fletcher	9748.10*	5 yr	40500.00	386.05	397.87		401.46	0.004331	15.20	2665.09	260.94	0.84
Verdugo-Fletcher	9748.10*	10 yr	48200.00	386.05	399.12		403.14	0.004325	16.10	2994.70	268.41	0.85
Verdugo-Fletcher	9748.10*	25 yr	65800.00	386.05	401.66	400.35	406.58	0.004313	17.80	3696.26	283.66	0.87
Verdugo-Fletcher	9748.10*	50 yr	77500.00	386.05	403.29	401.86	408.66	0.004208	18.60	4166.01	293.43	0.87
Verdugo-Fletcher	9748.10*	100 yr	94600.00	386.05	406.03		411.60	0.003695	18.94	4993.66	309.90	0.83
Verdugo-Fletcher	9748.10*	200 yr	109000.00	386.05	409.29		414.38	0.002755	18.10	6022.71	316.81	0.73
Verdugo-Fletcher	9748.10*	500 yr	125000.00	386.05	413.99		418.29	0.001802	16.64	7511.47	316.81	0.60
Verdugo-Fletcher	9517.93*	Design	78000.00	385.04	402.59		407.80	0.003994	18.31	4259.10	295.27	0.85
Verdugo-Fletcher	9517.93*	2 yr	21600.00	385.04	393.28		395.59	0.004290	12.21	1768.46	239.40	0.79
Verdugo-Fletcher	9517.93*	5 yr	40500.00	385.04	396.91		400.46	0.004271	15.13	2677.29	261.18	0.83
Verdugo-Fletcher	9517.93*	10 yr	48200.00	385.04	398.16		402.14	0.004266	16.02	3008.23	268.67	0.84
Verdugo-Fletcher	9517.93*	25 yr	65800.00	385.04	400.72	399.34	405.59	0.004248	17.71	3715.25	284.01	0.86
Verdugo-Fletcher	9517.93*	50 yr	77500.00	385.04	402.51	400.86	407.71	0.004009	18.30	4234.96	294.78	0.85
Verdugo-Fletcher	9517.93*	100 yr	94600.00	385.04	405.61		410.79	0.003327	18.27	5176.75	313.36	0.79
Verdugo-Fletcher	9517.93*	200 yr	109000.00	385.04	409.14		413.78	0.002406	17.30	6300.58	319.54	0.69
Verdugo-Fletcher	9517.93*	500 yr	125000.00	385.04	413.95		417.90	0.001587	15.95	7838.00	319.54	0.57
Verdugo-Fletcher	9287.77*	Design	78000.00	384.04	401.96		406.91	0.003707	17.85	4369.03	297.52	0.82
Verdugo-Fletcher	9287.77*	2 yr	21600.00	384.04	392.35		394.62	0.004163	12.09	1785.91	239.85	0.78
Verdugo-Fletcher	9287.77*	5 yr	40500.00	384.04	396.01		399.49	0.004149	14.98	2703.43	261.79	0.82
Verdugo-Fletcher	9287.77*	10 yr	48200.00	384.04	397.27		401.18	0.004144	15.87	3037.84	269.35	0.83
Verdugo-Fletcher	9287.77*	25 yr	65800.00	384.04	399.86		404.62	0.004113	17.52	3756.19	284.89	0.85
Verdugo-Fletcher	9287.77*	50 yr	77500.00	384.04	401.87		406.82	0.003728	17.85	4341.59	296.96	0.82
Verdugo-Fletcher	9287.77*	100 yr	94600.00	384.04	405.30		410.07	0.002954	17.54	5394.43	317.52	0.75
Verdugo-Fletcher	9287.77*	200 yr	109000.00	384.04	409.02		413.27	0.002100	16.53	6592.74	322.27	0.64
Verdugo-Fletcher	9287.77*	500 yr	125000.00	384.04	413.92		417.55	0.001404	15.30	8170.01	322.27	0.54
Verdugo-Fletcher	9057.604 23000	Design	78000.00	383.04	401.48		406.10	0.003350	17.24	4523.40	300.63	0.78
Verdugo-Fletcher	9057.604 23000	2 yr	21600.00	383.04	391.54		393.70	0.003853	11.79	1831.34	240.99	0.75
Verdugo-Fletcher	9057.604 23000	5 yr	40500.00	383.04	395.22		398.57	0.003903	14.68	2759.09	263.08	0.80

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	9057.604 23000	10 yr	48200.00	383.04	396.49		400.25	0.003907	15.56	3098.28	270.70	0.81
Verdugo-Fletcher	9057.604 23000	25 yr	65800.00	383.04	399.13		403.70	0.003876	17.17	3832.73	286.52	0.83
Verdugo-Fletcher	9057.604 23000	50 yr	77500.00	383.04	401.38		406.00	0.003373	17.25	4492.81	300.02	0.79
Verdugo-Fletcher	9057.604 23000	100 yr	94600.00	383.04	405.07		409.44	0.002595	16.77	5641.78	322.18	0.71
Verdugo-Fletcher	9057.604 23000	200 yr	109000.00	383.04	408.94		412.82	0.001833	15.80	6898.24	325.00	0.60
Verdugo-Fletcher	9057.604 23000	500 yr	125000.00	383.04	413.89		417.25	0.001244	14.69	8508.83	325.00	0.51
Verdugo-Fletcher	8885.58*	Design	78000.00	382.39	401.04		405.53	0.003216	17.01	4586.71	301.87	0.77
Verdugo-Fletcher	8885.58*	2 yr	21600.00	382.39	390.84		393.03	0.003922	11.86	1820.82	240.71	0.76
Verdugo-Fletcher	8885.58*	5 yr	40500.00	382.39	394.51		397.89	0.003974	14.77	2742.34	262.68	0.81
Verdugo-Fletcher	8885.58*	10 yr	48200.00	382.39	395.77		399.57	0.003981	15.66	3078.80	270.25	0.82
Verdugo-Fletcher	8885.58*	25 yr	65800.00	382.39	398.43		403.04	0.003919	17.23	3818.18	286.19	0.83
Verdugo-Fletcher	8885.58*	50 yr	77500.00	382.39	400.93		405.43	0.003244	17.02	4553.33	301.20	0.77
Verdugo-Fletcher	8885.58*	100 yr	94600.00	382.39	404.84		409.00	0.002424	16.38	5776.74	324.65	0.68
Verdugo-Fletcher	8885.58*	200 yr	109000.00	382.39	408.84		412.51	0.001696	15.38	7085.53	327.60	0.58
Verdugo-Fletcher	8885.58*	500 yr	125000.00	382.39	413.85		417.04	0.001156	14.32	8729.51	327.60	0.49
Verdugo-Fletcher	8713.55*	Design	78000.00	381.75	400.64		404.99	0.003074	16.74	4658.70	303.35	0.75
Verdugo-Fletcher	8713.55*	2 yr	21600.00	381.75	390.08	388.84	392.34	0.004135	12.07	1789.87	239.97	0.78
Verdugo-Fletcher	8713.55*	5 yr	40500.00	381.75	393.67	392.32	397.19	0.004211	15.06	2690.09	261.52	0.83
Verdugo-Fletcher	8713.55*	10 yr	48200.00	381.75	394.91	393.54	398.86	0.004220	15.96	3019.54	268.97	0.84
Verdugo-Fletcher	8713.55*	25 yr	65800.00	381.75	397.67		402.36	0.004023	17.39	3784.50	285.53	0.84
Verdugo-Fletcher	8713.55*	50 yr	77500.00	381.75	400.52		404.88	0.003105	16.77	4622.36	302.63	0.76
Verdugo-Fletcher	8713.55*	100 yr	94600.00	381.75	404.63		408.60	0.002260	15.98	5919.03	327.34	0.66
Verdugo-Fletcher	8713.55*	200 yr	109000.00	381.75	408.74		412.23	0.001570	14.98	7276.09	330.20	0.56
Verdugo-Fletcher	8713.55*	500 yr	125000.00	381.75	413.82		416.85	0.001076	13.96	8951.39	330.20	0.47
Verdugo-Fletcher	8541.532 22485	Design	78000.00	381.10	400.29		404.47	0.002906	16.42	4749.46	305.11	0.73
Verdugo-Fletcher	8541.532 22485	2 yr	21600.00	381.10	388.19	388.19	391.42	0.007163	14.42	1498.07	232.54	1.00
Verdugo-Fletcher	8541.532 22485	5 yr	40500.00	381.10	391.68	391.68	396.31	0.006366	17.26	2345.85	253.48	1.00
Verdugo-Fletcher	8541.532 22485	10 yr	48200.00	381.10	392.90	392.90	398.00	0.006173	18.12	2659.57	260.80	1.00
Verdugo-Fletcher	8541.532 22485	25 yr	65800.00	381.10	396.79	395.40	401.65	0.004232	17.69	3720.09	284.15	0.86
Verdugo-Fletcher	8541.532 22485	50 yr	77500.00	381.10	400.16		404.36	0.002939	16.45	4710.19	304.34	0.74
Verdugo-Fletcher	8541.532 22485	100 yr	94600.00	381.10	404.46		408.22	0.002098	15.57	6074.56	330.14	0.64
Verdugo-Fletcher	8541.532 22485	200 yr	109000.00	381.10	408.67		411.97	0.001452	14.58	7474.99	332.80	0.54
Verdugo-Fletcher	8541.532 22485	500 yr	125000.00	381.10	413.79		416.67	0.001001	13.62	9179.16	332.80	0.46
Verdugo-Fletcher	8310.036 22254	Design	78000.00	377.91	400.42		404.14	0.000871	15.47	5042.47	224.00	0.57
Verdugo-Fletcher	8310.036 22254	2 yr	21600.00	377.91	387.08	384.52	388.80	0.001158	10.51	2054.86	224.00	0.61
Verdugo-Fletcher	8310.036 22254	5 yr	40500.00	377.91	392.33	387.95	394.77	0.000954	12.54	3229.69	224.00	0.58
Verdugo-Fletcher	8310.036 22254	10 yr	48200.00	377.91	394.22	389.18	396.92	0.000915	13.20	3652.41	224.00	0.58
Verdugo-Fletcher	8310.036 22254	25 yr	65800.00	377.91	397.91		401.26	0.000896	14.69	4480.07	224.00	0.58
Verdugo-Fletcher	8310.036 22254	50 yr	77500.00	377.91	400.32		404.02	0.000872	15.44	5020.03	224.00	0.57
Verdugo-Fletcher	8310.036 22254	100 yr	94600.00	377.91	403.80		407.93	0.000831	16.31	5799.32	224.00	0.56
Verdugo-Fletcher	8310.036 22254	200 yr	109000.00	377.91	407.55		411.74	0.000728	16.42	6640.12	224.00	0.53

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	8310.036 22254	500 yr	125000.00	377.91	412.43		416.49	0.000602	16.16	7733.22	224.00	0.48
Verdugo-Fletcher	8206.965 22151.25	Design	78000.00	377.20	400.62	392.73	404.05	0.000770	14.87	5245.90	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	2 yr	21600.00	377.20	387.27	383.81	388.70	0.000856	9.57	2256.65	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	5 yr	40500.00	377.20	392.52	387.24	394.68	0.000787	11.80	3431.07	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	10 yr	48200.00	377.20	394.40	388.47	396.83	0.000772	12.51	3853.69	224.00	0.53
Verdugo-Fletcher	8206.965 22151.25	25 yr	65800.00	377.20	398.11	391.07	401.17	0.000780	14.05	4683.60	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	50 yr	77500.00	377.20	400.52	392.66	403.94	0.000770	14.84	5223.46	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	100 yr	94600.00	377.20	403.99	394.84	407.85	0.000747	15.76	6001.47	224.00	0.54
Verdugo-Fletcher	8206.965 22151.25	200 yr	109000.00	377.20	407.71	396.62	411.66	0.000666	15.95	6835.31	224.00	0.51
Verdugo-Fletcher	8206.965 22151.25	500 yr	125000.00	377.20	412.56	398.50	416.43	0.000560	15.78	7921.05	224.00	0.47
Verdugo-Fletcher	8151.212		Bridge									
Verdugo-Fletcher	8095.458 22039.75	Design	78000.00	376.43	387.35	391.97	403.13	0.008599	31.88	2446.82	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	2 yr	21600.00	376.43	381.55	383.04	387.06	0.007752	18.85	1145.84	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	5 yr	40500.00	376.43	384.20	386.48	392.61	0.006964	23.26	1741.00	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	10 yr	48200.00	376.43	385.16	387.71	394.60	0.006774	24.66	1954.89	224.00	1.47
Verdugo-Fletcher	8095.458 22039.75	25 yr	65800.00	376.43	386.17	390.31	400.28	0.008840	30.14	2182.83	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	50 yr	77500.00	376.43	387.31	391.90	403.02	0.008607	31.81	2436.42	224.00	1.70
Verdugo-Fletcher	8095.458 22039.75	100 yr	94600.00	376.43	389.06	394.10	406.42	0.007937	33.43	2829.54	224.00	1.66
Verdugo-Fletcher	8095.458 22039.75	200 yr	109000.00	376.43	390.02	395.85	409.93	0.008344	35.81	3044.04	224.00	1.71
Verdugo-Fletcher	8095.458 22039.75	500 yr	125000.00	376.43	390.58	397.74	414.72	0.009638	39.42	3170.58	224.00	1.85
Verdugo-Fletcher	7999.417 21944	Design	78000.00	375.77	386.77	391.30	402.32	0.008399	31.64	2464.88	224.00	1.68
Verdugo-Fletcher	7999.417 21944	2 yr	21600.00	375.77	380.94	382.38	386.34	0.007467	18.64	1159.02	224.00	1.44
Verdugo-Fletcher	7999.417 21944	5 yr	40500.00	375.77	383.54	385.81	391.95	0.006964	23.26	1741.00	224.00	1.47
Verdugo-Fletcher	7999.417 21944	10 yr	48200.00	375.77	384.49	387.04	393.95	0.006793	24.68	1953.24	224.00	1.47
Verdugo-Fletcher	7999.417 21944	25 yr	65800.00	375.77	385.60	389.64	399.46	0.008581	29.87	2203.00	224.00	1.68
Verdugo-Fletcher	7999.417 21944	50 yr	77500.00	375.77	386.73	391.23	402.21	0.008404	31.57	2454.54	224.00	1.68
Verdugo-Fletcher	7999.417 21944	100 yr	94600.00	375.77	388.46	393.41	405.66	0.007828	33.29	2841.80	224.00	1.65
Verdugo-Fletcher	7999.417 21944	200 yr	109000.00	375.77	389.43	395.19	409.14	0.008211	35.63	3059.45	224.00	1.70
Verdugo-Fletcher	7999.417 21944	500 yr	125000.00	375.77	390.03	397.03	413.81	0.009410	39.13	3194.58	224.00	1.83
Verdugo-Fletcher	7855.044 21800	Design	78000.00	375.12	386.71	391.00	400.64	0.017225	29.96	2603.59	259.39	1.67
Verdugo-Fletcher	7855.044 21800	2 yr	21600.00	375.12	383.24	382.21	385.63	0.004513	12.42	1739.40	238.60	0.81
Verdugo-Fletcher	7855.044 21800	5 yr	40500.00	375.12	384.24	385.70	390.72	0.010630	20.44	1981.89	244.61	1.27
Verdugo-Fletcher	7855.044 21800	10 yr	48200.00	375.12	384.97	386.92	392.69	0.011561	22.30	2161.10	248.96	1.33
Verdugo-Fletcher	7855.044 21800	25 yr	65800.00	375.12	385.78	389.42	397.79	0.016364	27.81	2366.05	253.84	1.61
Verdugo-Fletcher	7855.044 21800	50 yr	77500.00	375.12	386.67	390.94	400.53	0.017191	29.87	2594.18	259.17	1.66
Verdugo-Fletcher	7855.044 21800	100 yr	94600.00	375.12	388.00	392.97	404.04	0.017541	32.15	2942.87	267.10	1.71
Verdugo-Fletcher	7855.044 21800	200 yr	109000.00	375.12	388.74	394.57	407.41	0.019120	34.67	3143.76	271.57	1.80
Verdugo-Fletcher	7855.044 21800	500 yr	125000.00	375.12	389.23	396.12	411.81	0.022197	38.13	3278.28	274.52	1.94
Verdugo-Fletcher	7628.42*	Design	78000.00	374.10	387.31	389.98	397.58	0.010903	25.72	3032.56	269.14	1.35

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	7628.42*	2 yr	21600.00	374.10	382.21		384.61	0.004526	12.43	1737.74	238.58	0.81
Verdugo-Fletcher	7628.42*	5 yr	40500.00	374.10	385.79	384.68	389.47	0.004508	15.40	2629.41	260.01	0.85
Verdugo-Fletcher	7628.42*	10 yr	48200.00	374.10	387.02	385.90	391.15	0.004497	16.31	2955.40	267.42	0.86
Verdugo-Fletcher	7628.42*	25 yr	65800.00	374.10	386.48	388.40	394.99	0.009730	23.40	2811.66	264.18	1.26
Verdugo-Fletcher	7628.42*	50 yr	77500.00	374.10	387.28	389.92	397.48	0.010858	25.63	3023.70	268.94	1.35
Verdugo-Fletcher	7628.42*	100 yr	94600.00	374.10	388.51	391.95	400.81	0.011805	28.14	3361.23	276.36	1.42
Verdugo-Fletcher	7628.42*	200 yr	109000.00	374.10	389.20	393.55	403.82	0.013311	30.69	3551.59	280.45	1.52
Verdugo-Fletcher	7628.42*	500 yr	125000.00	374.10	389.64	395.14	407.60	0.015814	34.01	3675.82	283.10	1.66
Verdugo-Fletcher	7401.80*	Design	78000.00	373.07	390.40	388.94	395.77	0.004184	18.61	4191.64	293.85	0.87
Verdugo-Fletcher	7401.80*	2 yr	21600.00	373.07	381.19		383.58	0.004511	12.42	1739.71	238.65	0.81
Verdugo-Fletcher	7401.80*	5 yr	40500.00	373.07	384.79		388.45	0.004457	15.34	2639.60	260.27	0.85
Verdugo-Fletcher	7401.80*	10 yr	48200.00	373.07	386.04	384.86	390.13	0.004438	16.24	2968.60	267.74	0.86
Verdugo-Fletcher	7401.80*	25 yr	65800.00	373.07	388.69	387.37	393.60	0.004301	17.79	3699.16	283.62	0.87
Verdugo-Fletcher	7401.80*	50 yr	77500.00	373.07	390.33	388.88	395.69	0.004190	18.58	4171.33	293.43	0.87
Verdugo-Fletcher	7401.80*	100 yr	94600.00	373.07	389.14	390.92	398.63	0.008046	24.72	3826.57	286.30	1.19
Verdugo-Fletcher	7401.80*	200 yr	109000.00	373.07	389.70	392.51	401.30	0.009464	27.34	3987.19	289.65	1.30
Verdugo-Fletcher	7401.80*	500 yr	125000.00	373.07	390.05	394.17	404.55	0.011549	30.56	4090.03	291.77	1.44
Verdugo-Fletcher	7175.18*	Design	78000.00	372.05	389.76		394.86	0.003870	18.12	4305.28	296.18	0.84
Verdugo-Fletcher	7175.18*	2 yr	21600.00	372.05	380.16		382.56	0.004518	12.42	1738.90	238.64	0.81
Verdugo-Fletcher	7175.18*	5 yr	40500.00	372.05	383.82		387.44	0.004399	15.28	2651.15	260.56	0.84
Verdugo-Fletcher	7175.18*	10 yr	48200.00	372.05	385.13		389.14	0.004313	16.08	2997.14	268.40	0.85
Verdugo-Fletcher	7175.18*	25 yr	65800.00	372.05	387.94		392.66	0.004045	17.42	3777.23	285.29	0.84
Verdugo-Fletcher	7175.18*	50 yr	77500.00	372.05	389.69		394.77	0.003877	18.09	4283.49	295.74	0.84
Verdugo-Fletcher	7175.18*	100 yr	94600.00	372.05	391.90	389.89	397.56	0.003786	19.11	4951.34	308.98	0.84
Verdugo-Fletcher	7175.18*	200 yr	109000.00	372.05	393.77	391.49	399.78	0.003626	19.67	5542.01	320.24	0.83
Verdugo-Fletcher	7175.18*	500 yr	125000.00	372.05	390.54	393.15	402.32	0.008514	27.54	4539.18	300.88	1.25
Verdugo-Fletcher	6948.56*	Design	78000.00	371.02	389.34		394.03	0.003428	17.38	4487.73	299.89	0.79
Verdugo-Fletcher	6948.56*	2 yr	21600.00	371.02	379.18		381.55	0.004428	12.34	1750.29	238.95	0.80
Verdugo-Fletcher	6948.56*	5 yr	40500.00	371.02	382.99		386.47	0.004148	14.98	2703.57	261.78	0.82
Verdugo-Fletcher	6948.56*	10 yr	48200.00	371.02	384.38		388.20	0.003998	15.68	3074.38	270.15	0.82
Verdugo-Fletcher	6948.56*	25 yr	65800.00	371.02	387.40		391.78	0.003636	16.80	3916.52	288.24	0.80
Verdugo-Fletcher	6948.56*	50 yr	77500.00	371.02	389.26		393.94	0.003436	17.36	4464.46	299.42	0.79
Verdugo-Fletcher	6948.56*	100 yr	94600.00	371.02	391.54		396.76	0.003355	18.33	5161.85	313.08	0.80
Verdugo-Fletcher	6948.56*	200 yr	109000.00	371.02	393.49		399.01	0.003205	18.84	5784.70	324.79	0.79
Verdugo-Fletcher	6948.56*	500 yr	125000.00	371.02	395.41	392.12	401.31	0.003057	19.50	6410.14	326.81	0.78
Verdugo-Fletcher	6721.944 20665.67	Design	78000.00	370.00	389.04		393.31	0.002986	16.58	4705.45	304.25	0.74
Verdugo-Fletcher	6721.944 20665.67	2 yr	21600.00	370.00	378.26		380.56	0.004241	12.17	1775.07	239.58	0.79
Verdugo-Fletcher	6721.944 20665.67	5 yr	40500.00	370.00	382.32		385.58	0.003753	14.49	2795.14	263.90	0.78
Verdugo-Fletcher	6721.944 20665.67	10 yr	48200.00	370.00	383.80		387.34	0.003567	15.09	3194.59	272.83	0.78
Verdugo-Fletcher	6721.944 20665.67	25 yr	65800.00	370.00	387.02		391.01	0.003174	16.04	4101.89	292.10	0.75
Verdugo-Fletcher	6721.944 20665.67	50 yr	77500.00	370.00	388.96		393.22	0.002993	16.56	4680.94	303.76	0.74

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	6721.944 20665.67	100 yr	94600.00	370.00	391.29		396.04	0.002940	17.51	5403.46	317.71	0.75
Verdugo-Fletcher	6721.944 20665.67	200 yr	109000.00	370.00	393.29		398.33	0.002814	18.01	6052.56	329.74	0.74
Verdugo-Fletcher	6721.944 20665.67	500 yr	125000.00	370.00	395.27		400.67	0.002675	18.63	6708.54	330.70	0.73
Verdugo-Fletcher	6524.88*	Design	78000.00	369.11	388.86		392.76	0.002620	15.85	4921.91	308.49	0.70
Verdugo-Fletcher	6524.88*	2 yr	21600.00	369.11	377.60		379.76	0.003868	11.81	1829.13	240.94	0.76
Verdugo-Fletcher	6524.88*	5 yr	40500.00	369.11	381.89		384.88	0.003303	13.88	2916.90	266.66	0.74
Verdugo-Fletcher	6524.88*	10 yr	48200.00	369.11	383.45		386.68	0.003116	14.42	3342.90	276.08	0.73
Verdugo-Fletcher	6524.88*	25 yr	65800.00	369.11	386.78		390.43	0.002773	15.32	4295.31	296.05	0.71
Verdugo-Fletcher	6524.88*	50 yr	77500.00	369.11	388.77		392.66	0.002625	15.83	4896.55	308.00	0.70
Verdugo-Fletcher	6524.88*	100 yr	94600.00	369.11	391.13		395.50	0.002600	16.78	5638.27	322.12	0.71
Verdugo-Fletcher	6524.88*	200 yr	109000.00	369.11	393.17		397.80	0.002501	17.28	6306.75	334.34	0.70
Verdugo-Fletcher	6524.88*	500 yr	125000.00	369.11	395.20		400.17	0.002376	17.89	6987.40	334.67	0.69
Verdugo-Fletcher	6327.82*	Design	78000.00	368.23	388.71		392.27	0.002295	15.14	5151.50	312.97	0.66
Verdugo-Fletcher	6327.82*	2 yr	21600.00	368.23	377.08		379.05	0.003349	11.27	1917.23	243.14	0.71
Verdugo-Fletcher	6327.82*	5 yr	40500.00	368.23	381.57		384.28	0.002837	13.19	3069.46	270.10	0.69
Verdugo-Fletcher	6327.82*	10 yr	48200.00	368.23	383.19		386.11	0.002685	13.71	3515.46	279.84	0.68
Verdugo-Fletcher	6327.82*	25 yr	65800.00	368.23	386.61		389.92	0.002413	14.61	4505.20	300.32	0.66
Verdugo-Fletcher	6327.82*	50 yr	77500.00	368.23	388.63		392.18	0.002300	15.12	5125.37	312.47	0.66
Verdugo-Fletcher	6327.82*	100 yr	94600.00	368.23	391.01		395.02	0.002299	16.08	5884.43	326.73	0.67
Verdugo-Fletcher	6327.82*	200 yr	109000.00	368.23	393.07		397.34	0.002221	16.59	6570.39	338.64	0.66
Verdugo-Fletcher	6327.82*	500 yr	125000.00	368.23	395.14		399.73	0.002116	17.19	7272.69	338.64	0.65
Verdugo-Fletcher	6130.76*	Design	78000.00	367.34	388.61		391.85	0.002003	14.45	5399.20	317.65	0.62
Verdugo-Fletcher	6130.76*	2 yr	21600.00	367.34	376.74		378.46	0.002728	10.54	2050.03	246.38	0.64
Verdugo-Fletcher	6130.76*	5 yr	40500.00	367.34	381.36		383.76	0.002387	12.45	3252.67	274.12	0.64
Verdugo-Fletcher	6130.76*	10 yr	48200.00	367.34	383.01		385.63	0.002280	12.97	3714.86	284.05	0.63
Verdugo-Fletcher	6130.76*	25 yr	65800.00	367.34	386.48		389.48	0.002086	13.89	4735.76	304.86	0.62
Verdugo-Fletcher	6130.76*	50 yr	77500.00	367.34	388.53		391.76	0.002006	14.43	5372.42	317.15	0.62
Verdugo-Fletcher	6130.76*	100 yr	94600.00	367.34	390.92		394.59	0.002027	15.39	6147.51	331.49	0.63
Verdugo-Fletcher	6130.76*	200 yr	109000.00	367.34	393.00		396.93	0.001967	15.91	6849.50	342.61	0.63
Verdugo-Fletcher	6130.76*	500 yr	125000.00	367.34	395.10		399.33	0.001883	16.51	7570.89	342.61	0.62
Verdugo-Fletcher	5933.705 19876.71	Design	78000.00	366.45	388.53	382.31	391.48	0.001749	13.78	5659.12	322.53	0.58
Verdugo-Fletcher	5933.705 19876.71	2 yr	21600.00	366.45	376.50	373.54	377.98	0.002161	9.76	2212.97	250.32	0.58
Verdugo-Fletcher	5933.705 19876.71	5 yr	40500.00	366.45	381.20	377.01	383.33	0.001994	11.72	3455.58	278.53	0.59
Verdugo-Fletcher	5933.705 19876.71	10 yr	48200.00	366.45	382.88	378.23	385.21	0.001930	12.26	3931.54	288.60	0.59
Verdugo-Fletcher	5933.705 19876.71	25 yr	65800.00	366.45	386.38	380.74	389.10	0.001802	13.21	4979.93	309.64	0.58
Verdugo-Fletcher	5933.705 19876.71	50 yr	77500.00	366.45	388.45	382.25	391.39	0.001751	13.76	5631.75	322.02	0.58
Verdugo-Fletcher	5933.705 19876.71	100 yr	94600.00	366.45	390.85	384.27	394.22	0.001789	14.73	6421.48	336.42	0.59
Verdugo-Fletcher	5933.705 19876.71	200 yr	109000.00	366.45	392.94	385.86	396.56	0.001743	15.27	7138.84	346.58	0.59
Verdugo-Fletcher	5933.705 19876.71	500 yr	125000.00	366.45	395.07	387.56	398.98	0.001678	15.87	7877.58	346.58	0.59
Verdugo-Fletcher	5929.973		Bridge									

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	5926.240 19869.29	Design	78000.00	366.41	379.50	382.28	389.99	0.011266	26.00	2999.95	268.52	1.37
Verdugo-Fletcher	5926.240 19869.29	2 yr	21600.00	366.41	372.19	373.49	377.23	0.014349	18.02	1198.89	224.69	1.37
Verdugo-Fletcher	5926.240 19869.29	5 yr	40500.00	366.41	375.12	376.99	382.31	0.012459	21.52	1882.01	242.25	1.36
Verdugo-Fletcher	5926.240 19869.29	10 yr	48200.00	366.41	376.13	378.20	384.08	0.012100	22.64	2129.35	248.30	1.36
Verdugo-Fletcher	5926.240 19869.29	25 yr	65800.00	366.41	378.19	380.71	387.73	0.011577	24.79	2653.98	260.67	1.37
Verdugo-Fletcher	5926.240 19869.29	50 yr	77500.00	366.41	379.44	382.22	389.90	0.011278	25.95	2986.00	268.21	1.37
Verdugo-Fletcher	5926.240 19869.29	100 yr	94600.00	366.41	380.01	384.26	394.11	0.014474	30.14	3139.14	271.61	1.56
Verdugo-Fletcher	5926.240 19869.29	200 yr	109000.00	366.41	381.27	385.86	396.46	0.014083	31.27	3485.22	279.15	1.56
Verdugo-Fletcher	5926.240 19869.29	500 yr	125000.00	366.41	382.59	387.52	398.88	0.013699	32.38	3859.88	287.09	1.56
Verdugo-Fletcher	5896.920 19840	Design	78000.00	366.28	385.47	382.15	389.66	0.002903	16.42	4750.79	305.14	0.73
Verdugo-Fletcher	5896.920 19840	2 yr	21600.00	366.28	374.54	373.37	376.84	0.004252	12.18	1773.65	239.55	0.79
Verdugo-Fletcher	5896.920 19840	5 yr	40500.00	366.28	378.74	376.85	381.91	0.003606	14.30	2832.68	264.75	0.77
Verdugo-Fletcher	5896.920 19840	10 yr	48200.00	366.28	380.27	378.07	383.70	0.003400	14.85	3246.24	273.96	0.76
Verdugo-Fletcher	5896.920 19840	25 yr	65800.00	366.28	383.47	380.58	387.37	0.003063	15.85	4151.87	293.13	0.74
Verdugo-Fletcher	5896.920 19840	50 yr	77500.00	366.28	385.39	382.09	389.57	0.002909	16.40	4726.65	304.66	0.73
Verdugo-Fletcher	5896.920 19840	100 yr	94600.00	366.28	380.08	384.12	393.70	0.013738	29.61	3194.62	272.83	1.53
Verdugo-Fletcher	5896.920 19840	200 yr	109000.00	366.28	381.33	385.72	396.05	0.013444	30.79	3540.34	280.33	1.53
Verdugo-Fletcher	5896.920 19840	500 yr	125000.00	366.28	382.65	387.38	398.48	0.013141	31.93	3914.73	288.23	1.53
Verdugo-Fletcher	5856.732 19800	Design	78000.00	366.10	385.43		389.54	0.002830	16.27	4792.87	305.96	0.72
Verdugo-Fletcher	5856.732 19800	2 yr	21600.00	366.10	374.37		376.66	0.004235	12.16	1775.99	239.61	0.79
Verdugo-Fletcher	5856.732 19800	5 yr	40500.00	366.10	378.65		381.77	0.003518	14.18	2856.13	265.28	0.76
Verdugo-Fletcher	5856.732 19800	10 yr	48200.00	366.10	380.20		383.56	0.003313	14.72	3274.90	274.59	0.75
Verdugo-Fletcher	5856.732 19800	25 yr	65800.00	366.10	383.42		387.25	0.002984	15.71	4189.36	293.89	0.73
Verdugo-Fletcher	5856.732 19800	50 yr	77500.00	366.10	385.35		389.45	0.002835	16.25	4768.55	305.49	0.72
Verdugo-Fletcher	5856.732 19800	100 yr	94600.00	366.10	380.18	383.94	393.17	0.012806	28.92	3270.95	274.50	1.48
Verdugo-Fletcher	5856.732 19800	200 yr	109000.00	366.10	381.42	385.54	395.53	0.012628	30.14	3616.05	281.94	1.48
Verdugo-Fletcher	5856.732 19800	500 yr	125000.00	366.10	382.73	387.20	397.97	0.012425	31.33	3989.97	289.79	1.49
Verdugo-Fletcher	5557.142 19500	Design	78000.00	364.73	385.22		388.78	0.002293	15.14	5152.60	312.94	0.66
Verdugo-Fletcher	5557.142 19500	2 yr	21600.00	364.73	373.53		375.53	0.003416	11.34	1904.67	242.81	0.71
Verdugo-Fletcher	5557.142 19500	5 yr	40500.00	364.73	378.19		380.84	0.002750	13.06	3101.52	270.77	0.68
Verdugo-Fletcher	5557.142 19500	10 yr	48200.00	364.73	379.82		382.68	0.002605	13.57	3551.23	280.56	0.67
Verdugo-Fletcher	5557.142 19500	25 yr	65800.00	364.73	383.16		386.45	0.002390	14.56	4519.67	300.56	0.66
Verdugo-Fletcher	5557.142 19500	50 yr	77500.00	364.73	385.14		388.69	0.002297	15.12	5127.18	312.45	0.66
Verdugo-Fletcher	5557.142 19500	100 yr	94600.00	364.73	387.78	382.57	391.68	0.002200	15.83	5974.65	328.32	0.65
Verdugo-Fletcher	5557.142 19500	200 yr	109000.00	364.73	389.77	384.17	393.97	0.002109	16.43	6632.32	330.70	0.65
Verdugo-Fletcher	5557.142 19500	500 yr	125000.00	364.73	391.66	385.83	396.27	0.002086	17.23	7255.77	330.70	0.65
Verdugo-Fletcher	5332.98*	Design	78000.00	363.72	385.11		388.30	0.001964	14.35	5436.03	318.37	0.61
Verdugo-Fletcher	5332.98*	2 yr	21600.00	363.72	373.13		374.85	0.002713	10.52	2053.78	246.49	0.64
Verdugo-Fletcher	5332.98*	5 yr	40500.00	363.72	377.97		380.28	0.002254	12.21	3316.11	275.52	0.62
Verdugo-Fletcher	5332.98*	10 yr	48200.00	363.72	379.63		382.15	0.002161	12.74	3783.54	285.52	0.62

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	5332.98*	25 yr	65800.00	363.72	383.02		385.96	0.002024	13.75	4784.47	305.84	0.61
Verdugo-Fletcher	5332.98*	50 yr	77500.00	363.72	385.02		388.21	0.001967	14.33	5409.89	317.88	0.61
Verdugo-Fletcher	5332.98*	100 yr	94600.00	363.72	387.69		391.22	0.001907	15.06	6280.31	333.91	0.61
Verdugo-Fletcher	5332.98*	200 yr	109000.00	363.72	389.72		393.53	0.001833	15.67	6956.99	334.84	0.61
Verdugo-Fletcher	5332.98*	500 yr	125000.00	363.72	391.63		395.83	0.001824	16.45	7596.80	334.84	0.61
Verdugo-Fletcher	5108.826 19051.36	Design	78000.00	362.70	385.03		387.90	0.001681	13.59	5737.43	323.96	0.57
Verdugo-Fletcher	5108.826 19051.36	2 yr	21600.00	362.70	372.88		374.32	0.002066	9.62	2245.94	251.10	0.57
Verdugo-Fletcher	5108.826 19051.36	5 yr	40500.00	362.70	377.82		379.83	0.001829	11.38	3557.79	280.70	0.56
Verdugo-Fletcher	5108.826 19051.36	10 yr	48200.00	362.70	379.50		381.71	0.001781	11.93	4039.95	290.83	0.56
Verdugo-Fletcher	5108.826 19051.36	25 yr	65800.00	362.70	382.92		385.54	0.001711	12.98	5069.12	311.33	0.57
Verdugo-Fletcher	5108.826 19051.36	50 yr	77500.00	362.70	384.94		387.80	0.001682	13.57	5710.63	323.46	0.57
Verdugo-Fletcher	5108.826 19051.36	100 yr	94600.00	362.70	387.63		390.82	0.001649	14.33	6602.17	338.98	0.57
Verdugo-Fletcher	5108.826 19051.36	200 yr	109000.00	362.70	389.68		393.14	0.001594	14.94	7295.73	338.98	0.57
Verdugo-Fletcher	5108.826 19051.36	500 yr	125000.00	362.70	391.61		395.45	0.001597	15.72	7950.33	338.98	0.57
Verdugo-Fletcher	5007.183 18950	Design	78000.00	362.24	385.00		387.73	0.001568	13.27	5876.98	326.53	0.55
Verdugo-Fletcher	5007.183 18950	2 yr	21600.00	362.24	372.80		374.12	0.001823	9.23	2340.82	253.36	0.53
Verdugo-Fletcher	5007.183 18950	5 yr	40500.00	362.24	377.76		379.65	0.001666	11.03	3672.02	283.13	0.54
Verdugo-Fletcher	5007.183 18950	10 yr	48200.00	362.24	379.46		381.54	0.001634	11.59	4160.28	293.30	0.54
Verdugo-Fletcher	5007.183 18950	25 yr	65800.00	362.24	382.89		385.37	0.001588	12.65	5201.42	313.87	0.55
Verdugo-Fletcher	5007.183 18950	50 yr	77500.00	362.24	384.91		387.64	0.001569	13.25	5849.90	326.03	0.55
Verdugo-Fletcher	5007.183 18950	100 yr	94600.00	362.24	387.61		390.66	0.001545	14.01	6750.62	340.90	0.55
Verdugo-Fletcher	5007.183 18950	200 yr	109000.00	362.24	389.66		392.99	0.001499	14.63	7451.47	340.90	0.55
Verdugo-Fletcher	5007.183 18950	500 yr	125000.00	362.24	391.60		395.29	0.001506	15.41	8112.51	340.90	0.56
Verdugo-Fletcher	4953.960 18897.24	Design	78000.00	362.00	384.98		387.65	0.001513	13.11	5950.66	327.88	0.54
Verdugo-Fletcher	4953.960 18897.24	2 yr	21600.00	362.00	372.76		374.03	0.001707	9.03	2392.13	254.57	0.52
Verdugo-Fletcher	4953.960 18897.24	5 yr	40500.00	362.00	377.74		379.56	0.001587	10.85	3732.84	284.42	0.53
Verdugo-Fletcher	4953.960 18897.24	10 yr	48200.00	362.00	379.43		381.46	0.001563	11.41	4224.17	294.60	0.53
Verdugo-Fletcher	4953.960 18897.24	25 yr	65800.00	362.00	382.87		385.29	0.001528	12.48	5271.40	315.21	0.54
Verdugo-Fletcher	4953.960 18897.24	50 yr	77500.00	362.00	384.90		387.56	0.001514	13.08	5923.44	327.39	0.54
Verdugo-Fletcher	4953.960 18897.24	100 yr	94600.00	362.00	387.60		390.58	0.001485	13.86	6827.59	339.76	0.54
Verdugo-Fletcher	4953.960 18897.24	200 yr	109000.00	362.00	389.65		392.91	0.001448	14.48	7525.82	339.76	0.54
Verdugo-Fletcher	4953.960 18897.24	500 yr	125000.00	362.00	391.59		395.21	0.001461	15.27	8184.08	339.76	0.55
Verdugo-Fletcher	4952.999 18896.24	Design	78000.00	362.00	384.66		387.65	0.002059	13.87	5623.36	315.99	0.58
Verdugo-Fletcher	4952.999 18896.24	2 yr	21600.00	362.00	372.59		374.03	0.002192	9.61	2246.99	243.55	0.56
Verdugo-Fletcher	4952.999 18896.24	5 yr	40500.00	362.00	377.50		379.56	0.002097	11.52	3515.37	273.03	0.57
Verdugo-Fletcher	4952.999 18896.24	10 yr	48200.00	362.00	379.18		381.45	0.002081	12.11	3981.46	283.09	0.57
Verdugo-Fletcher	4952.999 18896.24	25 yr	65800.00	362.00	382.57		385.29	0.002063	13.22	4976.71	303.46	0.58
Verdugo-Fletcher	4952.999 18896.24	50 yr	77500.00	362.00	384.58		387.55	0.002059	13.85	5597.44	315.50	0.58
Verdugo-Fletcher	4952.999 18896.24	100 yr	94600.00	362.00	387.25		390.58	0.002110	14.63	6465.18	339.74	0.59
Verdugo-Fletcher	4952.999 18896.24	200 yr	109000.00	362.00	389.31		392.91	0.002015	15.21	7166.32	339.74	0.58
Verdugo-Fletcher	4952.999 18896.24	500 yr	125000.00	362.00	391.24		395.21	0.002005	15.98	7821.65	339.74	0.59

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4938.000 18881.24	Design	78000.00	361.93	384.23		387.61	0.002822	14.75	5287.31	303.82	0.62
Verdugo-Fletcher	4938.000 18881.24	2 yr	21600.00	361.93	372.35		373.99	0.002875	10.28	2100.20	232.49	0.60
Verdugo-Fletcher	4938.000 18881.24	5 yr	40500.00	361.93	377.18		379.53	0.002815	12.30	3293.89	261.50	0.61
Verdugo-Fletcher	4938.000 18881.24	10 yr	48200.00	361.93	378.83		381.42	0.002811	12.91	3733.77	271.40	0.61
Verdugo-Fletcher	4938.000 18881.24	25 yr	65800.00	361.93	382.17		385.25	0.002814	14.08	4674.81	291.47	0.62
Verdugo-Fletcher	4938.000 18881.24	50 yr	77500.00	361.93	384.15		387.52	0.002822	14.73	5262.75	303.34	0.62
Verdugo-Fletcher	4938.000 18881.24	100 yr	94600.00	361.93	386.78		390.54	0.002836	15.56	6081.63	319.13	0.63
Verdugo-Fletcher	4938.000 18881.24	200 yr	109000.00	361.93	388.87		392.87	0.002812	16.06	6789.02	339.42	0.63
Verdugo-Fletcher	4938.000 18881.24	500 yr	125000.00	361.93	390.79		395.17	0.002754	16.80	7442.56	339.42	0.63
Verdugo-Fletcher	4923.007 18866.24	Design	78000.00	361.86	383.68		387.58	0.001746	15.84	4922.75	290.90	0.68
Verdugo-Fletcher	4923.007 18866.24	2 yr	21600.00	361.86	372.03		373.95	0.001721	11.12	1942.61	221.04	0.66
Verdugo-Fletcher	4923.007 18866.24	5 yr	40500.00	361.86	376.76		379.49	0.001716	13.26	3054.85	249.41	0.67
Verdugo-Fletcher	4923.007 18866.24	10 yr	48200.00	361.86	378.38		381.38	0.001721	13.91	3466.09	259.12	0.67
Verdugo-Fletcher	4923.007 18866.24	25 yr	65800.00	361.86	381.66		385.22	0.001735	15.13	4347.74	278.79	0.68
Verdugo-Fletcher	4923.007 18866.24	50 yr	77500.00	361.86	383.60		387.48	0.001746	15.82	4899.69	290.43	0.68
Verdugo-Fletcher	4923.007 18866.24	100 yr	94600.00	361.86	386.18		390.50	0.001760	16.69	5669.70	305.92	0.68
Verdugo-Fletcher	4923.007 18866.24	200 yr	109000.00	361.86	388.28		392.84	0.001774	17.12	6366.15	339.10	0.70
Verdugo-Fletcher	4923.007 18866.24	500 yr	125000.00	361.86	390.22		395.14	0.001699	17.80	7023.19	339.10	0.69
Verdugo-Fletcher	4908 18851.24	Design	78000.00	361.79	382.89		387.54	0.002522	17.32	4503.37	276.55	0.76
Verdugo-Fletcher	4908 18851.24	2 yr	21600.00	361.79	371.59		373.92	0.002441	12.26	1761.13	208.75	0.74
Verdugo-Fletcher	4908 18851.24	5 yr	40500.00	361.79	376.17		379.46	0.002461	14.56	2780.92	236.25	0.75
Verdugo-Fletcher	4908 18851.24	10 yr	48200.00	361.79	377.74		381.35	0.002473	15.26	3159.08	245.66	0.75
Verdugo-Fletcher	4908 18851.24	25 yr	65800.00	361.79	380.92		385.18	0.002503	16.57	3971.95	264.77	0.75
Verdugo-Fletcher	4908 18851.24	50 yr	77500.00	361.79	382.81		387.45	0.002521	17.29	4482.04	276.09	0.76
Verdugo-Fletcher	4908 18851.24	100 yr	94600.00	361.79	385.32		390.47	0.002545	18.21	5195.04	291.17	0.76
Verdugo-Fletcher	4908 18851.24	200 yr	109000.00	361.79	387.40		392.80	0.002666	18.65	5843.43	338.77	0.79
Verdugo-Fletcher	4908 18851.24	500 yr	125000.00	361.79	389.41	385.37	395.11	0.002452	19.16	6523.73	338.77	0.77
Verdugo-Fletcher	4892.987 18836.24	Design	78000.00	361.72	381.20	380.16	387.50	0.004214	20.14	3873.61	256.84	0.91
Verdugo-Fletcher	4892.987 18836.24	2 yr	21600.00	361.72	370.61	370.15	373.87	0.004117	14.49	1490.62	193.33	0.92
Verdugo-Fletcher	4892.987 18836.24	5 yr	40500.00	361.72	374.88	374.18	379.42	0.004141	17.08	2370.73	218.95	0.91
Verdugo-Fletcher	4892.987 18836.24	10 yr	48200.00	361.72	376.36	375.56	381.31	0.004155	17.86	2699.46	227.77	0.91
Verdugo-Fletcher	4892.987 18836.24	25 yr	65800.00	361.72	379.35	378.40	385.14	0.004190	19.30	3408.78	245.75	0.91
Verdugo-Fletcher	4892.987 18836.24	50 yr	77500.00	361.72	381.13	380.09	387.40	0.004213	20.10	3854.94	256.41	0.91
Verdugo-Fletcher	4892.987 18836.24	100 yr	94600.00	361.72	383.50	382.36	390.42	0.004243	21.11	4480.23	270.64	0.91
Verdugo-Fletcher	4892.987 18836.24	200 yr	109000.00	361.72	385.34	384.16	392.75	0.004264	21.86	4987.16	281.65	0.92
Verdugo-Fletcher	4892.987 18836.24	500 yr	125000.00	361.72	386.03	386.03	395.06	0.005076	24.12	5182.50	285.78	1.00
Verdugo-Fletcher	4841.999 18785.24	Design	78000.00	361.49	381.03	379.94	387.28	0.004173	20.06	3888.32	257.21	0.91
Verdugo-Fletcher	4841.999 18785.24	2 yr	21600.00	361.49	370.48	369.92	373.66	0.003979	14.31	1509.41	193.93	0.90
Verdugo-Fletcher	4841.999 18785.24	5 yr	40500.00	361.49	374.73	373.95	379.20	0.004061	16.96	2388.22	219.44	0.91
Verdugo-Fletcher	4841.999 18785.24	10 yr	48200.00	361.49	376.20	375.33	381.09	0.004086	17.74	2716.83	228.25	0.91

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4841.999 18785.24	25 yr	65800.00	361.49	379.18	378.17	384.92	0.004141	19.22	3424.02	246.14	0.91
Verdugo-Fletcher	4841.999 18785.24	50 yr	77500.00	361.49	380.95	379.87	387.18	0.004172	20.03	3869.66	256.77	0.91
Verdugo-Fletcher	4841.999 18785.24	100 yr	94600.00	361.49	383.32	382.14	390.20	0.004209	21.05	4494.26	270.98	0.91
Verdugo-Fletcher	4841.999 18785.24	200 yr	109000.00	361.49	385.15	383.92	392.53	0.004238	21.80	4999.07	281.93	0.91
Verdugo-Fletcher	4841.999 18785.24	500 yr	125000.00	361.49	387.04	386.66	394.80	0.004505	22.36	5591.32	337.35	0.97
Verdugo-Fletcher	4621.872 18583.24	Design	78000.00	360.58	379.03	379.03	386.27	0.005056	21.59	3612.91	250.72	1.00
Verdugo-Fletcher	4621.872 18583.24	2 yr	21600.00	360.58	369.02	369.02	372.70	0.004865	15.40	1402.66	190.60	1.00
Verdugo-Fletcher	4621.872 18583.24	5 yr	40500.00	360.58	373.04	373.04	378.22	0.004938	18.25	2219.26	214.78	1.00
Verdugo-Fletcher	4621.872 18583.24	10 yr	48200.00	360.58	374.42	374.42	380.10	0.004980	19.12	2521.29	223.06	1.00
Verdugo-Fletcher	4621.872 18583.24	25 yr	65800.00	360.58	377.27	377.27	383.92	0.005030	20.69	3179.65	240.13	1.00
Verdugo-Fletcher	4621.872 18583.24	50 yr	77500.00	360.58	378.96	378.96	386.18	0.005055	21.56	3595.45	250.30	1.00
Verdugo-Fletcher	4621.872 18583.24	100 yr	94600.00	360.58	381.23	381.23	389.19	0.005085	22.63	4179.49	263.94	1.00
Verdugo-Fletcher	4621.872 18583.24	200 yr	109000.00	360.58	383.02	383.02	391.51	0.005088	23.39	4659.39	274.63	1.00
Verdugo-Fletcher	4621.872 18583.24	500 yr	125000.00	360.58	385.58	385.58	393.79	0.004816	22.99	5437.19	333.00	1.00
Verdugo-Fletcher	4571.869 18533.24	Design	78000.00	360.35	375.90	378.22	385.97	0.007035	25.46	3063.32	243.35	1.26
Verdugo-Fletcher	4571.869 18533.24	2 yr	21600.00	360.35	367.30	368.47	372.40	0.007314	18.12	1192.34	191.73	1.28
Verdugo-Fletcher	4571.869 18533.24	5 yr	40500.00	360.35	370.71	372.37	377.92	0.007172	21.55	1879.07	212.14	1.28
Verdugo-Fletcher	4571.869 18533.24	10 yr	48200.00	360.35	371.90	373.73	379.80	0.007136	22.56	2136.49	219.30	1.27
Verdugo-Fletcher	4571.869 18533.24	25 yr	65800.00	360.35	374.36	376.50	383.62	0.007072	24.42	2694.75	234.08	1.27
Verdugo-Fletcher	4571.869 18533.24	50 yr	77500.00	360.35	375.84	378.15	385.88	0.007037	25.42	3048.46	242.98	1.26
Verdugo-Fletcher	4571.869 18533.24	100 yr	94600.00	360.35	377.84	380.37	388.89	0.006992	26.67	3546.70	254.99	1.26
Verdugo-Fletcher	4571.869 18533.24	200 yr	109000.00	360.35	379.42	382.02	391.21	0.006941	27.55	3956.12	264.45	1.26
Verdugo-Fletcher	4571.869 18533.24	500 yr	125000.00	360.35	381.26	384.56	393.50	0.006675	28.08	4452.31	275.48	1.23
Verdugo-Fletcher	4521.727 18483.24	Design	78000.00	360.12	374.42	377.43	385.61	0.007309	26.85	2905.10	245.77	1.38
Verdugo-Fletcher	4521.727 18483.24	2 yr	21600.00	360.12	366.48	367.95	372.02	0.007907	18.89	1143.38	198.16	1.39
Verdugo-Fletcher	4521.727 18483.24	5 yr	40500.00	360.12	369.59	371.73	377.56	0.007651	22.65	1787.90	216.79	1.39
Verdugo-Fletcher	4521.727 18483.24	10 yr	48200.00	360.12	370.70	373.05	379.43	0.007545	23.72	2032.16	223.45	1.39
Verdugo-Fletcher	4521.727 18483.24	25 yr	65800.00	360.12	372.98	375.75	383.26	0.007394	25.72	2557.83	237.14	1.38
Verdugo-Fletcher	4521.727 18483.24	50 yr	77500.00	360.12	374.36	377.37	385.52	0.007312	26.81	2891.09	245.43	1.38
Verdugo-Fletcher	4521.727 18483.24	100 yr	94600.00	360.12	376.23	379.54	388.54	0.007211	28.15	3360.79	256.65	1.37
Verdugo-Fletcher	4521.727 18483.24	200 yr	109000.00	360.12	377.71	381.27	390.86	0.007126	29.10	3745.74	265.50	1.37
Verdugo-Fletcher	4521.727 18483.24	500 yr	125000.00	360.12	379.37	383.10	393.16	0.006900	29.80	4194.14	275.44	1.35
Verdugo-Fletcher	4471.730 18433.24	Design	78000.00	359.90	373.37	376.69	385.09	0.015865	27.48	2838.86	250.84	1.44
Verdugo-Fletcher	4471.730 18433.24	2 yr	21600.00	359.90	365.99	367.44	371.46	0.016909	18.78	1149.94	206.52	1.40
Verdugo-Fletcher	4471.730 18433.24	5 yr	40500.00	359.90	368.86	371.13	377.01	0.016656	22.91	1767.80	223.75	1.44
Verdugo-Fletcher	4471.730 18433.24	10 yr	48200.00	359.90	369.89	372.41	378.89	0.016440	24.08	2001.98	229.95	1.44
Verdugo-Fletcher	4471.730 18433.24	25 yr	65800.00	359.90	372.03	375.05	382.72	0.016060	26.24	2507.29	242.78	1.44
Verdugo-Fletcher	4471.730 18433.24	50 yr	77500.00	359.90	373.32	376.63	385.00	0.015874	27.43	2825.40	250.52	1.44
Verdugo-Fletcher	4471.730 18433.24	100 yr	94600.00	359.90	375.08	378.76	388.03	0.015588	28.87	3276.63	261.11	1.44
Verdugo-Fletcher	4471.730 18433.24	200 yr	109000.00	359.90	376.47	380.42	390.35	0.015357	29.90	3646.08	269.47	1.43
Verdugo-Fletcher	4471.730 18433.24	500 yr	125000.00	359.90	378.02	382.07	392.67	0.014887	30.72	4069.54	278.74	1.42

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	4421.838 18383.24	Design	78000.00	359.67	372.63	375.98	384.34	0.014398	27.46	2840.14	257.73	1.46
Verdugo-Fletcher	4421.838 18383.24	2 yr	21600.00	359.67	365.76	366.96	370.70	0.014061	17.84	1210.77	216.51	1.33
Verdugo-Fletcher	4421.838 18383.24	5 yr	40500.00	359.67	368.40	370.54	376.22	0.014764	22.44	1805.05	232.39	1.42
Verdugo-Fletcher	4421.838 18383.24	10 yr	48200.00	359.67	369.36	371.79	378.12	0.014742	23.75	2029.82	238.12	1.43
Verdugo-Fletcher	4421.838 18383.24	25 yr	65800.00	359.67	371.36	374.37	381.96	0.014546	26.13	2518.60	250.13	1.45
Verdugo-Fletcher	4421.838 18383.24	50 yr	77500.00	359.67	372.58	375.91	384.25	0.014405	27.41	2827.09	257.43	1.46
Verdugo-Fletcher	4421.838 18383.24	100 yr	94600.00	359.67	374.24	378.00	387.28	0.014154	28.98	3264.59	267.43	1.46
Verdugo-Fletcher	4421.838 18383.24	200 yr	109000.00	359.67	375.56	379.62	389.62	0.013935	30.09	3622.74	275.35	1.46
Verdugo-Fletcher	4421.838 18383.24	500 yr	125000.00	359.67	377.02	381.31	391.96	0.013524	31.02	4029.85	284.08	1.45
Verdugo-Fletcher	4420.793 18382.24	Design	78000.00	359.67	371.80	375.53	384.33	0.014676	28.40	2746.52	262.80	1.55
Verdugo-Fletcher	4420.793 18382.24	2 yr	21600.00	359.67	365.26	366.74	370.69	0.016115	18.70	1155.35	223.53	1.45
Verdugo-Fletcher	4420.793 18382.24	5 yr	40500.00	359.67	367.78	370.23	376.21	0.015888	23.29	1738.85	238.68	1.52
Verdugo-Fletcher	4420.793 18382.24	10 yr	48200.00	359.67	368.69	371.45	378.10	0.015633	24.62	1958.00	244.13	1.53
Verdugo-Fletcher	4420.793 18382.24	25 yr	65800.00	359.67	370.59	373.96	381.95	0.015036	27.04	2433.67	255.55	1.54
Verdugo-Fletcher	4420.793 18382.24	50 yr	77500.00	359.67	371.75	375.47	384.23	0.014691	28.35	2733.85	262.51	1.55
Verdugo-Fletcher	4420.793 18382.24	100 yr	94600.00	359.67	373.34	377.51	387.27	0.014206	29.95	3158.97	272.05	1.55
Verdugo-Fletcher	4420.793 18382.24	200 yr	109000.00	359.67	374.60	379.11	389.61	0.013830	31.08	3506.69	279.62	1.55
Verdugo-Fletcher	4420.793 18382.24	500 yr	125000.00	359.67	375.99	380.76	391.95	0.013298	32.06	3899.07	287.92	1.54
Verdugo-Fletcher	4215.917 18178.06	Design	78000.00	358.74	372.38	374.60	381.90	0.009744	24.77	3149.48	271.83	1.28
Verdugo-Fletcher	4215.917 18178.06	2 yr	21600.00	358.74	366.73	365.81	369.21	0.004770	12.64	1708.66	237.92	0.83
Verdugo-Fletcher	4215.917 18178.06	5 yr	40500.00	358.74	370.24	369.30	374.06	0.004773	15.69	2580.45	258.97	0.88
Verdugo-Fletcher	4215.917 18178.06	10 yr	48200.00	358.74	369.52	370.52	375.80	0.008453	20.11	2396.40	254.67	1.16
Verdugo-Fletcher	4215.917 18178.06	25 yr	65800.00	358.74	371.25	373.03	379.55	0.009390	23.12	2845.65	265.04	1.24
Verdugo-Fletcher	4215.917 18178.06	50 yr	77500.00	358.74	372.33	374.54	381.81	0.009733	24.70	3137.12	271.56	1.28
Verdugo-Fletcher	4215.917 18178.06	100 yr	94600.00	358.74	373.84	376.58	384.85	0.010012	26.62	3553.96	280.62	1.32
Verdugo-Fletcher	4215.917 18178.06	200 yr	109000.00	358.74	375.05	378.18	387.20	0.010126	27.97	3897.15	287.86	1.34
Verdugo-Fletcher	4215.917 18178.06	500 yr	125000.00	358.74	376.39	379.83	389.59	0.010064	29.16	4287.08	295.88	1.35
Verdugo-Fletcher	3957.652 17907.7	Design	78000.00	357.51	373.93	373.38	380.05	0.005067	19.86	3927.67	288.50	0.95
Verdugo-Fletcher	3957.652 17907.7	2 yr	21600.00	357.51	365.33	364.60	367.93	0.005136	12.95	1668.10	236.89	0.86
Verdugo-Fletcher	3957.652 17907.7	5 yr	40500.00	357.51	368.81	368.08	372.79	0.005062	16.00	2530.63	257.81	0.90
Verdugo-Fletcher	3957.652 17907.7	10 yr	48200.00	357.51	370.01	369.29	374.47	0.005054	16.96	2842.69	264.98	0.91
Verdugo-Fletcher	3957.652 17907.7	25 yr	65800.00	357.51	372.43	371.80	377.91	0.005057	18.79	3502.53	279.52	0.94
Verdugo-Fletcher	3957.652 17907.7	50 yr	77500.00	357.51	373.87	373.31	379.97	0.005067	19.82	3910.70	288.15	0.95
Verdugo-Fletcher	3957.652 17907.7	100 yr	94600.00	357.51	374.54	375.35	382.78	0.006540	23.04	4106.36	292.19	1.08
Verdugo-Fletcher	3957.652 17907.7	200 yr	109000.00	357.51	375.61	376.94	385.05	0.006990	24.65	4421.91	298.60	1.13
Verdugo-Fletcher	3957.652 17907.7	500 yr	125000.00	357.51	376.85	378.60	387.40	0.007256	26.07	4795.58	306.02	1.16
Verdugo-Fletcher	3727.154 17637.4	Design	78000.00	356.29	373.59	372.16	378.98	0.004210	18.64	4183.47	293.77	0.87
Verdugo-Fletcher	3727.154 17637.4	2 yr	21600.00	356.29	364.56		366.86	0.004223	12.15	1777.58	239.65	0.79
Verdugo-Fletcher	3727.154 17637.4	5 yr	40500.00	356.29	368.21		371.73	0.004211	15.05	2690.21	261.50	0.83
Verdugo-Fletcher	3727.154 17637.4	10 yr	48200.00	356.29	369.46		373.41	0.004211	15.95	3021.40	268.99	0.84

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	3727.154 17637.4	25 yr	65800.00	356.29	372.00	370.58	376.84	0.004214	17.66	3725.55	284.27	0.86
Verdugo-Fletcher	3727.154 17637.4	50 yr	77500.00	356.29	373.52	372.09	378.90	0.004210	18.61	4165.14	293.40	0.87
Verdugo-Fletcher	3727.154 17637.4	100 yr	94600.00	356.29	375.56	374.13	381.65	0.004206	19.81	4775.72	305.63	0.88
Verdugo-Fletcher	3727.154 17637.4	200 yr	109000.00	356.29	377.14	375.72	383.79	0.004204	20.70	5266.37	315.11	0.89
Verdugo-Fletcher	3727.154 17637.4	500 yr	125000.00	356.29	378.74	377.39	386.01	0.004208	21.63	5778.80	323.08	0.90
Verdugo-Fletcher	3437.429 17367	Design	78000.00	355.06	372.40		377.76	0.004175	18.59	4195.60	294.02	0.87
Verdugo-Fletcher	3437.429 17367	2 yr	21600.00	355.06	363.38		365.65	0.004140	12.07	1789.03	239.93	0.78
Verdugo-Fletcher	3437.429 17367	5 yr	40500.00	355.06	367.01		370.51	0.004166	15.00	2699.71	261.72	0.82
Verdugo-Fletcher	3437.429 17367	10 yr	48200.00	355.06	368.26		372.19	0.004174	15.90	3030.52	269.20	0.84
Verdugo-Fletcher	3437.429 17367	25 yr	65800.00	355.06	370.81		375.62	0.004178	17.61	3736.28	284.49	0.86
Verdugo-Fletcher	3437.429 17367	50 yr	77500.00	355.06	372.33		377.68	0.004175	18.55	4177.21	293.64	0.87
Verdugo-Fletcher	3437.429 17367	100 yr	94600.00	355.06	374.38		380.43	0.004171	19.75	4789.44	305.90	0.88
Verdugo-Fletcher	3437.429 17367	200 yr	109000.00	355.06	375.97		382.58	0.004163	20.63	5284.31	315.45	0.89
Verdugo-Fletcher	3437.429 17367	500 yr	125000.00	355.06	377.57		384.79	0.004159	21.56	5797.02	322.48	0.90
Verdugo-Fletcher	3283.58*	Design	78000.00	354.45	371.63	370.32	377.12	0.004310	18.80	4150.04	293.09	0.88
Verdugo-Fletcher	3283.58*	2 yr	21600.00	354.45	362.68		365.00	0.004297	12.22	1767.58	239.40	0.79
Verdugo-Fletcher	3283.58*	5 yr	40500.00	354.45	366.28		369.86	0.004318	15.18	2667.80	260.99	0.84
Verdugo-Fletcher	3283.58*	10 yr	48200.00	354.45	367.52		371.54	0.004319	16.09	2995.97	268.42	0.85
Verdugo-Fletcher	3283.58*	25 yr	65800.00	354.45	370.05	368.74	374.98	0.004317	17.81	3695.06	283.62	0.87
Verdugo-Fletcher	3283.58*	50 yr	77500.00	354.45	371.57	370.26	377.03	0.004311	18.76	4131.76	292.71	0.88
Verdugo-Fletcher	3283.58*	100 yr	94600.00	354.45	373.61	372.29	379.79	0.004297	19.95	4740.88	304.94	0.89
Verdugo-Fletcher	3283.58*	200 yr	109000.00	354.45	375.19	373.89	381.93	0.004284	20.83	5232.02	314.46	0.90
Verdugo-Fletcher	3283.58*	500 yr	125000.00	354.45	376.79	375.58	384.15	0.004287	21.78	5740.41	322.18	0.91
Verdugo-Fletcher	3129.733 17096.7	Design	78000.00	353.83	370.63	369.70	376.42	0.004670	19.32	4038.01	290.75	0.91
Verdugo-Fletcher	3129.733 17096.7	2 yr	21600.00	353.83	361.86		364.31	0.004680	12.56	1719.11	238.16	0.82
Verdugo-Fletcher	3129.733 17096.7	5 yr	40500.00	353.83	365.40	364.40	369.17	0.004672	15.58	2598.78	259.37	0.87
Verdugo-Fletcher	3129.733 17096.7	10 yr	48200.00	353.83	366.61	365.62	370.85	0.004670	16.51	2918.60	266.66	0.88
Verdugo-Fletcher	3129.733 17096.7	25 yr	65800.00	353.83	369.09	368.13	374.28	0.004672	18.29	3597.41	281.51	0.90
Verdugo-Fletcher	3129.733 17096.7	50 yr	77500.00	353.83	370.57	369.64	376.34	0.004670	19.28	4020.39	290.38	0.91
Verdugo-Fletcher	3129.733 17096.7	100 yr	94600.00	353.83	372.55	371.67	379.10	0.004665	20.53	4608.87	302.29	0.93
Verdugo-Fletcher	3129.733 17096.7	200 yr	109000.00	353.83	374.09	373.27	381.24	0.004666	21.46	5080.03	311.50	0.94
Verdugo-Fletcher	3129.733 17096.7	500 yr	125000.00	353.83	375.66	374.96	383.46	0.004681	22.41	5578.13	320.95	0.95
Verdugo-Fletcher	2870.441 16826.4	Design	78000.00	352.61	369.58		375.23	0.004503	19.08	4088.56	291.83	0.90
Verdugo-Fletcher	2870.441 16826.4	2 yr	21600.00	352.61	360.73		363.12	0.004512	12.42	1739.77	238.70	0.81
Verdugo-Fletcher	2870.441 16826.4	5 yr	40500.00	352.61	364.29		367.98	0.004517	15.41	2628.06	260.07	0.85
Verdugo-Fletcher	2870.441 16826.4	10 yr	48200.00	352.61	365.52		369.66	0.004514	16.33	2952.09	267.44	0.87
Verdugo-Fletcher	2870.441 16826.4	25 yr	65800.00	352.61	368.01		373.09	0.004517	18.08	3638.75	282.43	0.89
Verdugo-Fletcher	2870.441 16826.4	50 yr	77500.00	352.61	369.52		375.15	0.004504	19.04	4070.45	291.45	0.90
Verdugo-Fletcher	2870.441 16826.4	100 yr	94600.00	352.61	371.56	370.46	377.91	0.004470	20.23	4677.03	303.68	0.91
Verdugo-Fletcher	2870.441 16826.4	200 yr	109000.00	352.61	373.13	372.08	380.05	0.004457	21.12	5161.20	313.10	0.92
Verdugo-Fletcher	2870.441 16826.4	500 yr	125000.00	352.61	374.71	373.74	382.27	0.004460	22.06	5665.10	321.28	0.93

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (Continued)

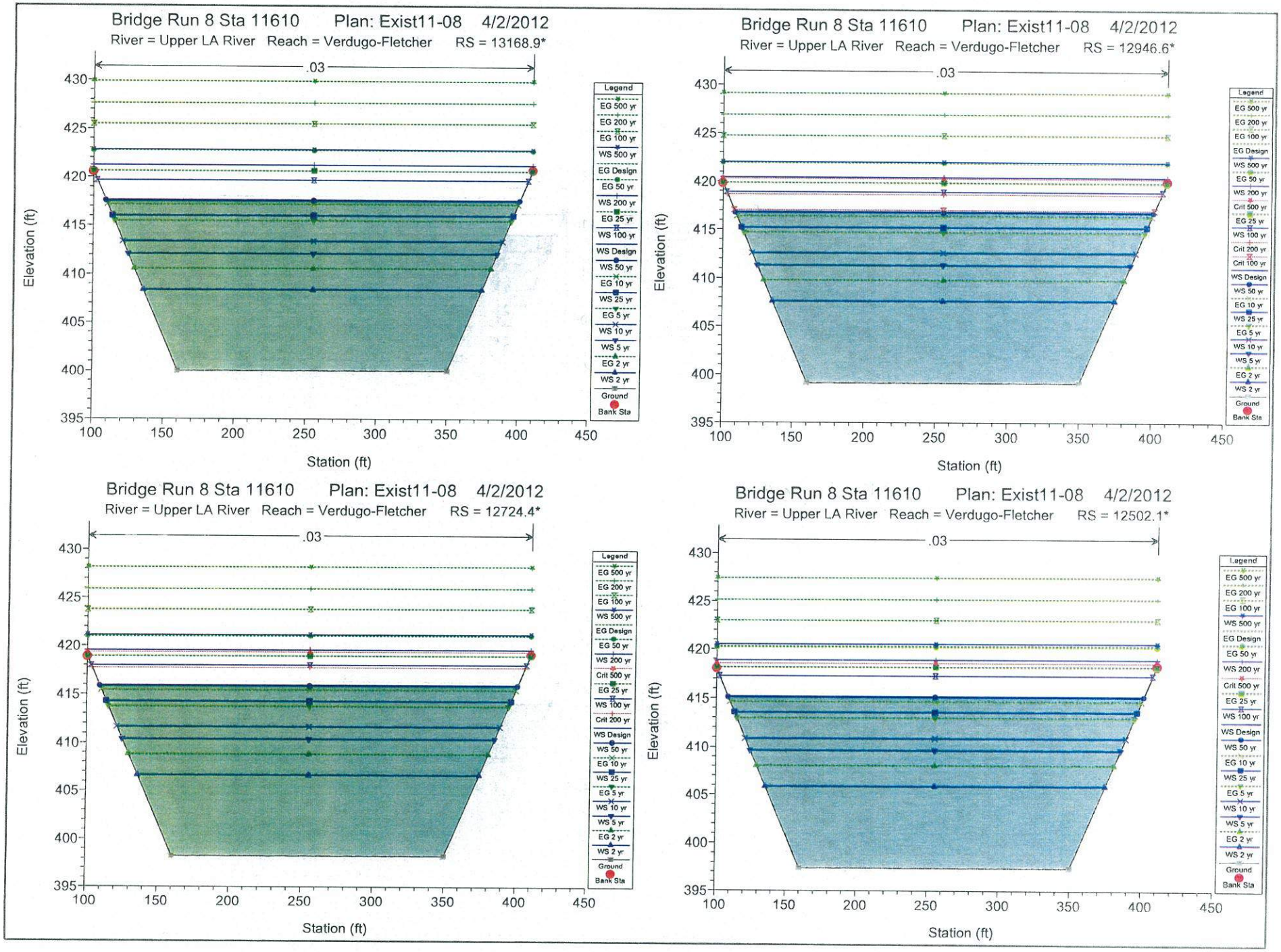
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Verdugo-Fletcher	2596.813 16556	Design	78000.00	351.38	368.35	367.25	374.00	0.004506	19.08	4087.66	291.81	0.90
Verdugo-Fletcher	2596.813 16556	2 yr	21600.00	351.38	359.48		361.88	0.004551	12.45	1734.84	238.58	0.81
Verdugo-Fletcher	2596.813 16556	5 yr	40500.00	351.38	363.05	361.95	366.74	0.004532	15.43	2625.22	260.01	0.86
Verdugo-Fletcher	2596.813 16556	10 yr	48200.00	351.38	364.28	363.17	368.42	0.004523	16.34	2950.02	267.40	0.87
Verdugo-Fletcher	2596.813 16556	25 yr	65800.00	351.38	366.78	365.68	371.86	0.004526	18.10	3636.34	282.38	0.89
Verdugo-Fletcher	2596.813 16556	50 yr	77500.00	351.38	368.29	367.19	373.92	0.004507	19.04	4069.47	291.43	0.90
Verdugo-Fletcher	2596.813 16556	100 yr	94600.00	351.38	370.34	369.23	376.68	0.004462	20.21	4679.74	303.74	0.91
Verdugo-Fletcher	2596.813 16556	200 yr	109000.00	351.38	371.95	370.85	378.83	0.004412	21.05	5179.12	313.45	0.91
Verdugo-Fletcher	2596.813 16556	500 yr	125000.00	351.38	373.57	372.51	381.06	0.004383	21.96	5692.83	320.68	0.92
Verdugo-Fletcher	2329.572 16285.7	Design	78000.00	350.16	367.31	366.03	372.82	0.004341	18.84	4139.95	292.88	0.88
Verdugo-Fletcher	2329.572 16285.7	2 yr	21600.00	350.16	358.30		360.68	0.004471	12.38	1744.90	238.83	0.81
Verdugo-Fletcher	2329.572 16285.7	5 yr	40500.00	350.16	361.87		365.54	0.004469	15.36	2637.38	260.29	0.85
Verdugo-Fletcher	2329.572 16285.7	10 yr	48200.00	350.16	363.13	361.95	367.22	0.004441	16.24	2968.17	267.80	0.86
Verdugo-Fletcher	2329.572 16285.7	25 yr	65800.00	350.16	365.68	364.46	370.67	0.004404	17.93	3670.36	283.10	0.88
Verdugo-Fletcher	2329.572 16285.7	50 yr	77500.00	350.16	367.24	365.97	372.73	0.004345	18.81	4120.78	292.49	0.88
Verdugo-Fletcher	2329.572 16285.7	100 yr	94600.00	350.16	369.40	368.01	375.52	0.004228	19.84	4767.35	305.46	0.89
Verdugo-Fletcher	2329.572 16285.7	200 yr	109000.00	350.16	371.12	369.63	377.69	0.004124	20.56	5301.65	315.78	0.88
Verdugo-Fletcher	2329.572 16285.7	500 yr	125000.00	350.16	372.87	371.29	379.94	0.003990	21.33	5860.25	320.08	0.88
Verdugo-Fletcher	2053.312 16015.41	Design	78000.00	348.93	366.33	364.81	371.65	0.004125	18.51	4212.83	294.37	0.86
Verdugo-Fletcher	2053.312 16015.41	2 yr	21600.00	348.93	357.04		359.44	0.004521	12.42	1738.62	238.67	0.81
Verdugo-Fletcher	2053.312 16015.41	5 yr	40500.00	348.93	360.64	359.51	364.30	0.004479	15.37	2635.45	260.24	0.85
Verdugo-Fletcher	2053.312 16015.41	10 yr	48200.00	348.93	361.90	360.73	365.99	0.004436	16.23	2969.40	267.83	0.86
Verdugo-Fletcher	2053.312 16015.41	25 yr	65800.00	348.93	364.57	363.23	369.47	0.004279	17.75	3706.14	283.86	0.87
Verdugo-Fletcher	2053.312 16015.41	50 yr	77500.00	348.93	366.26	364.74	371.56	0.004131	18.49	4192.27	293.95	0.86
Verdugo-Fletcher	2053.312 16015.41	100 yr	94600.00	348.93	368.59	366.79	374.39	0.003915	19.33	4894.90	307.96	0.85
Verdugo-Fletcher	2053.312 16015.41	200 yr	109000.00	348.93	370.47		376.60	0.003739	19.87	5484.28	319.24	0.85
Verdugo-Fletcher	2053.312 16015.41	500 yr	125000.00	348.93	372.35		378.90	0.003535	20.54	6084.25	319.48	0.83
Verdugo-Fletcher	1810.09*	Design	78000.00	347.83	365.71		370.69	0.003742	17.91	4355.40	297.28	0.82
Verdugo-Fletcher	1810.09*	2 yr	21600.00	347.83	355.94		358.34	0.004520	12.42	1738.77	238.68	0.81
Verdugo-Fletcher	1810.09*	5 yr	40500.00	347.83	359.62		363.23	0.004370	15.24	2657.31	260.76	0.84
Verdugo-Fletcher	1810.09*	10 yr	48200.00	347.83	360.96		364.94	0.004255	16.01	3010.97	268.77	0.84
Verdugo-Fletcher	1810.09*	25 yr	65800.00	347.83	363.82		368.46	0.003960	17.29	3804.88	285.95	0.84
Verdugo-Fletcher	1810.09*	50 yr	77500.00	347.83	365.63		370.60	0.003750	17.88	4333.25	296.83	0.82
Verdugo-Fletcher	1810.09*	100 yr	94600.00	347.83	368.15		373.49	0.003478	18.55	5098.67	311.93	0.81
Verdugo-Fletcher	1810.09*	200 yr	109000.00	347.83	370.13		375.75	0.003294	19.03	5727.79	323.29	0.80
Verdugo-Fletcher	1810.09*	500 yr	125000.00	347.83	372.13		378.10	0.003079	19.61	6375.83	323.29	0.78
Verdugo-Fletcher	1566.886 15529.1	Design	78000.00	346.72	365.32		369.84	0.003248	17.06	4571.63	301.60	0.77
Verdugo-Fletcher	1566.886 15529.1	2 yr	21600.00	346.72	354.92		357.26	0.004358	12.28	1759.44	239.19	0.80
Verdugo-Fletcher	1566.886 15529.1	5 yr	40500.00	346.72	358.79		362.21	0.004033	14.84	2729.16	262.39	0.81
Verdugo-Fletcher	1566.886 15529.1	10 yr	48200.00	346.72	360.23		363.95	0.003851	15.48	3113.40	271.04	0.80

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	1566.886 15529.1	25 yr	65800.00	346.72	363.32		367.56	0.003468	16.53	3979.98	289.59	0.79
Verdugo-Fletcher	1566.886 15529.1	50 yr	77500.00	346.72	365.24		369.75	0.003255	17.04	4548.05	301.13	0.77
Verdugo-Fletcher	1566.886 15529.1	100 yr	94600.00	346.72	367.87		372.71	0.003009	17.65	5360.24	316.90	0.76
Verdugo-Fletcher	1566.886 15529.1	200 yr	109000.00	346.72	369.92		375.01	0.002839	18.10	6021.85	327.10	0.74
Verdugo-Fletcher	1566.886 15529.1	500 yr	125000.00	346.72	372.01		377.40	0.002652	18.64	6705.33	327.10	0.73
Verdugo-Fletcher	1323.64*	Design	78000.00	345.62	364.75		369.08	0.002989	16.70	4670.58	298.38	0.74
Verdugo-Fletcher	1323.64*	2 yr	21600.00	345.62	353.84		356.20	0.004356	12.32	1752.54	236.56	0.80
Verdugo-Fletcher	1323.64*	5 yr	40500.00	345.62	357.92		361.25	0.003811	14.64	2765.85	259.70	0.79
Verdugo-Fletcher	1323.64*	10 yr	48200.00	345.62	359.45		363.04	0.003585	15.20	3170.29	268.38	0.78
Verdugo-Fletcher	1323.64*	25 yr	65800.00	345.62	362.69		366.75	0.003190	16.18	4067.68	286.70	0.76
Verdugo-Fletcher	1323.64*	50 yr	77500.00	345.62	364.67		368.99	0.002995	16.68	4646.85	297.93	0.74
Verdugo-Fletcher	1323.64*	100 yr	94600.00	345.62	367.34		372.00	0.002784	17.31	5464.86	313.10	0.73
Verdugo-Fletcher	1323.64*	200 yr	109000.00	345.62	369.42		374.34	0.002631	17.79	6126.24	321.40	0.72
Verdugo-Fletcher	1323.64*	500 yr	125000.00	345.62	371.54		376.78	0.002476	18.36	6807.78	321.40	0.70
Verdugo-Fletcher	1080.39*	Design	78000.00	344.52	364.27		368.38	0.002712	16.27	4793.99	295.46	0.71
Verdugo-Fletcher	1080.39*	2 yr	21600.00	344.52	352.77		355.14	0.004334	12.36	1748.22	234.03	0.80
Verdugo-Fletcher	1080.39*	5 yr	40500.00	344.52	357.21		360.36	0.003460	14.26	2840.46	257.75	0.76
Verdugo-Fletcher	1080.39*	10 yr	48200.00	344.52	358.83		362.21	0.003227	14.76	3264.67	266.39	0.74
Verdugo-Fletcher	1080.39*	25 yr	65800.00	344.52	362.17		366.01	0.002876	15.72	4185.23	284.25	0.72
Verdugo-Fletcher	1080.39*	50 yr	77500.00	344.52	364.19		368.29	0.002717	16.25	4770.28	295.03	0.71
Verdugo-Fletcher	1080.39*	100 yr	94600.00	344.52	366.90		371.35	0.002553	16.93	5587.95	309.48	0.70
Verdugo-Fletcher	1080.39*	200 yr	109000.00	344.52	368.99		373.72	0.002423	17.45	6245.47	315.70	0.69
Verdugo-Fletcher	1080.39*	500 yr	125000.00	344.52	371.13		376.19	0.002303	18.06	6920.06	315.70	0.68
Verdugo-Fletcher	837.1499 14802	Design	78000.00	343.42	363.89		367.76	0.002431	15.79	4941.36	292.85	0.68
Verdugo-Fletcher	837.1499 14802	2 yr	21600.00	343.42	351.75		354.10	0.004218	12.30	1756.65	231.85	0.79
Verdugo-Fletcher	837.1499 14802	5 yr	40500.00	343.42	356.67		359.58	0.003008	13.69	2959.03	256.59	0.71
Verdugo-Fletcher	837.1499 14802	10 yr	48200.00	343.42	358.35		361.48	0.002812	14.18	3397.99	265.05	0.70
Verdugo-Fletcher	837.1499 14802	25 yr	65800.00	343.42	361.77		365.35	0.002548	15.19	4331.76	282.20	0.68
Verdugo-Fletcher	837.1499 14802	50 yr	77500.00	343.42	363.81		367.66	0.002434	15.76	4917.80	292.45	0.68
Verdugo-Fletcher	837.1499 14802	100 yr	94600.00	343.42	366.51		370.75	0.002325	16.52	5727.54	306.04	0.67
Verdugo-Fletcher	837.1499 14802	200 yr	109000.00	343.42	368.62		373.15	0.002220	17.09	6377.86	310.00	0.66
Verdugo-Fletcher	837.1499 14802	500 yr	125000.00	343.42	370.76		375.65	0.002136	17.75	7041.49	310.00	0.66
Verdugo-Fletcher	660.8601 14625.7	Design	78000.00	342.00	364.82	357.46	367.43	0.001444	12.97	6015.31	324.37	0.53
Verdugo-Fletcher	660.8601 14625.7	2 yr	21600.00	342.00	352.37	348.82	353.64	0.001744	9.03	2390.75	258.11	0.52
Verdugo-Fletcher	660.8601 14625.7	5 yr	40500.00	342.00	357.40	352.24	359.21	0.001560	10.78	3757.13	284.91	0.52
Verdugo-Fletcher	660.8601 14625.7	10 yr	48200.00	342.00	359.13	353.43	361.12	0.001523	11.32	4257.39	294.10	0.52
Verdugo-Fletcher	660.8601 14625.7	25 yr	65800.00	342.00	362.64	355.91	365.02	0.001469	12.36	5322.51	312.79	0.53
Verdugo-Fletcher	660.8601 14625.7	50 yr	77500.00	342.00	364.73	357.40	367.33	0.001444	12.94	5988.23	323.92	0.53
Verdugo-Fletcher	660.8601 14625.7	100 yr	94600.00	342.00	367.51	359.44	370.43	0.001386	13.72	6895.11	326.78	0.53
Verdugo-Fletcher	660.8601 14625.7	200 yr	109000.00	342.00	369.65	361.02	372.85	0.001357	14.36	7593.06	326.78	0.52
Verdugo-Fletcher	660.8601 14625.7	500 yr	125000.00	342.00	371.84	362.68	375.35	0.001344	15.04	8309.24	326.78	0.53

HEC-RAS Plan: Exist1108 River: Upper LA River Reach: Verdugo-Fletcher (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)	
Verdugo-Fletcher	607.0587		Bridge									
Verdugo-Fletcher	553.2573 14519.28	Design	78000.00	341.14	352.99	356.24	364.35	0.013321	27.05	2883.53	275.98	1.47
Verdugo-Fletcher	553.2573 14519.28	2 yr	21600.00	341.14	346.29	347.80	351.69	0.017450	18.64	1158.62	239.08	1.49
Verdugo-Fletcher	553.2573 14519.28	5 yr	40500.00	341.14	348.90	351.14	356.76	0.015326	22.50	1800.23	253.43	1.49
Verdugo-Fletcher	553.2573 14519.28	10 yr	48200.00	341.14	349.82	352.31	358.52	0.014795	23.67	2036.60	258.52	1.49
Verdugo-Fletcher	553.2573 14519.28	25 yr	65800.00	341.14	351.76	354.72	362.11	0.013828	25.82	2548.06	269.20	1.48
Verdugo-Fletcher	553.2573 14519.28	50 yr	77500.00	341.14	352.94	356.18	364.26	0.013341	27.00	2869.97	275.71	1.47
Verdugo-Fletcher	553.2573 14519.28	100 yr	94600.00	341.14	354.56	358.16	367.14	0.012748	28.47	3323.10	284.62	1.47
Verdugo-Fletcher	553.2573 14519.28	200 yr	109000.00	341.14	355.83	359.71	369.38	0.012340	29.53	3690.94	291.65	1.46
Verdugo-Fletcher	553.2573 14519.28	500 yr	125000.00	341.14	357.19	361.33	371.69	0.011935	30.56	4090.28	299.10	1.46
Verdugo-Fletcher	0 14519.28	Design	78000.00	339.01	356.84	353.31	360.54	0.002684	15.43	5054.62	336.98	0.70
Verdugo-Fletcher	0 14519.28	2 yr	21600.00	339.01	346.62	345.32	348.58	0.003902	11.23	1923.28	275.64	0.75
Verdugo-Fletcher	0 14519.28	5 yr	40500.00	339.01	349.99	348.46	353.05	0.003905	14.02	2887.92	295.90	0.79
Verdugo-Fletcher	0 14519.28	10 yr	48200.00	339.01	351.16	349.57	354.60	0.003903	14.89	3237.92	302.91	0.80
Verdugo-Fletcher	0 14519.28	25 yr	65800.00	339.01	353.55	351.87	357.80	0.003901	16.54	3979.23	317.26	0.82
Verdugo-Fletcher	0 14519.28	50 yr	77500.00	339.01	354.98	353.25	359.71	0.003904	17.47	4437.36	325.80	0.83
Verdugo-Fletcher	0 14519.28	100 yr	94600.00	339.01	356.90	355.14	362.30	0.003901	18.64	5075.20	337.35	0.85
Verdugo-Fletcher	0 14519.28	200 yr	109000.00	339.01	358.40	356.61	364.31	0.003900	19.51	5586.33	346.32	0.86
Verdugo-Fletcher	0 14519.28	500 yr	125000.00	339.01	356.35	358.16	366.49	0.007599	25.56	4891.33	334.06	1.18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Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12946.6*
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12724.4*
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12502.1*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
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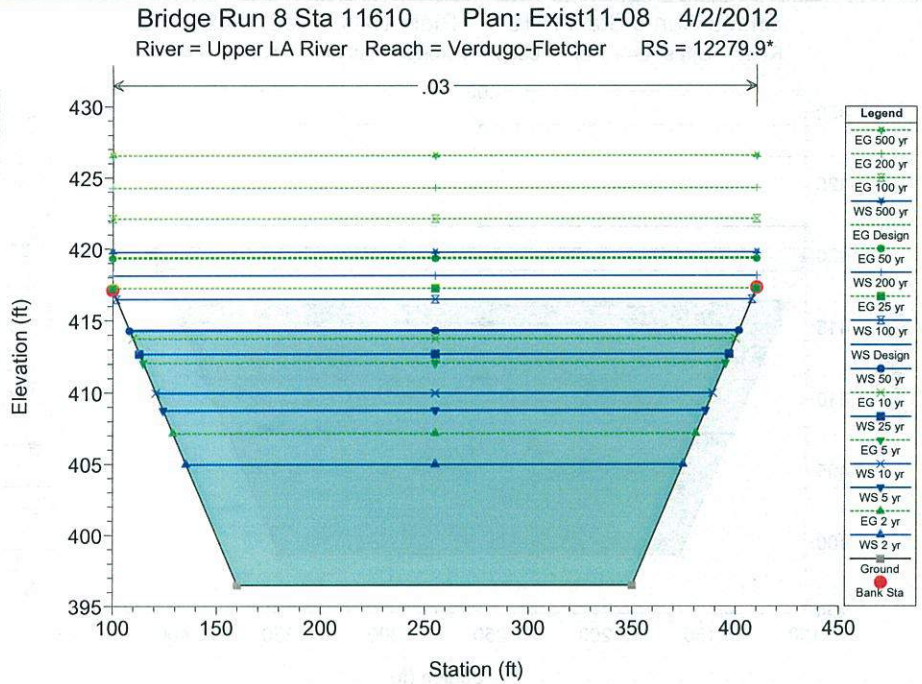
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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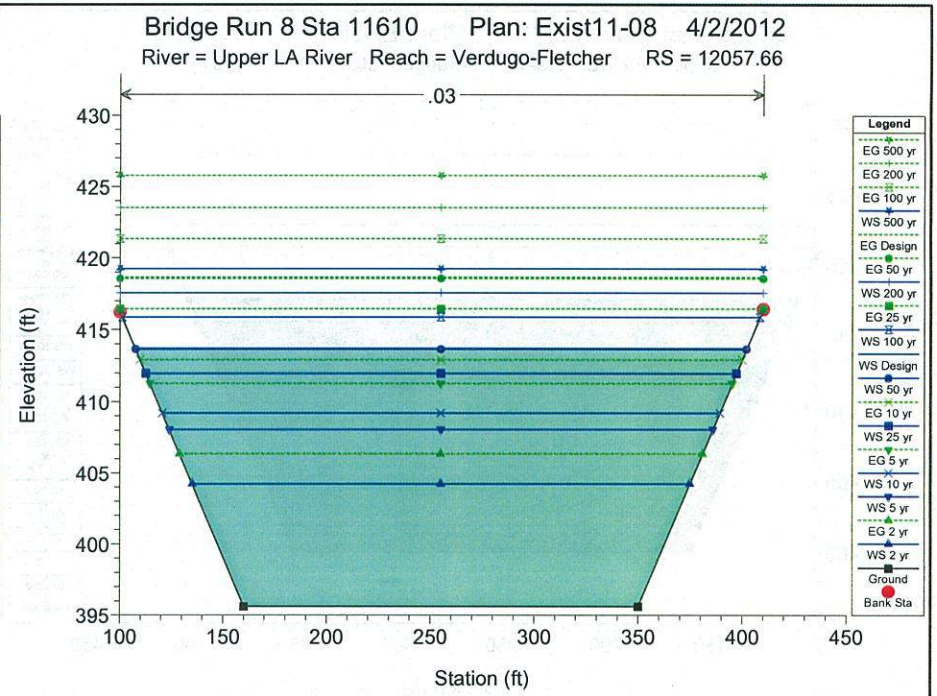
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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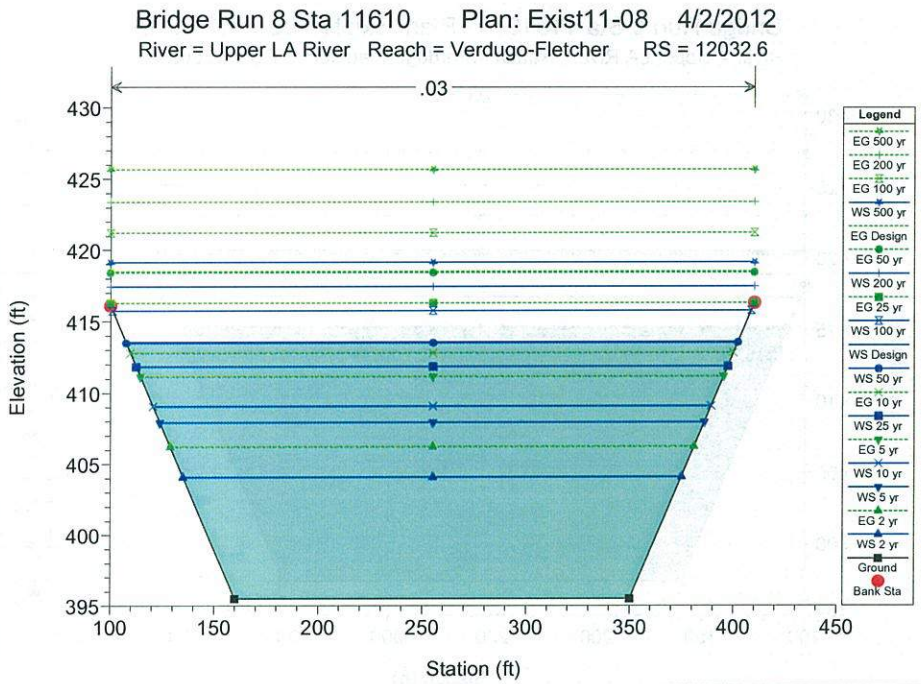
River = Upper LA River Reach = Verdugo-Fletcher RS = 12057.66
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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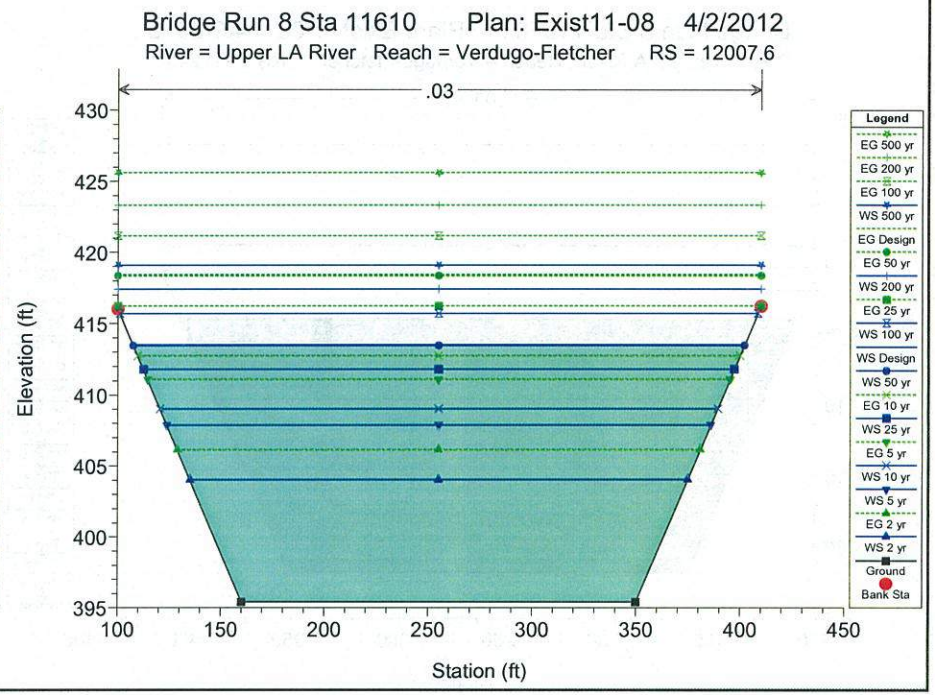
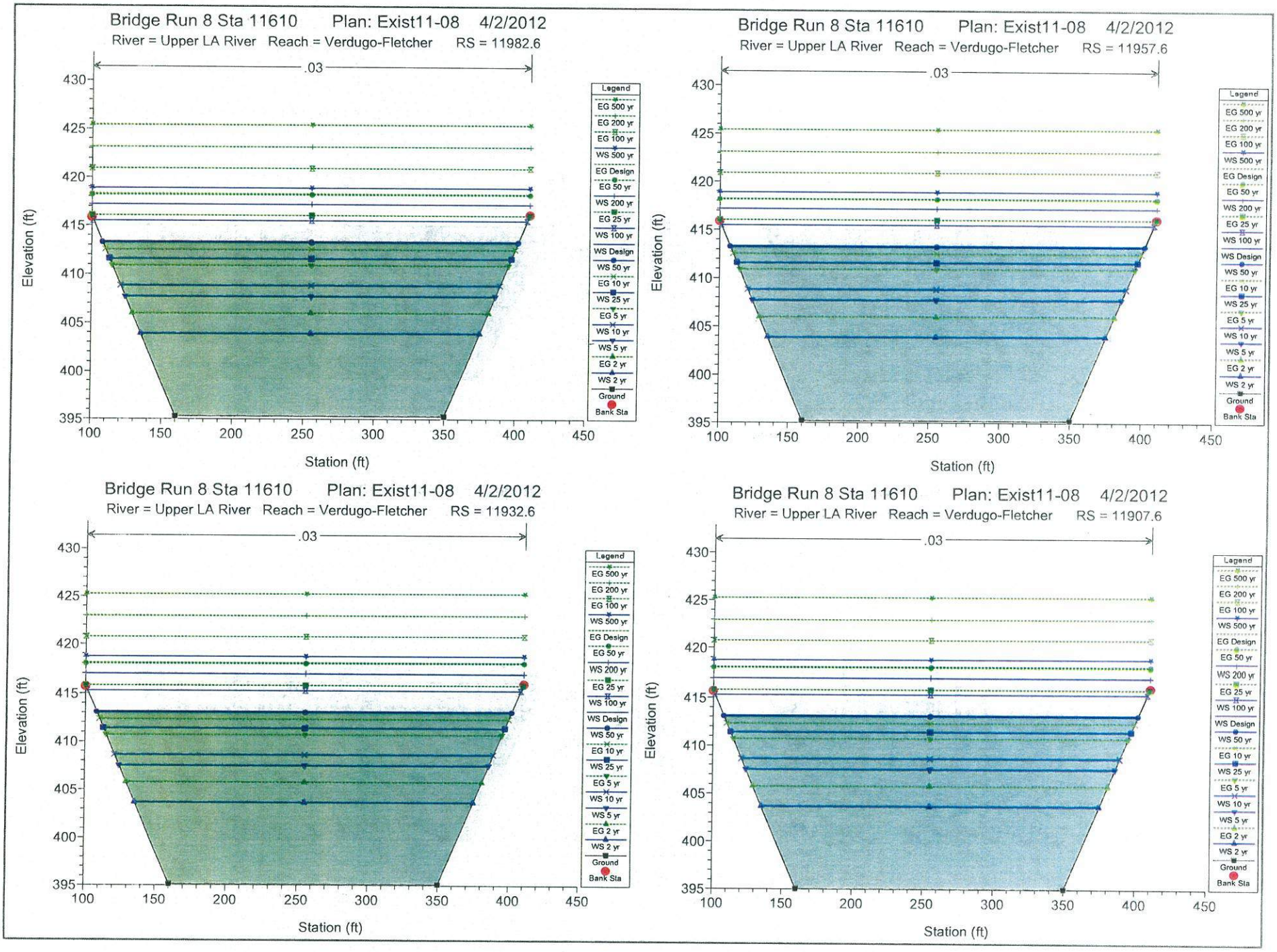
River = Upper LA River Reach = Verdugo-Fletcher RS = 12032.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 12007.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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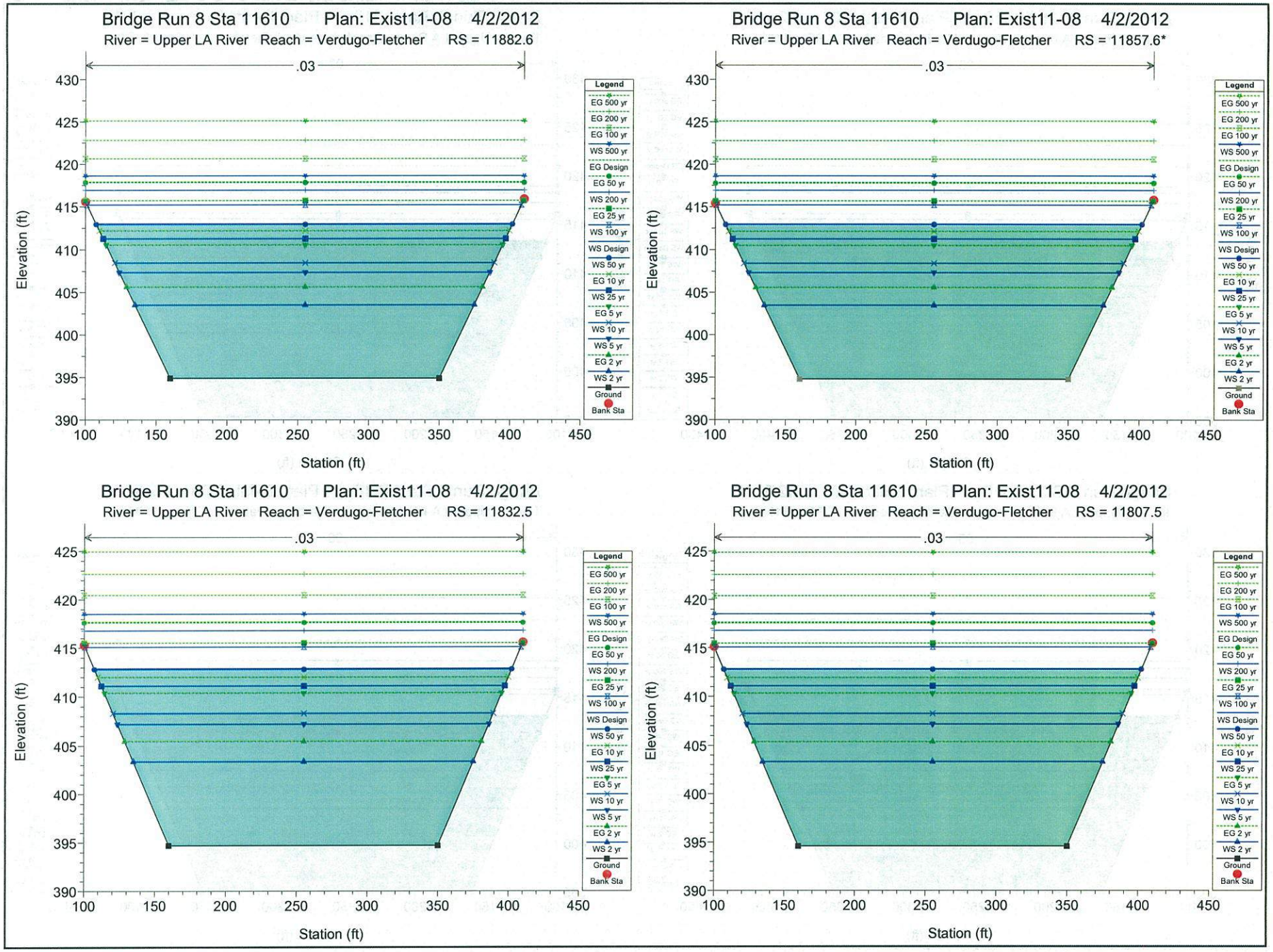
River = Upper LA River Reach = Verdugo-Fletcher RS = 11982.6
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11957.6
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11932.6
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11907.6
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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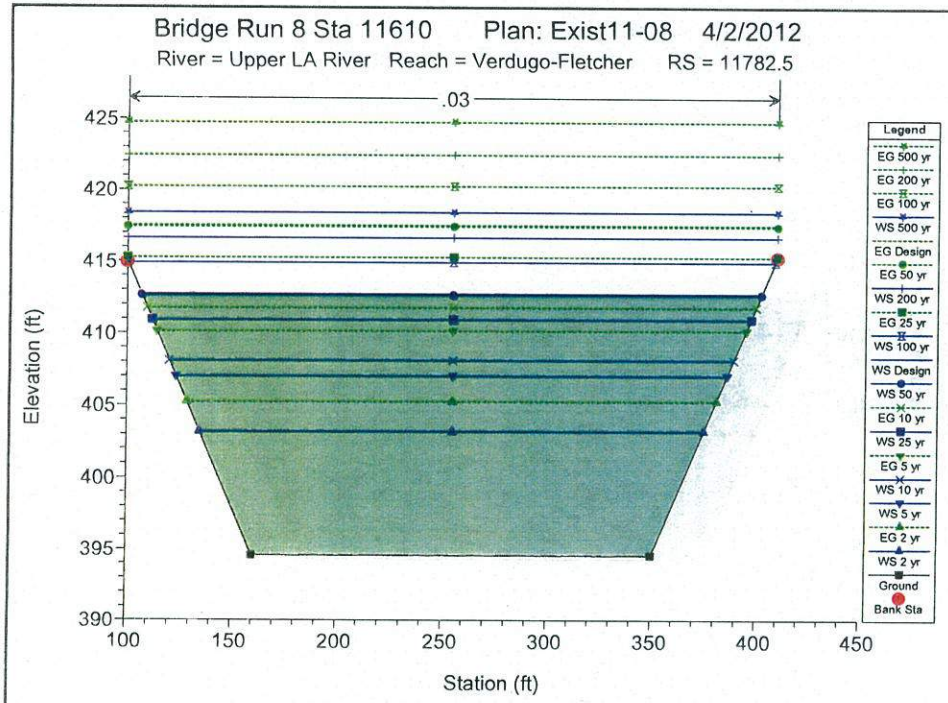
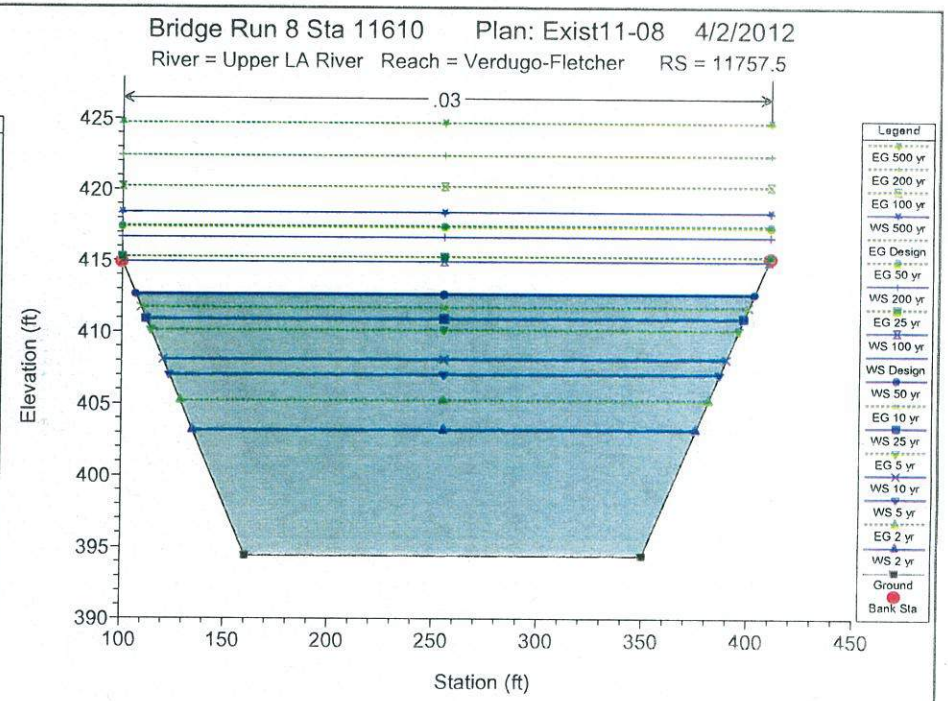
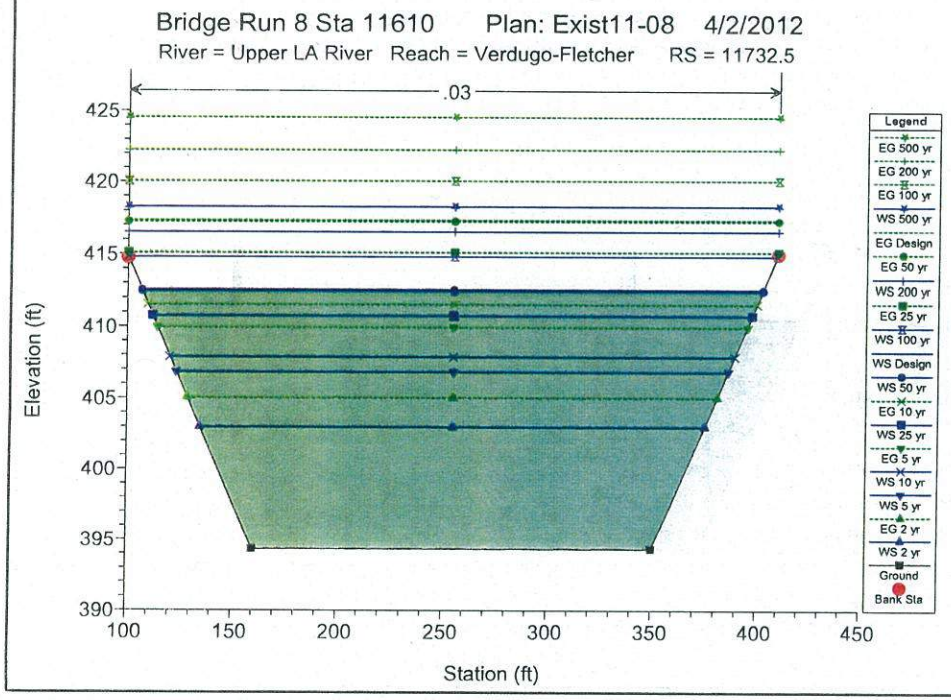
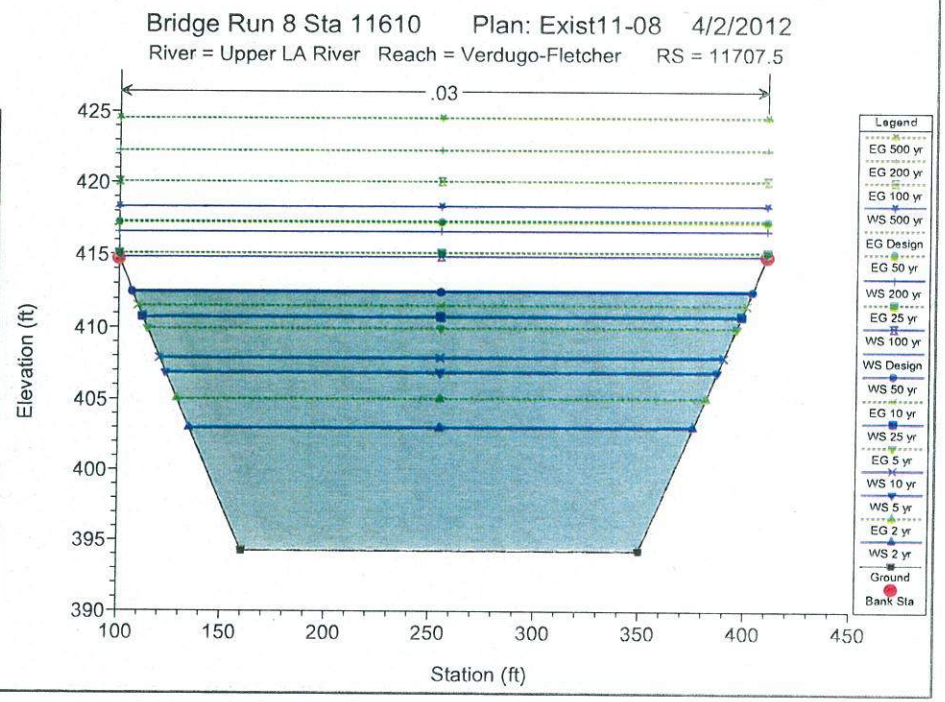
River = Upper LA River Reach = Verdugo-Fletcher RS = 11882.6
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11857.6*
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11832.5
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11807.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta

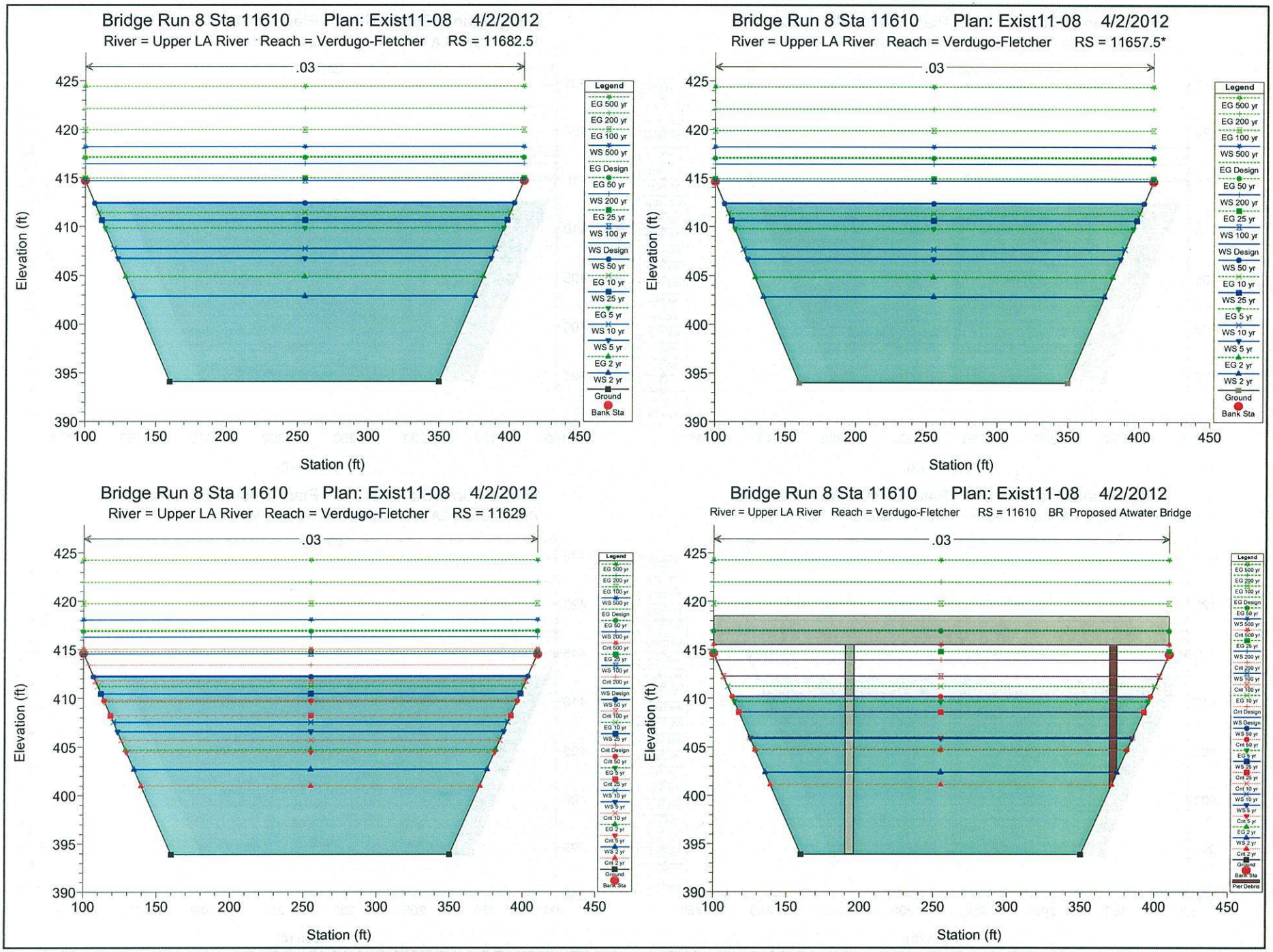
60


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11782.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11757.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11732.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11707.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta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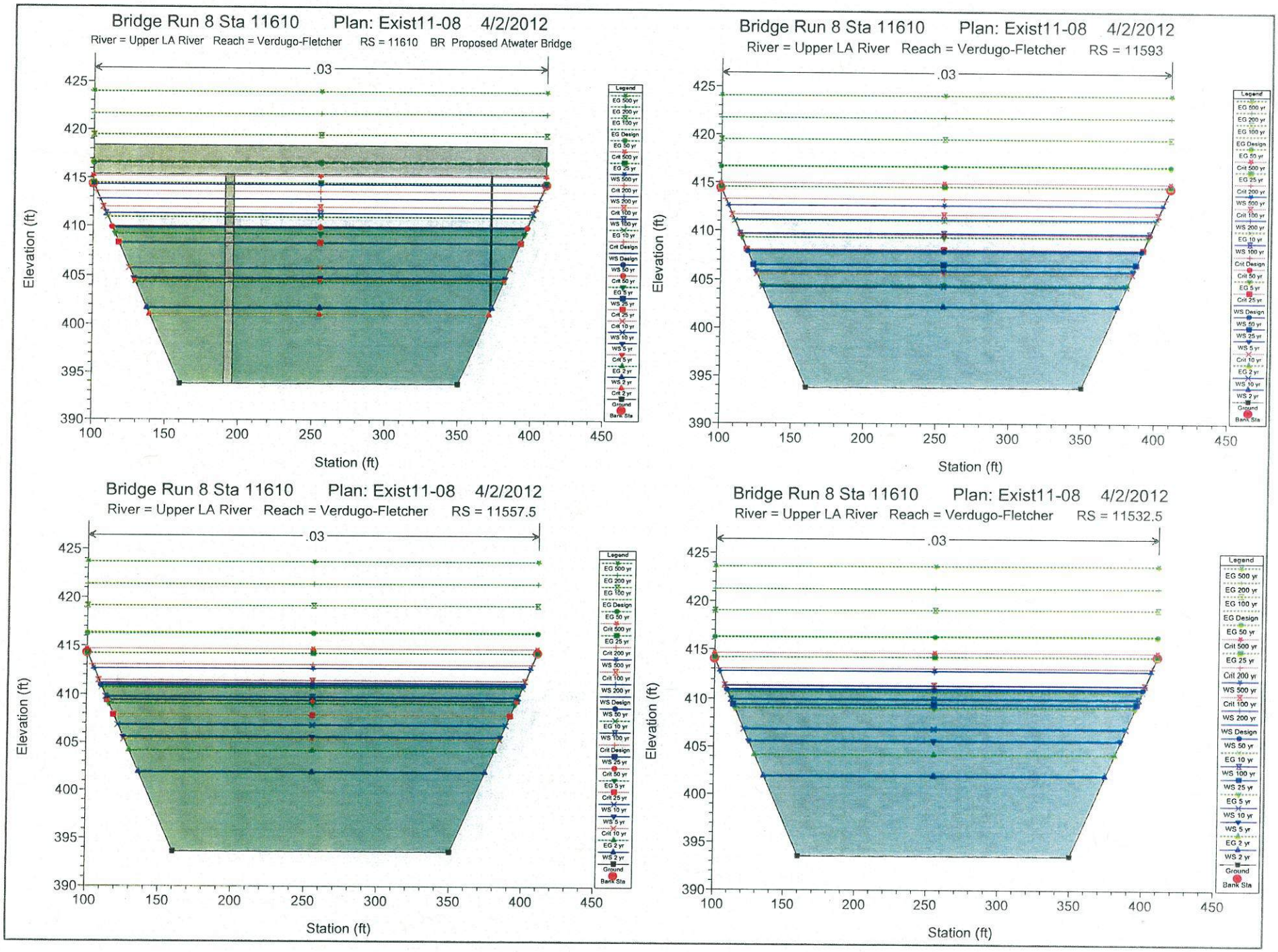
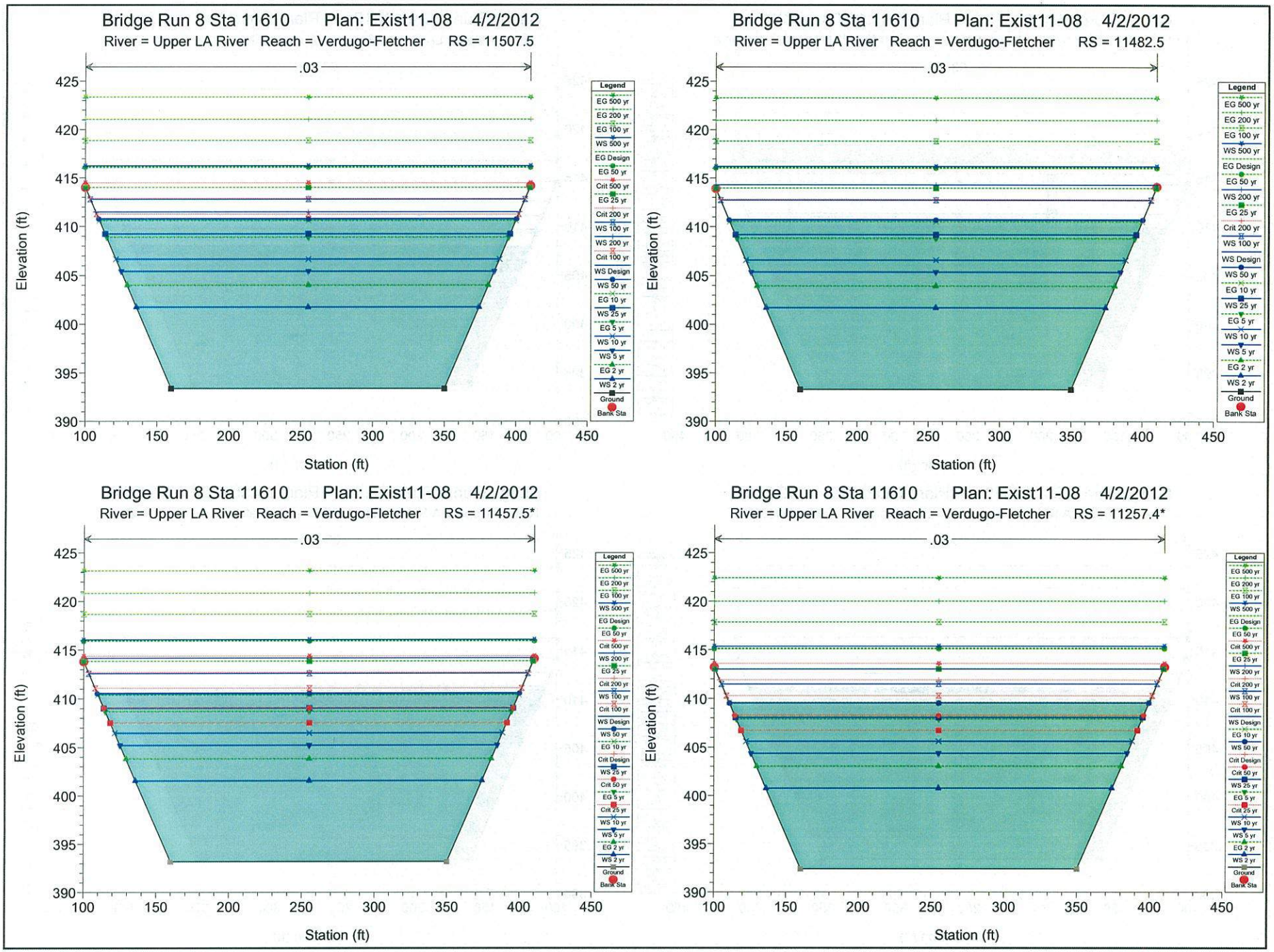
River = Upper LA River Reach = Verdugo-Fletcher RS = 11682.5
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11657.5*
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11629
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11610 BR Proposed Atwater Bridge
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
WS 200 yr
EG 25 yr
WS 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta
Pier Debris

62


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11610 BR Proposed Atwater Bridge
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11593
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11557.5
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11532.5
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
EG Design
EG 50 yr
Crit 500 yr
EG 25 yr
Crit 200 yr
WS 500 yr
Crit 100 yr
WS 200 yr
WS Design
WS 50 yr
EG 10 yr
WS 100 yr
Crit Design
WS 25 yr
Crit 50 yr
EG 5 yr
Crit 25 yr
WS 10 yr
WS 5 yr
Crit 10 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta


Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11507.5
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11482.5
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11457.5*
Bridge Run 8 Sta 11610 Plan: Exist11-08 4/2/2012
River = Upper LA River Reach = Verdugo-Fletcher RS = 11257.4*
.03
Elevation (ft)
Station (ft)
Legend
EG 500 yr
EG 200 yr
EG 100 yr
WS 500 yr
EG Design
EG 50 yr
Crit 500 yr
EG 25 yr
Crit 200 yr
WS 100 yr
WS 200 yr
Crit 100 yr
WS Design
WS 50 yr
EG 10 yr
WS 25 yr
EG 5 yr
WS 10 yr
WS 5 yr
EG 2 yr
WS 2 yr
Ground
Bank Sta
Crit Design
Crit 50 yr
Crit 25 yr

64

APPENDIX B

FUSCOE DESIGN SURVEY (SEPTEMBER 2011)

TOPOGRAPHIC SURVEY

RECORD DATA NOTE:

THE BOUNDARY AND EASEMENT DATA SHOWN HEREON WAS COMPILED FROM RECORD DATA WITHOUT THE BENEFIT OF A TITLE REPORT. FOR THE PURPOSE OF THIS MAP, THE BEARINGS SHOWN ON PARCEL MAP L.A. NO. 6351, RECORDED IN BOOK 234 PAGES 12 THROUGH 14, INCLUSIVE, OF PARCEL MAPS IN THE OFFICE OF THE COUNTY RECORDER OF LOS ANGELES COUNTY WAS USED AS THE BASIS OF BEARINGS FOR THE ADJOINING RECORD MAPS AND DOCUMENTS.

PROPOSED EQUESTRIAN BRIDGE NOTE:

THE PROPOSED EQUESTRIAN BRIDGE LOCATION IS PLOTTED HEREON TO SHOW THE LOCATION OF PREVIOUS SURVEY BY BUREAU OF ENGINEERING (BOE) AND TO PROVIDE A TIE TO LA RIVER BIKE PATH GEOMETRY PER MAP A-20522 FROM FOUND MONUMENTATION.

EASEMENTS:

(A) AN EASEMENT OF THE UNITED STATES OF AMERICA FOR FLOOD CONTROL PER DOCUMENT NO. 1746 RECORDED APRIL 5, 1967, OFFICIAL RECORDS.

(B) AN EASEMENT OF THE UNITED STATES OF AMERICA FOR FLOOD CONTROL PER DOCUMENT NO. 1747 RECORDED APRIL 5, 1967 IN BOOK D3604-810, OFFICIAL RECORDS

(C) AN EASEMENT OF THE STATE OF CALIFORNIA FOR PUBLIC ROAD AND HIGHWAY PURPOSES PER DOCUMENT NO. 2755 RECORDED DECEMBER 22, 1965, OFFICIAL RECORDS.

(D) AN EASEMENT OF THE STATE OF CALIFORNIA FOR PUBLIC ROAD AND HIGHWAY PURPOSES PER O.R. D235-782 AS SHOWN ON CADASTRAL MAP 1598205 (DOCUMENT WAS NOT PROVIDED)

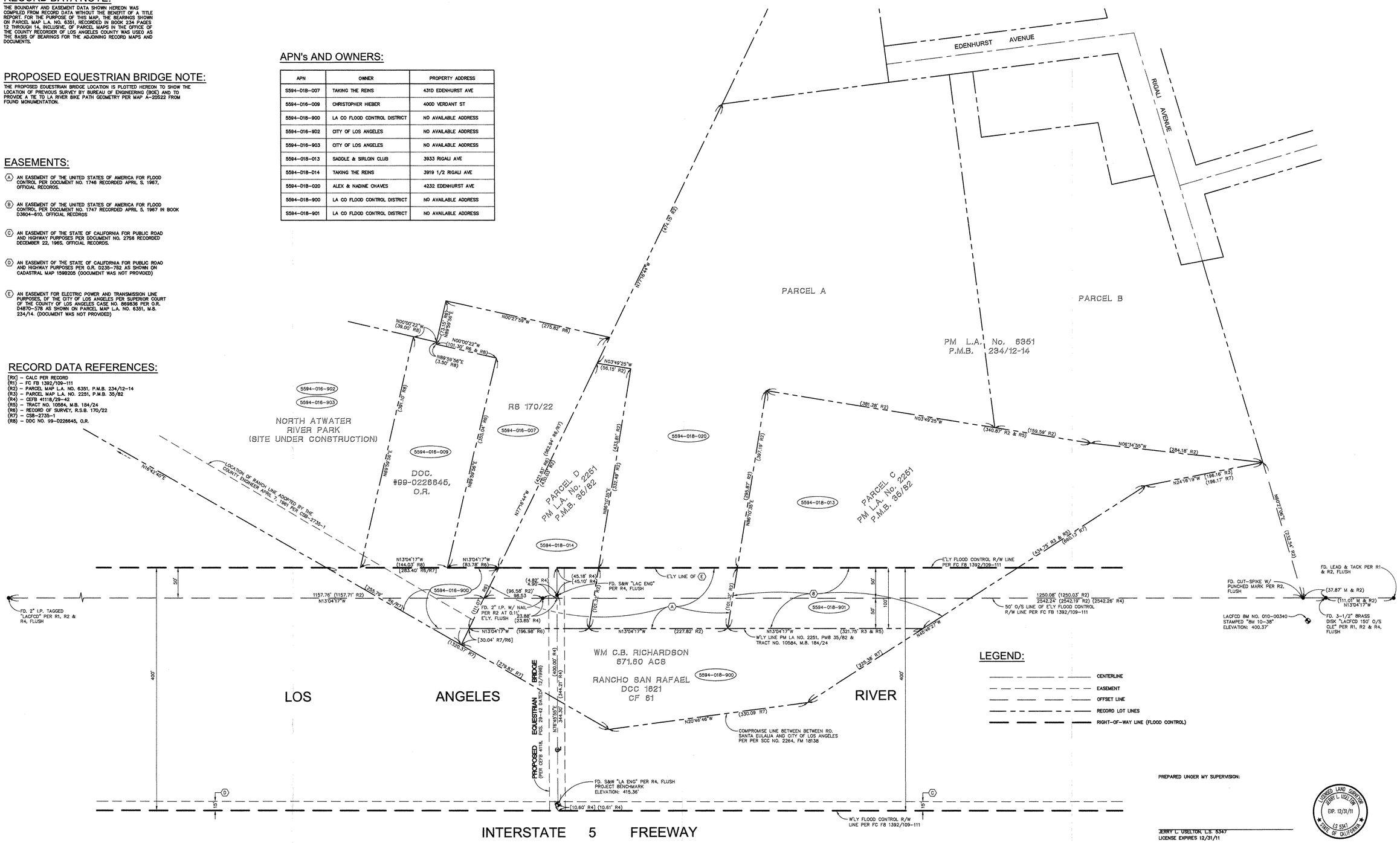
(E) AN EASEMENT FOR ELECTRIC POWER AND TRANSMISSION LINE PURPOSES, OF THE CITY OF LOS ANGELES PER SUPERIOR COURT OF THE COUNTY OF LOS ANGELES CASE NO. 869836 PER O.R. D4870-578 AS SHOWN ON PARCEL MAP L.A. NO. 6351, M.B. 234/14. (DOCUMENT WAS NOT PROVIDED)

RECORD DATA REFERENCES:

[RX] – CALC PER RECORD
(R1) – FC FB 1392/109-111
(R2) – PARCEL MAP L.A. NO. 6351, P.M.B. 234/12-14
(R3) – PARCEL MAP L.A. NO. 2251, P.M.B. 35/82
(R4) – CEFB 41118/29-42
(R5) – TRACT NO. 10584, M.B. 184/24
(R6) – RECORD OF SURVEY, R.S.B. 170/22
(R7) – CSB-2735-1
(R8) – DDC NO. 99-0226645, O.R.

APN's AND OWNERS:

APN	OWNER	PROPERTY ADDRESS
5594-018-007	TAKING THE REINS	4310 EDENHURST AVE
5594-016-009	CHRISTOPHER HIEBER	4000 VERDANT ST
5594-018-900	LA CO FLOOD CONTROL DISTRICT	NO AVAILABLE ADDRESS
5594-016-902	CITY OF LOS ANGELES	NO AVAILABLE ADDRESS
5594-016-903	CITY OF LOS ANGELES	NO AVAILABLE ADDRESS
5594-018-013	SADDLE & SIRLOIN CLUB	3933 RIGALI AVE
5594-018-014	TAKING THE REINS	3919 1/2 RIGALI AVE
5594-018-020	ALEX & NADINE CHAVES	4232 EDENHURST AVE
5594-018-900	LA CO FLOOD CONTROL DISTRICT	NO AVAILABLE ADDRESS
5594-018-901	LA CO FLOOD CONTROL DISTRICT	NO AVAILABLE ADDRESS



PREPARED UNDER MY SUPERVISION:

JERRY L. USELTON, L.S. 5347
LICENSE EXPIRES 12/31/11

LICENSED LAND SURVEYOR JERRY L. USELTON EXP. 12/31/11 LS 5347 STATE OF CALIFORNIA

BOUNDARY PLAT

GRAPHIC SCALE: 1" = 60'

NO.	DATE	REVISION

TOPOGRAPHIC SURVEY

of: ATWATER BRIDGE
LOS ANGELES RIVER CROSSING

for: BURO HAPPOLD CONSULTING
& CITY OF LOS ANGELES

FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

DATE: SEPT. 27, 2011
SCALE: 1" = 60'
FN: 88006-TOPO.dwg
JN: 88D-D6
DRAWN BY: JBF
CHECKED BY: JLU

SHEET 1 OF 3

TOPOGRAPHIC SURVEY

LEGEND:

- BRUSH LINE / TREE LINE
- BUILDING
- ELECTROLIER
- FENCE
- GUARDRAIL
- PALM
- POWER POLE
- POWER POLE W/ LIGHT
- RETAINING WALL
- SIGN
- SIGNBOARD AT FREEWAY
- SPOT ELEVATION FROM AERIAL TOF
- TRANSMISSION TOWER
- UTILITY METERS
- WATER LINE
- CENTERLINE
- EASEMENT
- OFFSET LINE
- RECORD LOT LINES
- RIGHT-OF-WAY LINE (FLOOD CONTROL)
- TRANSMISSION LINE
- 393.49 AC — ELEVATION FROM SUPPLEMENTAL TOPO

AC	ASPHALT CONCRETE
CE	CONCRETE (EDGE)
CT	CONCRETE (TOE)
EP	EDGE OF PAVEMENT
FS	FINISH SURFACE
GB	GRADE BREAK
NG	NATURAL GROUND
TCF	TOP OF CONCRETE FOOTING

BENCHMARKS:

LACFCD BM
DESCRIPTION: #010 00340
NELY SIDE OF LOS ANGELES RIVER AND RIGALI AVE. ON APPROX C/L OF RIGALI AVE. PRODUCED SWLY, AT S.D. OUTLET FOR FLAP GATE, PAINTED 333., APPROX 24 FT SWLY OF JOIN CONC AND ROCK AND ADDITIONAL ASPHALT FACE, IN TOP AND AT SWLY COR OF TRIANGULAR CONC HD-WALL, A STD F.C. DISK, STMPD BM 10-38
ELEVATION: 400.37' NGVD 29 (1960 ADJ)

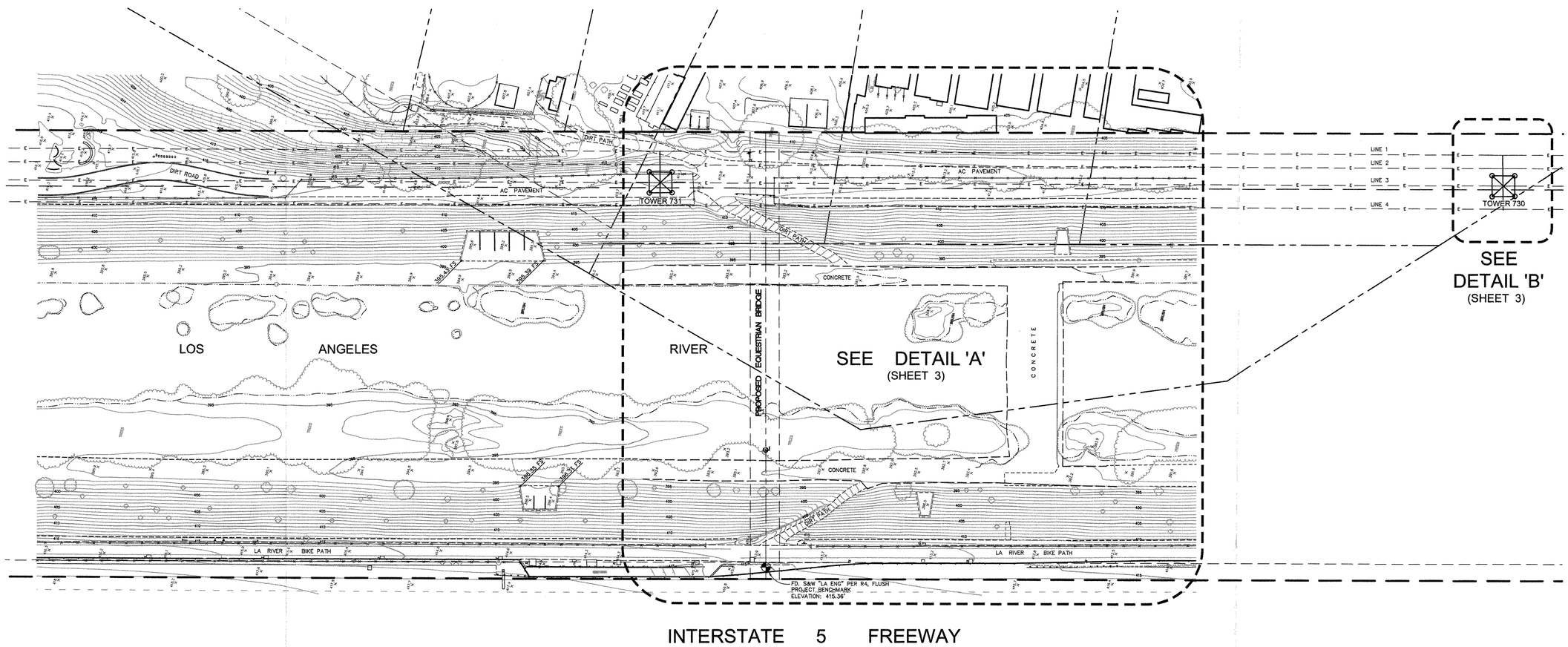
PROJECT BENCHMARK
DESCRIPTION: FD. S&W "LA ENG" PER R4, FLUSH (STA. 6+55.79)
ELEVATION: 415.36'

NOTE: THE LACFCD BM AND THE PROJECT BENCHMARK ARE ON THE SAME DATUM AND THE ELEVATION OF THE PROJECT BENCHMARK AS SURVEYED MATCHES THE ELEVATION NOTED BY BOE SURVEY PER CEFB 41118/29-42.

TOPOGRAPHY NOTE:

THE TOPOGRAPHY SHOWN HEREON IS
BY: ROBERT J. LUNG & ASSOCIATES
2832 WALNUT AVENUE, SUITE E
TUSTIN, CALIFORNIA 92880
(714) 832-2077

PHOTO DATE: SEPT. 20, 2011
CONTOUR INTERVAL = 1 FOOT



TOPOGRAPHIC PLAT

40' 0' 20' 40' 80'
GRAPHIC SCALE: 1" = 40'

NO.	DATE	REVISION

TOPOGRAPHIC SURVEY

of: ATWATER BRIDGE
LOS ANGELES RIVER CROSSING

for: BURO HAPPOLD CONSULTING
& CITY OF LOS ANGELES

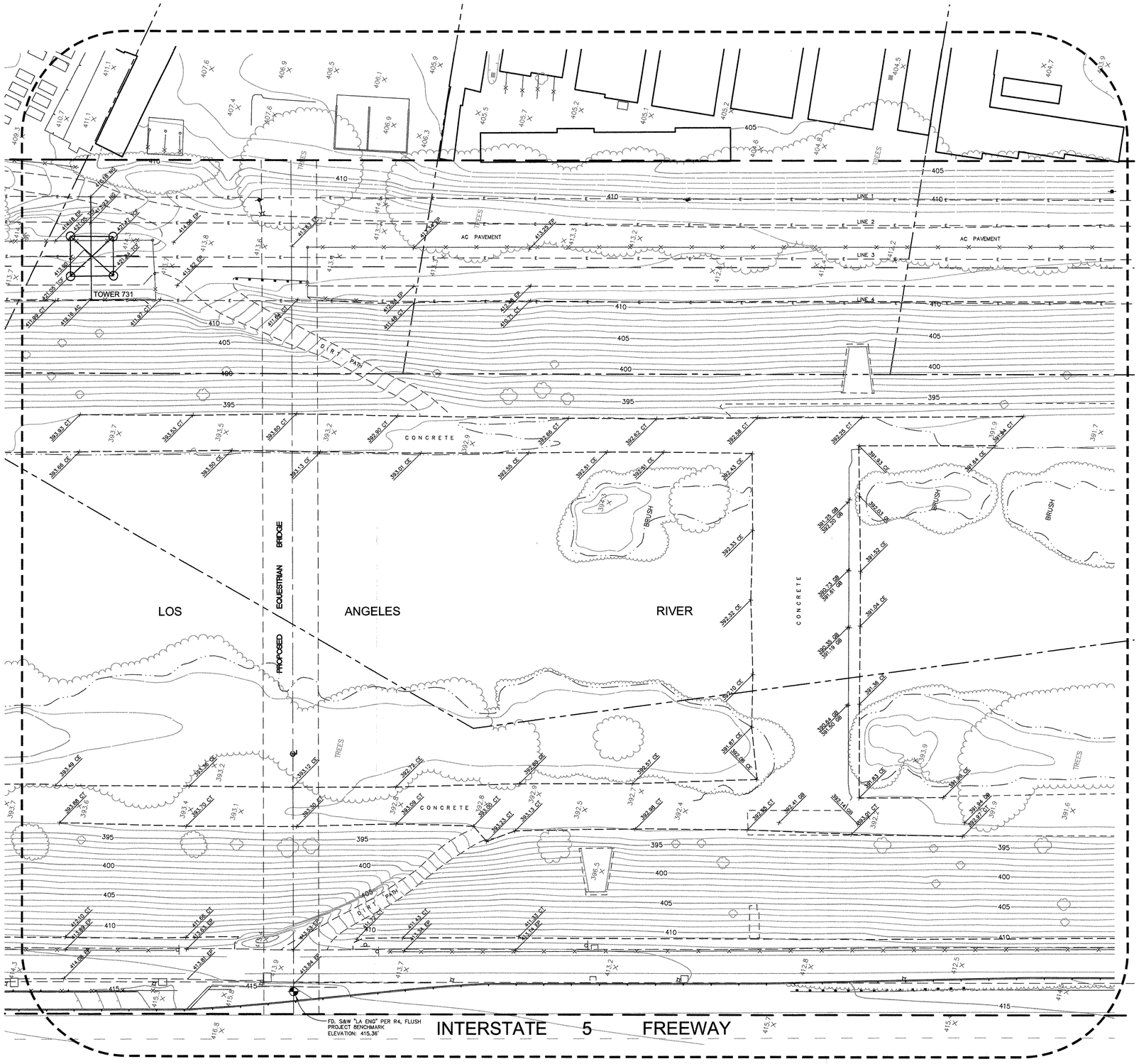
FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

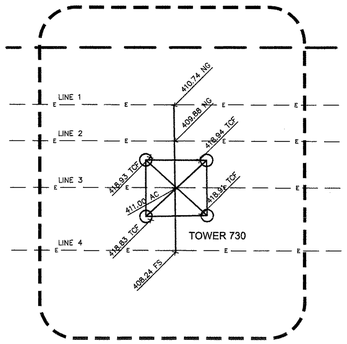
DATE: SEPT. 27, 2011
SCALE: 1" = 40'
FN: 88DD6-TOPO.dwg
JN: 880-D6
DRAWN BY: JBF
CHECKED BY: JLU

SHEET 2 OF 3

M:\MAPPING\880\06\BRIDTOPO\88DD6-TOPO.DWG (10-07-11)

TOPOGRAPHIC SURVEY





DETAIL 'B'

SCALE 1" = 20'

TRANSMISSION LINE OBSERVATION DATA:

	LOCATION	TOWER 731		STATIONING FROM TOWER 730								TOWER 730	
		CROSS-ARM TO INSULATOR	INSULATOR TO CONDUCTOR	STA 0 + 600.00		STA 0 + 450.00		STA 0 + 300.00		STA 0 + 150.00		CROSS-ARM TO INSULATOR	INSULATOR TO CONDUCTOR
				CONDUCTOR	GROUND	CONDUCTOR	GROUND	CONDUCTOR	GROUND	CONDUCTOR	GROUND		
ELEVATION	LINE 1	520.52'	517.14'	503.07'	413.16' NG	495.78'	408.89' NG	495.56'	411.16' NG	501.88'	409.34' NG	518.39'	514.97'
	LINE 2	520.59'	517.18'	502.83'	413.49' NG	495.37'	413.10' NG	495.15'	412.00' NG	501.70'	411.85' NG	518.47'	515.02'
	LINE 3	520.59'	512.75'	500.39'	413.32' AC	493.89'	412.68' AC	493.62'	412.05' AC	499.15'	411.41' AC	518.41'	510.60'
	LINE 4	520.64'	512.80'	499.80'	411.66' AC	492.96'	410.89' AC	492.66'	409.87' AC	498.48'	408.94' FS	518.50'	510.63'

METEOROLOGICAL DATA AT TIME OF SURVEY:

DATE: OCT. 3, 2011
TIME: 8:57 AM (START) 9:41 AM (END)
TEMPERATURE RANGE: 71.4 °F TO 76.6 °F
WIND SPEED RANGE: 1.3 MPH TO 3.3 MPH
CONDITION: CLEAR SKY

LEGEND:

- BRUSH LINE / TREE LINE
- BUILDING
- ELECTROLIER
- FENCE
- GUARDRAIL
- PALM
- POWER POLE
- POWER POLE W/ LIGHT
- RETAINING WALL
- SIGN
- SIGNBOARD AT FREEWAY
- SPOT ELEVATION FROM AERIAL TOPO
- TRANSMISSION TOWER
- UTILITY METERS
- WATER LINE
- CENTERLINE
- EASEMENT
- OFFSET LINE
- RECORD LOT LINES
- RIGHT-OF-WAY LINE (FLOOD CONTROL)
- TRANSMISSION LINE
- ELEVATION FROM SUPPLEMENTAL TOPO

AC	ASPHALT CONCRETE
CE	CONCRETE (EDGE)
CT	CONCRETE (TOE)
EP	EDGE OF PAVEMENT
FS	FINISH SURFACE
GB	GRADE BREAK
NG	NATURAL GROUND
TCF	TOP OF CONCRETE FOOTING

DETAIL PLAT

20' 0' 10' 20' 40'
GRAPHIC SCALE: 1" = 20'

DETAIL 'A'

SCALE 1" = 20'

NO.	DATE	REVISION

TOPOGRAPHIC SURVEY

of: ATWATER BRIDGE
LOS ANGELES RIVER CROSSING

for: BURO HAPPOLD CONSULTING
& CITY OF LOS ANGELES

FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

DATE: SEPT. 27, 2011
SCALE: 1" = 20'
FN: 88006-TOPO.dwg
JN: 880-06
DRAWN BY: JBF
CHECKED BY: JLU

SHEET 3 OF 3

APPENDIX C

R&U – MANNING'S "n" VALUE RANGES

Manning's "n" Values

Reach	River Station	LOB	Main	ROB	High Values			Low Values		
Verdugo-Fletcher	15148.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	14930.4	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	14712.3	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	14494.1	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	14276	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	14057.9	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	13835.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	13613.4	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	13391.1	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	13168.9	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12946.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12724.4	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12502.1	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12279.9	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12057.66	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12032.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	12007.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11982.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11957.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11932.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11907.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11882.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11857.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11832.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11807.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11782.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11757.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11732.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11707.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11682.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11657.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11632.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11607.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11582.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11557.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11532.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11507.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11482.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11457.5	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11429	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11410	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028

Verdugo-Fletcher	11393	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11343	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11257.4	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	11057.4	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	10857.3	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	10657.2	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	10457.1	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	10257.07	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	10218.8	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	9978.273	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	9748.1	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	9517.93	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	9287.77	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	9057.6	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	8885.58	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	8713.55	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	8541.532	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	8310.036	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	8206.965	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	8151.212	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	8095.458	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	7999.417	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	7855.044	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	7628.42	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	7401.8	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	7175.18	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	6948.56	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	6721.944	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	6524.88	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	6327.82	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	6130.76	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5933.705	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5929.973	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5926.24	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5896.92	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5856.732	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5557.142	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5332.98	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5108.826	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	5007.183	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4953.96	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4952.999	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4938	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028

Verdugo-Fletcher	4923.007	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4908	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4892.987	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4841.999	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4621.872	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4571.869	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4521.727	0.04	0.02	0.04	0.052	0.023	0.052	0.028	0.017	0.028
Verdugo-Fletcher	4471.73	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4421.838	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4420.793	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	4215.917	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	3957.652	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	3727.154	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	3437.429	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	3283.58	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	3129.733	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	2870.441	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	2596.813	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	2329.572	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	2053.312	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	1810.09	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	1566.886	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	1323.64	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	1080.39	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	837.1499	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	660.8601	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	607.0587	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	553.2573	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028
Verdugo-Fletcher	0	0.04	0.03	0.04	0.052	0.038	0.052	0.028	0.022	0.028

APPENDIX D

R&U – STAGE DISCHARGE UNCERTAINTY CALCULATIONS

Stage-Discharge Uncertainty Calculations - Existing Conditions

$S_t = (S_{natural}^2 + S_{model}^2)^{0.5}$ (Eqn. 5-6, page 5-5)

S_t = standard deviation of total uncertainty
$S_{natural}$ = standard deviation of uncertainty related to watershed characertistics
S_{model} = standard deviation of uncertianty related to computations from hydraulic model

$S_{natural} = (0.07208 + 0.04936\ I_{Bed} - 2.262\text{x}10^{-7}\ A_{basin} + 0.02164\ H_{range} + 1.4194\text{x}10^{-5}\ Q_{100})^2$ (m) (Eqn. 5-5, page 5-4)

I_{Bed} = stream bed identifier related to bed material
A_{basin} = drainage basin area (km^2)
H_{Range} = maximum expected or observed range in stage (m)
Q_{100} = peak discharge from 100-year flood (m^3/sec)

$S_{Model} = E_{Mean}\ /\ 4$ (ft) (Eqn. 5-7, page 5-6)

E_{Mean} = mean difference in stage between upper and lower limit water surface profiles (ft)

Values for I_{bed} assigned using Ref. 2, Table 5-1, based on bed material noted in Ref. 5.

For H_{Range} the minimum water surface elevation is the channel invert, since the channel is essentially ephemeral with no flow for much of the year. The maximum water surface elevation is assumed to be a foot above the lower levee top elevation.

			Snatural										Smodel				Stotal	
Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Remarks
Control	15148.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	424.56	430.11	1.39	1.39	1.44	Index Station
Unmitigated	14930.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	423.55	429.23	1.42	1.43	1.49	
Unmitigated	14712.3	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		422.58	428.37	1.45			
Unmitigated	14494.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		421.67	427.50	1.46			
Unmitigated	14276	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		420.79	426.63	1.46			
Unmitigated	14057.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		419.9	425.78	1.47			
Unmitigated	13835.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		419.06	424.90	1.46			
Unmitigated	13613.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		418.24	424.01	1.44			
Unmitigated	13391.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		417.36	423.13	1.44			
Unmitigated	13168.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		416.48	422.24	1.44			
Unmitigated	12946.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		415.67	421.33	1.41			
Unmitigated	12724.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.79	420.43	1.41			
Unmitigated	12502.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		413.88	419.53	1.41			
Unmitigated	12279.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		413.01	418.61	1.40			
Unmitigated	12057.66	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		412.13	417.69	1.39			Index Station

			Snatural										Smodel				Stotal	
Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Remarks
Mitigated	12032.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	412.04	417.59	1.39	1.38	1.44	
Mitigated	12007.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.94	417.48	1.39			
Mitigated	11982.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.84	417.37	1.38			Index Station - Left
Mitigated	11957.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.74	417.26	1.38			
Mitigated	11932.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.64	417.15	1.38			
Mitigated	11907.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.54	417.05	1.38			
Mitigated	11882.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.44	416.94	1.38			
Mitigated	11857.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.29	416.84	1.39			
Mitigated	11832.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.19	416.74	1.39			
Mitigated	11807.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.09	416.64	1.39			
Mitigated	11782.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411	416.54	1.39			Index Station - Right
Mitigated	11757.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.9	416.44	1.39			
Mitigated	11732.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.80	416.34	1.38			
Mitigated	11707.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.70	416.24	1.39			
Mitigated	11682.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.60	416.13	1.38			
Mitigated	11657.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.50	416.02	1.38			
Mitigated	11629	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		410.41	415.9	1.37			

Stage-Discharge Uncertainty Calculations - Proposed Conditions

$S_t = (S_{natural}^2 + S_{model}^2)^{0.5}$ (Eqn. 5-6, page 5-5)

S_t = standard deviation of total uncertainty
$S_{natural}$ = standard deviation of uncertainty related to watershed characertistics
S_{model} = standard deviation of uncertianty related to computations from hydraulic model

$S_{natural} = (0.07208 + 0.04936\ I_{Bed} - 2.262\text{x}10^{-7}\ A_{basin} + 0.02164\ H_{range} + 1.4194\text{x}10^{-5}\ Q_{100})^2$ (m) (Eqn. 5-5, page 5-4)

I_{Bed} = stream bed identifier related to bed material
A_{basin} = drainage basin area (km^2)
H_{Range} = maximum expected or observed range in stage (m)
Q_{100} = peak discharge from 100-year flood (m^3/sec)

$S_{Model} = E_{Mean} / 4$ (ft) (Eqn. 5-7, page 5-6)

E_{Mean} = mean difference in stage between upper and lower limit water surface profiles (ft)

Values for I_{bed} assigned using Ref. 2, Table 5-1, based on bed material noted in Ref. 5.

For H_{Range} the minimum water surface elevation is the channel invert, since the channel is essentially ephemeral with no flow for much of the year. The maximum water surface elevation is assumed to be a foot above the lower levee top elevation.

			Snatural										Smodel				Stotal	
Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Remarks
Control	15148.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	424.56	430.11	1.39	1.39	1.44	Index Station
Unmitigated	14930.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	423.55	429.23	1.42	1.44	1.49	
Unmitigated	14712.3	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		422.58	428.37	1.45			
Unmitigated	14494.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		421.67	427.50	1.46			
Unmitigated	14276	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		420.79	426.63	1.46			
Unmitigated	14057.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		419.9	425.79	1.47			
Unmitigated	13835.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		419.06	424.91	1.46			
Unmitigated	13613.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		418.24	424.03	1.45			
Unmitigated	13391.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		417.36	423.15	1.45			
Unmitigated	13168.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		416.48	422.27	1.45			
Unmitigated	12946.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		415.67	421.37	1.43			
Unmitigated	12724.4	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.79	420.49	1.43			
Unmitigated	12502.1	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		413.88	419.60	1.43			
Unmitigated	12279.9	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		413.01	418.7	1.42			
Unmitigated	12057.66	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		412.13	417.81	1.42			Index Station

			Snatural										Smodel				Stotal	
Index Reach No.	Cross Section No.	100-year Discharge (ft^3/sec)	100-year Discharge (m^3/sec)	Drainage Area mi^2	Drainage Area (km^2)	Bottom Material	I_{Bed}	H_{Range} (ft)	H_{Range} (m)	Natural Uncertainty S_n (m)	Natural Uncertainty S_n (ft)	Reach Average S_n (ft)	Minimum Water Surface Elevation Low N (ft)	Maximum Water Surface Elevation High N (ft)	Model Uncertainty *Smodel* (ft)	Reach Average *Smodel* (ft)	Total Uncertainty *Stotal* (ft)	Remarks
Mitigated	12032.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40	0.40	412.04	417.71	1.42	0.99	1.07	
Mitigated	12007.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.94	417.61	1.42			
Mitigated	11982.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.84	417.50	1.42			Index Station - Left
Mitigated	11957.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.74	417.40	1.41			
Mitigated	11932.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.64	417.29	1.41			
Mitigated	11907.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.54	417.19	1.41			
Mitigated	11882.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.44	417.09	1.41			
Mitigated	11857.6	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.29	416.99	1.43			
Mitigated	11832.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		411.19	416.89	1.43			
Mitigated	11807.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.14	416.80	0.67			
Mitigated	11782.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.24	416.70	0.61			Index Station - Right
Mitigated	11757.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.29	416.60	0.58			
Mitigated	11732.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.37	416.51	0.53			
Mitigated	11707.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.45	416.41	0.49			
Mitigated	11682.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.48	416.31	0.46			
Mitigated	11657.5	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.53	416.21	0.42			
Mitigated	11629	94600	2679.9	587	1520.3	Cobbles	2	21.0	6.4	0.12	0.40		414.56	416.07	0.38			

APPENDIX E

R&U – HEC-FDA SCREEN CAPTURES

MITIGATION TYPE 'A'

Project Performance

File Help

Atwater R&U Project Performance
by Plans and Damage Reaches by Analysis Year 2012
(Stages in ft.)

Without Project Base Year Performance Target Criteria:
Event Exceedance Probablility = 0.01
Residual Damage = 5.00 %

Plan Name	Stream Name	Damage Reach Name	Damage Reach Description	Target Stage	Target Stage Annual Exceedance Probability		Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events					
					Median	Expected	10	30	50	10%	4%	2%	1%	.4%	.2%
Without	LA River	Mitigated-Right		levee	0.0083	0.0120	0.1139	0.3043	0.4537	0.9999	0.9733	0.8248	0.5433	0.2135	0.0925
		Mitigated-Left		levee	0.0075	0.0108	0.1032	0.2788	0.4200	0.9999	0.9800	0.8537	0.5895	0.2531	0.1192
		Unmitigated-Righ		levee	0.0062	0.0090	0.0867	0.2382	0.3645	1.0000	0.9872	0.8936	0.6652	0.3337	0.1855
		Unmitigated-Left		levee	0.0067	0.0098	0.0933	0.2547	0.3873	0.9999	0.9843	0.8777	0.6352	0.3014	0.1587
		Control-Right	No Impact to WSE	levee	0.0061	0.0086	0.0827	0.2281	0.3505	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
		Control-Left	No Impact to WSE	levee	0.0065	0.0093	0.0894	0.2449	0.3738	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768
Atwater Bridge	LA River	Mitigated-Right		levee	0.0090	0.0121	0.1151	0.3070	0.4573	1.0000	0.9814	0.8332	0.5160	0.1635	0.0504
		Mitigated-Left		levee	0.0075	0.0103	0.0987	0.2679	0.4054	1.0000	0.9887	0.8799	0.5998	0.2248	0.0815
		Unmitigated-Righ		levee	0.0082	0.0117	0.1109	0.2972	0.4445	0.9999	0.9769	0.8336	0.5526	0.2196	0.0968
		Unmitigated-Left		levee	0.0088	0.0125	0.1180	0.3139	0.4662	0.9999	0.9720	0.8133	0.5213	0.1955	0.0812
		Control-Right	No Impact to WSE	levee	0.0061	0.0086	0.0827	0.2281	0.3505	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
		Control-Left	No Impact to WSE	levee	0.0065	0.0093	0.0894	0.2449	0.3738	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768

***** - Computations have not been completed.
\+ - Something has changed and computations need to be redone.

MITIGATION TYPE 'B'

Project Performance

File Help

Atwater R&U Scenario 2 Project Performance
by Plans and Damage Reaches by Analysis Year 2012
(Stages in ft.)

Without Project Base Year Performance Target Criteria:
Event Exceedance Probablility = 0.01
Residual Damage = 5.00 %

Plan Name	Stream Name	Damage Reach Name	Damage Reach Description	Target Stage	Target Stage Annual Exceedance Probability		Long-Term Risk (years)			Conditional Non-Exceedance Probability by Events					
					Median	Expected	10	30	50	10%	4%	2%	1%	.4%	.2%
Without	LA River	Mitigated-Right		levee	0.0083	0.0120	0.1139	0.3043	0.4537	0.9999	0.9733	0.8248	0.5433	0.2135	0.0925
		Mitigated-Left		levee	0.0075	0.0108	0.1032	0.2788	0.4200	0.9999	0.9800	0.8537	0.5895	0.2531	0.1192
		Unmitigated-Righ		levee	0.0062	0.0090	0.0867	0.2382	0.3645	1.0000	0.9872	0.8936	0.6652	0.3337	0.1855
		Unmitigated-Left		levee	0.0067	0.0098	0.0933	0.2547	0.3873	0.9999	0.9843	0.8777	0.6352	0.3014	0.1587
		Control-Right	No Impact to WSE	levee	0.0061	0.0086	0.0827	0.2281	0.3505	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
		Control-Left	No Impact to WSE	levee	0.0065	0.0093	0.0894	0.2449	0.3738	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768
Atwater Bridge	LA River	Mitigated-Right		levee	0.0069	0.0096	0.0918	0.2509	0.3821	1.0000	0.9913	0.8986	0.6364	0.2538	0.0973
		Mitigated-Left		levee	0.0069	0.0095	0.0912	0.2495	0.3802	1.0000	0.9914	0.8994	0.6397	0.2586	0.1015
		Unmitigated-Righ		levee	0.0063	0.0090	0.0864	0.2376	0.3637	1.0000	0.9885	0.8966	0.6649	0.3274	0.1774
		Unmitigated-Left		levee	0.0068	0.0097	0.0927	0.2530	0.3850	1.0000	0.9860	0.8818	0.6357	0.2960	0.1521
		Control-Right	No Impact to WSE	levee	0.0061	0.0086	0.0827	0.2281	0.3505	1.0000	0.9890	0.9024	0.6821	0.3548	0.2067
		Control-Left	No Impact to WSE	levee	0.0065	0.0093	0.0894	0.2449	0.3738	1.0000	0.9864	0.8873	0.6511	0.3199	0.1768

***** - Computations have not been completed.
\+ - Something has changed and computations need to be redone.

APPENDIX F

USACE MoR NO. 4, DATED AUGUST 4, 2004 - DEBRIS LOADING

CESPL-ED-H (335-2-5c) 4 August 2004

MEMORANDUM FOR RECORD

SUBJECT: Hydrology and Hydraulics Policy Memorandum No. 4
Debris Loading on Bridges and Culverts

1. **Purpose.** This memorandum establishes the policy on the allowance for debris loading on bridges and culverts for the hydraulic analysis of natural streams as well as the hydraulic design of flood control channels and levees. The criteria provided herein supplements the criteria provided in Engineer Manual EM 1110-2-1601, *Hydraulic Design of Flood Control Channels*, 1 July 1991, with Change 1, 30 June 1994 (Ref. 1). This memorandum addresses debris only in the form of floatable trash. It does not address debris in the form of sediment deposition that may also reduce the flow capacity of bridges and culverts. Guidance on this other issue is available in several Corps of Engineers references on sedimentation engineering. This memorandum also does not address debris loading on trashracks at outlet works for dams or debris basins, or on culvert entrances. Guidance on this other issue is available in Corps of Engineers and U.S. Bureau of Reclamation guidance on the hydraulic design of dam outlet works, and in technical references published by culvert manufacturers.

2. **Background.** Historical experience has consistently demonstrated that bridges and culverts often trap significant amounts of floating trash and other debris during flood flows. For both open channel and pressure flow conditions, debris is typically caught on the piers of a bridge and the divider walls of multi-barrel culverts. For weir flow conditions, additional debris is caught on structural components of the road deck or superstructure. These components include handrails, guardrails, and the structural members of a truss bridge. Debris loading can substantially reduce the flow capacity of bridges and culverts. For smaller bridges and especially culverts, it is not usual for debris loading to completely clog the conveyance through the structure. In addition, debris loading on the superstructure may significantly increase the headwater elevation for the flood flow to pass over the top of the roadway. Not only does trapped debris physically obstruct the available flow area, but it also increases the energy losses at the entrance to bridges as well as culverts. The rough and irregular shape of a mass of trapped debris can largely negate the benefits of streamlined bridge piers or flared wingwalls and rounded edges at culvert entrances.

3. **Examples.** The enclosed photographs illustrate typical examples of debris loading at bridges and culverts.

Figure 1

18. Bull Creek, 2 February 1945, Victory Blvd. bridge. Trash on pier; view from left abutment.

Figure 2

8. P. E. Ry. Van Nuys Line bridge at mile 26.3 on Los Angeles River. View upstream from left bank.

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Big crane clears debris from H Street bridge

Figure 8

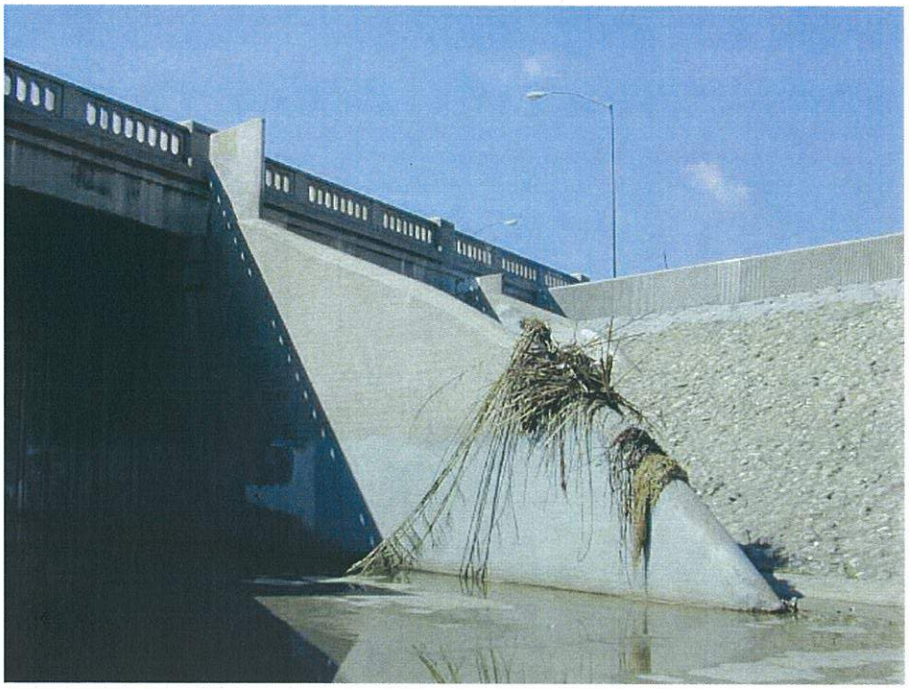


Figure 9

Figure 10

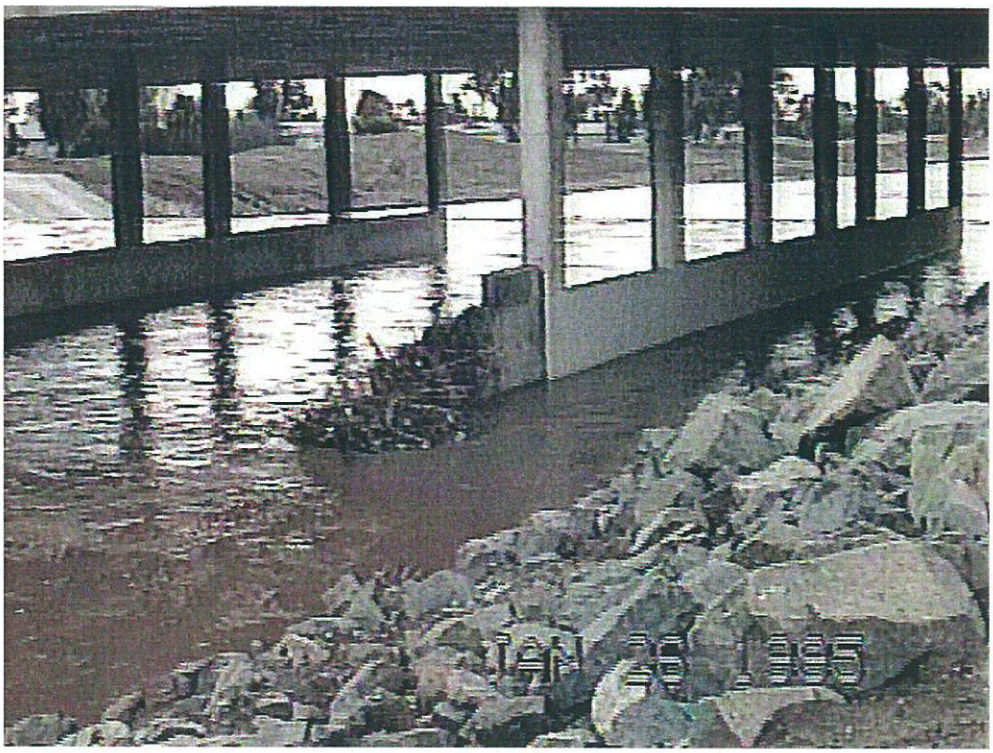
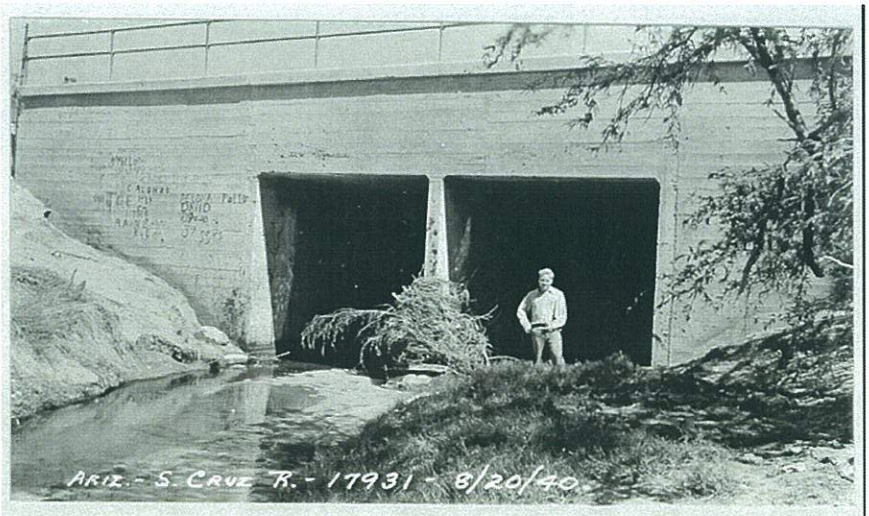


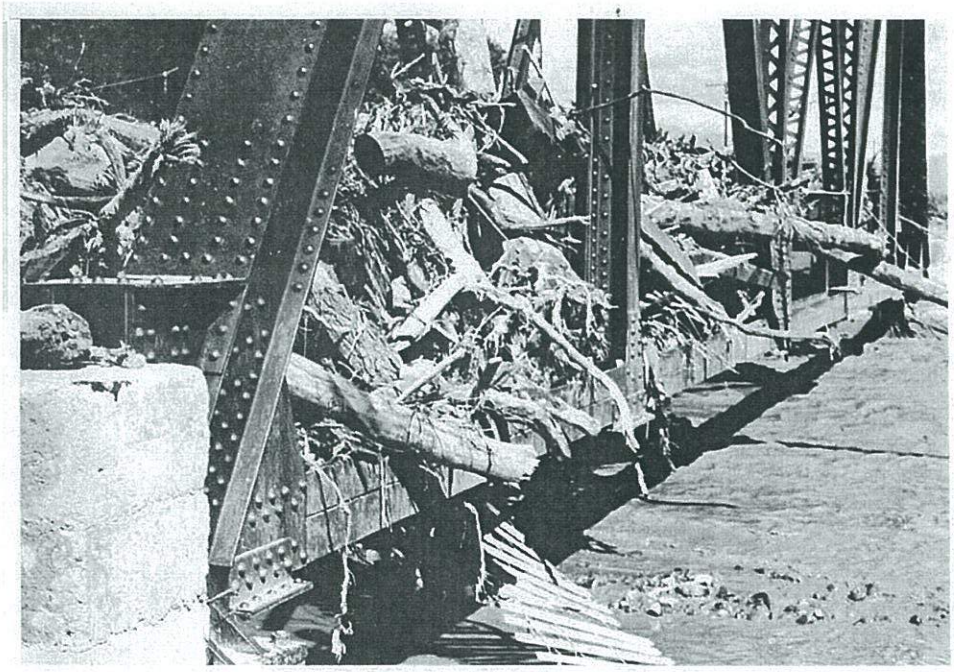
Figure 11



Downstream view of the left branch of Tucson Arroyo at intersection of Bean Avenue and Tenth Street, showing turn in channel and intake of two 10 x 10-foot conduits which reduces to 10 x 8-foot barrels in 100 feet.

Figure 12

Figure 13



Floating debris accumulation at railroad bridge crossing, Santa Paula Creek, after Feb. storm, indicating level of flood flow. Note limited clearance under bridge.

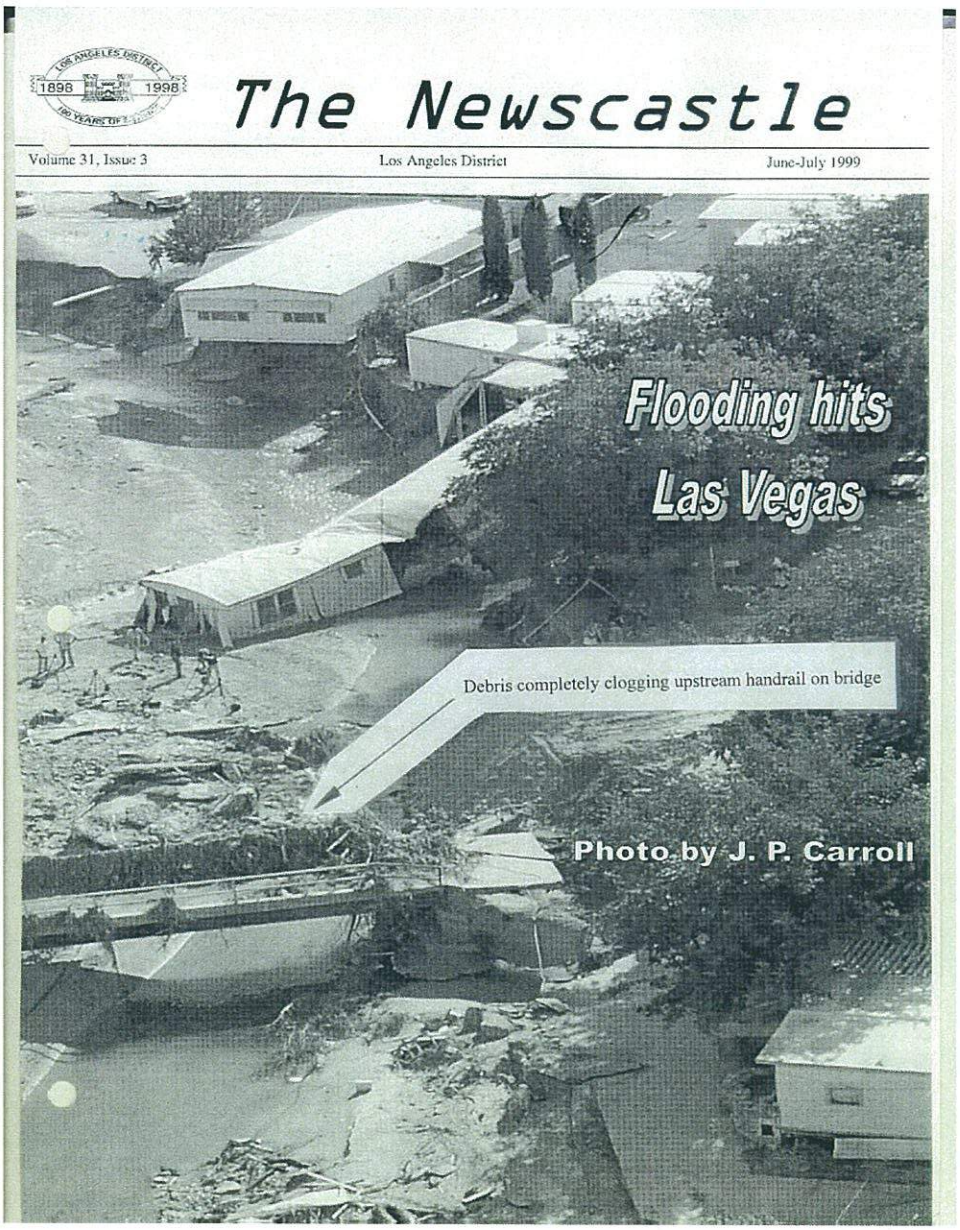
Figure 14

The Southern Pacific Railroad bridge at Clifton makes an effective trash rack for skimming floating debris from the San Francisco River.

Figure 15

19. Anaheim Street bridge downstream view.

Figure 16



4. Figures 1 through 3 display debris loading on vertical piers without sloping pier extensions. Figure 4 shows debris loading on a pier with a sloping extension that is not the standard Corps of Engineers design. Figures 5 and 6 show especially heavy debris loading on large circular piers. Figure 7 shows debris being removed from a bridge by a crane during emergency flood operations, a relatively common occurrence. Figures 8 through 10 indicate debris loading on the standard Corps design of a sloping pier extension. Figures 11 and 12 display debris loading at the entrance to multi-barrel box culverts. Figures 13 and 14 show debris caught on the members of a truss bridge. Figure 15 displays debris loading on the utility line suspended under the bridge deck. Figure 16 indicates the upstream handrail of a bridge totally clogged with debris.

5. **Debris Loading Assumptions.** The Los Angeles District has previously had no known written policy concerning debris loading on bridge piers in general. The unwritten "rule of thumb" policy for simple vertical piers was to assume two feet of debris on each side of each pier for the full depth of flow. This particular design criterion is not considered especially conservative, because long-term observations have indicated that debris loading in excess of two feet is not unusual. For example, Figure 4 appears to show that the width of the debris mass at the bottom of the pier is on the order of double the usual assumption of two feet. Much more extreme examples are shown in Figures 5 and 6.

6. The past policy made no distinction in terms of the pier shape; in other words, the same loading was applied to blunt, square-edged piers as was applied to rounded or streamlined piers. However, the unwritten policy for debris loading was modified for piers with sloping extensions, which are sometimes referred to as "debris noses". These extensions are illustrated in Plate B-18 of Ref. 1. The purpose of the sloping extensions is to minimize the debris loading on the pier. Documentation on the design of these extensions could not be located in the Hydrology and Hydraulics Section Files. Ref. 1 makes reference to previous Los Angeles District model study reports, but these documents make no reference to sloping pier extensions.

7. The only documentation available that discusses debris loading on sloping pier extensions is the Memorandum for Hydraulics Section files dated 22 June 1970, Subject: Hydraulic Design Criteria at Bridges (Ref. 2, attached as Encls. 1 and 2). This memorandum indicates that previous practice was to assume a debris loading of two feet on each side of the pier extension, but only for a depth of six feet below the upstream water surface. The memorandum indicates that "When this criteria was first developed from model studies, it was felt that the sloping extensions would not only move the debris up, but off the pier. However, as no prototype evidence was available, it was decided to make the above assumption on debris loading. Experience from recent floods, particularly the 1969 floods, indicates that the sloping extension is quite effective in preventing debris accumulation. Therefore, except in special circumstances, the practice of assuming debris loads on sloping extensions will be discontinued."

8. The above policy was countermanded by policy set forth in the Memorandum for Record dated 8 May 1996, Subject: Debris Loading on Sloping Pier Extensions (Ref. 3, attached as Encl. 3). This memorandum indicates that sloping pier extensions are effective in reducing but not totally eliminating the debris load. The revised policy is based largely on experience with bridges in the Los Angeles River and Santa Ana River during floods after 1969; this experience has indicated that sloping pier extensions often catch at least some debris. Even though these watercourses are located in heavily urbanized areas, evidently significant quantities of smaller floating trash are either passed through upstream reservoir outlet works into the channels, or are transported to the main channels by urban runoff from tributaries and storm drains. Accordingly, the assumption noted in Ref. 2 of no debris loading on sloping pier extensions is presumed to be valid "only for improved channels in urban areas with either relatively low debris potential or with dams or debris basins to trap debris upstream of the bridge. If the bridge is located in a basically natural channel with a relatively high debris potential, the sloping pier extensions will probably be ineffective in significantly reducing the debris loading...".

9. The photograph in Figure 8 shows a sloping pier extension that has performed as intended. Debris has been pushed by moderate flows up the edge of the sloping pier extension, and most of the remaining debris that did not fall off of the pier extends down no more than about six feet

from the edge. Figure 9 is a somewhat better illustration, although the flows transporting the debris to the pier were very low. However, in certain situations a sloping pier extension may be largely ineffective in reducing the debris loading according to the standard design assumption. The photograph in Fig. 10 is a good example of a bridge pier with a sloping extension that retained debris for the full height of the pier.

10. Another consideration on the debris loading assumption for sloping pier extensions is the flow state. Some engineers believe that these extensions are effective only for high-velocity flow conditions, such as would be typical of supercritical flow. The thought is that high flow velocities are required to force the debris to ride up high on the more horizontal portion of the pier extension; supposedly, subcritical flow conditions will not generally provide sufficiently high velocities. However, other engineers believe that flow accelerations near the pier provide locally high flow velocities sufficient to move the debris up the extension. The policy in Ref. 3 follows the second line of reasoning, and indicates that the reduced debris loading assumption should be applied to subcritical flow conditions as well as supercritical.

11. Ref. 3 cautions that the normal debris loading assumption for vertical piers is a reasonable minimum value for design, and may need to be increased if the debris potential is demonstrably high. In past practice, "demonstrably" has been interpreted as well-documented evidence of unusually high debris potential, such as photographs of one or more bridge piers with debris loading clearly exceeding the minimum values. Figures 5 and 6 are good examples of especially heavy debris loading. The width of the debris mass is clearly greater than the two feet used in the standard assumption. Even if the particular study or project reach includes only clear-span bridges, photographs of unusually high debris loading on the superstructure would also be valid support for using an assumption of greater debris loading on future bridges with piers. The photograph in Figure 13 is a good example of unusually high debris loading on a bridge superstructure.

12. The above debris loading assumptions are not applicable to circular, elliptical, or streamlined piers above a certain width. Typically, the combination of substantial width and curved surfaces prevents the accumulation of debris. Past practice has been to omit the standard debris loading assumptions for these types of piers if the width is equal to or greater than six feet. Also, the above assumptions apply only to the upstream pier in a series of piers, assuming that the piers are all aligned one behind the other in the direction of flow. Bridges constructed across the stream on a significant skew with the piers aligned normal to the bridge deck present additional potential for debris accumulation. Older wooden trestle railroad bridges are a typical example. These situations require careful consideration and should be analyzed by examining the flow path around and through piers or piles on a plan view drawing of suitable scale. The key factor is which downstream piers can reasonably be expected to catch debris.

13. The debris loading assumptions described above also apply to the divider walls on multi-barrel box culverts. However, the divider walls on multi-barrel culverts with circular, elliptical, arch, or other non-rectangular cross sections require additional considerations. For these culverts, the divider walls are not a constant width, and the minimum width may be substantially greater than the width of a typical bridge pier or divider wall for box culverts. As is the case for bridge piers, if the minimum width the divider wall is greater than six feet, no debris loading should be assumed. Further guidance on applying the standard debris assumptions to narrower divider walls on multi-barrel culverts with non-rectangular cross sections is provided below.

14. As indicated in paras. 2 and 4 above, debris loading should also be considered for bridge and culvert superstructures in addition to the piers. In general, all open flow area below the top of handrails and guardrails should be assumed totally clogged with debris. For truss bridges, the entire open area below the computed upstream water surface elevation and above the bridge deck should be assumed totally clogged with debris. Similarly, the open area between utility lines and the soffit of the bridge should also be assumed totally clogged.

15. **Calculations.** Most water surface profile computations through bridges are performed with the HEC-RAS, WASURO, or WS1D computer programs. Each of these programs will automatically make the proper allowance for the additional obstruction caused by debris loading on bridge piers based on user input. For each program, the user must also input the assumed width of debris and the depth of the debris below the computed water surface elevation immediately upstream. In addition, the user must specify values of the pier shape coefficient "K" in Yarnell's equation for Class A low flow, and for the HEC-RAS program, a value of the drag coefficient "C_D". For all piers without sloping extensions, the values recommended for piers with a square nose and tail should be used to reflect the propensity for high energy losses caused by the rough and irregular shape of the debris mass. The recommended values are included in *HEC-RAS, River Analysis System, Hydraulic Reference Manual, Version 3.1*, September 2002 (Ref. 4), and are 1.25 and 2.0 for K and C_D, respectively. For piers that exceed the maximum width for probable debris loading, the recommend values corresponding to the particular pier shape should be used. For piers with sloping extensions, consideration should be given to using values intermediate between those for the subject pier shape without debris and for a pier with square and tail. Logically, the intermediate values should be based on an interpolation of the two extreme values prorated according to the percentage of flow depth exposed to the obstructed and unobstructed pier. For example, a computed upstream flow depth of nine feet would warrant values for the pier shape and drag coefficients of two-thirds of the maximum value, because six feet of the nine-foot flow depth is exposed to debris. However, this adjustment would require an iterative solution and may not be warranted, given the uncertainty of the actual debris loading. Unless the computed flow upstream flow depth is considerably greater than six feet, a reasonable approach would be to simply use the maximum coefficient values.

16. Computations of water surface profiles upstream of culverts typically require a different calculation procedure or set of algorithms as compared to profiles upstream of bridges. Typically, some form of algorithms and associated data developed by the Federal Highway Administration is used. The HEC-RAS program was developed using the FHWA methodology. Because of the input format of these algorithms, it is not possible to simply specify the width of a pier or divider wall; instead, the gross area of the culvert inlet must be reduced externally to reflect the debris loading. For box culverts with rectangular cross-sectional flow areas, this procedure is simple, because the obstructed flow area is a linear function of the flow depth. Therefore, the width of all of the interior barrels should be reduced by the assumed debris loading for both adjacent divider walls; for both outside barrels, the width should be reduced only for the debris loading on the divider wall opposite the outside wall of the culvert. These reduced widths are then used in the culvert headwater calculations.

17. For circular culverts, however, the procedure is more complicated, because the area obstructed is not a linear function of the flow depth. To overcome this complication, a simple procedure was developed using computation tables available in *Handbook of Hydraulics*, King and Brater, 5th Edition, 1963 (Ref. 5). Table 7-4 on page 7-30 allows an expedient computation

of the flow area of a circular conduit flowing partly full for a specified flow depth relative to the conduit diameter. However, the same table can be also used to calculate the area of a circular conduit obstructed by sediment deposition of a given depth, or alternatively, of debris loading on a divider wall along the side of the conduit. Since the circumference is perfectly circular, the same obstructed area applies in the direction measured normal to the circumference at any point. In other words, the area obstructed horizontally by a given depth vertically from the bottom of the conduit is the same as the area obstructed vertically by the same depth horizontally from the side. The actual calculation procedure is as follows:

$$A_d = C_a d^2$$

where A_d = flow area obstructed by sediment or debris
C_a = coefficient from table 7-4
d = diameter of circular conduit
D = depth of sediment or debris

18. To apply the procedure manually, the ratio of the selected depth of sediment or debris loading to the conduit diameter is computed, the corresponding value of the coefficient is read from the table, and the obstructed area is computed. This procedure has been automated in a spreadsheet, including all of the values of the coefficient in the table. Copies of the spreadsheet pages in .pdf format have been attached as Encls. 4 and 5. Once the obstructed area is calculated, it is subtracted from the gross area to determine the net flow area of the conduit. Then, the equivalent conduit diameter is calculated to provide the same net flow area. The equivalent diameter is then used for all of the culvert headwater calculations. As with multi-barrel box culverts, the equivalent diameter of the interior barrels of multi-barrel circular culverts should be reduced to reflect debris loading on each of the adjacent divider walls, whereas the diameter of the two outside barrels should be reduced only for the debris loading on the single adjacent pier. The same procedure can be used essentially in reverse to determine the diameter of a series of multi-barrel culverts required to satisfy the desired hydraulic design criteria of discharge and headwater depth with the imposed debris loading on the divider walls. This procedure has also been automated in the spreadsheet.

19. As is the case for bridges, the analysis and design of culverts should reflect the increased energy losses at the inlet caused by the abrupt change in flow area and the general roughness of the debris mass. These factors caused by the debris loading largely negate the efficiency of the culvert entrance provided by wingwalls and headwalls. Therefore, the culvert entrance loss coefficients should be selected accordingly. For a reasonably conservative calculation of the headwater, the least efficient culvert entrance in terms of headwalls and wingwalls should be specified in the program input. However, the actual condition of the edges of the culverts at the entrance (for example - square, beveled, or rounded) will be mostly unaffected by the debris loading on the divider walls; therefore the actual edges should be specified in the input data.

20. The debris loading assumptions and procedures discussed above will result in a substantial reduction of flow capacity for small culverts. In fact, the assumptions and procedures will result multi-barrel culverts with a width or diameter of two feet or less being assumed completely clogged with debris. This assumption is reasonable for small culverts subject to heavy debris loading. For somewhat larger culverts, it may also be reasonable to treat the relatively low capacity caused by debris loading as essentially negligible. With this rationale, multi-barrel

culverts with widths or diameters of three feet or less should be assumed have negligible flow capacity because of debris loading on the divider walls. Even larger culverts can become essentially clogged with debris, as the example in Figure 12 shows. One entire barrel of a double-barrel box culvert with dimensions of approximately five feet wide by six feet high is almost totally obstructed.

21. The key requirements of the design policy on debris loading are summarized as follows:

1) *Piers without sloping pier extensions (Case 1)*: Assume two feet of debris loading on each side of each pier for the full depth of flow.

2) *Piers with sloping pier extensions (Case 2)*: Assume two feet of debris loading on each side of each pier for a depth of six feet below the computed water surface. This assumption requires a trial and error solution, unless the floating debris option in the HEC-RAS bridge data editor is used, or the WASURO or WS1D program is used.

3) *Circular, elliptical, or streamlined piers with widths greater than six feet, and culvert divider walls with widths greater than six feet*: Assume no debris loading.

4) *Open areas on bridge deck between utility lines, handrails, guardrails, posts, and truss and other structural members*: Assume the open areas are completely clogged with debris.

5) *Pier shape coefficient K and drag coefficient C_D for Case 1*: Use values corresponding to a pier with a square nose and tail.

6) *Pier shape coefficient K and drag coefficient C_D for Case 2*: Interpolate values between those for a pier with a square nose and tail and the subject pier, based on the percentage of the computed flow depth obstructed by the assumed six-foot debris loading.

7) *Width of multi-barrel rectangular culverts*: Reduce the width of all interior barrels by two feet on each adjacent pier (total of four feet), and reduce the width of all outside barrels by two feet.

8) *Diameter of multi-barrel circular culverts*: Calculate the equivalent reduced diameter of all interior barrels to reflect two feet of debris on each adjacent pier (total of four feet), and calculate equivalent reduced diameter for both outside barrels to reflect two feet of debris on the single adjacent pier.

9) *Entrance conditions for multi-barrel culverts*: Assume the least efficient combination of headwall and wingwalls, but assume the debris loading does not significantly affect the actual type of inlet edge.

10) *Limiting size of culverts for debris loading assumption:* Assume complete debris blockage for all multi-barrel culverts with widths or diameters of three feet or less.

JOSEPH B. EVELYN, PE
Chief, Hydrology and Hydraulics Branch

CF: EVELYN
CESPL-ED-H
CESPL-ED-H
CESPL-ED-HH (4) VERMEEREN
CESPL-ED-HH

COZAKOS
CESPL-ED-HH

REFERENCES

1. Engineer Manual EM 1110-2-1601, *Hydraulic Design of Flood Control Channels*, 1 July 1991, with Change 1, 30 June 1994.

2. Memorandum for Hydraulics Section Files dated 22 June 1970, Subject: Hydraulic Design Criteria at Bridges.

3. CESPL-ED-HH Memorandum for Record dated 8 May 1996, Subject: Debris Loading on Sloping Pier Extensions.

4. *HEC-RAS, River Analysis System, Hydraulic Reference Manual, Version 3.1*, November 2002.

5. *Handbook of Hydraulics*, King and Brater, 5th Edition, 1963.

Enclosure 1

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

IN REPLY REFER TO

SPLED-DH

22 June 1970

MEMORANDUM FOR: HYDRAULICS SECTION FILES

SUBJECT: Hydraulic Design Criteria at Bridges

1. Sloping pier extensions. The practice in this section with regards to debris on sloping pier extensions has been to assume 2 feet of debris on each side of each pier for a depth of 6 feet below the water surface. When this criteria was first developed from model studies, it was felt that the sloping extension would not only move the debris up, but off the pier. However, as no prototype evidence was available, it was decided to make the above assumption on debris loading.

2. Experience from recent floods, particularly the 1969 floods, indicates that the sloping extension is quite effective in preventing debris accumulation.[1] Therefore, except in special circumstances, the practice of assuming debris loads on sloping extensions will be discontinued. *

a. When the design engineer determines that excessive quantities of debris of the type likely to get trapped on the piers, such as trees with large branches, would be brought down by flood waters, he should bring the problem to his supervisor's attention for an agreement on the debris load to assume.

b. When the flow is indicated as "Class C" on the Classification of Flow chart, such as Plate 11 in the draft of EM 1110-2-1601, a check should be made assuming a debris load. If this assumption results in a change to "Class B" flow, compute the water surface on this assumption.

3. Freeboard for "Class C" flow. The minimum bridge clearance for "Class C" flow should be 4 feet above d_1 depth. If the engineer feels the classification is marginal between Class C and B, the clearance should be equal to the d_1 depth indicated by Class B flow.

A. RODLES
Chief, Hydraulics Section

*i.e. IF CHANNEL IS JUDGED TO BE IN A HIGH DEBRIS AREA w/ NO PROTECTION SUCH AS DAMS OR DEBRIS BASINS. [1] (OVER)

** (OVER)

[1] SUPPOSEDLY THE EXTENSIONS PERFORM BEST FOR HIGH VELOCITY FLOW – THE INTENT IS TO ALLOW THE HIGH MOMENTUM OF THE FLOW SHOVE THE DEBRIS UP THE SLOPE OUT OF THE WATER. FOR LOW VELOCITY FLOWS, THE EXTENSIONS MAY NOT BE EFFECTIVE, SO THAT THE OLD ASSUMPTION PROBABLY WOULD BE BEST.

Enclosure 2

** i.e. CLASS B OR C FLOW AT BRIDGE; EVEN IF FLOW U/S OF BRIDGE IS SUBCRITICAL, THERE WILL PROBABLY BE SUFFICIENT LOCAL ACCELERATION AT THE PIER NOSE TO CREATE VELOCITIES HIGH ENOUGH TO MOVE THE DEBRIS UP.

2) FOR AREAS W/ LESS DEBRIS PRODUCTION THAN LACDA (SUCH AS PHOENIX), A REDUCED (BUT NOT ZERO) DEBRIS ALLOWANCE WOULD BE PRUDENT, SUCH AS 1 FT EA. SIDE FOR 6 FEET BELOW THE WATER SURFACE.

Enclosure 3

SPLED-HH 8 May 1986

MEMORANDUM FOR RECORD

SUBJECT: Debris Loading on Sloping Bridge Pier Extensions

1. In the hydraulic design of flood control channels, sloping bridge pier extensions are used to reduce the amount of debris collected on bridge piers. The following advice concerning the effectiveness of sloping bridge pier extensions in reducing debris loading is offered by Edward Chew based on his past experience.

2. The sloping pier extensions are effective in reducing, but not eliminating the debris load. A reasonable assumption on debris loading for sloping pier extensions is 2 feet of debris on each side of the pier for a depth of 6 feet below the design water surface, and no debris below that point. This assumption applies to subcritical flow as well as to supercritical flow.

3. The above assumption is valid only for improved channels in urban areas with either relatively low debris potential or with dams or debris basins to trap debris upstream of the bridge. If the bridge is located in a basically natural channel with a relatively high debris potential, the sloping pier extensions will probably be ineffective in significantly reducing the debris loading, and therefore may not be cost effective. For this case, the loading for simple vertical piers should be used, that is, at least 2 feet of debris on each side of the pier for the full depth of flow. The value of 2 feet is considered a reasonable minimum value for design, and may need to be increased if the debris potential is demonstrably high.

Joseph B. Evelyn
JOSEPH B. EVELYN
Chief, Hydraulics Section

JBE 5-12
EVELYN
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12 May
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APPENDIX G

PRELIMINARY PROJECT SITE PLANS & BRIDGE PLANS

APPENDIX H

USACE INITIAL REPORT REVIEW COMMENTS MARCH 7, 2012

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. Box 532711
LOS ANGELES, CALIFORNIA 90053-2325

March 7, 2012

REPLY TO
ATTENTION OF:
Office of the Chief
Engineering Division

Mr. Andrew Willrodt, P.E.
FUSCOE Engineering
Suite 1470
600 Wilshire Boulevard
Los Angeles, California 90017

Dear Mr. Willrodt:

This is in response to your letter dated December 19, 2011, concerning the project to construct the Atwater Bridge over the Los Angeles River Channel (Design B Section File No. EE2012-19).

Your project has been reviewed and we have the following comments:

a. Confirm that the west bank is not a levee with photos to support the statements in Section 1.2.2 of the report that "the ground elevations along and beyond the west side areas of the channel generally lie at or above the top of bank elevations by some 2 to 3 ft".

b. In the report on page 4, when discussing Manning's n-value used, it was noted that values of 0.03 and 0.04 were used for the channel's cobble/earthen river bottom and rip-rap sides respectively. However, the model has a composite n-value of 0.03, which includes the channel bottom and riprap sides. Correct the variation.

c. In Section 1.2.1, the report states the bridge will be 36 ft nominal width. In Section 1.2.3, the report states the nominal deck width is 34 ft. Clarify the difference in these widths.

d. Explain what the impact would be if the secondary pier had a sloping pier nose.

e. The proposed project Atwater Bridge induces an increase to the channel's WSE for approximately 3900 feet. USACE recommends a freeboard of 2.5 ft for trapezoidal channels or 3.0 ft for reaches with levees. According to Table 2.1 of the report, some with-project freeboard values do not meet this requirement. Re-submittal is required showing mitigation to meet the freeboard requirement of 2.5 ft. Include the RAS models in the submittal.

f. Please provide further information on the use of a wall or curb to mitigate the increase in WSE.

g. The Risk and Uncertainty (R&U) Analysis for the left and right bank levees should be done as a separate analysis since the freeboard varies from one bank to the other.

h. The index location for each damage reach should be set to the river station with the least amount of freeboard under with project conditions. For the left bank, the index locations for the "Unmitigated" and "Mitigated" damage reaches per Table 2.1 should be 120+07.60 and 114+29.00, respectively. The right bank, index locations for the "Unmitigated" and "Mitigated" damage reaches per Table 2.1 should be 120+07.60, and 116+07.50, respectively.

i. According to Table 3.2.3 of the report, the R&U results in a 1.7% increase in Conditional Non-Exceedance Probability for the 100-yr event from existing to proposed conditions in the portion of the channel with the highest increase in water surface elevation. Clarify if the 100-yr event water surfaces are lower than the existing conditions water surface with the bridge. Please provide HEC-RAS output for all 6 profiles (10%, 4, 2, 1, 0.4 and 0.2) for existing and proposed conditions.

j. According to Table 3.2.3 of the report, the R&U results in a 0.8% increase in Conditional Non-Exceedance Probability for the 50-yr event from existing to proposed conditions in the portion of the channel with the highest increase in water surface elevation. Clarify if the 50-yr event water surfaces are lower than the existing conditions water surface with the bridge. Please provide HEC-RAS output for all 6 profiles (10%, 4, 2, 1, 0.4 and 0.2) for existing and proposed conditions.

k. A resubmittal is required.

If you have any questions regarding this matter, please contact Mr. Ted Masigat, Design B Section, at (213) 452-3393.

Sincerely,

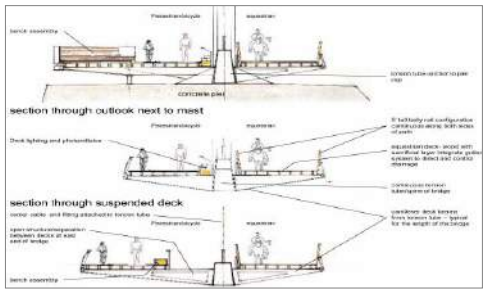
Brian Tracy for

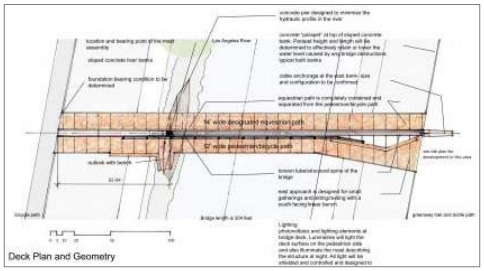
Richard J. Leifield, P.E.
Chief, Engineering Division

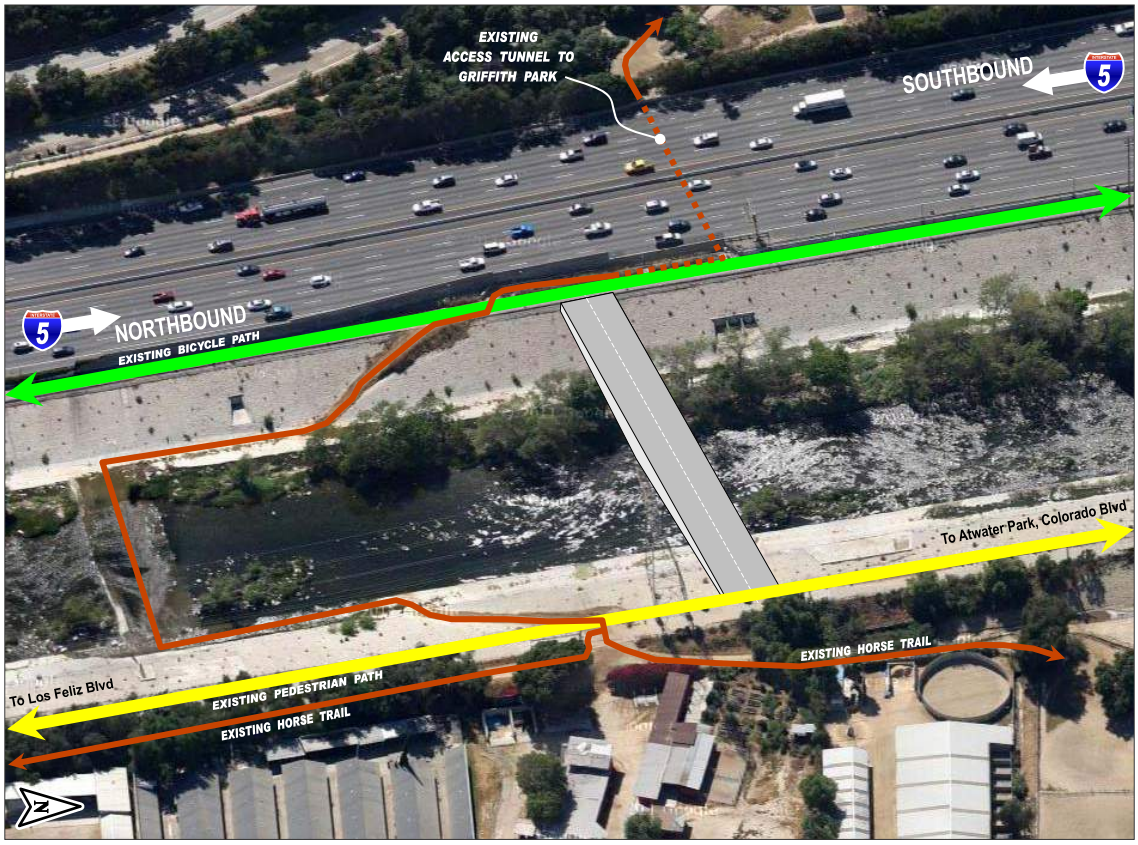
TRAFFIC & TRANSPORTATION IMPACT ANALYSIS

FOR THE

PROPOSED NORTH ATWATER NON-MOTORIZED BRIDGE PROJECT







Presented to:

CDM Smith

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Prepared for:

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Department of Public Works
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19 Years of Excellence

August 10, 2012

TRAFFIC & TRANSPORTATION ANALYSIS

FOR THE

PROPOSED NORTH ATWATER NON-MOTORIZED BRIDGE PROJECT

Presented to:

CDM Smith
523 W. 6th Street, Suite 400
Los Angeles, CA 90014

Prepared for:

City of Los Angeles
Department of Transportation (LADOT) and
Department of Public Works (Bureau of Engineering)

Prepared by:

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August 10, 2012

1.0 - Introduction

This technical memorandum summarizes the traffic analyses conducted by Minagar & Associates, Inc. in support of the California Environmental Quality Act (CEQA) for the North Atwater Non-Motorized Bridge Project over the Los Angeles River in the Atwater Village area of Los Angeles, California. The CEQA process requires identification and analysis of the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the examination focuses on changes in the existing physical conditions of the existing affected area. The following report describes these existing traffic and transportation conditions within the project study area, the potential impacts of the project, the methodologies used to evaluate the potential impacts, and finally, the impact of the project upon build-out conditions.

Figure 1 illustrates the project location and study area.

The North Atwater Bridge Project consists of a pre-fabricated 36-foot wide cable stayed bridge which will span approximately 390 feet across the Los Angeles River. The bridge crossing will provide pedestrian and equestrian access from the east side of the river to Griffith Park on the west side of the River and I-5 Freeway. Additionally, the bridge will provide bicycle access from Atwater Park (located just north of the proposed bridge and on the east side of the river) to the L.A. bicycle trail system along the west bank of the L.A. River.

As proposed, the North Atwater Multimodal Bridge will carry only pedestrian, bicycle and equestrian traffic. Due to this conditional non-motorized element, and per the concurrence of Los Angeles Department of Transportation (LADOT) staff, the North Atwater Bridge project is pre-determined to not generate any additional vehicle trips, and thus is categorically exempt from standard traffic impact analysis requirements.

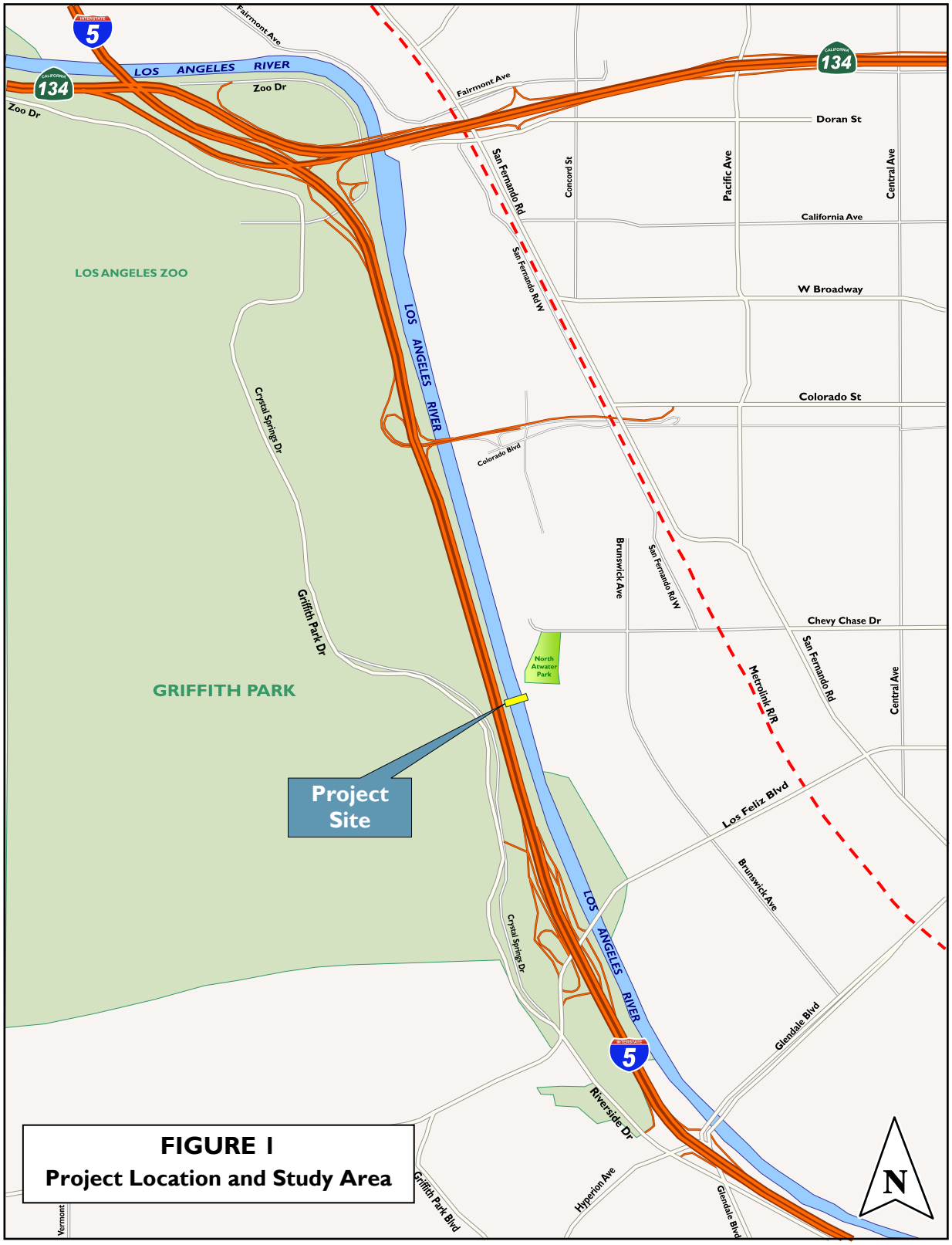


FIGURE 1
Project Location and Study Area

Nonetheless, the project team does acknowledge the potential for the project to temporarily disrupt traffic flow on the adjacent I-5 Northbound freeway lanes, due to need to close one or two lanes during various hours during the construction phase.

This report identifies three key traffic study components:

- (1) Temporary (Construction Period) Traffic Impacts—Since the project will not generate any project trips, only freeway mainline Level of Service (LOS) changes resulting from lane closures are presented;
- (2) Temporary (Construction Period) Impacts to Multi-modal (i.e., Pedestrian, Bicycle and Equestrian) Traffic—Including temporary travel path closures and detours; and
- (3) Identification of project features to mitigate potential any temporary and/or permanent traffic and transportation impacts

For the first traffic study component, *Highway Capacity Manual* (HCM) Freeway Mainline Analysis methods were used to evaluate the impact of the project construction activities during various hours of the day on the adjacent Northbound I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The project as proposed will require the use of the adjacent freeway shoulder and one (1) through lane on the adjacent I-5 freeway mainline segment. For a conservative analysis, a maximum of two (2) through lanes was used for evaluating project construction impacts. Given the project duration of less than 12 months, the analysis was limited to the following two traffic scenarios:

- I. Existing (2012) conditions
- II. Existing (2012) Plus Project conditions

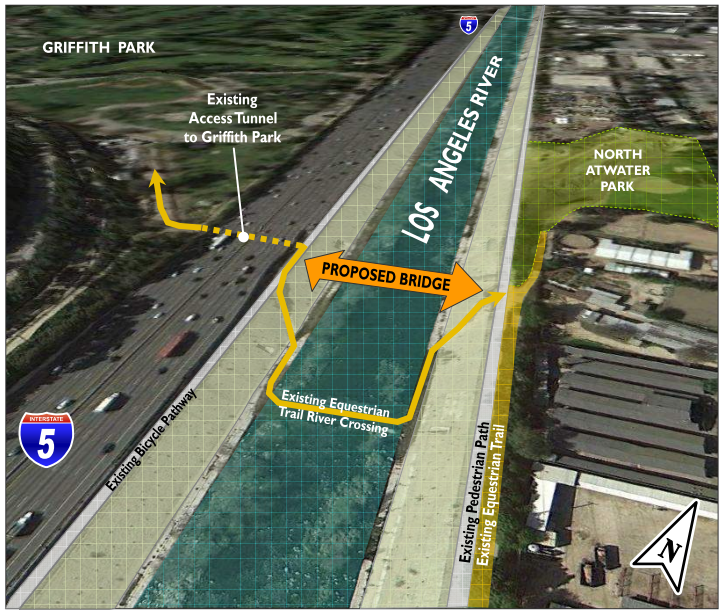
The results of the analyses reveal that the construction of the proposed Atwater Multimodal/Non-Motorized Bridge Crossing Project will result in insignificant traffic impacts upon the adjacent Northbound I-5 Freeway mainline segment during the construction period.

Based on the traffic impact analysis of the adjacent northbound I-5 freeway lanes, an acceptable Level of Service (i.e., LOS "C" or better) can be maintained if project-related lane closures on the mainline are conducted within the following time periods:

- Monday through Thursday:
  - Morning- 12AM to 6AM
  - Evening- 8PM to 12AM
- Friday:
  - Morning- 12AM to 6AM
  - Evening- 8PM to 9AM
- Saturday:
  - Morning- 12AM to 9AM
  - Evening- 10PM to 12AM
- Sunday:
  - Morning- 12AM to 10AM
  - Evening- 9PM to 12AM

However, as a conservative measure, and based on discussions with Caltrans staff, the proposed highway lane closures for this project would occur only on typical weekend days (Saturday/Sunday), and during the overnight period between 10PM and 6AM. It is expected that during these hours, traffic conditions hours would return to baseline levels upon conclusion of the construction phase, and therefore any traffic impacts due to the lane closures would be de minimis and temporary.

2.0 - Existing Conditions



The proposed Atwater Multimodal Crossing is a response to a series of conditions on several scales. From a traffic/transportation perspective, the bridge crossing will serve to provide connectivity and access on a multimodal basis from the neighborhoods to the east to Griffith Park on the west. The crossing will allow safe access for equestrian users from the stable complexes on the east to Griffith Park. Additionally, the bridge will allow for bicycle access from Atwater Park to the Los Angeles River segment of the L.A. bicycle trail system. The existing site is physically constrained in terms of available space for construction staging, delivery of bridge components, materials and equipment storage, and actual on-site construction and bridge assembly. As shown in the image below, the Northbound I-5 Freeway abuts the existing L.A. River bicycle path along the west side of the riverbank. The adjacent freeway shoulder and lanes will require periodic closures for delivery of bridge components constructed off-site and then assembled at the project site. Lane closures will only be required during delivery of the components.

View of I-5 Northbound Lanes. Lane closures to occur where the existing shoulder is separated from the L.A. River Bicycle Path by a concrete soundwall near the proposed location of the bridge alignment

2.1 - Existing Pedestrian, Bicycle and Equestrian Facilities

The existing non-motorized transportation facilities are composed of the following elements:

- Los Angeles Greenway Trail—Pedestrian path on the east side of the L.A. River. Nearest local street access points are located at Colorado Boulevard to the north, and Los Feliz Boulevard to the south.

- Los Angeles River Bike Way—Class II paved bicycle path on the west side of the L.A. River. Nearest access points are located around the river "bend" at Victory Boulevard/Riverside Drive (to the north), and at the dedicated overcrossing across Los Feliz Boulevard (to the south). An existing access tunnel (Tunnel #1) is located under the I-5 Freeway alignment which connects the bikeway to the proceeding Griffith Park trails to the west of the freeway.

- Equestrian Horse Trail and River Crossing—Part of the L.A. Greenway Trail, includes a equestrian bridle path which runs adjacent to the pedestrian walkway from Los Feliz Boulevard to North Atwater Park. Two traversable slopes run alongside each embankment from the riverbed to the top of the proposed bridge alignment, serving as a crossing point for equestrian traffic between the west and east sides of the river.

- Glendale Narrows Riverwalk—Non-motorized improvement projects along the L.A. River, located north of the proposed North Atwater Bridge along the River "bend" near the I-5/SR-134 confluence. As of April 2012, the Phase I of the City of Glendale's Glendale Narrows Riverwalk is still under construction along the north bank of the L.A. River, opposite of Griffith Park. The project includes half a mile of recreational trail for bicyclists and pedestrians, two small parks, an equestrian facility, landscaping, and additional trail features, and is expected to be completed during this Fall. A large portion of the second phase of the project has already been constructed, which will ultimately include an extension of the bicycle/pedestrian path eastward and south around the river bend to the Verdugo Wash. A final future phase will include the Los Angeles River Bridge connecting the Riverwalk to Griffith Park across the L.A. River, and the Verdugo Wash Bridge, which will connect the Riverwalk to North Atwater across the Verdugo Wash confluence with the Los Angeles River.

2.2 - Existing Traffic Volumes

Existing 24-hour traffic counts were obtained from Caltrans District 7 for the Northbound Interstate 5 (I-5) Freeway Segment between Los Feliz Boulevard and Colorado Boulevard. The hourly data was provided by Caltrans as collected from its Performance Measurement System (PeMS) freeway monitoring database and mainline loop sensors for the month of April 2012. ***Table 1*** shows the full traffic volume data set used in the analysis, which includes both passenger cars and heavy vehicles. Heavy vehicle splits for 3-axle, 4-axle and 5-axle trucks were obtained from Caltrans Traffic Volume Branch's most recent database, and applied to the Highway Capacity Manual (HCM) analysis.

2.3 - Existing Level of Service Analysis

Using the data mentioned above, a Level of Service (LOS) analysis was conducted for the Northbound I-5 Freeway mainline segment located to the west and adjacent to the project site. The analyses were conducted using the appropriate procedures from the *Highway Capacity Manual* (HCM)(Transportation Research Board) as per Caltrans' latest *Traffic Impact Analysis Guidelines*. Additional analysis inputs for the existing freeway mainline segment are as follows:

- Number of Lanes: 5
- Average Lane Width: 12'
- Right Shoulder Lateral Clearance: 12'
- Interchange Density: 0.75 per mile (8 per 6 miles)
- Peak Hour Factor, PHF: 0.95 (typical urban freeway)
- Driver Population Factor: 1.00 Monday through Friday, 0.95 Saturday/Sunday due to Griffith Park and L.A. Zoo trip attractors
- Passenger Car Equivalents, PCE: 2-Axle=1.5, 3-Axle=2.0, 4-Axle=3.0

TABLE 1: Existing Daily Freeway Traffic Volumes

County: Los Angeles (District 7)
Rte/Location/Dir: NB Interstate 5 (I-5); PM ±24.54
Fwy Segment: North of Los Feliz Boulevard

Caltrans Hourly Station Freeway Traffic Volumes: April 2012

Time	AM Hours												PM Hours											
	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
Day	**MONDAY - THURSDAY**																							
Mon	1,800	1,270	787	734	805	1,738	4,140	5,588	6,952	7,071	6,525	6,462	6,019	6,035	6,129	6,634	6,801	6,887	6,674	6,475	5,072	4,018	3,549	3,249
Tue	2,140	1,232	787	689	824	1,689	4,151	6,118	6,511	6,690	6,299	5,951	5,809	5,655	6,073	6,385	6,533	6,841	6,133	6,826	6,085	4,635	4,159	4,017
Wed	2,283	1,380	905	749	867	1,689	4,063	5,736	6,973	7,264	6,508	5,729	5,636	5,568	6,608	6,613	6,638	6,659	6,990	6,775	5,873	4,809	3,854	3,349
Thu	2,821	1,707	1,010	846	924	1,826	4,107	5,925	7,111	7,395	6,802	6,254	6,616	5,784	6,649	6,511	6,642	6,747	6,806	6,772	6,197	4,929	4,156	3,523
Mon	1,838	1,558	932	741	919	1,871	4,205	5,917	6,863	7,126	6,804	6,196	6,543	6,448	6,661	6,712	6,533	6,850	6,851	6,627	5,269	4,288	3,490	2,661
Tue	1,907	1,275	864	784	882	1,737	4,246	6,170	6,834	7,104	6,879	6,415	5,878	4,924	5,678	6,617	6,785	7,021	6,884	6,646	6,239	4,578	3,726	3,115
Wed	1,868	1,111	771	687	814	1,667	3,527	4,582	6,280	7,189	6,903	5,998	5,617	5,899	6,152	6,494	6,330	6,978	6,851	6,504	5,119	4,175	3,845	3,509
Thu	2,177	1,233	809	786	859	1,452	3,999	5,974	6,827	7,089	6,935	6,636	6,229	6,580	6,561	7,010	5,429	7,031	7,105	6,849	5,950	4,235	4,259	3,826
Mon	1,944	1,615	997	759	949	1,915	4,087	6,050	6,896	7,023	6,512	5,971	6,236	5,986	6,236	6,667	6,741	6,706	6,304	6,107	5,311	3,998	3,427	3,016
Tue	2,153	1,251	851	824	891	1,774	4,129	5,909	6,697	7,096	7,059	6,209	6,226	6,056	6,115	6,552	6,626	6,634	6,671	6,445	5,459	4,274	3,742	3,463
Wed	2,157	1,198	796	699	834	1,661	4,096	6,122	6,576	7,176	6,960	6,446	5,777	5,877	6,280	5,726	6,611	6,687	6,861	6,659	5,384	4,400	3,778	3,628
Thu	2,919	1,379	968	794	916	1,817	4,085	6,013	6,979	7,054	6,539	6,349	6,112	5,977	6,377	5,762	5,910	5,763	6,843	6,701	6,364	4,634	3,871	3,246
Mon	1,771	1,506	993	838	969	1,899	3,984	5,961	6,528	7,042	6,702	5,952	5,666	5,932	5,944	6,443	6,811	6,710	6,566	6,579	4,964	3,788	3,484	3,418
Tue	2,099	1,262	772	687	871	1,785	4,169	6,011	6,941	7,222	6,938	6,014	6,046	5,959	6,132	6,728	6,888	6,915	6,645	6,458	5,243	4,207	3,733	4,226
Wed	1,969	1,267	656	703	827	1,759	3,969	5,878	6,956	7,375	6,811	5,721	5,593	5,979	6,096	6,501	6,897	6,549	6,845	6,507	5,354	3,971	3,862	3,501
Thu	2,303	1,380	819	794	784	1,650	3,650	5,597	6,592	6,697	6,037	5,932	6,139	6,057	6,084	6,634	6,977	6,991	6,858	6,603	5,602	4,093	4,029	2,976
Mon	1,864	1,228	867	690	904	1,696	4,205	6,056	6,776	7,199	6,921	5,996	5,820	5,915	6,119	6,685	6,815	6,554	6,619	6,539	5,126	3,876	3,401	2,598
Day	**FRIDAY**																							
Fri	3,259	1,823	1,191	1,052	1,007	1,744	3,761	5,662	6,559	6,559	6,535	5,352	5,440	5,766	6,158	6,481	6,274	7,063	6,938	6,423	5,342	4,821	4,290	3,753
Fri	2,947	1,381	971	858	882	1,669	3,792	5,643	6,174	6,557	5,813	6,019	5,901	5,161	5,470	5,518	5,948	6,303	6,240	6,381	5,091	3,965	3,625	3,725
Fri	3,270	1,807	1,172	1,031	1,019	1,769	3,984	5,833	6,922	7,149	7,080	6,381	6,350	6,331	6,869	6,950	6,483	6,402	6,928	6,610	5,907	5,028	4,301	3,914
Fri	3,561	1,505	964	830	940	1,780	4,145	6,194	6,855	7,038	6,730	6,428	6,336	6,458	6,654	6,942	6,654	7,007	6,723	6,630	5,703	5,011	4,424	5,034
Day	**SATURDAY**																							
Sat	3,444	1,944	1,452	1,274	917	1,229	2,033	2,736	3,830	4,952	5,800	6,301	5,500	5,948	4,778	6,124	6,052	6,600	6,370	6,210	5,496	4,879	4,298	4,279
Sat	3,635	1,619	1,179	1,087	876	1,163	1,998	2,798	3,787	4,682	5,800	6,279	6,280	6,792	6,778	6,900	6,688	6,819	6,082	5,751	5,450	5,973	5,566	4,389
Sat	3,864	2,529	1,636	1,377	996	1,323	2,314	3,141	4,221	4,891	5,868	6,230	6,421	6,632	6,647	6,666	6,561	6,537	6,070	5,923	5,609	4,991	4,420	4,539
Sat	4,067	2,392	1,569	1,263	936	1,338	2,265	3,169	4,344	5,086	5,989	6,100	6,318	6,217	6,229	6,830	6,683	6,538	5,499	5,700	5,764	5,125	5,376	6,064
Day	**SUNDAY**																							
Sun	1,974	2,299	1,540	1,257	805	750	1,042	1,577	2,162	2,850	4,623	5,511	6,134	5,968	6,233	6,357	6,311	6,315	6,372	5,912	5,331	4,848	4,607	3,341
Sun	2,553	2,165	1,482	1,349	781	736	1,054	1,450	2,160	2,837	4,364	5,770	6,010	5,976	6,825	6,648	6,474	5,827	5,210	5,495	5,497	5,739	5,243	3,974
Sun	2,371	2,593	1,434	1,204	827	761	1,096	1,678	2,382	3,097	4,508	5,531	5,617	6,127	6,084	6,617	6,448	6,882	7,016	6,375	5,396	4,893	4,231	3,613
Sun	2,062	2,437	1,729	1,423	857	768	1,236	1,646	2,493	3,104	4,628	5,430	5,981	6,162	6,613	6,252	6,472	6,323	6,343	6,133	5,500	4,838	4,270	3,206
Sun	1,989	2,673	1,765	1,502	809	782	1,309	1,733	2,494	3,453	4,719	5,754	5,916	6,007	6,298	6,462	6,724	6,901	6,526	5,595	5,396	4,877	4,124	2,939

2.4 - Existing Freeway Mainline Levels of Service (LOS)

In accordance with the policies established by Caltrans, the "Operational Analysis" method from HCM for freeway mainline segments was used to perform the Level of Service (LOS) analysis. The HCM operational method determines two key operating characteristics of freeway mainline segments: (1) the average passenger car speed, and (2) the traffic density in terms of passenger cars per mile per lane (pcpmpl). These two outputs are then converted into an LOS value for the basic freeway segment, ranging from excellent, nearly free-flow conditions at LOS A to heavily-congested, slow speed conditions at LOS F. The LOS definitions and the relationship between LOS and mainline segment traffic density are shown in ***Table 2***.

TABLE 2

Caltrans Level of Service (LOS) Criteria

Transition between LOS "C" and LOS "D" Criteria
(Reference Highway Capacity Manual)

BASIC FREEWAY SEGMENTS @ 65 mi/hr

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum v/c	Maximum Service Flow Rate (pc/hr/ln)
A	11	65.0	0.30	710
B	18	65.0	0.50	1170
C	26	64.6	0.71	1680
D	35	59.7	0.89	2090
E	45	52.2	1.00	2350

Caltrans' desired LOS range for freeway mainline segments is at the transition between LOS "C" and LOS "D" for State highway facilities. If a segment is forecasted to fall to LOS D under the project conditions, mitigation measures should be pursued. If the State highway facility is currently operating at less than the appropriate target LOS, the existing level of service should be maintained.

Table 3 presents the results of the existing freeway mainline level of service calculations during various peak times of the day and week. As shown in Table 3, the Northbound I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard is operating LOS C or better during all hours of the day and days of the week.

3.0 - Forecast Conditions

3.1 - Existing Plus Project Level of Service

Traffic forecasts were prepared for the NB I-5 mainline segment between Los Feliz Boulevard and Colorado Boulevard. The methodology for developing the "project condition" included a reduction in the number of available through lanes due to construction lane closures, and elimination of factors for right shoulder lateral clearance.

Based on the project team's estimation, the construction phase will require closure of the adjacent freeway shoulder, as well as one (1) through lane on the adjacent I-5 freeway mainline segment to allow for the delivery and loading/unloading of materials and equipment. To provide a conservative analysis, however, a total of two (2) through lanes were assumed for the lane closure and in evaluating potential project construction impacts, as shown in ***Figure 2***, below.

Caltrans District 7 (D7) provided Lane Requirements and Hours of Work charts for the subject freeway segment. Combined with the above assumptions, Caltrans' lane/hours charts were used to develop a "worst case" scenario for the various peak hours of the day, and days of the week. The resulting LOS calculations comparing Existing Year 2012 conditions, Existing Year 2012 conditions with the maximum permitted lane closures, and the Existing Year 2012 conditions with project-related lane closures, are shown below on ***Table 3***.

TABLE 3: Freeway Level of Service (LOS) With and Without Project

EXISTING CONDITIONS—YEAR 2012
Northbound I-5: North of Los Feliz Boulevard

Day(s) of Week	Hour[1]																							
	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7	8	9	10	11
Monday through Thursday	B*					A	C													C	C			B
Friday	B*					A	C													C		B		B
Saturday	B								B	B	C									C			B	
Sunday	B*									A		C	C							C		B		B

EXISTING + MAXIMUM PERMITTED LANE CLOSURES CONDITIONS[2]
Northbound I-5: North of Los Feliz Boulevard

Day(s) of Week	Hour[1]																							
	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7	8	9	10	11
Monday through Thursday	D*					A				C										D	D			D
Friday	D*					A				C										E		C		E
Saturday	E								C	C						C				D			D	
Sunday	D*									C		C					C			D		D		D

EXISTING + PROJECT CONSTRUCTION LANE CLOSURE CONDITIONS
Northbound I-5: North of Los Feliz Boulevard

Day(s) of Week	Hour[1]																							
	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7	8	9	10	11
Monday through Thursday	C					A															D			C
Friday	C					A																C		C
Saturday	C								C														C	
Sunday	C									C												D		C

Legend:

- Normal freeway operation
- Two adjacent NB through freeway lanes open (3 lanes closed)
- Three adjacent NB through freeway lanes open (2 lanes closed)
- Four adjacent NB through freeway lanes open (1 lane closed)
- Five NB through freeway lanes open (all lanes open—no closures permitted)
- No proposed lane closures for construction activities

[1] "M"=12:00 Midnight to 1:00AM; "N"=12:00 Noon to 1:00PM
[2] Per Caltrans D7 Lane Requirements and Hours of Work Charts for I-5 NB North of Los Feliz Blvd.
* Estimated LOS from preceding day traffic

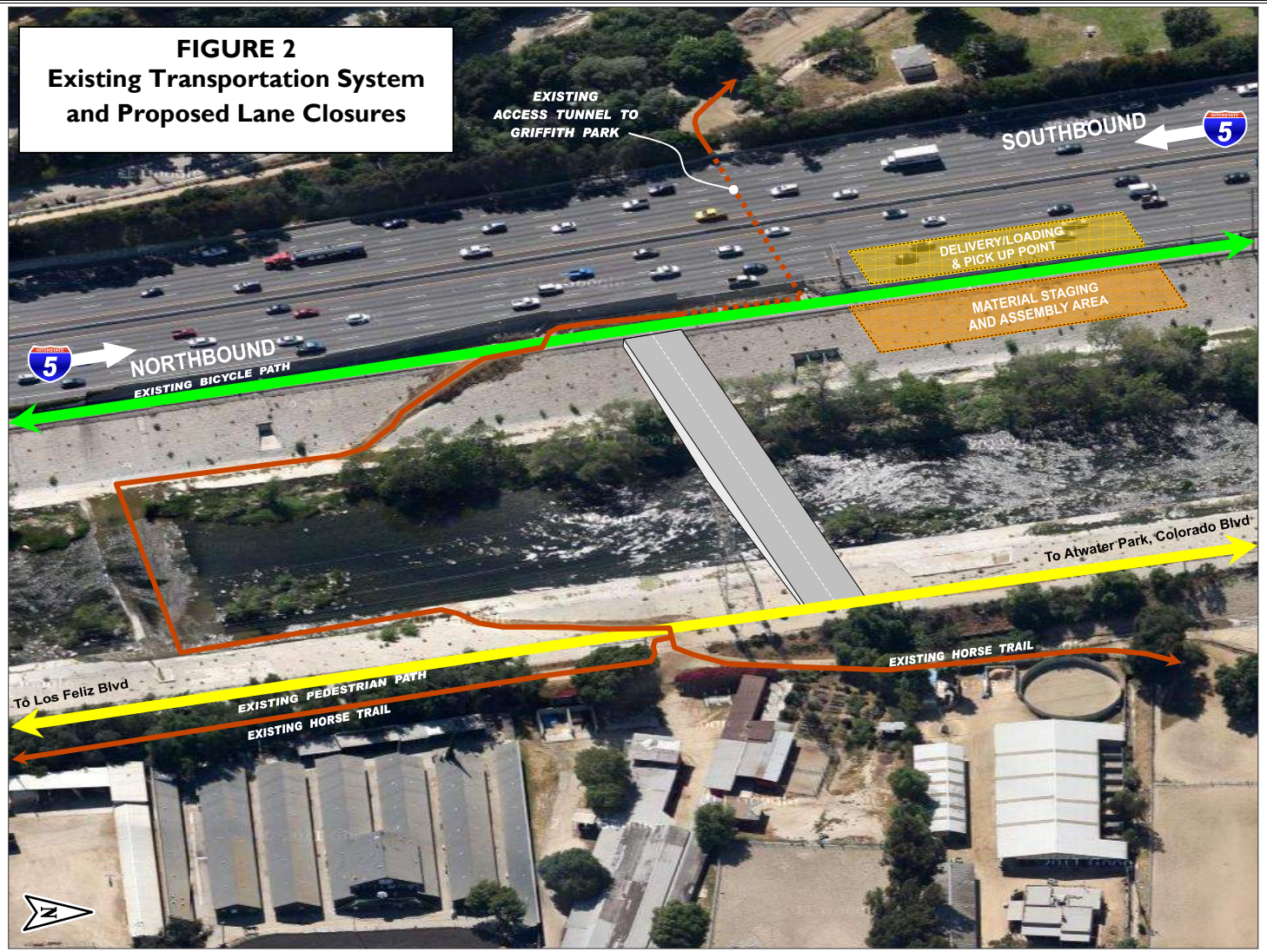


FIGURE 2
Existing Transportation System and Proposed Lane Closures

The LOS summary on Table 3 reveals that the existing Northbound I-5 Freeway segment north of Los Feliz Boulevard, when operating at the upper limit of Caltrans' permitted work hours and lane requirements, falls into the LOS D/E range during various hours each day. However, under the proposed two-lane closure project conditions, the freeway mainline segment would maintain an acceptable LOS "C" or better during all hours and days. The only exceptions occur when freeway mainline segment operations fall to LOS "D" during the 8:00PM-11:00PM period from Monday to Thursday, and during the 9:00PM-11:00PM period on Sunday. In these two cases, the Traffic Management Plan (TMP) should limit project construction activities to closure of only one (1) through lane and/or the only existing 12' paved shoulder, in order to retain a minimum mainline LOS of "C".

The Freeway Mainline Analysis Level of Service worksheets are provided in **Appendix A** of this technical memorandum.

4.0 - Construction Impacts

4.1 - Temporary Construction-Related Effects on Access and Circulation

Construction for this project is expected to start fall of 2012 and be completed in the fall of 2013. Under the proposed project condition, temporary construction activities would not result in any disruption to access or circulation as there will be no restriction to vehicular on- or off-ramp access between the highway and local street system. No permanent barriers to local communities will occur, and existing vehicular access points and circulation routes to and from the surrounding area would remain open.

Access to the nearby interchanges at Los Feliz Boulevard and Crystal Springs Dive (to the south) and Colorado Boulevard (to the north) would not be affected by the construction activities

associated with the proposed project. Construction activity would be temporary, and limited to localized, site-specific activities in the immediate vicinity of the proposed project along the subject portion of the River. The anticipated temporary effects would be primarily related to trucks and equipment on the roadside, and partial and/or complete lane closures on the adjacent I-5 freeway segment. Increased traffic from construction equipment and heavy trucks traveling to and from the project site in this area would be insignificant and, construction-related effects would be minimal.

Given the above conditions, no permanent adverse effects to local or regional traffic access or circulation are anticipated with implementation of the proposed project. Therefore, no avoidance, minimization, and/or mitigation measures are proposed to compensate for any offset or change in traffic access or circulation.

4.2 - Traffic Management Plan (TMP)

A Traffic Management Plan (TMP), a standard condition placed on all construction projects, is designed to minimize construction activity-related motorist delays, queuing, and accidents by the effective application of traditional traffic-handling practices and innovative approaches. The TMP will include measures to offset traffic congestion and maintain traffic flow throughout the alternative routing and surrounding area on the adjacent I-5 Freeway, and throughout the local north Atwater and Los Feliz neighborhoods within the project area. The preliminary TMP will include proposed Lane Closure Charts and Detour Plans as approved by Caltrans, and will be finalized by the time final designs are prepared. However, it is certain that a minimum of three (3) lanes would be kept open at all times in the northbound direction, and all five (5) lanes in the southbound direction.

The final TMP will include traffic mitigation strategies for the duration of construction, address lane closure requirements, and seek to inform the public and motorists. TMP strategies will include: project phasing, a detour plan(s), and provision of temporary lanes/shoulders. Traffic

management strategies will also include a multi-modal public awareness effort, traffic systems and signage, and traffic support and safety elements for re-routing existing bicycle, pedestrian and equestrian traffic around the construction area. The public awareness element will generally involve distribution of brochures, mailers, and/or media releases in cooperation with the City of Los Angeles and the local community, in order to educate and inform the public of the construction activities. Motorist information strategies would include message signage and a highway advisory radio (HAR) to alert motorists of road closures and/or detours. Static signage would be used for non-motorized path closures for the duration of the project.

4.3 - Pedestrian, Bicycle and Equestrian Traffic Impacts

The California Code of Regulations Streets and Highways Code Sections 890-894.2, the California Bicycle Transportation Act, discusses the importance of a non-motorized transportation system, establishes bikeway specifications and encourages local agency participation in developing improved bikeways. California Code of Regulations Streets and Highways Code Sections 894.6-894.8, the California Pedestrian Safety Act, encourages projects that address pedestrian safety.

By design, the North Atwater Multimodal Bridge Project should have beneficial traffic and transportation impacts and would not contribute to cumulative adverse effects. To improve the safety and accessibility of non-motorized traffic across the L.A. River, the designed bridge provides a cross section and deck width that sufficiently accommodates Class II bike traffic, pedestrians and equestrians in both directions. The proposed paved bicycle and pedestrian paths on each of the east and west riverbanks are equal to the widths of the existing paths approaching the construction area to provide a continuous multimodal facility.

The proposed project may cause disruptions in the existing non-motorized traffic along the L.A. River during the construction period, due to potential bikeway and pedestrian path closures and restricted local access to the River near the construction area. The closure of entry gates

into the L.A. River Greenway Trial (east side) and L.A. River Bike Path (west side) during the construction period would result in local street detours that may impact non-motorized users in the community who regularly travel along the L.A. River paths.

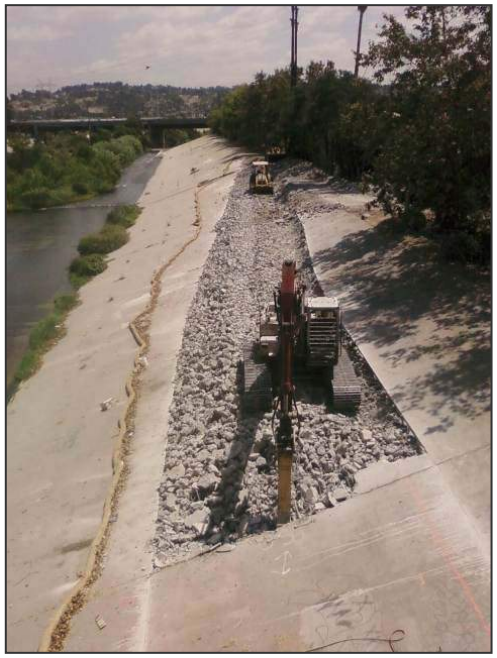
The proposed project would temporarily close the pedestrian and bicycle access points into the L.A. River at Los Feliz Boulevard (to the south), Colorado Boulevard (to the north), and at the existing access tunnel to Griffith Park under the I-5 Freeway. The closure would block pedestrian and equestrian access to North Atwater Park from the south, and restrict bicycle travel along the L.A. River between Colorado Boulevard and Los Feliz Boulevard for approximately 12 months during the construction of the bridge structure and rehabilitation of associated non-motorized components. The pedestrian, bicycle and equestrians paths on each side of the river would be reopened after construction is complete.

Temporary project impacts are defined as those that would occur during the construction of the proposed project. These temporary impacts would not occur prior to the construction effort and would no longer be evidenced upon completion and full operation of the proposed North Atwater Bridge Crossing. However, in order to minimize neighborhood disruption and local impacts to non-motorized traffic, the following measures are proposed:

- Place appropriate signage to inform pedestrians, bicyclists and equestrians of access around the construction area. Disabled access shall be maintained during construction where feasible.

- Notify local property owners, residences, and businesses on the east side of the river near the construction area of major construction activities (e.g., utility relocation/disruption, re-routing of delivery trucks, heavy equipment operation).

- Coordinate with Caltrans staff to provide advance notification of lane closures during construction periods, to be posted on Changeable Message Sign (CMS) boards on NB Interstate 5, where feasible.



Typical closure of non-motorized route during construction activities for the L.A. River Bike Path in 2010 near Hyperion Avenue

- Develop reasonable detour plans for non-motorized traffic as part of the proposed strategies in the TMP. Include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction area, and provide appropriate traffic systems and signage, traffic support and safety elements. Potential alternate routes include:
    - L.A. River Greenway Trail Detour: Close pedestrian gate and equestrian trail at Los Feliz Boulevard near Glenfeliz Boulevard. Close pedestrian gates on the south side of Colorado Street, and all non-motorized access points to the east side of the L.A. River near North Atwater Park. Provide detour route using existing pedestrian facilities on Brunswick Avenue between Colorado Boulevard and Los Feliz Boulevard.
    - L.A. River Bike Path Detour: At Los Feliz Boulevard, close access to the bikeway entrance on the north side of the street, and close overcrossing access on the south side of the street. North of SR-134, close the bicycle path at Riverside Drive. Provide detour route between Riverside Drive and Los Feliz Boulevard using the existing Griffith Park Loop Bike Trail via Zoo Drive and Crystal Springs Drive, west of the I-5.

Typical Detour Signs for Bike Path Closure along L.A. River during Construction Period

- With the implementation of the TMP, potential temporary direct or indirect traffic and transportation impacts to the non-motorized public are considered less than significant. The proposed project (no alternatives) would have a beneficial permanent direct impact on pedestrian, bicycle and equestrian traffic within the project area; however, existing non-motorized traffic using the L.A. River between Colorado Boulevard and Los Feliz Boulevard may experience longer travel times due to re-routing of these paths through local streets and around the construction zone. With the addition of the above project features, however, these impacts would be considered less than significant.

4.4 - Permits

It is anticipated that a Caltrans encroachment permit shall be required due to the necessary temporary use of Caltrans' operational highway right-of-way for the purposes of delivering and loading/unloading of truck loads and construction materials during various times over the construction period. The encroachment permit, along with accompanying project plans, will be submitted in concurrence with the City of Los Angeles, and approved by Caltrans D7, Division of Engineering Services (DES). A sample encroachment permit is provided in ***Appendix B***. The

construction effort will also likely use a portion of this area for temporary staging purposes, although the primary location for construction staging and parking activities will be performed outside of Caltrans right-of-way and within the boundaries of the River (e.g., portions of the existing bike path).

Due to the size and non-divisible nature of the bridge components which will be prefabricated off-site and transported to the project site, one or more Caltrans transportation permits will also be completed and submitted for approval. Tractor trailer combinations and/or body types have not been specified at this time; however, the applicant will comply with Caltrans Headquarters' (HQ) special processing requirements for approval of special hauling equipment which exceed the Department's standard weight classification methods. In addition, a variance permit may be required for truck loads exceeding maximum 15' width, 17' height, and 135' length dimensions. The completed transportation permit will also include relevant documentation of the following travel details for each of the specified trips:

- Written route surveys for any load heights equal to or greater than 17'-0";
- Origin/destination and proposed route(s);
- Proposed fuel stops and turn outs;
- Obstacles, their owners (e.g., overhead CATV wires, telephone/utility wires, etc.) and proposed avoidance measures;
- Critical turns, approximate speeds, and hauling times;
- Traffic control plans;
- Pilot car requirements; and
- Any additional required city/county permits. If a pilot car is required, then travel would be permitted before sunrise and after sunset Monday through Friday, with additional travel restrictions for the L.A. area (i.e., "no movement" curfew between 6-9AM and 3-6PM). However, night and weekend travel could also be requested for approval from Caltrans.

APPENDIX A

HCM Freeway Mainline Analysis

Level of Service (LOS) Worksheets

APPENDIX B

Sample Project Caltrans Permits: Encroachment (Highway ROW) and Transportation Permits

BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 001	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	5am - 6am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	1,743	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

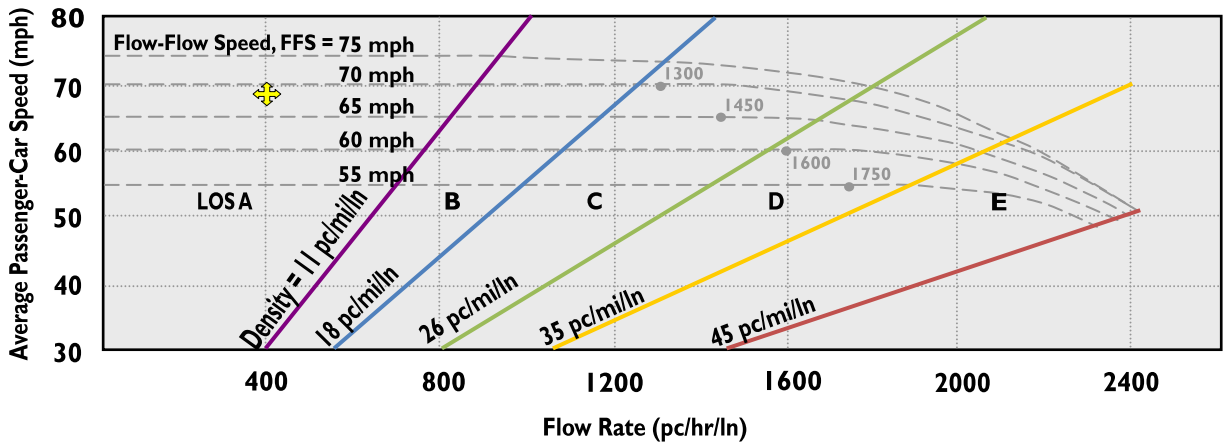
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 402 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 5.91 pc/mi/ln

LOS: **A**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:	PM:	From/To:	Peak Time Period:	
General Info:	# 002	I-5 NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	7,107	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

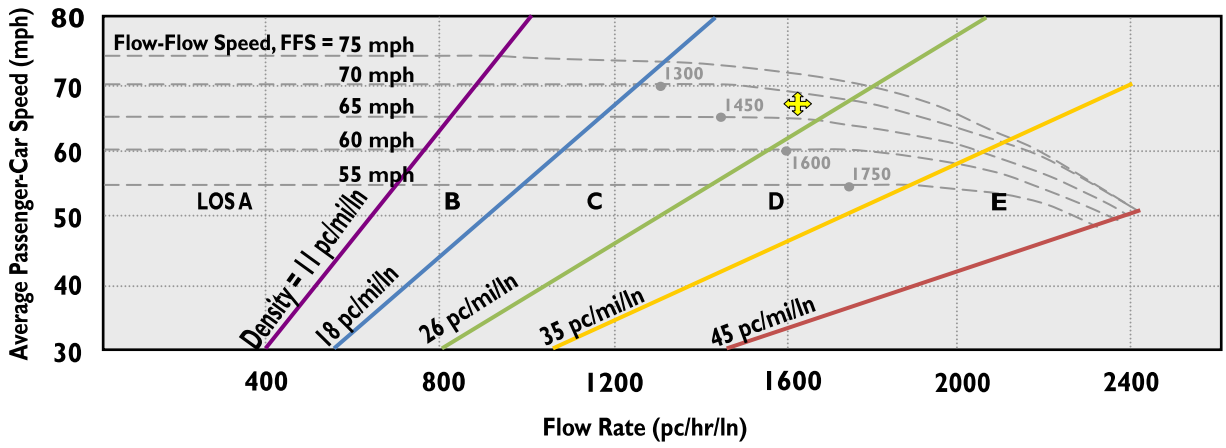
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}640 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 24.09 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 003	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,592	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

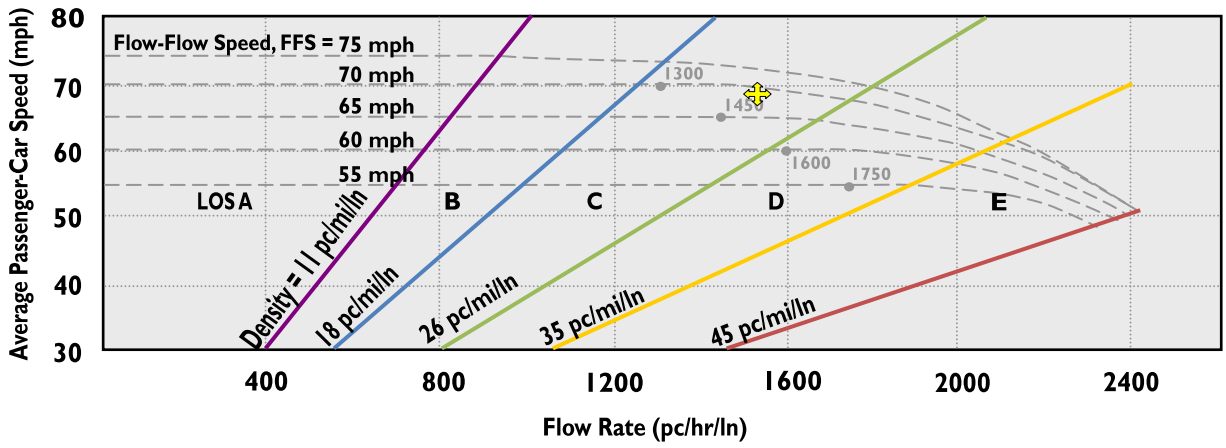
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}521 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 22.34 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 004	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	8pm - 9pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,565	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

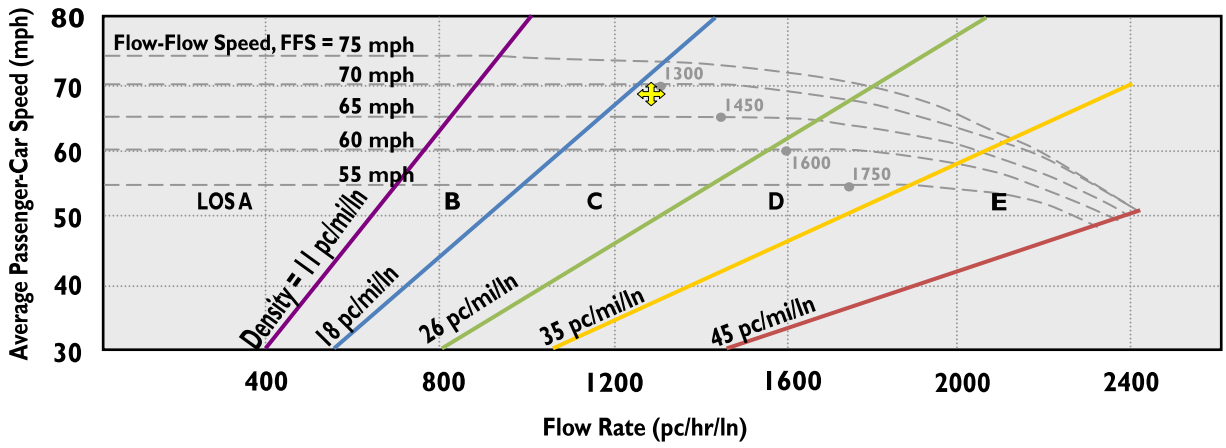
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}284 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 18.86 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 005	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,372	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

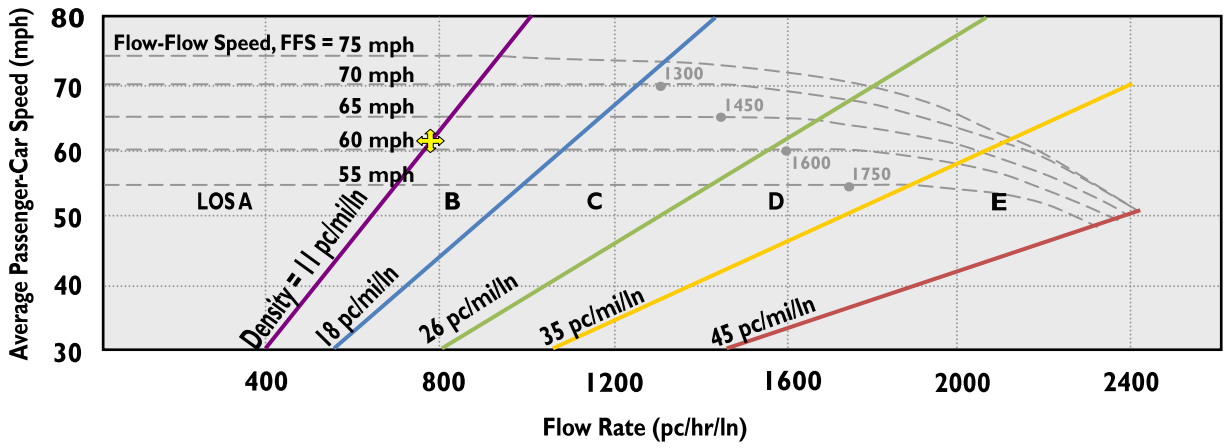
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 778 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 11.43 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 006	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	5am - 6am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	1,741	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

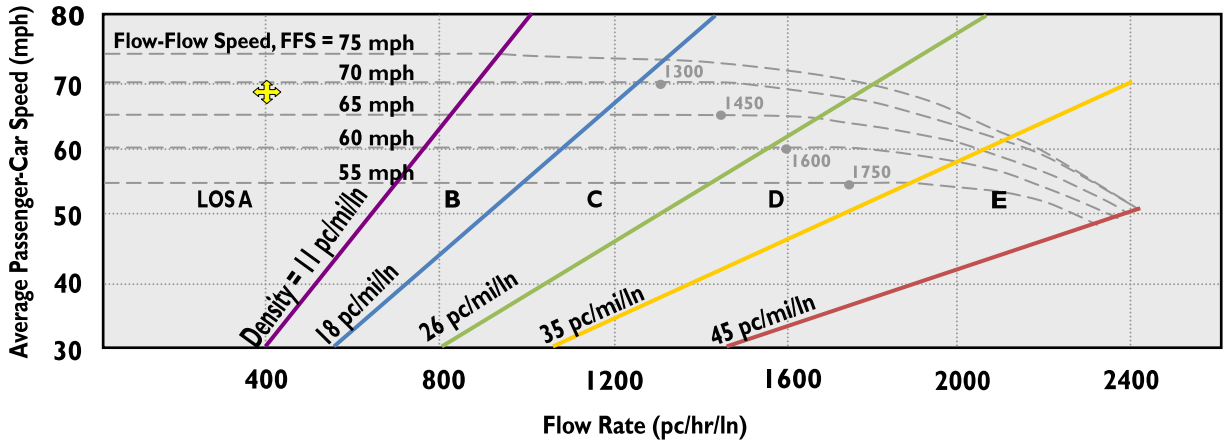
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 402 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 5.90 pc/mi/ln

LOS: **A**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 007	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,826	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

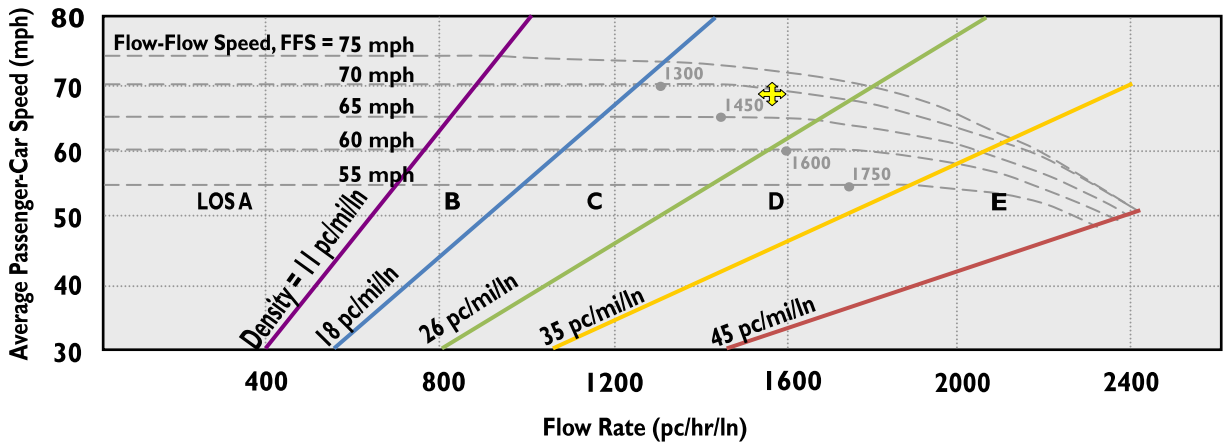
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}575 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 23.13 pc/mi/ln

LOS: **C**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 008	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,511	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

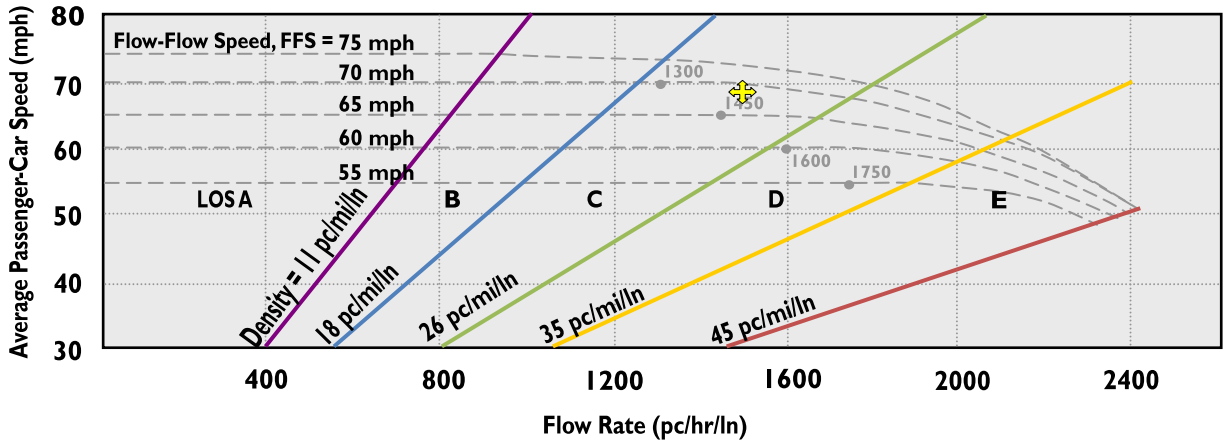
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}503 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 22.07 pc/mi/ln

LOS: **C**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 009	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	9pm - 10pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,706	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

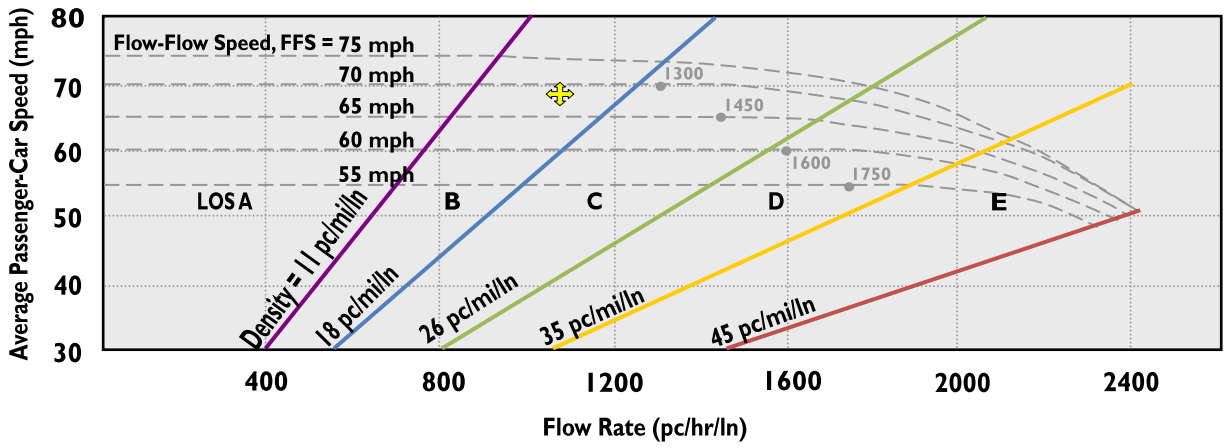
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}086 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 15.95 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 010	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,107	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

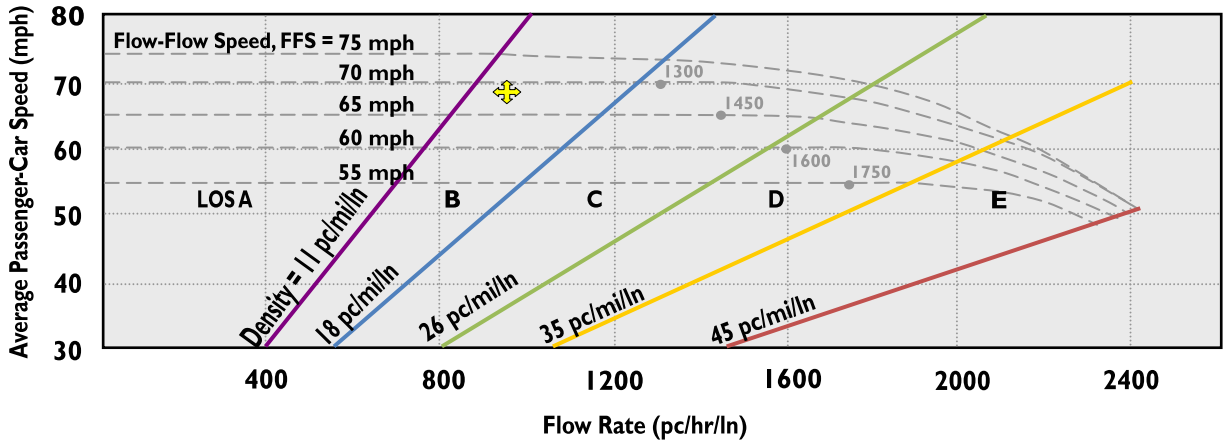
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 948 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 13.92 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 011	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	8am - 9am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,046	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

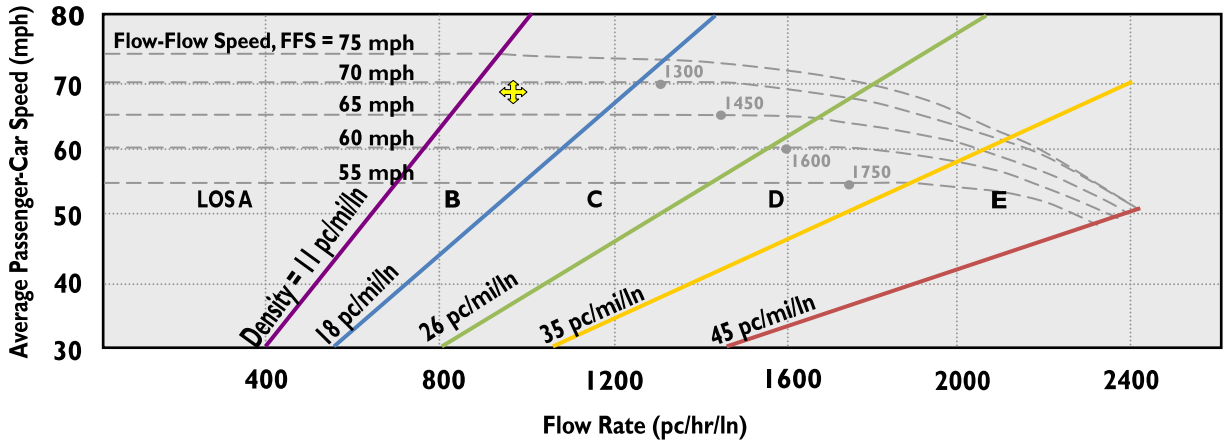
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 983 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 14.43 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 012	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,903	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

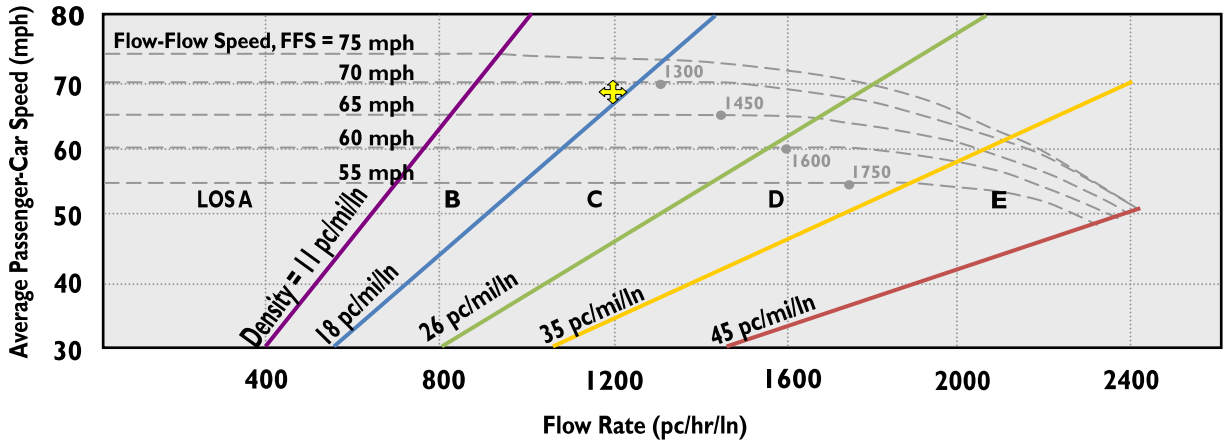
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}191 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 17.49 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 013	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	3pm - 4pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,630	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

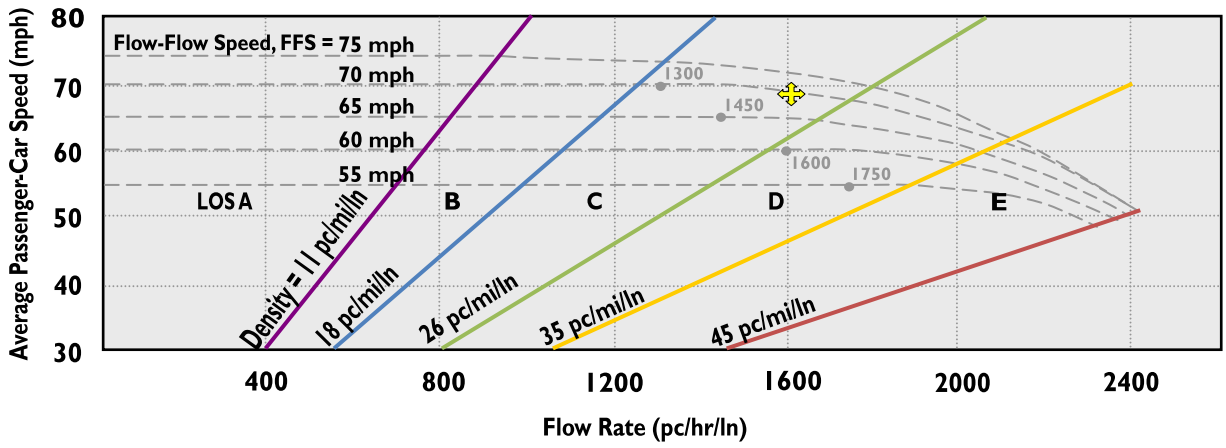
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}611 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 23.65 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 014	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,896	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

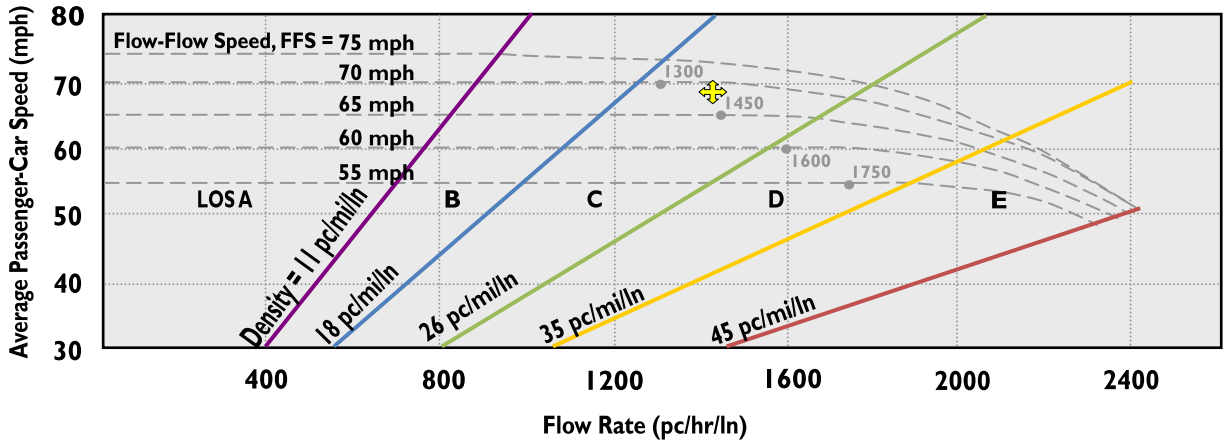
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}432 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 21.03 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 015	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	10pm - 11pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,915	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

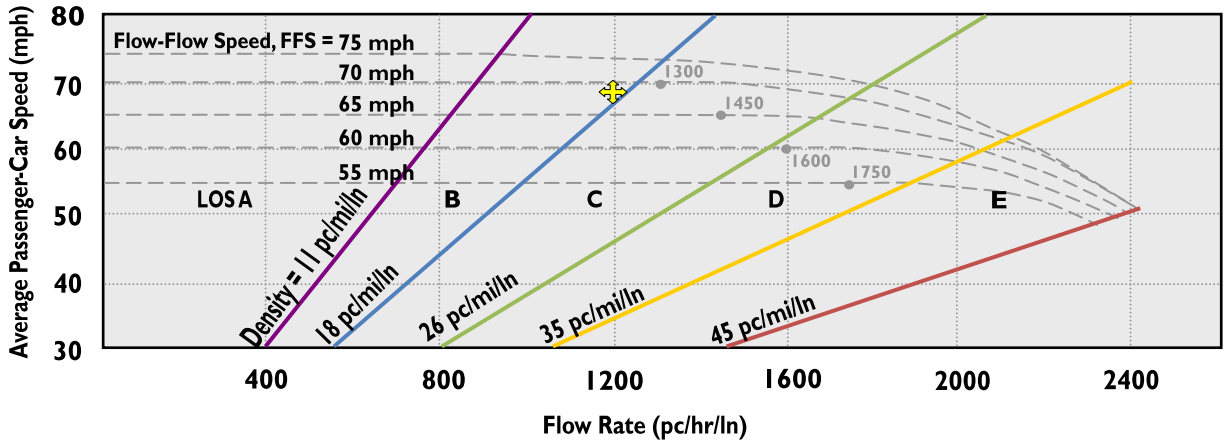
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}194 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 17.53 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 016	I-6	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	Mid - 7am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,753	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

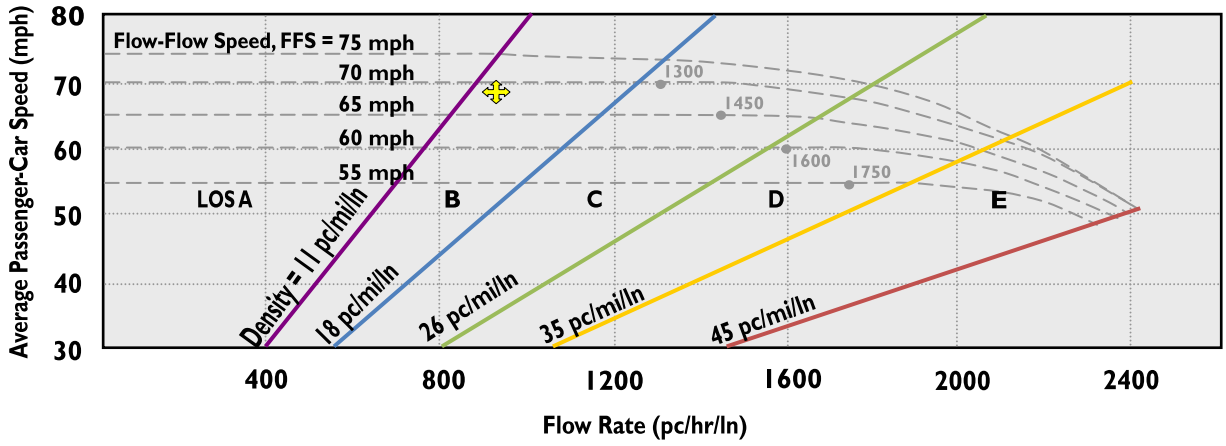
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 912 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 13.39 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 017	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,068	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

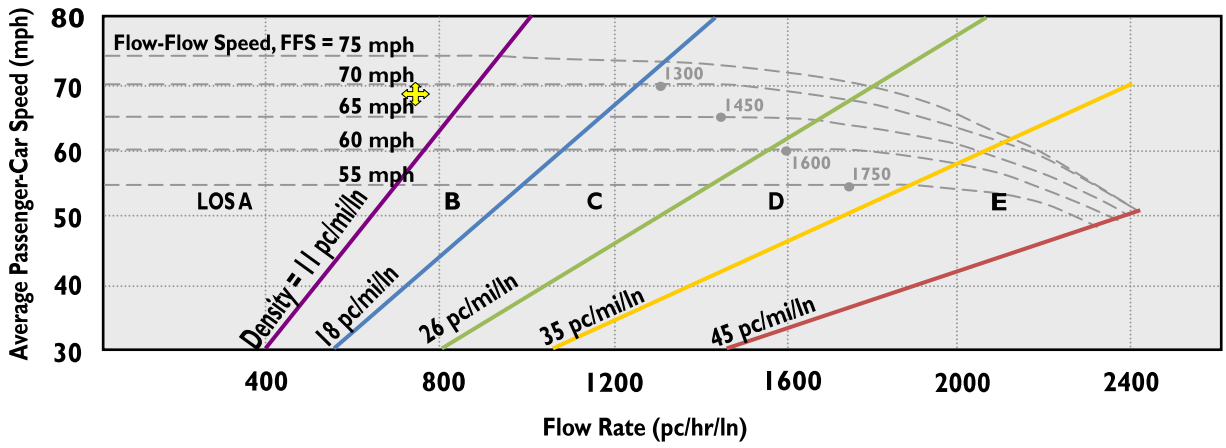
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 745 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 10.94 pc/mi/ln

LOS: **A**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 018	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	11am - Noon

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,599	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

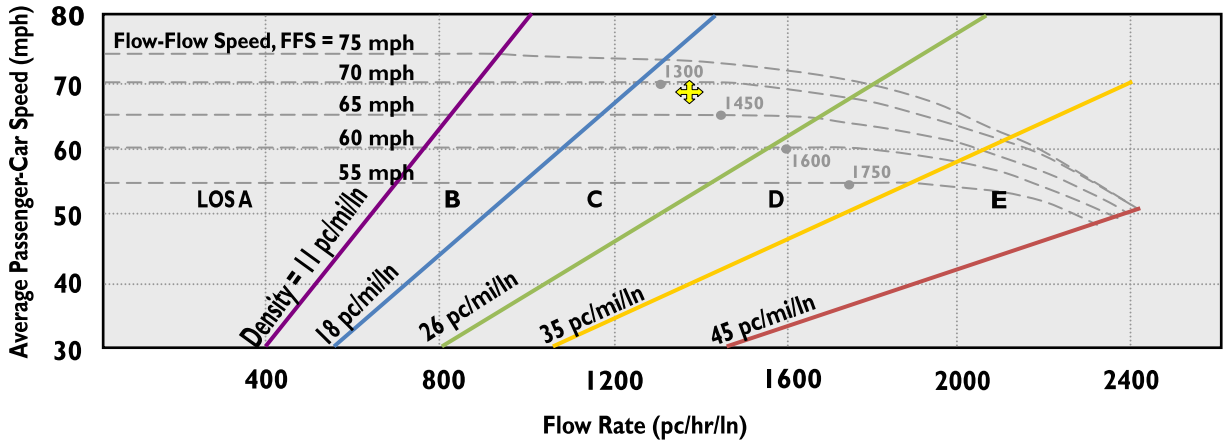
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}360 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 19.97 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 019	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	4pm - 5pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,486	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

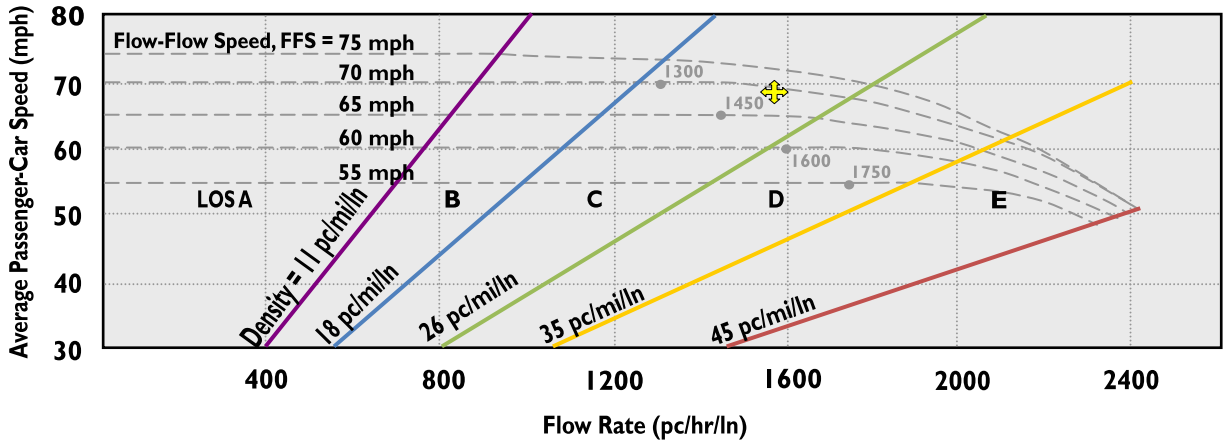
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}576 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 23.14 pc/mi/ln

LOS: **C**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 020	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,902	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

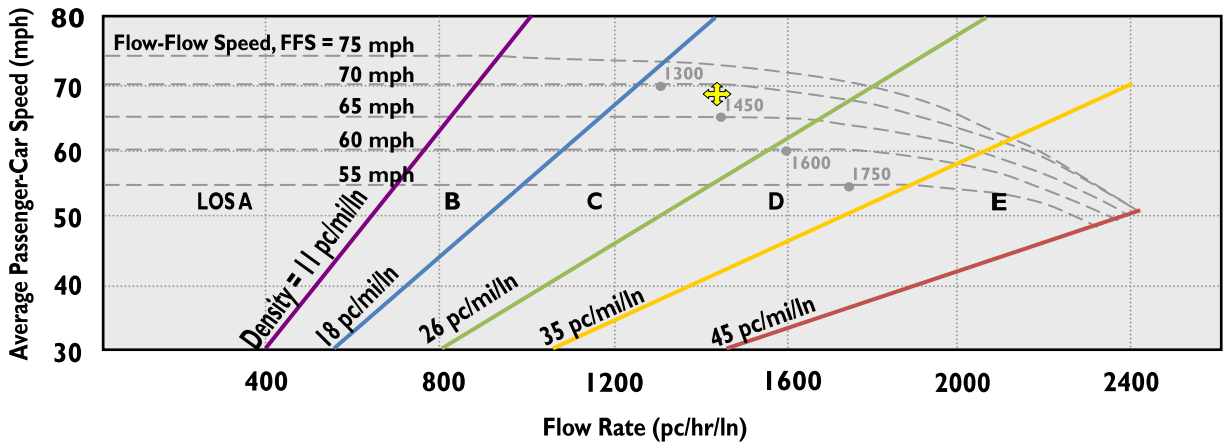
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}434 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 21.05 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 021	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	9pm - 10pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,039	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

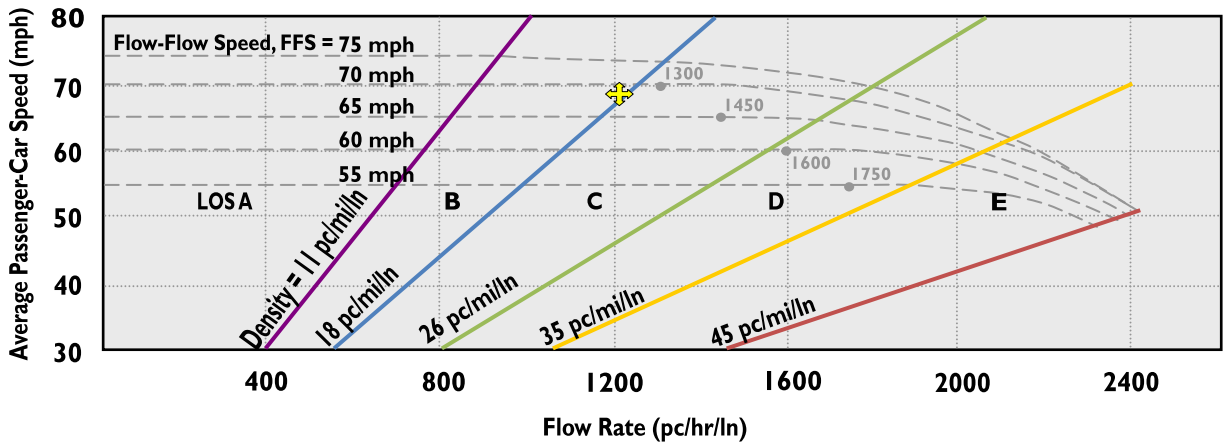
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}224 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 17.98 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 022	I-5	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	11pm - 9am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,415	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.00	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	68.1	mph

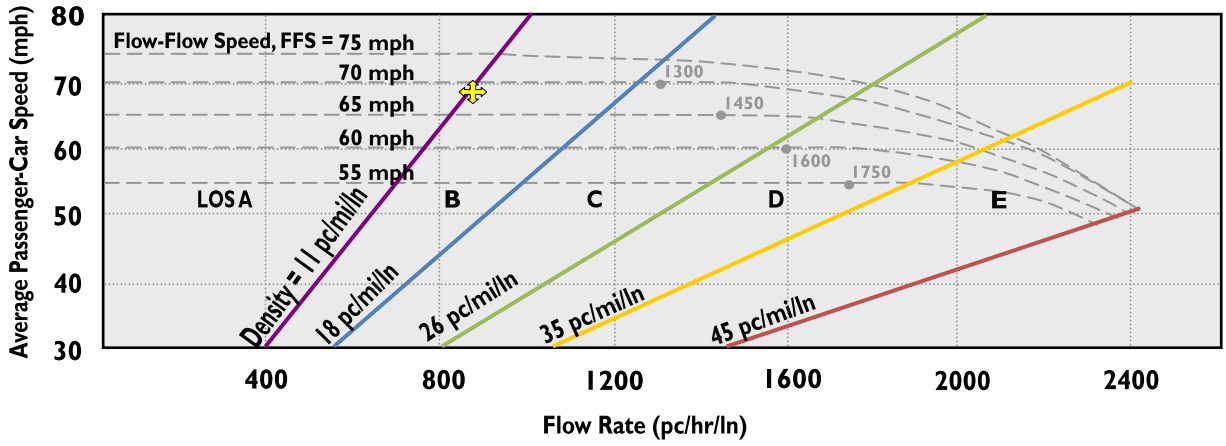
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 830 \text{ pc/hr/ln}$$

S = 68.1 mph

D = 12.18 pc/mi/ln

LOS: B



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 001	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	5am - 6am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	1,743	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

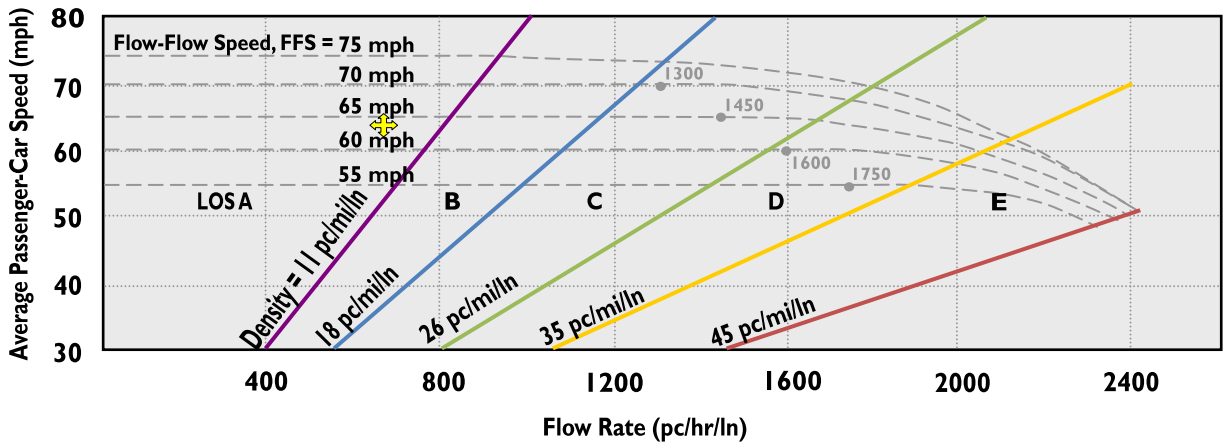
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 670 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 10.49 pc/mi/ln

LOS: **A**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 002	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	7,107	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.60	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mph

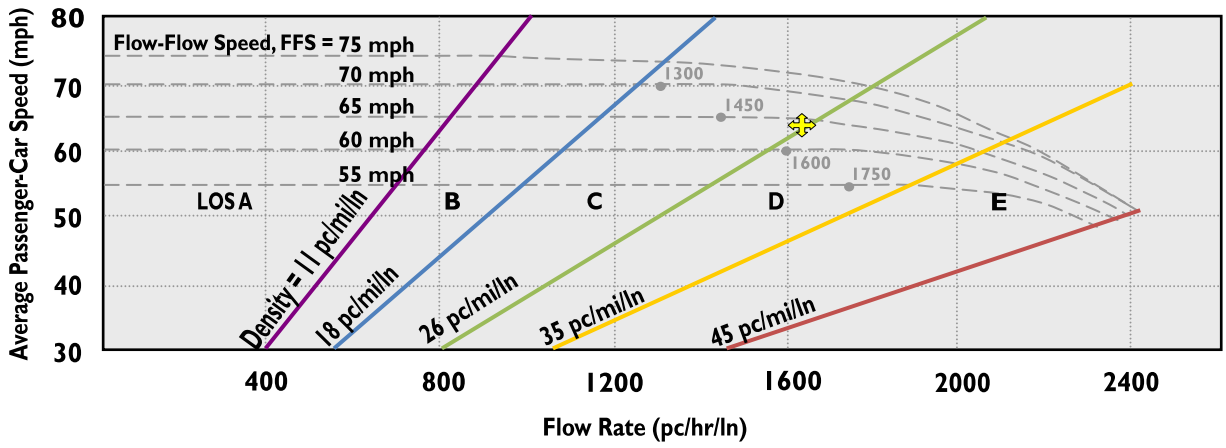
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}640 \text{ pc/hr/ln}$$

S = 67.5 mph

D = 24.30 pc/mi/ln

LOS: **C**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 003	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,592	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

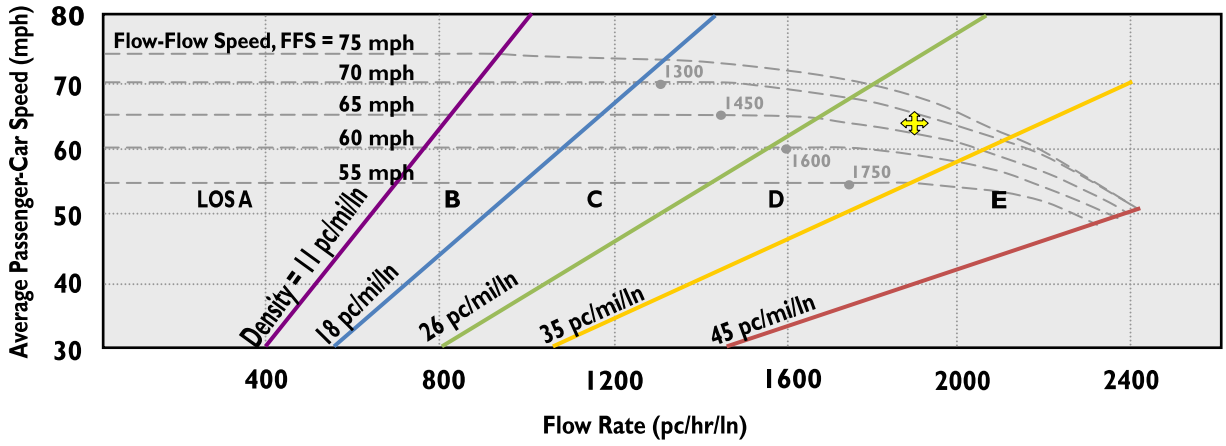
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}902 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 28.68 pc/mi/ln

LOS: **D**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 004	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	8pm - 9pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,565	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

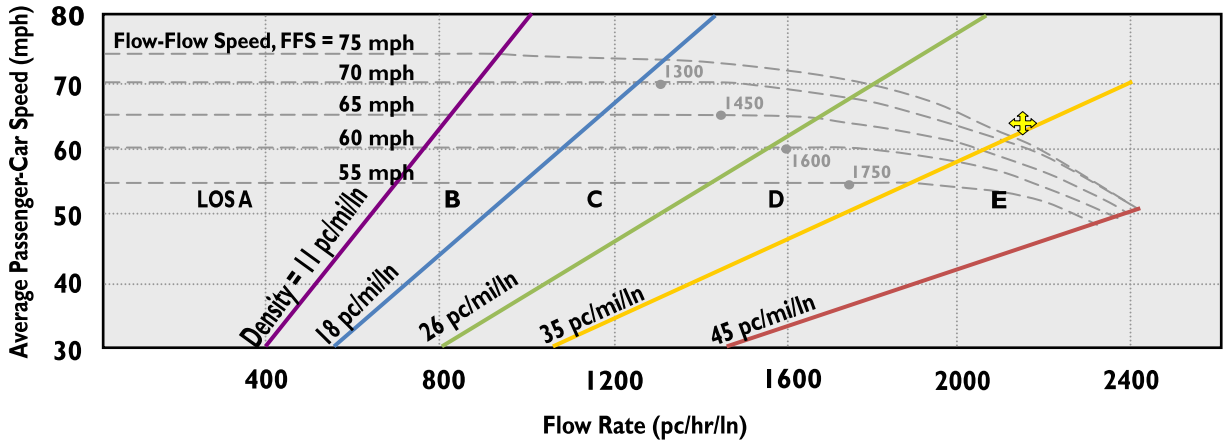
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}141 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 33.50 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 005	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,372	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	2	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	3.60	mph
f_{ID}:	1.3	mph
f_N:	3.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	61.5	mph

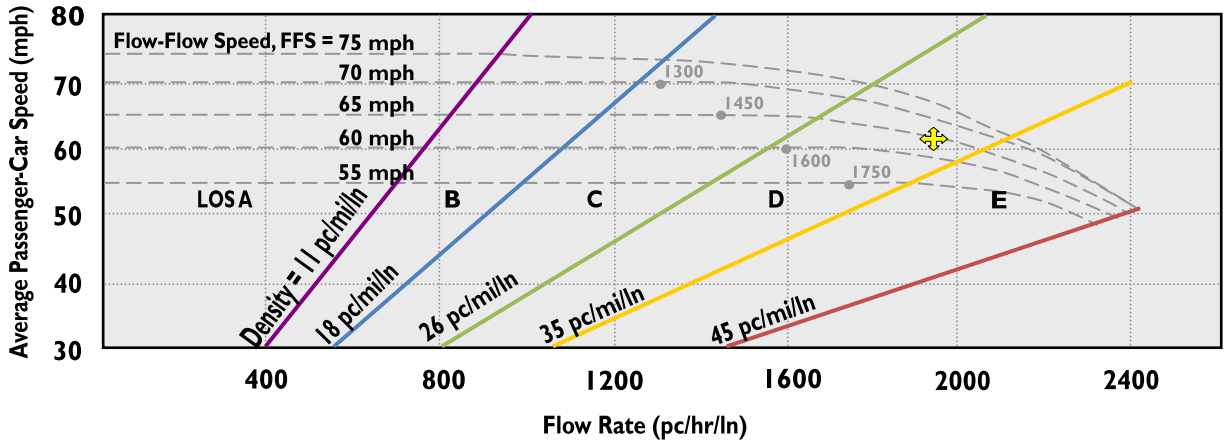
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}946 \text{ pc/hr/ln}$$

S = 61.5 mph

D = 31.64 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 006	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	5am - 6am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	1,741	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

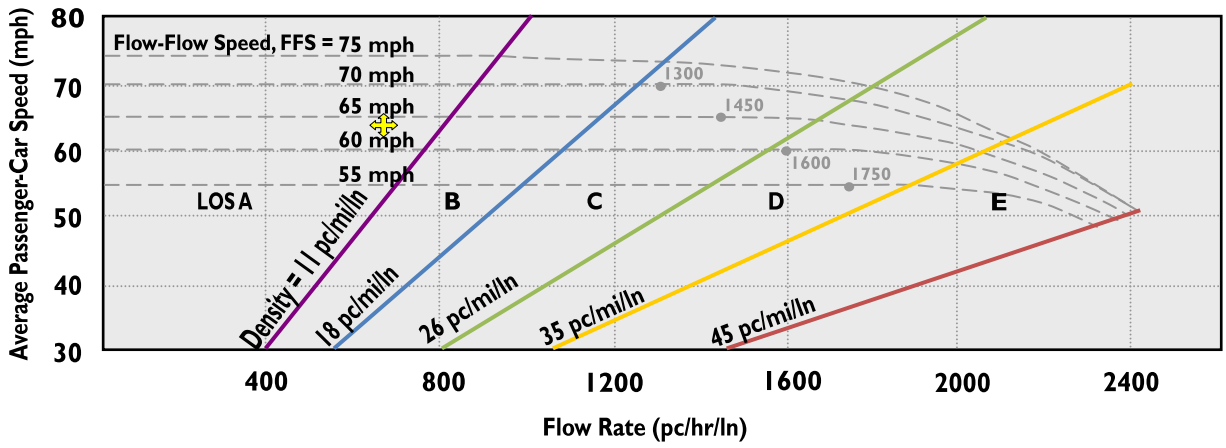
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 670 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 10.48 pc/mi/ln

LOS: **A**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 007	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,826	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.60	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mph

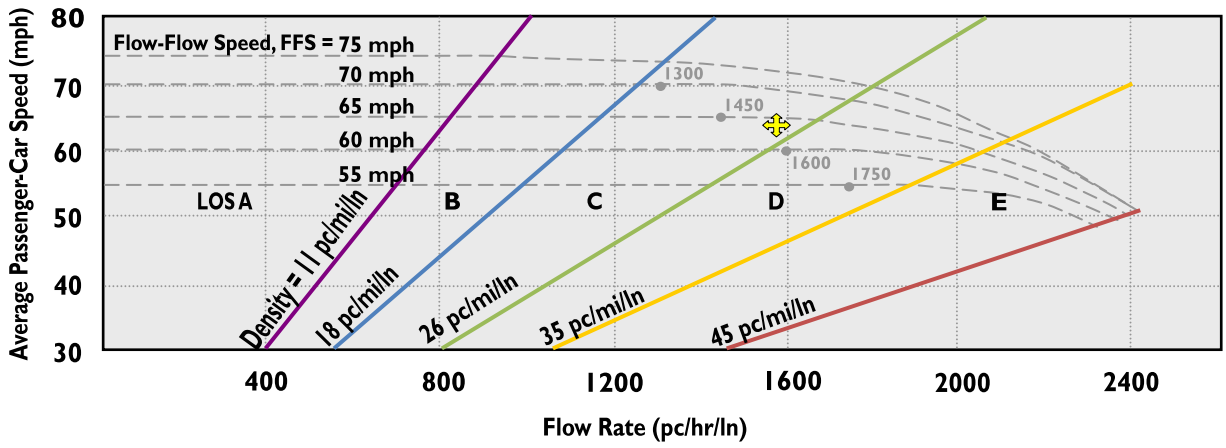
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}575 \text{ pc/hr/ln}$$

S = 67.5 mph

D = 23.34 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 008	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,511	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

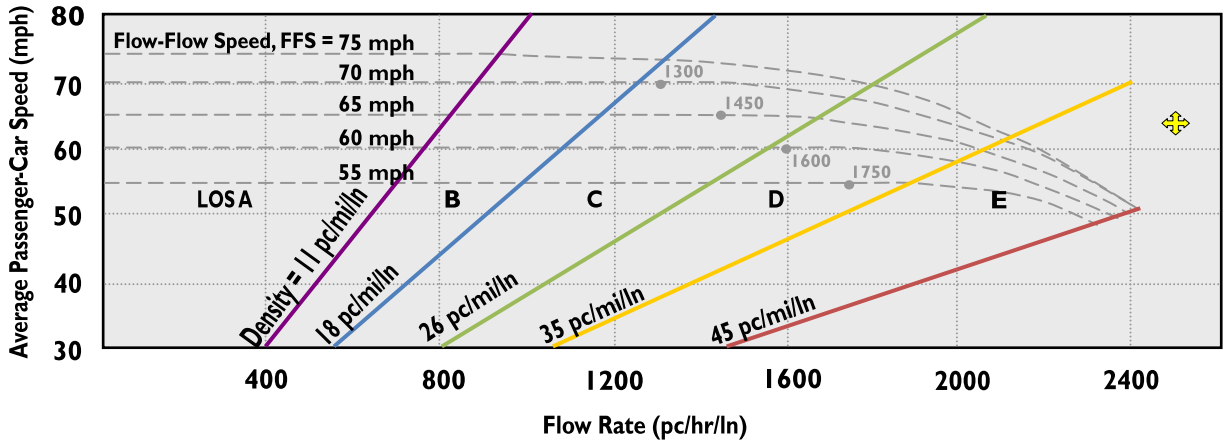
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}504 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 39.19 pc/mi/ln

LOS: E



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 009	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	9pm - 10pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,706	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

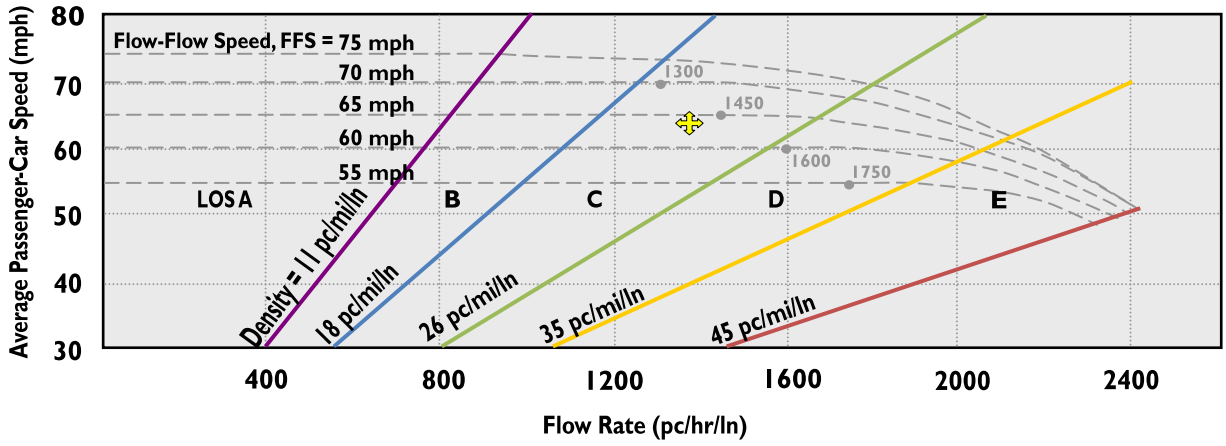
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}358 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 20.48 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 010	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,107	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	2	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	3.60	mph
f_{ID}:	1.3	mph
f_N:	3.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	61.5	mph

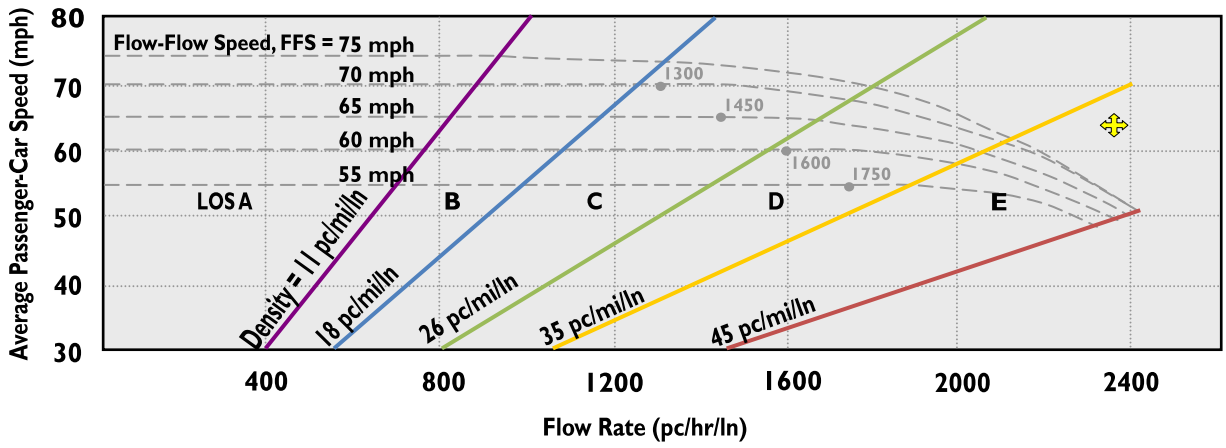
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}370 \text{ pc/hr/ln}$$

S = 61.5 mph

D = 38.53 pc/mi/ln

LOS: E



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 011	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	8am - 9am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,046	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

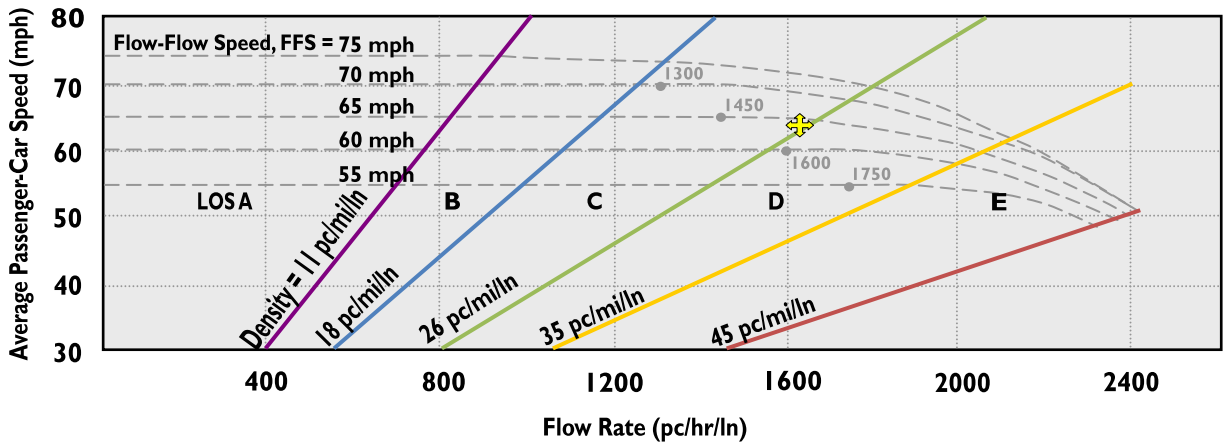
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}638 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 25.64 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 012	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,903	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

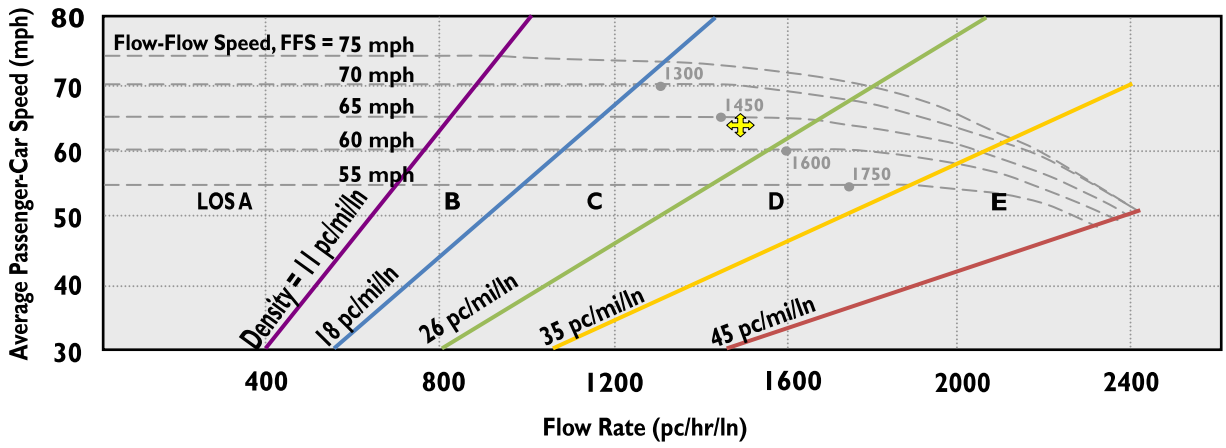
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}489 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 22.46 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 013	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	3pm - 4pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,630	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.60	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mph

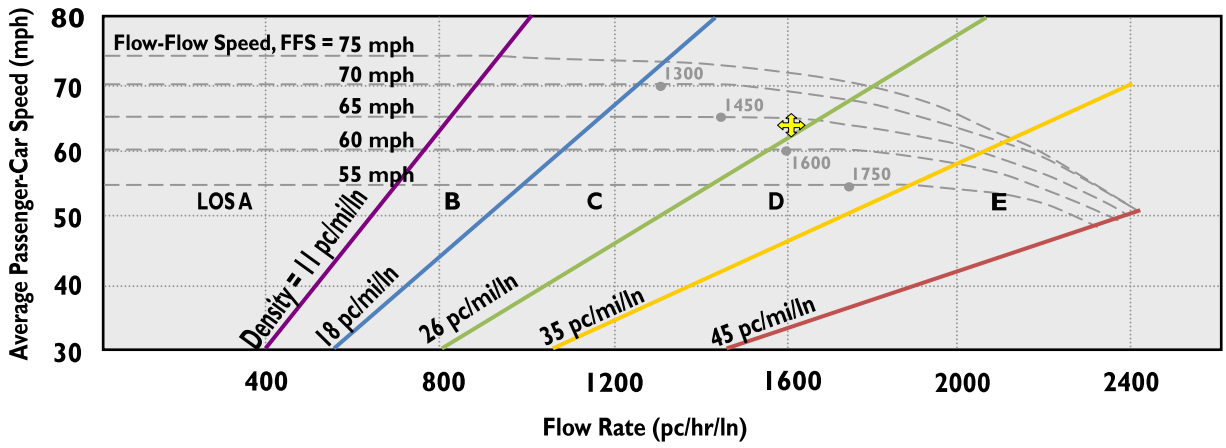
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}611 \text{ pc/hr/ln}$$

S = 67.5 mph

D = 23.86 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 014	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,896	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

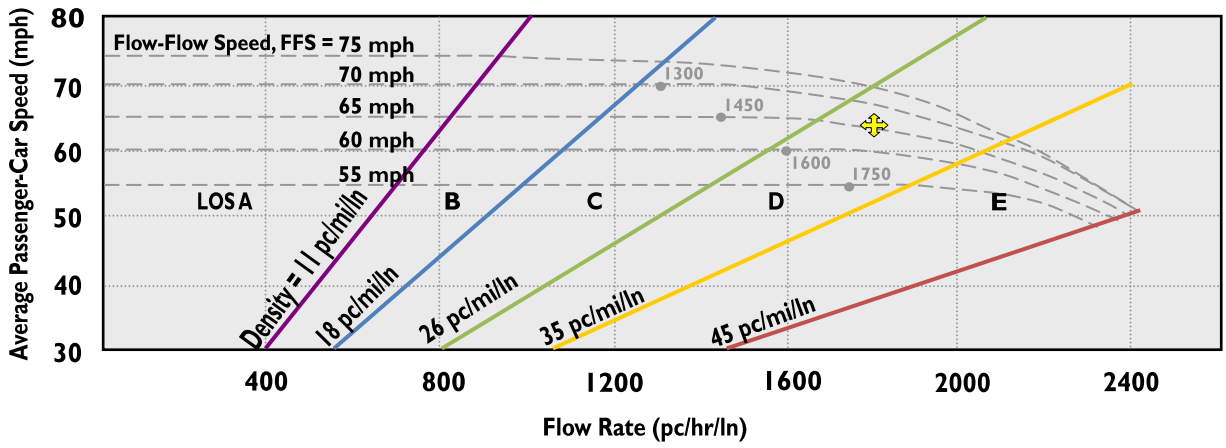
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}790 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 27.01 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 015	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	10pm - 11pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,915	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

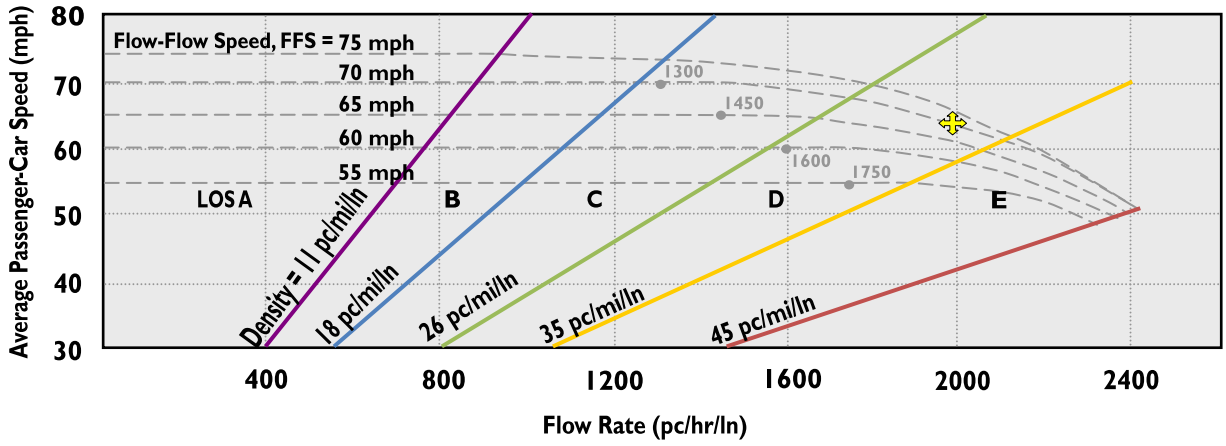
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}990 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 31.14 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 016	I-6	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	Mid - 7am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,753	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	2	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	3.60	mph
f_{ID}:	1.3	mph
f_N:	3.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	61.5	mph

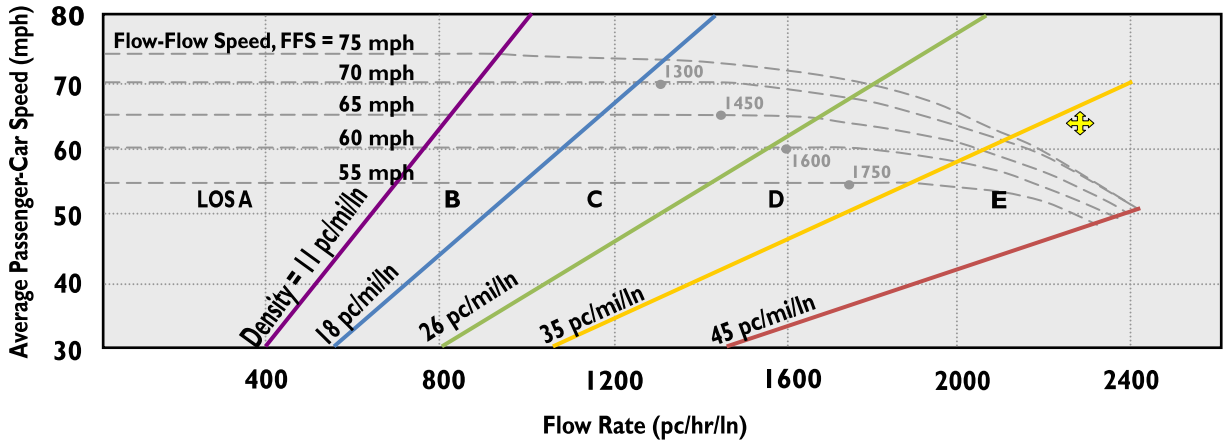
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}279 \text{ pc/hr/ln}$$

S = 61.5 mph

D = 37.06 pc/mi/ln

LOS: E



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 017	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	9am - 10am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,068	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

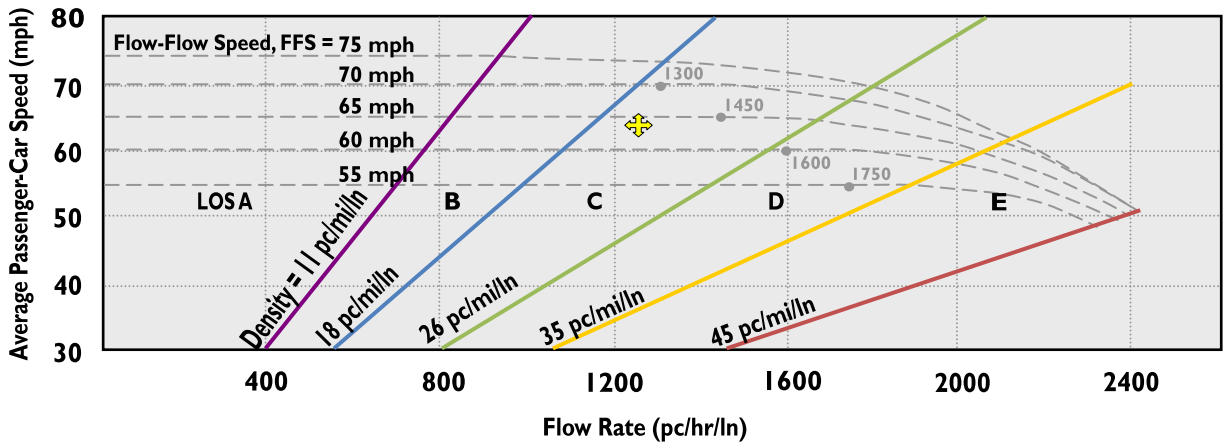
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}242 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 19.44 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 018	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	11am - Noon

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,599	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

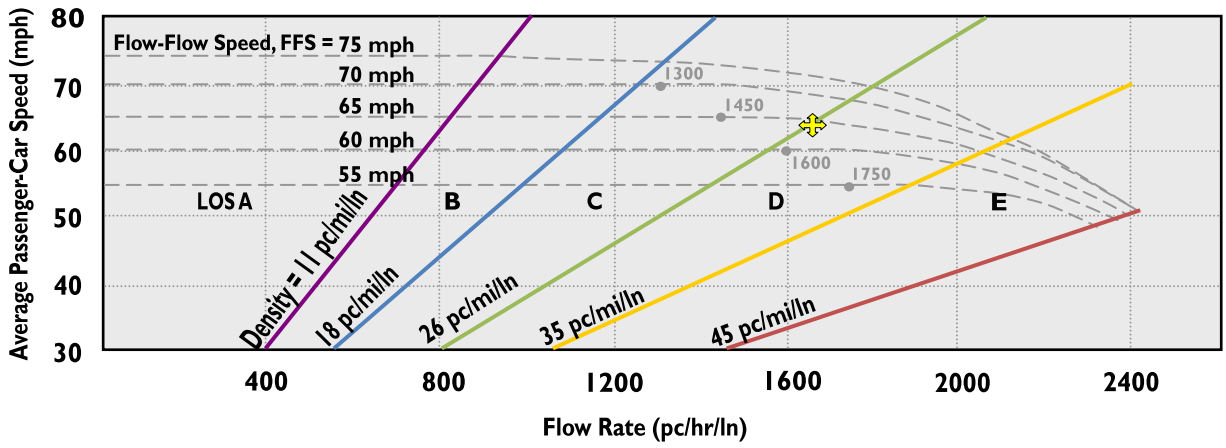
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}700 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 25.64 pc/mi/ln

LOS: C



MINAGAR & ASSOCIATES, INC.

North Atwater Multi-Modal (pedestrian, bicycle, equestrian) Bridge Project:
Traffic Impact Study for Temporary Lane Closures on NB I-5 Freeway
Plotted: 8/6/2012

BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 019	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	4pm - 5pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	6,486	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	5	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	0.60	mph
f_{ID}:	1.3	mph
f_N:	0.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mph

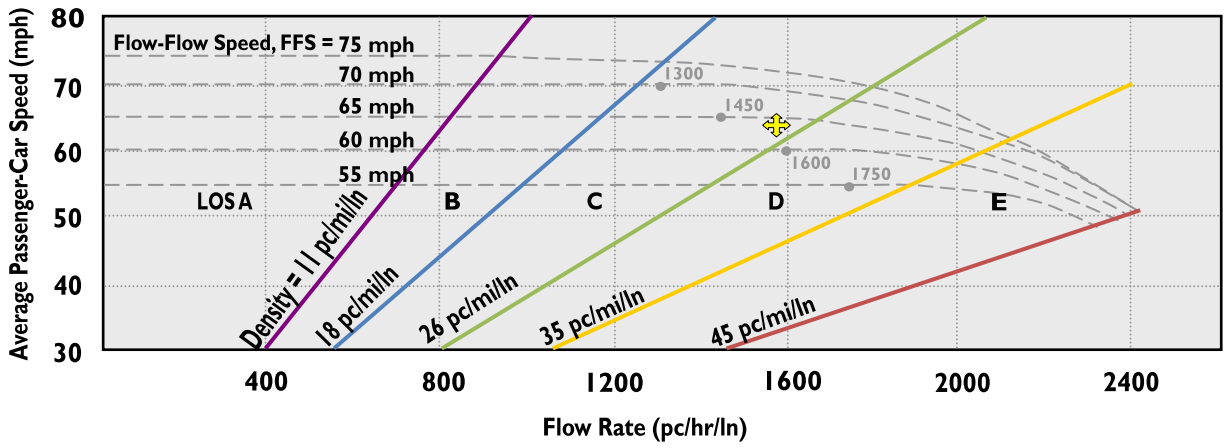
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}576 \text{ pc/hr/ln}$$

S = 67.5 mph

D = 23.34 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 020	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	7pm - 8pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,902	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	4	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	1.20	mph
f_{ID}:	1.3	mph
f_N:	1.20	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	66.3	mph

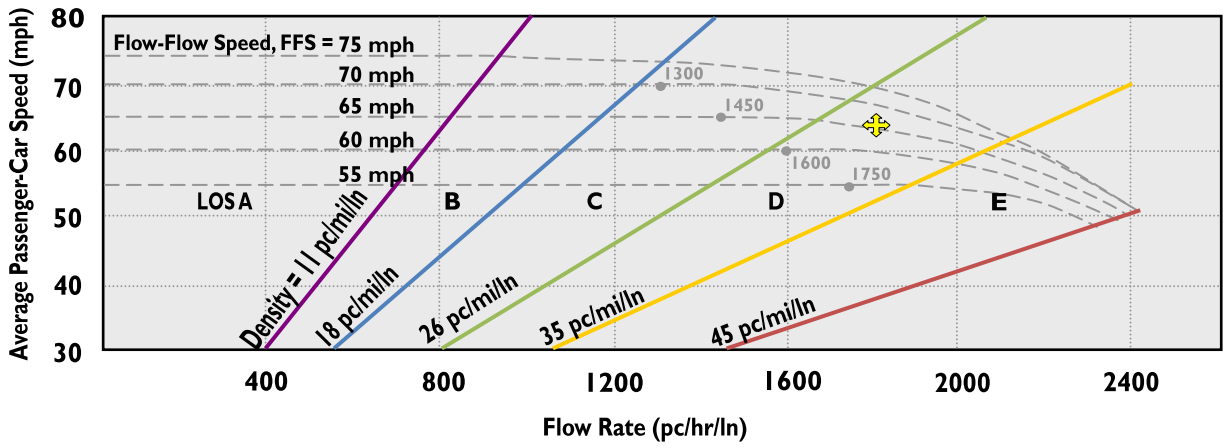
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}792 \text{ pc/hr/ln}$$

S = 66.3 mph

D = 27.03 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 021	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	9pm - 10pm

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	5,039	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

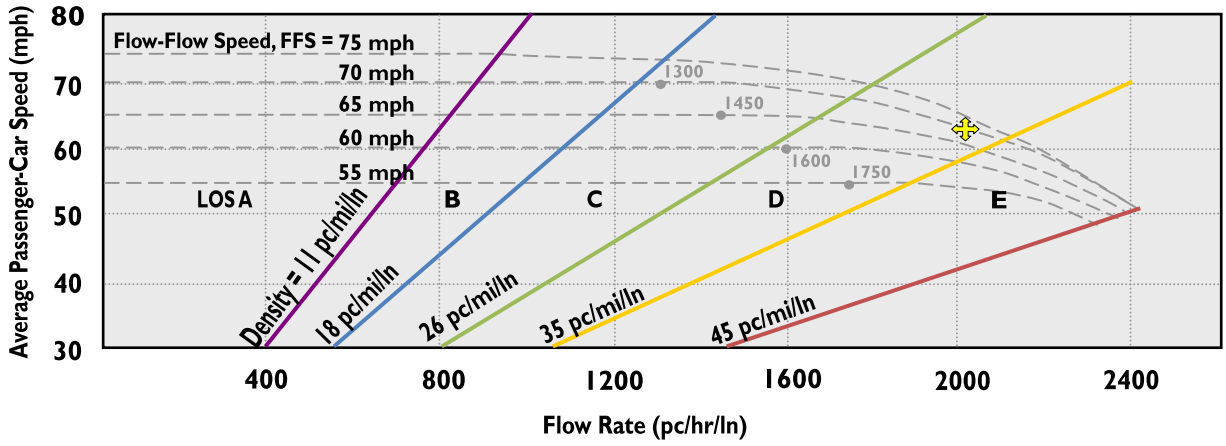
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}040 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 31.93 pc/mi/ln

LOS: **D**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 022	I-5	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	11pm - 9am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,415	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	2	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	3.60	mph
f_{ID}:	1.3	mph
f_N:	3.60	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	61.5	mph

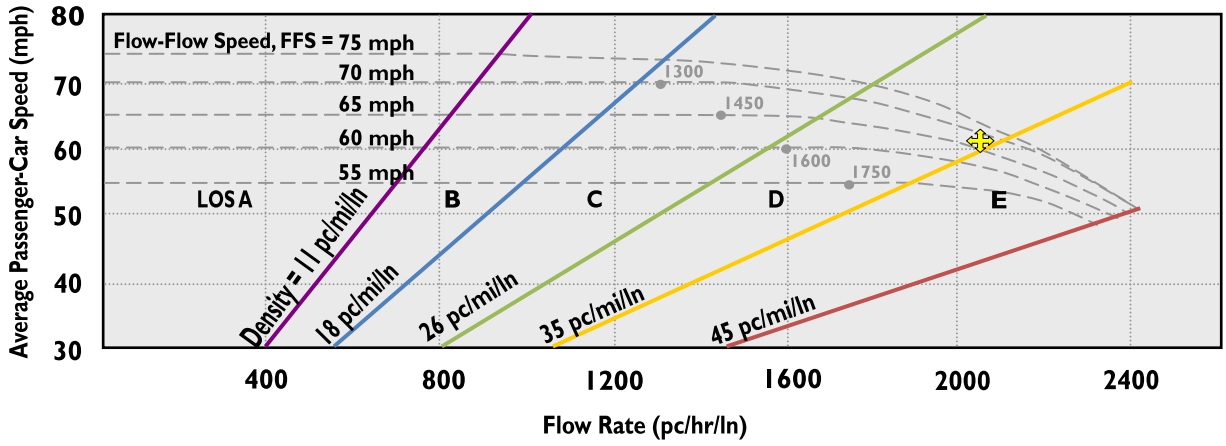
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 2{,}074 \text{ pc/hr/ln}$$

S = 61.5 mph

D = 33.72 pc/mi/ln

LOS: D



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 005	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Mon-Thu	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,372	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

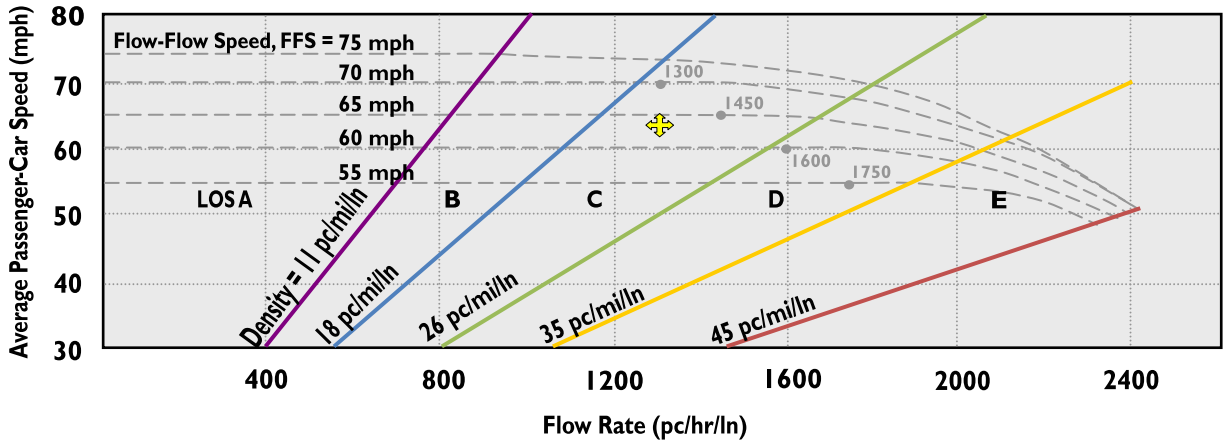
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}297 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 20.30 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 010	I-5	NB	24.54	Loz Feliz Blvd. / Colorado Blvd.	Fri	11pm - 5am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	4,107	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[x] Commuter/Weekday		Grade:		
	[ ] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 1.00 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

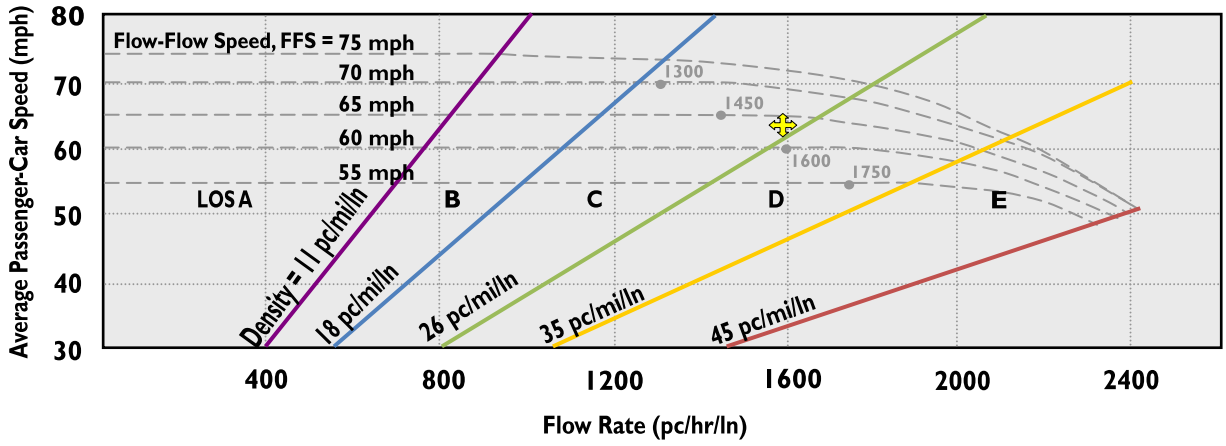
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}580 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 24.72 pc/mi/ln

LOS: **C**



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 016	I-6	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sat	Mid - 7am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,753	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level [ ] Rolling [ ] Mountainous		
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length:	- mi	Up/Down - %

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

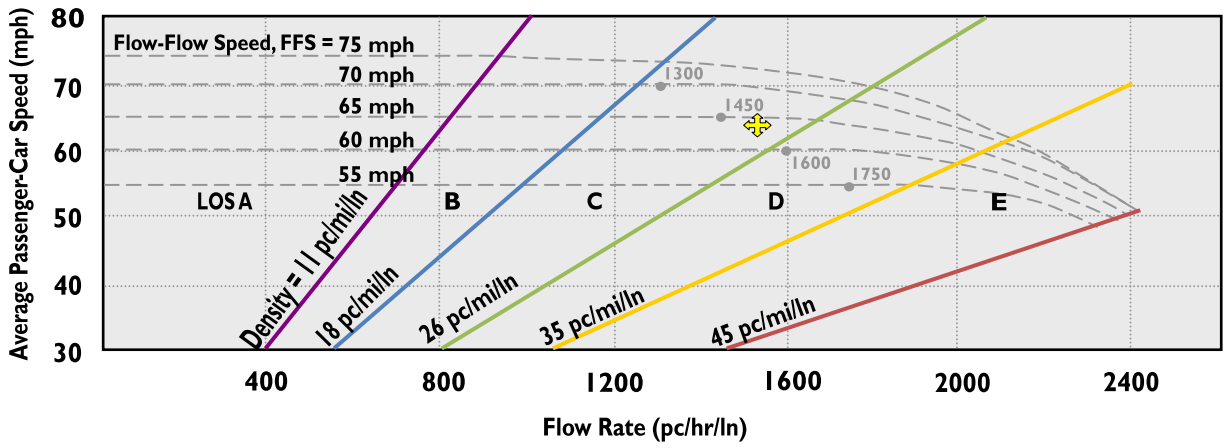
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}520 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 23.78 pc/mi/ln

LOS: C



BASIC FREEWAY SEGMENTS LOS WORKSHEET

Location: Los Angeles, CA **Agency:** City of L.A. Bureau of Engineering / LADOT / Caltrans D7

	Scenario:	Rte/Dir:		PM:	From/To:	Peak Time Period:	
General Info:	# 022	I-5	NB	25.54	Loz Feliz Blvd. / Colorado Blvd.	Sun	11pm - 9am

Data Date: April 2012 Analysis Date: 7/27/2012 Calculated by: GG Checked by: FM

Flow Inputs

Volume, V:	3,415	veh/hr	Peak-Hour Factor, PHF:	0.95	
Annual Average Daily Traffic, AADT:	-	veh/day	% Trucks and Buses, P_T:	6.35%	%
Peak-Hour Proportion of AADT, K:	-		% RVs, P_R:	-	%
Peak-Hour Direction Proportion, D:	-		General Terrain:		
DDHV = AADT * K * D:	-	veh/hr	[x] Level	[ ] Rolling	[ ] Mountainous
Driver Type:	[ ] Commuter/Weekday		Grade:		
	[x] Recreational/Weekend		Length: - mi	Up/Down - %	

Calculate Flow Adjustments

f_p: 0.95 E_T: varies by axle E_R: 2.00

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} = 0.91$$

Speed Inputs

Lane Width:	12	ft
Right-Shoulder Lateral Clearance:	12	ft
Interchange Density	0.75	per mile
Number of Lanes, N:	3	
Base Free-Flow Speed, BFFS:	70	mph

Calculate Speed Adjustments and FFS

f_{LW}:	0.0	mph
f_{LC}:	2.40	mph
f_{ID}:	1.3	mph
f_N:	2.40	mph
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	63.9	mph

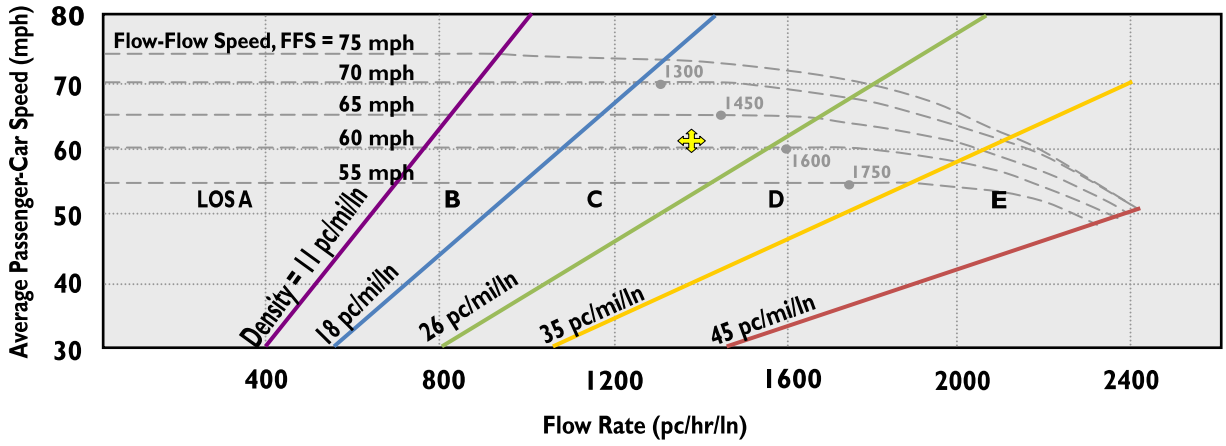
LOS and Performance Measures

$$v_p = \frac{v}{PHF * N * f_{HV} * f_p} = 1{,}383 \text{ pc/hr/ln}$$

S = 63.9 mph

D = 21.64 pc/mi/ln

LOS: C



STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV. 07/2007)

Permission is requested to encroach on the State Highway right-of-way as follows:
(Complete all BOXES [write N/A if not applicable])
This application is not complete until all requirements have been approved.

FOR CALTRANS USE
PERMIT NO.
DIST/CO/RTE/PM
SIMPLEX STAMP
DATE OF SIMPLEX STAMP

1. COUNTY	2. ROUTE	3. POSTMILE
LOS ANGELES	5	24.54

4. ADDRESS OR STREET NAME	5. CITY
N/A	LOS ANGELES

6. CROSS STREET *(Distance and direction from site)*	7. PORTION OF RIGHT-OF-WAY
~3,600' N/O LOS FELIZ BL O/C	SHOULDER

8. WORK TO BE PERFORMED BY	9. EST. START DATE	10. EST. COMPLETION DATE
☐ OWN FORCES ☑ CONTRACTOR	2012	2013

11. EXCAVATION	MAX. DEPTH	AVG. DEPTH	AVG. WIDTH	LENGTH	SURFACE TYPE
	N/A	N/A			AC PAVEMENT

12. EST. COST IN STATE HIGHWAY RIGHT-OF-WAY	FUNDING SOURCE(S)
$	☐ FEDERAL ☐ STATE ☐ LOCAL ☑ PRIVATE

13. PIPES	PRODUCT TYPE	DIAMETER	VOLTAGE / PSIG	14. CALTRANS PROJECT E.A. NUMBER
	N/A	N/A	N/A	N/A

15. ☐ **Double Permit** **Parent Permit Number** _____

Applicant's Reference Number / Utility Work Order Number _____

16. Have your plans been reviewed by another Caltrans branch? ☐ **NO** ☐ **YES** (If "YES") **Who?**_____

17. Completely describe work to be done within STATE highway right-of-way :

Attach 6 complete sets of **FOLDED** plans (folded 8.5" x 11"), and any applicable specifications, calculations, maps, etc.
All dimensions shall be in U.S. Customary (English) Units.

[ATTACH PLANS/SPECIFICATIONS/MAPS]

18. Is a city, county, or other agency involved in the approval of this project?

☑ YES ***(If "YES", check type of project and attach environmental documentation and conditions of approval.)***

☐ COMMERCIAL DEVELOPMENT ☐ BUILDING ☐ GRADING ☐ OTHER_____

☐ CATEGORICALLY EXEMPT ☐ NEGATIVE DECLARATION ☐ ENVIRONMENTAL IMPACT REPORT ☑ OTHER [PER CITY DETERM]

☐ NO ***(If "NO", please check the category below which best describes the project, and complete page 4 of this application.)***

☐ DRIVEWAY OR ROAD APPROACH, RECONSTRUCTION, MAINTENANCE, OR RESURFACING
☐ PUBLIC UTILITY MODIFICATIONS, EXTENSIONS, HOOKUPS
☐ FLAGS, SIGNS, BANNERS, DECORATIONS, PARADES AND CELEBRATIONS
☐ OTHER_____
☐ FENCE
☐ MAILBOX
☐ EROSION CONTROL
☐ LANDSCAPING

19. Will this project cause a substantial change in the significance of a historical resource (45 years or older), or cultural resource? ☐ YES ☑ NO
(If "YES", provide a description)

20. Is this project on an existing highway or street where the activity involves removal of a scenic resource including a significant tree or stand of trees, a rock outcropping or a historic building? ☐ YES ☑ NO (If "YES", provide a description)

21. Is work being done on applicant's property? ☐ YES ☐ NO (If "YES", attach site and grading plans.)

ADA NOTICE: For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV. 07/2007)

PERMIT NO.

22. Will this proposed project require the disturbance of soil? ☐ YES ☑ NO

If "YES", estimate the area within State Highway right-of-way in square feet AND acres: _____ (ft^2) AND _____ (acres)

estimate the area outside of State Highway right-of-way in square feet AND acres: _____ (ft^2) AND _____ (acres)

23. Will this proposed project require dewatering? ☐ YES ☑ NO

If "YES", estimate total gallons AND gallons/month._____(gallons) AND _____(gallons/month)

SOURCE*: ☐ STORM WATER ☐ NON-STORM WATER

(*See Caltrans SWMP for definitions of non-storm water discharge: http://www.dot.ca.gov/hq/env/stormwater/index.htm)

24. How will any storm water or ground water be disposed of from within or near the limits of this proposed project?

☐ Storm Drain System ☐ Combined Sewer / Storm System ☐ Storm Water Retention Basin

☑ Other (explain): N/A

PLEASE READ THE FOLLOWING CLAUSES PRIOR TO SIGNING THIS ENCROACHMENT PERMIT APPLICATION.

The applicant, understands and herein agrees to that an encroachment permit can be denied, and/or a bond required for non-payment of prior or present encroachment permit fees. Encroachment Permit fees may still be due when an application is withdrawn or denied, and that a denial may be appealed, in accordance with the California Streets and Highways Code, Section 671.5. All work shall be done in accordance with Caltrans rules and regulations subject to inspection and approval.

The applicant, understands and herein agrees to the general provisions, special provisions and conditions of the encroachment permit, and to indemnify and hold harmless the State, its officers, directors, agents, employees and each of them (Indemnitees) from and against any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, judgments, losses and liabilities of every kind and nature whatsoever (Claims) arising out of or in connection with the issuance and/or use of this encroachment permit and the placement and subsequent operation and maintenance of said encroachment for: 1) bodily injury and/or death to persons including but not limited to the Applicant, the State and its officers, directors, agents and employees, the Indemnities, and the public; and 2) damage to property of anyone. Except as provided by law, the indemnification provisions stated above shall apply regardless of the existence or degree of fault of Indemnities. The Applicant, however, shall not be obligated to indemnify Indemnities for Claims arising from the sole negligence and willful misconduct of State, its officers, directors, agents or employees.

DISCHARGES OF STORM WATER AND NON-STORM WATER: Work within State Highway right-of-way shall be conducted in compliance with all applicable requirements of the National Pollutant Discharge Elimination System (NPDES) permit issued to the Department of Transportation (Department), to govern the discharge of storm water and non-storm water from its properties. Work shall also be in compliance with all other applicable Federal, State and Local laws and regulations, and with the Department's Encroachment Permits Manual and encroachment permit. Compliance with the Departments NPDES permit requires amongst other things, the preparation and submission of a Storm Water Pollution Protection Plan (SWPPP), or a Water Pollution Control Program (WPCP), and the approval of same by the appropriate reviewing authority prior to the start of any work. Information on the requirements may also be reviewed on the Department's Construction Website at:

http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

25. NAME of APPLICANT or ORGANIZATION *(Print or Type)*	E-MAIL ADDRESS
ADDRESS of APPLICANT or ORGANIZATION WHERE PERMIT IS TO BE MAILED *(Include City and Zip Code)*	
PHONE NUMBER	FAX NUMBER

26. NAME of AUTHORIZED AGENT / ENGINEER *(Print or Type)*	**IS LETTER OF AUTHORIZATION ATTACHED?** ☐ **YES** ☐ **NO**	E-MAIL ADDRESS
ADDRESS of AUTHORIZED AGENT / ENGINEER *(Include City and Zip Code)*		
PHONE NUMBER	FAX NUMBER	

27. SIGNATURE of APPLICANT or AUTHORIZED AGENT	**28. PRINT OR TYPE NAME**	**29. TITLE**	**30. DATE**

PERMIT NO.
WORK ORDER/REFERENCE NUMBER

FEE CALCULATION -- FOR CALTRANS USE

☐ CASH ☐ CREDIT CARD NAME ON CARD _____ PHONE NUMBER _____

☐ CHECK NUMBER _____ NAME ON CHECK _____ PHONE NUMBER _____

☐ EXEMPT ☐ PROJECT EA __ __ __ __ __ __ ☐ DEFERRED BILLING (Utility)

CALCULATED BY	(1)		(2)		
REVIEW 1. _____ HOURS @ $_____ * 2. _____ HOURS @ $_____ *	1. FEE / DEPOSIT $_____	DATE	2. FEE / DEPOSIT $_____	DATE	TOTAL FEE / DEPOSIT $_____ $_____
INSPECTION 1. _____ HOURS @ $_____ * 2. _____ HOURS @ $_____ *	1. FEE / DEPOSIT $_____	DATE	2. FEE / DEPOSIT $_____	DATE	TOTAL FEE / DEPOSIT $_____ $_____
FIELD WORK _____ HOURS @ $_____ *	$_____		$_____		$_____
EQUIPMENT & MATERIALS	DEPOSIT $_____	DATE	DEPOSIT $_____	DATE	DEPOSIT $_____
CASH DEPOSIT IN LIEU OF BOND	$_____		$_____		$_____
TOTAL COLLECTED **CASHIER'S INITIALS**	$_____ _____		$_____ _____		$_____

** The current hourly rate is set annually by Headquarters Accounting. District Office staff do not have authority to modify this rate.*

PERFORMANCE BOND	☐	DATE	AMOUNT $
PAYMENT BOND	☐	DATE	AMOUNT $
LIABILITY INSURANCE REQUIRED?		☐ YES ☐ NO	AMOUNT $

PERMIT NO.

INSTRUCTIONS
for completing page 4

This page needs to be completed when the proposed project DOES NOT involve a City, County or other public agency.

Your answers to these questions will assist departmental staff in identifying any physical, biological, social or economic resources that may be affected by your proposed project within the State highway right-of-way. And, to determine which type of environmental studies may be required to approve your application for an encroachment permit.

It is the applicant's responsibility for the production of all required environmental documentation and supporting studies, in some cases this may be costly and time-consuming. If possible, attach photographs of the location of the proposed project.

Please answer these questions to the best of your ability. Provide a description of any "YES" answers (type, name, number, etc.)

1. **Will any existing vegetation and/or landscaping within the highway right-of-way be disturbed?**
2. **Are there waterways (e.g. river, creek, pond, natural pool or dry streambed) adjacent to or within the limits of the project or highway right-of-way?**
3. **Is the proposed project located within five miles of the coast line?**
4. **Will the proposed project generate construction noise levels greater than 86 dBA (e.g. jack-hammering, pile driving)?**
5. **Will the proposed project incorporate land from a public park, recreation area or wildlife refuge open to the public?**
6. **Are there any recreational trails or paths within the limits of the proposed project or highway right-of-way?**
7. **Will the proposed project impact any structures, buildings, rail lines, or bridges within highway right-of-way?**
8. **Will the proposed project impact access to any businesses or residences?**
9. **Will the proposed project impact any existing public utilities or public services?**
10. **Will the proposed project impact existing pedestrian facilities, such as sidewalks, crosswalks, or overcrossings?**
11. **Will new lighting be constructed within or adjacent to highway right-of-way?**

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

TRANSPORTATION PERMIT

TR-0015 (REV. 02/2009)

IN COMPLIANCE WITH YOUR REQUEST AND SUBJECT TO ALL THE TERMS, CONDITIONS AND RESTRICTIONS WRITTEN BELOW AND IN THE ACCOMPANIMENTS, PERMISSION IS HEREBY GRANTED TO:

PERMIT VALID:

FROM:

TO:

MOVEMENT AUTHORIZED:

PERMIT VALID FOR 7 CONSECUTIVE DAYS

SEE 24/7 TRAVEL CONDITIONS FOR AUTHORIZED TIMES OF MOVEMENT.

☐ NO NIGHT TRAVEL

PERMIT NUMBER

THIS PERMIT IS NOT VALID WITHOUT THE FOLLOWING ACCOMPANIMENTS:

- ☒ Permit Conditions 04/2007
- ☒ 24/7 Travel Conditions
- ☐ Calif Vehicle Inspection Report
- ☐ SC MH ☐ MH Certifications
- ☒ Pilot Car Special Conditions
- ☒ Curfew Maps [LA, SAC, SD, SF]
- ☐ SC Holiday Conditions
- ☐
- ☐
- ☐

NAME
[RESPONSIBLE PERSON/TRANSPORTATION COMPANY]

ADDRESS
[ADDR RESPONSIBLE PARTY]

CITY/STATE/ZIP
[CITY/STATE/ZIP RESPONSIBLE PARTY]

OFFICE PHONE NUMBER (*Including Area Code*)

OFFICE FAX NUMBER (*Including Area Code*)

DESCRIPTION OF THE LOAD OR EQUIPMENT AND MODEL NO. ☒ **HAUL** ☐ **DRIVE** ☐ **TOW**
[BRIEF DESCR OF PREFAB STEEL BRIDGE DECK/SPAN COMPONENT HAULED]

DIMENSIONS OF LOAD
VARIBLE—14'0" MAX HT; 10'0" MAX WDTH

DESCRIPTION OF HAULING EQUIPMENT:
[TRUCK/TRAILER DESCRIPTION/COMBINATIONS; E.G., LOW/FLATBED]

VEHICLE WIDTH: 8'6"	**SEMI-TRAILER LENGTH:** 90'0"	**KINGPIN TO LAST AXLE:** 80'0"	**COMB VEHICLE LENGTH:** 110'0"

AXLE NUMBER	1	2	3	4	5	6	7	8	9
NUMBER OF TIRES PER AXLE	2	4	4	4	4	4	4		
DISTANCE BETWEEN AXLES		15'0"	5'0"	15'0"	7'0"	40'0"	7'0"		
WIDTH OF AXLES AT TIRE SIDEWALL	11'0"	11'0"	11'0"	11'0"	11'0"	11'0"			
MAXIMUM ALLOWABLE WEIGHT	120,000 LBS								

NOT TO EXCEED THE LOADED DIMENSIONS SHOWN BELOW OR AXLE WEIGHTS SHOWN ABOVE

LOADED HEIGHT:	LOADED WIDTH:	LOADED OVERALL LENGTH:	LOADED OVERHANG:	WEIGHT CLASS:
14'0"	14'0"	110'0"	3' MAX	8

ORIGIN:
[ORIGIN/PICK UP LOCATION]

DESTINATION:
L.A. RIVER BED - I-5 NB N/O LOS FELIZ BLVD.

AUTHORIZED STATE HIGHWAYS - CITY AND/OR COUNTY PERMITS MAY BE REQUIRED WHENEVER THE * IS SHOWN IN THE STATE ROUTE.

For office use only

PILOT CAR ☐ YES ☐ NO

CASH, CHARGE, CREDIT CARD OR EXEMPT INFORMATION			APPLICANT SIGNATURE	DATE
CREDIT CARD EX. DATE	FEE $	NUMBER OF TRIPS	AUTHORIZED STATE AGENT	DATE

REQUESTED ROUTE: (*Include Address of Origin and Delivery Site)*

NORTHBOUND INTERSTATE 5 (I-5) FREEWAY

CONTACT PERSON (PRINT)

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS 89, Sacramento, CA 95814.

2013 196708

FILED
Sep 19 2013

Dean C. Logan, Registrar – Recorder/County Clerk

Electronically signed by JOSEFINA JIMENEZ

CITY OF LOS ANGELES

OFFICE OF THE CITY CLERK
ROOM 395, CITY HALL
LOS ANGELES, CALIFORNIA 90012
CALIFORNIA ENVIRONMENTAL QUALITY ACT

NOTICE OF DETERMINATION

(Article I – City CEQA Guidelines)

CITY CLERK'S USE
DOCUMENT FILED
City Clerk's Office
No: ND13-018-BE
Certified by EG
Date: 9/18/13

Public Resources Code Section 21152(a) requires local agencies to submit this information to the County Clerk. The filing of this notice starts a 30-day statute of limitations on court challenges to the approval of the project pursuant to Public Resources Code Section 21167.

LEAD CITY AGENCY AND ADDRESS:	COUNCIL DISTRICT
Department of Public Works, Bureau of Engineering **1149 South Broadway, Suite 600, Los Angeles CA 90015-2213**	4, 13
PROJECT TITLE: North Atwater Crossing AKA North Atwater Multimodal Bridge over the Los Angeles River	C.F.: 12-0533 W.O. E1907492

PROJECT DESCRIPTION AND LOCATION: The project involves the construction of a multi-modal, cable-stay bridge over the Los Angeles River to facilitate crossings for bicycles, pedestrians and equestrians. The crossing would connect near existing equestrian facilities on the eastern bank of the Los Angeles River to an existing segment of the Los Angeles River Bikeway on the western bank, enabling safe, year-round passage into Griffith Park. The proposed project would cross the Los Angeles River about one-half mile upstream of Los Feliz Boulevard. The bridge would be approximately 302 feet long and 38 feet wide with two separate paths, one designated for equestrian use and the other shared by pedestrians and bicyclists. The main bearing point would be the single pier, which would be located in the Los Angeles River approximately 114 feet from the western bank.
Los Angeles County

CONTACT PERSON:	STATE CLEARINGHOUSE NUMBER:	TELEPHONE
Jim Doty	2012111091	213-485-5759

This is to advise that on September 17, 2013, the City Council of the City of Los Angeles (☒ Lead Agency or ☐ Responsible Agency) approved the project described above and made the following determinations:

SIGNIFICANT EFFECT	☐ The project **will** have a significant effect on the environment. ☒ The project **will not** have a significant effect on the environment.
MITIGATION MEASURES	☒ Mitigation measures **were** made a condition of project approval. ☐ Mitigation measures **were not** made a condition of project approval.
OVERRIDING CONSIDERATION	☐ A Statement of Overriding Considerations **was** adopted. ☐ A Statement of Overriding Considerations **was not** adopted. ☒ A Statement of Overriding Considerations **was not** required.
ENVIRONMENTAL IMPACT REPORT	☐ An Environmental Impact Report **was** prepared for project and may be examined at the Office of the City Clerk. ☒ An Environmental Impact Report **was not** prepared for the project.
NEGATIVE DECLARATION	☒ A ~~Negative Declaration or~~ Mitigated Negative Declaration **was** prepared for project and may be examined at the Office of the City Engineer ☐ A Negative Declaration or Mitigated Negative Declaration **was not** prepared for the project.

THIS NOTICE WAS POSTED
ON September 19 2013
UNTIL October 21 2013
REGISTRAR – RECORDER/COUNTY CLERK

The Mitigated Negative Declaration is available to the general public at the Office of the City Clerk, Room 395 of City Hall, and in the files of the Bureau of Engineering, 1149 South Broadway, Suite 700, Los Angeles CA 90015-2213.

SIGNATURE:	TITLE:	DATE:
James E. Doty **James E. Doty**	**Environmental Affairs Officer** **Environmental Management Group**	9-17-13

DISTRIBUTION: Part 1 - County Clerk Part 2 - City Clerk Part 3 - Agency Record Part 4 - Responsible Agency

rev 6/2011

State of California—Natural Resources Agency
CALIFORNIA DEPARTMENT DF FISH AND WILDLIFE
2013 ENVIRONMENTAL FILING FEE CASH RECEIPT

RECEIPT #
201309191220003

STATE CLEARING HOUSE # *(If applicable)*

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY

LEAD AGENCY	DATE
CITY OF LOS ANGELES	09/19/2013
COUNTY/STATE AGENCY OF FILING	DOCUMENT NUMBER
LOS ANGELES	2013196708

PROJECT TITLE
NOTH ATWATER CROSSING AKA NORTH ATWATER MULTIMODEL BRIDGE OVER THE LOS ANGELES RIVER

PROJECT APPLICANT NAME			PHONE NUMBER
JIM DOTY CITY OF LOS ANGELES			(201)348-5575
PROJECT APPLICANT ADDRESS	CITY	STATE	ZIP CODE
1149 SOUTH BROADWAY SUITE 600	LOS ANGELES	CA	90015

PROJECT APPLICANT *(Check appropriate box):*

☑ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$2,995.25	$	0.00
☑ Negative Declaration (ND)(MND)	$2,156.25	$	2,156.25
☐ Application Fee Water Diversion (State Water Resources Control Board Only)	$850.00	$	0.00
☐ Projects Subject to Certified Regulatory Programs (CRP)	$1,018.50	$	0.00
☑ County Administrative Fee	~~$50.00~~	$	75.00
☐ Project that is exempt from fees			
☐ Notice of Exemption			
☐ CDFW No Effect Determination (Form Attached)			
☐ Other _____		$	0.00

PAYMENT METHOD:

☐ Cash ☐ Credit ☑ Check ☐ Other _____ $ 2,231.25

SIGNATURE	TITLE
X	IC

ORIGINAL - PROJECT APPLICANT COPY - CDFW/ASB COPY - LEAD AGENCY COPY - COUNTY CLERK FG 753.5a (Rev. 11/12)

CITY OF LOS ANGELES

CALIFORNIA

HOLLY L. WOLCOTT
Interim City Clerk

When making inquiries relative to this matter, please refer to the Council File No.

ERIC GARCETTI
MAYOR

Office of the
CITY CLERK

Council and Public Services
Room 395, City Hall
Los Angeles, CA 90012
General Information - (213) 978-1133
Fax: (213) 978-1040

SHANNON HOPPES
Council and Public Services
Division

www.cityclerk.lacity.org

September 17, 2013

To All Interested Parties:

The City Council adopted the action(s), as attached, under Council File No. 12-0533, at its meeting held September 17, 2013.

City Clerk
io

21 MITIGATED NEGATIVE DECLARATION and ARTS, PARKS, HEALTH, AGING AND RIVER COMMITTEE REPORT relative to the North Atwater Crossing Project.

Recommendations for Council action:

1. FIND that, on the basis of whole record, there is no substantial evidence that the North Atwater Crossing Project will have a significant effect on the environment; that the Mitigated Negative Declaration (SCH No. 2012111091; WO No. E1907492) reflects the City's independent judgment and analysis; is in compliance with the California Environmental Quality Act (CEQA); that the documents constituting the record of proceedings in this matter are located in Council File No. 12-0533 in the custody of the City Clerk; and ADOPT the CEQA Initial Study/Mitigated Negative Declaration.

2. ADOPT the Mitigated Negative Declaration (SCH No. 2012111091) as described in the July 10, 2013 Board of Public Works (Board) report and attached to the Council file.

3. APPROVE the North Atwater Crossing Project as described in the Initial Study/July 10, 2013 Board report and attached to the Counicl file.

4. ADOPT the Mitigation Monitoring Program as described in the July 10, 2013 Board report and attached to the Council file.

Fiscal Impact Statement: The Board reports that the North Atwater Crossing Project's design and construction is being funded by the Los Angeles River Revitalization Corporation, an independent non-profit corporation. Council Districts Four and 13 have provided discretionary funding (AB1290) to support the project's environmental review, permitting, and inspection. The Bureau of Engineering has also allocated Los Angeles River funds to support the project.

Community Impact Statement: None submitted.

Summary:

On September 9, 2013, your Committee considered a July 10, 2013 Board report, Mitigated Negative Declaration (SCH No, 2012111091), and Initial Study relative to the North Atwater Crossing Project. According to the Board, the bridge would be approximately 302 feet long and 38 feet wide with two separate paths, one designated for equestrian use and the other shared by pedestrians and bicyclists. No motorized vehicles would be allowed on the bridge. Bollards would be placed to keep all vehicles off the walking and riding surfaces.

The main bearing point would be the single pier, which would be located in the Los Angeles River approximately 114 feet from the western bank. This pier would be designed to be as hydraulically-neutral as possible thereby minimizing the impact on the flow. This concrete pier would land in the present "long island" found at the bottom of the Los Angeles River in this area.

The pier would sit on piles that would be sunk to bedrock approximately 30 feet below the Los Angeles River bottom. This island presently includes some vegetation. After construction of the pier, the island would be restored with native grasses and plants. Two abutments would be constructed at each end of the bridge to anchor the structure on the banks and outside the riverbed. These

elements would be constructed of concrete and would sit on piles and footings. The sloping concrete slurry bank would be restored around them. After consideration and having provided an opportunity for public comment, the Committee moved to recommend approval of the recommendations contained in the Board report and detailed in the above recommendations. This matter is submitted for Council for its consideration.

Respectfully Submitted,

ARTS, PARKS, HEALTH, AGING AND RIVER COMMITTEE

MEMBER	VOTE
O'FARRELL:	YES
LABONGE:	YES
BUSCAINO:	YES
CEDILLO:	ABSENT
PRICE:	ABSENT

-NOT OFFICIAL UNTIL COUNCIL ACTS-

ADOPTED

SEP 17 2013

LOS ANGELES CITY COUNCIL

FORTHWITH

eng.lacity.org/techdocs/emg/north_atwater.htm

LA DPW ENGINEERING TRANSFORMING LOS ANGELES

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North Atwater Crossing Project

An Initial Study/Mitigated Negative Declaration (IS/MND) is available for review for the for the proposed North Atwater Crossing project. The project involves the construction of a multi-modal, cable-stay bridge over the Los Angeles River to facilitate crossings for bicycles, pedestrians and equestrians. The bridge would be approximately 325 feet long, crossing over the River and include support columns in two locations within the River. Although the proposed project could have a significant effect on biological resources, hydrology and water quality, noise and traffic, there would not be a significant effect as a result of the implementation of the identified mitigation measures.

The Initial Study/Mitigated Negative Declaration can be viewed from the links below and is available for review beginning Thursday, November 29, 2012 at the following locations:

- Atwater Village Branch Library, 3379 Glendale Boulevard, phone (323) 664-1353
- Council District 4 Field Office, 3750 Verdugo Road, phone (323) 478-9002
- Council District 13 Field Office, 6501 Fountain Avenue, phone (323) 957-6415
- Public Works, Bureau of Engineering, EMG, 1149 S. Broadway (contact Nicole Cobleigh at 213-485-5761)

Comments must be received in writing by Friday, December 28, 2012, by e-mail to Nicole.Cobleigh@lacity.org (include "North Atwater Crossing" in subject), or mail to:

Nicole Cobleigh
City of Los Angeles
BOE EMG
1149 South Broadway, Suite 600, Mail Stop 939
Los Angeles, CA 90015.

If you have any questions, please contact Nicole Cobleigh at (213) 485-5761 or via e-mail at Nicole.Cobleigh@lacity.org

Report (Click on underlined text to view report)	Review Status	Public Review Period
Notice of Intent to Adopt MND		
Initial Study/Mitigated Negative Declaration	Closed	11/29/12 - 12/28/12

Initial Study Appendices

Appendix A: Environmental Screening Checklist
Appendix B: Air Quality and Greenhouse Gas Emission Worksheets
Appendix C: Geotechnical Evaluation Report
Appendix D: Hydraulics and Water Surface Assessments Report
Appendix E: Traffic and Transportation Impact Analysis

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http://eng.lacity.org/techdocs/emg/north_atwater.htm

North Atwater Crossing Project

Draft Environmental Assessment

U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

US Army Corps of Engineers

March 2013

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

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LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

Appendices

Appendix A – Air Quality
Appendix B – Traffic and Circulation

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

1.0 INTRODUCTION

1.1 Proposed Project

The Los Angeles River Revitalization Corporation (applicant) has requested authorization from the U.S. Army Corps of Engineers (Corps) to construct a pedestrian/equestrian bridge across the Glendale Narrows reach of the Los Angeles River, approximately one-half mile upstream of the Los Feliz Boulevard river crossing near Atwater Village. The applicant's proposed project would connect the North Atwater Park on the east bank to an existing stretch of the LA River Bikeway on the river's western bank and provide year-round passage to Griffith Park.

The proposed project entails construction of a cable-stayed steel bridge frame that would span the approximately 325-foot-wide Los Angeles River channel and include one major pier supported via new concrete footings below the channel bottom. The proposed configuration is a modified "fan," where the high-stressed cables are incrementally attached along the tall mast proportionally corresponding to the distance the cable is attached from the mast.

The bridge would be 35 feet wide with two separate paths, one designated for equestrian use and the other shared by pedestrians and bicyclists. No motorized vehicles would be allowed on the bridge. Bollards would be placed to keep all vehicles off the walking and riding surfaces. These pathways would be separated by a continuous structural beam from bank to bank. Attached to this beam would be a 140-foot tall mast or pylon that would be used to support the bridge deck with steel cables, as shown in Exhibit 2.

The proposed project would require a single concrete pier to be placed within the river's invert and one additional pier on the upper part of the west embankment. The pier would sit on piles that would be sunk to bedrock approximately 30 feet below grade, and would be designed to be as hydraulically-neutral as possible.

Bridge construction would entail removal of 0.18-acre of native and non-native vegetation riparian vegetation shrub and approximately seven willow trees.

1.2 Location

The proposed action would cross the LA River approximately one-half mile upstream of the Los Feliz Boulevard river crossing. Refer to **Figure 1.1** and **Figure 1.2**, for the location of the proposed action.

1.3 Authority

The U.S. Army Corps of Engineers (Corps) channelized the Los Angeles River pursuant to authorization from the 1936 Flood Control Act. Channelization began in 1938 and was

completed by 1960. The Corps continues to maintain operational control and easements along the River. Therefore, construction of the North Atwater Crossing would require the following:

- Section 408 authorization pursuant to Section 14 of the Rivers and Harbors Act for alteration of a federally constructed levee.
- Section 404 authorization pursuant to Section 404 of the Clean Water Act for discharge of fill into waters of the U.S.
- Grant of consent to construct within Government-owned easement area, pursuant to an easement held by the United States over portions of land within the project area.

The required permissions from the Corps constitute a federal action pursuant to the National Environmental Policy Act (NEPA). This environmental assessment (EA) constitutes the Corps' compliance with NEPA. An EA is intended to provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impacts (FONSI).

2.0 PURPOSE AND NEED

2.1 Background

In 1998, the City of Los Angeles City Council File recognized the need for an equestrian bridge across the L.A. River in Atwater Village since at grade crossings in the river posed a danger to both horses and riders, and presented the city with potential liabilities if injuries were to occur. Horse manure in the river also posed a concern with respect to water quality.

In 2005, the city of Los Angeles, in recognition of the importance of the Los Angeles River, commissioned the Los Angeles River Revitalization Master Plan in order to develop a 20-year blueprint for development and management of the Los Angeles River. The plan recommended more than 240 projects. One recommended project was the construction of a bridge that would be a "signature" bridge expressing a distinct design and artistic sensibility that would become a landmark for the river.

In 2009, the City Council and the Mayor established the LA River Revitalization Corporation (applicant), to oversee implementation of the Revitalization Master Plan including the proposed Atwater Bridge.

2.2 Statement of Need

There is an increasing recognition of the importance of the Los Angeles River to the surrounding region. Revitalization projects to connect residents to the river are underway including in-river

recreation programs, restoration projects, and pocket parks along the Glendale Narrows reach of the Los Angeles River.

An at-grade crossing within the Los Angeles River located approximately 3,100 feet north of Los Feliz Boulevard is currently used by equestrian riders who ride and maintain their horses in the Atwater Village area. Eequestrians routinely cross Los Angeles River to exercise their horses in Griffith Park. Due to the uneven surface of the soft bottom channel invert and perennial flows through the channel, the potential for injuries to both horses and riders is a concern.
Thus, there is a need for structure that would reconnect residents of Los Angeles to the Los Angeles River, and provide a safe passage for pedestrians and horses from the Atwater Village area to Griffith Park.

2.3 Statement of Purpose

The purpose is to construct a cable-stayed suspended pedestrian/equestrian bridge across the Los Angeles River within the vicinity of Atwater Village.

3.0 ALTERNATIVES

3.1 Alternatives Considered but Not Evaluated Further

Two bridge structure options were evaluated and dropped from further evaluation. The bridge structure types studied included a double arch span bridge, truss bridge, and cable-stayed bridge. Bridge types were evaluated for performance, time of erosion, visual impact, and multi-modal functionality. The double arch span bridge and truss bridge were eliminated from further evaluation due to technical constraints. Specifically, the double arch span would require large foundations in the channel to support the arch and require construction of a foundation under the Interstate 5 (I-5) Freeway. The truss bridge would not be able to span the River without requiring two freestanding piers in the waterway. The size of these piers and their configuration created hydraulic changes that would require extensive upstream mitigation.

The cable-stayed bridge, however, would only require one pier in the River. With minimal foundations required at each bank, this solution would have less impact on the waterway. Therefore, the cable-stayed bridge is the preferred bridge type and all of the three build alternatives evaluated further would be a cable-stayed bridge.

3.2 Alternatives Evaluated in this Environmental Assessment

This document evaluates a reasonable range of alternatives that meet the purpose and need of the proposed action. As discussed above, the cable-stayed bridge is the preferred bridge type. Several crossing locations were considered for the proposed action. The following three crossing locations were considered and are shown in **Figure 3.1**:

- Site Location A Alternative: Crossing at the new Atwater Park Extension
- Site Location B Alternative: Crossing adjacent to the present equestrian crossing
- Site Location C Alternative: Crossing north of the present crossing

Of the three crossing locations, the preferred alternative (proposed action) is the Site Location C Alternative. Construction of the proposed bridge at all three locations are feasible and would entail environmental impacts. Location C was identified as the preferred alternative based on public comments received by the applicant.

3.2.2 Site Location A

The Site Location A is being considered to determine if there was value in crossing near the new Atwater Park Extension. The impact evaluation considers the site's location to a large swale, drainage into the River, access during construction, and the need to improve approximately 400 feet of the bike path to allow parallel equestrian use. Under this alternative, the bridge structure would be the same, and the scope of construction activities, size of construction footprint, and operation and maintenance would be similar to the Preferred Alternative.

3.2.3 Site Location B

The Site Location B Alternative would be located closest to the existing equestrian crossing and would retain the patterns of existing movement across the River. Additionally, under the Site Location B Alternative, the location where equestrians and bicyclists interact would not change. This alternative would, however, require the demolition of the existing River access and prohibit access to Griffith Park during the construction period. The bridge structure would be the same, and the scope of construction activities, size of construction footprint, and operation and maintenance would be similar to the Preferred Alternative.

3.2.4 No Action Alternative

The No Action Alternative would not result in the construction of the project. Travel patterns for equestrians, bicyclists and pedestrians would remain unchanged. A safe passage across the Los Angeles River for equestrians, bicyclists and pedestrians outside of the riverbed would not be provided.

3.2.4 Site Location C

Site Location C is the applicant's preferred alternative. The applicant selected Site C after public input and additional surveys and investigations. The crossing would be constructed north of the existing crossing within the riverbed and would allow access to Griffith Park during almost 90 percent of the construction period.

Bridge Type

The would consist of the construction of a steel bridge frame that would span the LA River channel and include one major pier supported via new concrete footings below the channel bottom. The bridge, which would cross the approximately 325 foot width of the LA River in this area, would be a cable-stayed bridge. The cable-stayed bridge would use high stressed cables attached to a tall mast or pylon to hang the bridge deck. The proposed configuration is a modified "fan," where the cables are incrementally attached along the mast proportionally corresponding to the distance the cable is attached from the mast. This fan pattern, along with the unique mast profile, would combine to create a distinctive and unique visual element in the landscape.

Refer to **Figure 3.2** for a visual representation of the proposed action.

Dimensions

The bridge would be approximately 325 feet long and 35 feet wide with two separate paths, one designated for equestrian use and the other shared by pedestrians and bicyclists. No motorized vehicles would be allowed on the bridge. Bollards would be placed to keep all vehicles off the walking and riding surfaces. These pathways would be separated by a continuous structural beam from bank to bank. Attached to this beam would be the 140-foot tall mast or pylon that would be used to support the bridge deck with steel cables, as shown in **Figure 3.3**.

The main bearing point would be the single pier, which would be located in the LA River approximately 94 feet from the River's western bank. This pier would be designed to be as hydraulically-neutral as possible thereby impacting the River's flows as little as possible. This concrete pier would land in the present "long island" found at the bottom of the LA River in this area. The pier would sit on piles that would be sunk to bedrock approximately 30 feet below the River bottom.

This island presently includes some vegetation; removal of vegetation would be required prior to construction and placement of the footing and pier. Brush clearance at this location would occur prior to migratory birds' spring nesting season. The estimated maximum brush clearing area is 8,000 square feet (0.18 acres); all brush clearing and removal would be performed manually. There would be no use of cranes or other machines to perform this work.

On supporting pier would be constructed at the upper stratum of the west embankment outside the riverbed. This elements would be constructed of concrete and would also sit on piles. The sloping concrete slurry bank would be restored around them; no vegetation removal would be required for this pier.

The existing ramps that are presently used for equestrian access to cross the LA River would be restored to their original condition and use, providing maintenance access to the River bottom.

Materials

The bridge structure would be painted steel with wood decks and detailing. The single pier placed in the LA River would be concrete. The bridge would be painted a neutral color so as not to compete with the River landscape while also providing the opportunity to see and understand its form. The wood would be finished and left in a natural color.

Construction

The site is constricted and bridge construction would require an orchestrated approach to the sequence of construction. Any work in the LA River would occur during the dry season and would require an active approach to avoid adversely impacting the surrounding environment and water quality.

A work platform would be created over the River bottom to keep vehicles and workers out of the sandy bottom surface. A construction crane would be used to install the structural steel frame and mast. This crane would be located so that it would be able to retrieve components from delivery trucks on the I-5 Freeway shoulder. Minimal storage would be allowed in this area. Workers would access the site from the North Atwater Park parking lot (at the end of Chevy Chase Drive) or along the River access road connecting from Los Feliz Boulevard, both of which are on the east side of the River. This area would also facilitate the movement of smaller components, equipment, and materials to-and-from the site. The I-5 Freeway shoulder would only be utilized for the delivery and unloading of the steel bridge structure and mast.

Construction Schedule

Construction is estimated to take approximately eight to ten months. Project construction would generally consist of five phases: mobilization, site preparation, site work, steel fabrication, and architectural finishings. Details for each of the five phases are provided below. Other than delivery of the bridge structure and mast, the time of which will be worked out with the California Department of Transportation (Caltrans), construction would occur between the hours of 7:00 a.m. to 3:30 p.m. Monday through Friday, and between 8:00 a.m. and 6:00 p.m. on Saturday. No construction would occur on Sundays or national holidays.

Mobilization

Contractor mobilization would occur during an approximately two-week period of time and would involve the set-up of a construction trailer and the equipment storage yard. During this time, detours would be established and signs would be posted. No actual work would take place in the River itself.

Site Preparation

Site preparation involves clearance of the site and preparing the project area for construction. Site preparation would occur over a period of approximately four weeks

and would be initiated in the spring, when the River officially "opens" and before the migratory birds' nesting season. This phase would include redirecting the channel as required away from work zone, water quality mitigation, erosion control, removal or trimming of vegetation as needed, and removal of the slurry surface where abutments would be constructed. The brush clearing area is approximately 1,200 square feet between the bike path adjacent to Griffith Park and the service road adjacent to North Atwater Park. All brush clearing and removal would be performed manually; there would be no use of cranes or other machines to perform this work. The construction site would be defined and fenced off and construction ramps would be built. Heavy equipment, including bull dozers, trucks and pneumatic hammers, would arrive to the construction site from the east side of the River.

Site Work

The site work phase would involve excavation, forming and placing the pier and concrete. This phase of construction would last approximately eight to 12 weeks. Also during this phase, the pile would be placed, formed and the pile cap would be poured. Forms for abutments and the pier would be constructed, and the fabrication and setting of imbed plates and other attachments to the concrete would be completed. Equipment utilized during this phase of construction would include drill rigs, back hoes, flat-bed trucks, bull dozers, concrete trucks and pumpers.

Steel Fabrication

Portions of this phase of construction would occur concurrent with the Site Work phase, including finalization of shop drawings and fabrication of components. The estimated timeframe for this phase of construction is approximately 10-12 weeks. The primary coordination issue would be the quantifying the exact field dimensions of the concrete bearing and then fabricating to match.

This work would then be brought to the site in sequence and components stored on site until erected. Delivery of bridge components would occur along the northbound shoulder of the I-5 Freeway at times stipulated by the Encroachment Permit that will be obtained from Caltrans. Delivery and unloading would likely occur during the nighttime hours on weekends, so as to minimize disruptions to northbound traffic on the I-5 Freeway. The deck structure would be shored in place across the River, the mast erected, cables set, and painting done on areas that would become inaccessible after removal of the shoring. Following removal of the shoring, the balance of the work in the River channel would be completed, including replacement of the sloped concrete surfaces, repair of the channel, and removal of all construction material in the waterway. Equipment utilized during this phase of construction would include shoring material (frames, beams – steel or aluminum), crane(s) for lifting and placing bridge components in place, hydraulic jacking equipment on trucks, concrete trucks and pumpers (on the banks of the River).

Architectural Finishings

During this phase of construction, the deck material, handrails, finishes, lighting and other architectural details would be installed. This work would occur over a period of approximately eight weeks and take place outside and above the LA River channel. Concurrently, the grading replacement and repair of the bike path, long curbs and retaining walls and other site/landscape features would be completed. Equipment utilized during this phase of construction would include smaller truck cranes, and bobcats with truck access along the banks of the River.

Operation and Maintenance

Once the finished project has been gifted to the City, operation and maintenance would be the responsibility of several departments within the City, including the Departments of Public Works, RAP, and Transportation. The primary responsibilities would be the maintenance and upkeep of the bridge for continued use by pedestrians, bicyclists and equestrians.

4.0 ENVIRONMENTAL EFFECTS

4.1 Biological Resources

4.1.1 Environmental Setting

Vegetation

The project is located within the 6.3-mile long, Glendale Narrows section of the LAR. Glendale Narrows supports approximately 63 acres of vegetation composed of native and non-native trees, shrubs, and tall grasses. Most vegetation is located on large sandbars up to several hundred feet long with widths varying from 20 to 100 feet. Approximately 47.7 acres (75% of vegetation by coverage) are native riparian species composed primarily of willows (*Salix spp.)* and mulefat (*Baccharis spp.*) with some presence of sycamore (*Platanus racemosa*) and cottonwood (*Populus fremontii*). Approximately 95% of the native trees are willows. Glendale Narrows also supports approximately 15.8 acres of non-native vegetation including 13.5 acres of arundo (*Arundo donax*), 326 fan palms (*Washingtonia robusta*), and 140 other nonnative trees. Both native and non-native vegetation exhibit a two-tiered structure: low growing shrubs and mature trees making up a single canopy layer.

Vegetation in the project area consists primarily of willows as well as non-native tall grasses, which are in various several stages of maturity (i.e., from small shrubs to trees up

to 20 feet high or more).

Wildlife

- **Aquatic species:** Glendale Narrows is a perennial water body that conveys approximately 30 million gallons per day discharged from the Tillman Water Reclamation Plant, and the Glendale Water Reclamation Plant. Furthermore, due to a high groundwater table, groundwater contributes to surface flow throughout the project reach. Aquatic species present within the project reach include crayfish, carp, tilapia, mosquito-fish, and exotic aquatic turtles. The project reach does not offer opportunities for permanent colonization since storm flows during the wet season frequently convey aquatic species downstream into fully-lined concrete sections of the Los Angeles River.

- **Mammalian species:** Glendale Narrows is a biological corridor due the presence of vegetation and water. The reach supports approximately 63 acres of vegetation composed of native and non-native trees, shrubs, and tall grasses which provide nesting and foraging habitat for arboreal mammals (raccoons, opossums, and rats) and terrestrial mammals (skunks, feral cats). However, the project reach does not offer opportunities for permanent colonization by mammals since storm flows scatter these species to adjacent urban areas or convey them downstream. Both the arboreal and terrestrial species are highly adaptive mammals commonly present within the adjacent urban environment.

- **Avian species:** Glendale Narrows supports approximately 63 acres of vegetation composed of native and non-native trees, shrubs, and tall grasses. The vegetation within the Glendale Narrows supports variety of avian species including shorebirds, songbirds, wading birds, raptors, hummingbirds, and others totaling approximately 54 species of birds that utilize the area year round.

- **Special status species:** The federally endangered least Bell's vireo (*Vireo belliipusillus*) has the potential to occur in Glendale Narrows, especially in areas downstream of the project site where vegetation is dense. Protocol surveys for the least Bell's vireo and the western willow flycatcher (*Empidonax traillii extimus*) were conducted by the Corps in 2005, 2007, and 2009 throughout the Glendale Narrows. The 2007 survey indicated presence of one pair and one male between the State Highway 2 overpass and the State Highway 110 overpass during the nesting season. The 2009 protocol surveys did not indicate presence of vireos in Glendale Narrows. The project reach is not within any designated or proposed critical habitat.

4.1.2 Thresholds of Significance

Based on the existing conditions described above, impacts would be considered significant if the

alternatives:

- Permanently and substantially reduce the amount of riparian vegetation within Glendale Narrows.
- Adversely affects sensitive and threatened species.

4.1.3 Environmental Consequences

Preferred Alternative

- **Vegetation:** The new bridge would have one pier within the waterway on an existing sandbar and two foundation supports on the banks, one on each side of the River. Construction of the pier would require removal of seven willow trees and clearing of 0.18 acres of shrubs. Furthermore, the pier would result in the permanent loss of approximately 0.04 acres of vegetation. Following construction, disturbed areas would naturally re-establish with native riparian and wetland plants. It is anticipated that riparian vegetation would quickly re-establish in the disturbed area through colonization by seedlings of willows, cottonwoods, and other riparian species following completion of construction. Implementation of Mitigation Measure BIO-3 (weeding maintenance would be performed for 1 year after construction) would facilitate natural recruitment and the establishment of native vegetation in the project area. Based on the temporary impacts to vegetation within the 0.18 acre clearing area, the 0.04 acre of permanent impacts to riparian vegetation, and implementation of mitigation, the Preferred Alternative would not result in an adverse effect on vegetation.

- **Wildlife:** The LA River channel is used as a wildlife corridor for aquatic and riparian species and migratory birds. These conditions would not change with construction or operation of the proposed action. The bridge would maintain a clear span over the river with a small the minimum footprint within the invert. Clearing and grubbing during construction would temporarily remove 0.18 acre of habitat. The habitat would be restored upon recruitment of vegetation subsequent to construction. Implementation of Mitigation Measure BIO-3 (weeding maintenance would be performed for 1 year after construction) would facilitate natural recruitment and the establishment of native vegetation in the project area.

  Presence of construction equipment and noise in the River would temporarily scatter wildlife to other vegetated areas upstream and downstream of the project area. Arboreal mammals (raccoons, opossums, and rats) and terrestrial mammals (skunks, feral cats) are mobile and highly adaptive. Wildlife is expected to utilize the project area upon completion of construction. Thus, temporary displacement

would entail less than significant impacts.

- **Special status species:** There is low potential for the vireo to occur within the project site since they have mostly been found in densely vegetated areas downstream of the project. Construction of the pier would require removal of seven willow trees and clearing of 0.18 acres of shrubs. Implementation of Mitigation Measure BIO-4 (work outside of nesting season and preconstruction biological surveys) would avoid impacts to the vireo.

- **Migratory Birds:** The vegetation within the Glendale Narrows supports variety of avian species including shorebirds, songbirds, wading birds, raptors, hummingbirds, and others totaling approximately 54 species of birds that utilize the area year round. Presence of construction equipment and noise in the River would temporarily scatter migratory birds to other vegetated areas upstream and downstream of the project area. Implementation of Mitigation Measure BIO-4 (work outside of nesting season and preconstruction biological surveys) would minimize impacts during construction.

  Once constructed, the array of cables extending from structural mast to the bridge deck cold increase the risk of collision at night since they can be difficult for birds to see as they are flying. The array of cables planned for this bridge and the relatively low height of the bridge across the river could create a hazard for birds navigating up and down the course of the river.

  The bridge utilizes cables that maximizes visibility. Cable diameters are between 1.75" on the front stays (east of the mast) and 2.5" on the back stays (west side of the mast). Furthermore, the cables will be arrayed in a vertical orientation from a massive center mast creating the appearance of a monolithic structure. Implementation of Mitigation Measure BIO-5 (Birdstrike Mitigation and Monitoring Program) would result in less than significant impacts.

Site Location A Alternative

No Action Alternative

There would be no construction or disturbance of vegetation, wildlife, or habitat under the No Action Alternative. Horses would continue to use the river, which would continue to be a detriment to water quality and cause trampling of native riparian and wetland vegetation. There would also be no program for Arundo removal and it would continue to spread in the area, choking out native riparian plant species. *While the No Action Alternative would not result in an adverse effect on biological resources, the benefits associated with the project would not be achieved. No mitigation is required.*

Mitigation Measures

Mitigation Measure BIO-1. Preventing Spread of Invasive Species
To minimize the spread of invasive plant species into construction areas, construction vehicles and equipment shall be cleaned with compressed water or air within a designated containment area prior to accessing the work area.

Mitigation Measure BIO-2. Vegetation Removal and Disposal
During vegetation removal, invasive plants, including seeds, rhizomes, and other plant parts, shall be contained and disposed of in an appropriate disposal facility away from the work zone.

Mitigation Measure BIO-3. Weeding Maintenance in the Project Area
After construction is complete, weeding maintenance shall be performed in the project area for 1 year post-construction to support natural recruitment and the re-establishment of native plant species.

Mitigation Measure BIO-4. Nesting Bird Avoidance
Vegetation clearing activities that involve tree removal or trimming would be timed as much as possible to occur outside the migratory bird nesting season, which occurs generally from March 1 through August 31 and as early as February 1 for raptors. If construction must occur during the nesting season, surveys for nesting birds would be conducted prior to construction activities, including removal of vegetation. Two biological surveys would be conducted, one 15 days prior and a second 72 hours prior to construction that would remove or disturb suitable nesting habitat. The surveys would be performed by a biologist with experience conducting breeding bird surveys. The biologist would prepare survey reports within 24 hours of conducting the surveys, documenting the presence or absence of any nesting bird in the habitat to be removed and any other such habitat within 300 feet of the construction work area (or within 500 feet for raptors). If an active nest is located, construction within 300 feet of the nest (or 500 feet for raptor nests) would be postponed until the nest is vacated and juveniles have fledged (minimum of six weeks after egg-laying) and when there is no evidence of a second attempt at nesting.

Mitigation Measure BIO-5. Bird Strike Mitigation and Monitoring
Implement nighttime lighting protocols to maximize visibility for migratory birds and minimize bird strikes. Implement monitoring program.

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

4.2 Air Quality, Climate Change and Odors

The analysis is associated with construction and operation of the proposed action and alternatives within the Atwater Village neighborhood of the City of Los Angeles. California is divided into fifteen different air basins based on common geographic and political boundaries. The South Coast Air Basin (SoCAB) covers the portion of Los Angeles County in which the proposed North Atwater Crossing project is located. The South Coast Air Quality Management District (SCAQMD) has jurisdiction for local air quality impacts in the South Coast portion of Los Angeles County.

4.2.1 Environmental Setting

The climate of the SoCAB is determined primarily by terrain and geography. Regional meteorology is dominated by a persistent high pressure area that commonly resides over the eastern Pacific Ocean. Seasonal variations in strength and position of this pressure cell cause changes in area weather patterns. Local climactic conditions are characterized by warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and moderate humidity. The SoCAB's normally mild climate is occasionally interrupted by periods of hot weather, winter storms, and hot easterly Santa Ana winds.

The SoCAB area has high levels of air pollution, particularly from June through September. Factors leading to high levels of pollution include a large amount of pollutant emissions, light winds, and shallow vertical atmospheric mixing. These factors reduce pollutant dispersion, exacerbating elevated air pollution levels. Pollutant concentrations in the SoCAB vary by location, season and time of day. Concentrations of O_3, for example, tend to be lower along the coast and in far inland areas of the basin and adjacent desert and higher in and near inland valleys.

Over the past 30 years, substantial progress has been made in reducing air pollution levels in Southern California. Previously, the USEPA designated SoCAB as a nonattainment area for all NAAQS except SO_2. The USEPA now designates SoCAB as in attainment for NO_2, SO_2, and CO. PM_{10}, $PM_{2.5}$, and O_3 levels, while reduced substantially from their previous peaks, remain above relevant NAAQS. Also, the lead NAAQS was lowered on January 12, 2009 (73 FR 66964) and the Los Angeles County portion of the SoCAB was designated as nonattainment for lead, effective December 31, 2010 (75 FR 71033).

Methodology

The air quality analysis was conducted to determine construction-related emissions using the California Emissions Estimator Model (CalEEMod), Version 2011.1.1 CalEEMod is a statewide land use emissions computer model that estimates construction and operational emissions from a variety of land use projects. CalEEMod also contains mitigation measures that can be used to reduce criteria and GHG emissions.

The analysis assumed that construction would occur over an eight-month period commencing in 2013 (earliest time possible for construction, as well as shortest period, which represents a worse case assumption). Operational emissions would be negligible because the bridge would be used for equestrian, bicycle, and pedestrian crossing and vehicular access would not occur; therefore, operational emissions were not quantified.

4.2.2 Thresholds of Significance

Based on the existing conditions described above, impacts would be considered significant if the alternatives:

- Violate federal air quality standards.
- Result in objectionable odor at the nearest sensitive receptor.

Greenhouse Gas Emissions

In the absence of federal regulation to govern the effects of climate change and GHG emissions, the CEQ provided draft guidance in a February 2010 memorandum that states that if a proposed action would cause direct emissions of 25,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year on an annual basis, then a quantitative and qualitative assessment of both direct and indirect GHG emissions should be completed. SCAQMD also developed a recommended interim threshold for assessing the significance of potential GHG emissions.

4.2.3 Environmental Consequences

Preferred Alternative

As discussed above, the air quality analysis was conducted to determine construction-related emissions using the CalEEMod. Operational emissions would be negligible because the bridge would be used for equestrian, bicycle, and pedestrian crossing and vehicular access would not occur; therefore, operational emissions were not quantified.

The main construction phases would include site preparation, site work, steel fabrication, and architectural finishings. Construction would occur six days per week over one shift and individual phases would not overlap. The footprint of the construction site was assumed to be equal to the bridge's total area, approximately 11,375 square feet (325 feet long by 35 feet wide). The type and quantity of off-road construction equipment, construction worker trips, and vendor trips assumed for the proposed action is included in Appendix A of this EA. No importing or exporting of excavated soil would occur during construction.

A summary of the regional emissions analysis is provided in **Table 4.2** below.

Table 4.2. Maximum Daily Criteria Pollutant Construction Emissions

Phase	Daily Emissions (lbs/day)					
	VOC	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	3.18	25.53	14.96	0.02	3.73	2.51
Site Work	1.68	13.00	10.88	0.02	1.32	0.99
Steel Fabrication	0.92	8.36	3.19	0.01	0.44	0.30
Architectural Finishings	9.02	28.19	14.67	0.03	1.73	1.58
Maximum	**9.02**	**28.19**	**14.96**	**0.03**	**3.73**	**2.51**
Significance Threshold	75	100	550	150	150	55
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Note:
PM_{10} and $PM_{2.5}$ emissions assume that fugitive dust is controlled by watering (SCAQMD Rule 403).
Key:
CO = carbon monoxide
lbs/day = pounds per day
NOx = nitrogen oxides
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
SO_2 = sulfur dioxide
VOC = volatile organic compounds

General Conformity Applicability Evaluation

As described previously, the general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria and precursor pollutants caused by the proposed action equal to exceed certain de minimis amounts, thus requiring the federal agency to make a determination of general conformity. The de minimis amounts vary based on the area's designation and classification for certain pollutants.

As shown in **Table 4.3**, unmitigated emissions for all pollutants would be less than the general conformity de minimis thresholds. As a result, a General Conformity Determination is not required.

Table 4.3. Annual Criteria Pollutant Construction Emissions

Phase	Annual Emissions (tpy)					
	VOC	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	0.04	0.31	0.18	<0.01	0.04	0.03
Site Work	0.04	0.30	0.27	<0.01	0.03	0.02
Steel Fabrication	0.02	0.25	0.10	<0.01	0.01	0.01
Architectural Finishings	0.21	0.67	0.35	<0.01	0.04	0.04
Maximum	**0.32**	**1.54**	**0.89**	**<0.01**	**0.13**	**0.10**
De Minimis Threshold	10	10	100	100	70	100
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Note:
PM_{10} and $PM_{2.5}$ emissions assume that fugitive dust is controlled by watering (SCAQMD Rule 403).
Key:
CO = carbon monoxide
NOx = nitrogen oxides
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compounds

Localized Significance Thresholds

The SCAQMD developed thresholds for local air quality impacts from construction activity (SCAQMD, 2008 and SCAQMD, 2009). Localized significance thresholds (LSTs) are only applicable to the following criteria pollutants: NOx, CO, PM_{10}, and $PM_{2.5}$. LSTs are analogous to California Ambient Air Quality Standards (CAAQS); pollutant levels below LSTs would not necessarily be expected to violate the CAAQS. LSTs consider ambient concentrations of pollutants for each source receptor area and distances to the nearest sensitive receptor.

LST emission tables were developed by the SCAQMD for projects up to five acres in size. SCAQMD recommends using the equipment type to determine the maximum daily disturbed acreage when analyzing air emissions with CalEEMod (SCAQMD, 2011). A review of the proposed equipment types (e.g., bulldozer, backhoe, etc.) indicated that no more than half an acre would be disturbed per day. The LST tables for one acre, the smallest acreage available, were therefore used to complete the analysis.

As described in the SCAQMD's LST Methodology (SCAQMD, 2008), only on-site emissions, which include fugitive dust and off-road construction equipment, were included in the LST analysis and not offsite mobile emissions from the proposed action (e.g., construction worker commuting or vendor trips). Onsite operational emissions are anticipated to be negligible and were not quantified.

Table 4.4 summarizes the allowable emissions for construction emissions for a project located in the Central Los Angeles Source-Receptor Area (SRA). The closest receptor would be located in the equestrian center immediately adjacent to the proposed construction site. As a result, a distance of approximately 82 feet (25 meters) was used to complete the LST analysis.

Table 4.4. Maximum Daily Onsite Criteria Pollutant Construction Emissions

Phase	**Daily Emissions (lbs/day)**			
	NOx	**CO**	**PM_{10}**	**$PM_{2.5}$**
Site Preparation	25.45	14.18	3.57	2.50
Site Work	11.85	9.40	1.07	0.94
Steel Fabrication	7.94	2.35	0.28	0.28
Architectural Coatings	28.11	13.89	1.57	1.57
Maximum	**28.11**	**14.18**	**3.57**	**2.50**
LST	74	680	5	3
Significant?	**No**	**No**	**No**	**No**

Key:
CO = carbon monoxide
lbs/day = pounds per day
LST = localized significance threshold
NOx = nitrogen oxides
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter

Results of the analysis indicate that project-related construction emissions would not exceed the established SCAQMD thresholds for criteria pollutants, and thus would be

less than significant. As such, the construction of the proposed action would not result in a violation of air quality standards or substantially contribute to existing or projected air quality violations; therefore, the impact would be less than significant.

As shown in Table 4.4, construction emissions associated with the proposed action would not exceed the LST thresholds and localized peak daily emissions would be less than significant. Operational emissions would be negligible because the bridge would be used for equestrian, bicycle, and pedestrian crossing and vehicular access would not occur; therefore, no impacts from operational emissions are anticipated from the proposed action. Thus, no adverse air quality effects would occur under the Preferred Alternative; no mitigation is required.

GHG Emissions

Total GHG construction emissions were estimated to be 168 metric tons over the eight-month construction period.

Odors

For the purposes of this study, the nearest sensitive receptors were defined as residences located east of the I-5 Freeway (approximately 550 feet from the project site). Sensitive receptors are defined as locations where children, chronically ill individuals or other sensitive persons reside, which typically include convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. The project site is at a distance, over 550 feet, from such sensitive receptors that odors from construction would not be experienced at the residences. Thus, no adverse odor effects would occur under the Preferred Alternative; no mitigation is required.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, construction-related air quality, GHG, and odor impacts would be the same as the Preferred Alternative. Thus, no adverse air quality, GHG, or odor effects would occur under the Site Location A Alternative; no mitigation is required.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, construction-related air quality, GHG, and odor impacts would be the same as the Preferred Alternative. Thus, no

adverse air quality, GHG, or odor effects would occur under the Site Location B Alternative; no mitigation is required.

No Action Alternative

There would be no construction and, therefore, no construction-related emissions under the No Action Alternative. Thus, the No Action Alternative would not result in any adverse effect air quality, GHG, or odor effect; no mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.3 Noise

Regulatory Setting

Federal: In the past, the USEPA coordinated all federal noise control activities through its Office of Noise Abatement and Control. However, in 1981, the Administration at that time concluded that noise issues were best handled at the state or local government level. As a result, the USEPA phased out the office's funding in 1982 as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 were not rescinded by Congress and remain in effect today, although essentially unfunded. Additionally, Title IV – Noise Pollution, of the Clean Air Act provides guidance to state and local entities in establishing appropriate noise control standards.

State: The California Office of Noise Control (CONC) was established under the California Noise Control Act of 1972. The CONC is a division of the California Department of Public Health Services who are responsible for developing model noise ordinances for urban, suburban, and rural environments, developing criteria, and guidelines for use in setting standards for human noise exposure and assisting local governments in developing and implementing noise abatement procedures. [Ref: http://codes.lp.findlaw.com/cacode/HSC/1/d28/1/s46002].

CONC has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure in the form of a land use/noise compatibility matrix. This matrix is presented in **Table 4.5**. Cities within the state have incorporated this compatibility matrix into their General Plan noise elements. These guidelines are meant to maintain acceptable noise levels in a community setting based on the type of land use. Noise compatibility by different types of land uses is a range from "Normally Acceptable" to "Clearly Unacceptable" levels. The guidelines are used by cities within the state to help

determine the appropriate land uses that could be located within an existing or anticipated ambient noise level.

Table 4.5. Land Use Compatibility For Community Noise Environments (in dBA)

Land Use	Normally Acceptable [(a)]	Conditionally Acceptable [(b)]	Normally Unacceptable[(c)]	Clearly Unacceptable [(d)]
Single-family, Duplex, Mobile Homes	50 - 60	55 - 70	70 - 75	above 70
Multi-Family Homes	50 - 65	60 - 70	70 - 75	above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 - 70	70 - 80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50 - 70	---	above 65
Sports Arena, Outdoor Spectator Sports	---	50 - 75	---	above 70
Playgrounds, Neighborhood Parks	50 - 70	---	67 - 75	above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business and Professional Commercial	50 - 70	67 - 77	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	above 75	---

dBA = A-weighted decibels

(a) Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

(b) Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

(c) Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning normally will suffice.

(d) Insulation features included in the design. Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Noise Control, California Department of Public Health.

Local: The alternatives have the potential to affect noise levels within the County of Los Angeles and the City. Noise within the County and the City are regulated by noise ordinances, which are found in the municipal code of each jurisdiction. These noise ordinances limit intrusive noise and establish sound measurements and criteria, minimum ambient noise levels for different land use zoning classifications, sound emission levels for specific uses (such as radio, television, vehicle repairs, and amplified equipment), hours of operation for certain activities (such as construction and trash collection), standards for determining noise deemed a disturbance of the

peace, and legal remedies for violations. The County Noise Ordinance can be found in Title 12, Chapter 12.08 of the County Code. The noise ordinance for the City can be found in Chapter XI of the City municipal code. Noise due to construction and excavation work when prohibited is regulated under Chapter IV, Article 1, of the City of Los Angeles Municipal Code. Section 41.40 of the Los Angles Municipal Code controls construction noise using the following prohibitions:

- Engaging in construction, repair, or excavation work with any construction type device, or job-site delivering of construction materials without a Police Commission permit;
- Between the hours of 9:00 p.m. and 7:00 a.m.;
- In any residential zone, or within 500 feet of land so occupied, before 8:00 a.m. or after 6:00 p.m. on any Saturday, nor at any time on any Sunday;
- In a manner as to disturb the peace and quiet of neighboring residents or any reasonable person of normal sensitiveness residing in the area.

In addition, the City's standard construction specifications require construction equipment to have noise suppressing devices, and require noise controls such as placement of noise barriers, use of low-noise generating equipment, maintenance of mufflers and ancillary noise abatement equipment, scheduling high noise producing activities during periods that are least sensitive, routing construction-related truck traffic away from noise-sensitive areas, and reducing construction vehicle speeds. Construction equipment noise levels within 500 feet of residential areas are limited to 75 dBA[1] at 50 feet, if technically feasible.

The General Plan Noise Element for the City provides noise management goals, objectives, policies, and programs for the City to achieve and incorporates the CONC noise compatibility matrix. This matrix is used to help cities determine the appropriate land use and mitigation measures based on the existing or anticipated ambient noise levels.

4.3.1 Environmental Setting

The project site is located east of I-5 Freeway approximately one-half mile upstream of where Los Feliz Boulevard crosses the LA River. The existing noise environment is characterized predominantly by traffic noise from the I-5 Freeway. Other noise sources that contribute to

[1] Sound intensity is measured in decibels that are A-weighted (i.e., dBA) to correct for the relative frequency response of the human ear.

background noise in this area include adjacent light industrial/manufacturing facilities, residential areas, birds, and recreational activities. The nearest residential uses to the proposed action are within the Lincourt Stable property and are approximately 500 feet from the eastern edge of the project site. In addition, there is a residential neighborhood approximately 700 feet to the east of the project site; however, the closest residence to the project area is located 550 feet to the east.

Ambient noise levels throughout the entire project reach is best characterized by traffic noise from the I-5 Freeway. Though ambient noise levels of the I-5 were not studied for the project, another study of the I-210 Freeway indicate noise levels adjacent to freeways range from approximately 60dB to 70dB.[2] Therefore, noise levels ranging from 60dB to 70dB may best characterize ambient noise levels throughout the project reach. The exceptions are Reach 4 and Reach 5 where Taylor Yard and light industrial/manufacturing facilities are located. Ambient noise levels at this reach maybe higher than 70dB.

Methodology

Noise calculations were based on standard noise levels of anticipated construction equipment used during construction phases and the Federal Highway Administration (FHWA) Roadway Construction Noise Model. Accordingly, each anticipated piece of construction equipment, at 50 feet, is estimated to produce between 74 and 81 dBA, on average, and daily construction Community Noise Equivalent Levels (CNELs) are estimated to range from 83 to 88 dBA at 50 feet (FHWA, 2006). At residential areas 500 feet away, the daily average noise level with construction would be approximately 67 dBA or less. It is estimated that the existing ambient noise level of the residential area is approximately 65 dBA; therefore, the increase in noise level with construction would be 2 dBA or less, which would be imperceptible. Most construction would occur Monday through Friday between the hours of 7:00 a.m. and 9:00 p.m. (most likely, daily construction would not occur after 3:30 p.m.) and between the hours of 8:00 a.m. and 6:00 p.m. on Saturdays.

4.3.2 Thresholds of Significance

Based on the existing conditions described above, an alternative would result in adverse noise effects if the alternative:

- Creates a substantial temporary or periodic increase in ambient noise levels for residents or workers in the project vicinity above levels existing without the project.

[2] Mestre Greve Associates. May 9, 2006. *I-210 Freeway Noise Monitoring Program.* Prepared for the City of Glendale.

- Leads to permanent abandonment of riparian avian species from the project reach due noise levels.

4.3.3 Environmental Consequences

The following analysis evaluates the potential for the three build alternatives and the No Action Alternative to adversely affect noise within the project site:

Preferred Alternative

Construction activities associated with the Preferred Alternative would generate noise impacts. Based on standard noise levels of anticipated construction equipment used during construction phases and the FHWA Roadway Construction Noise Model, the daily average noise level with construction at residential areas 500 feet away would be approximately 67 dBA or less. It is estimated that the existing ambient noise level of the residential area is approximately 65 dBA given that the area is located approximately 700 feet east of the site; therefore, the increase in noise level with construction would be 2 dBA or less, which would be imperceptible.

Most construction would occur Monday through Friday between the hours of 7:00 a.m. and 9:00 p.m. (most likely, daily construction would not occur after 3:30 p.m.) and between the hours of 8:00 a.m. and 6:00 p.m. on Saturdays. The only instance where night construction would occur is when the bridge components are delivered to the project site via the I-5 Freeway on the west side of the River. As delivery of construction materials at night is prohibited, permission from the Executive Director of the Board of Police Commissioners must be obtained in writing. Mitigation Measure NOISE-1 would be required to mitigate temporary elevated noise associated with night construction on nearby residences. With implementation of Mitigation Measure NOISE-1, adverse noise effects would not occur from construction of the Preferred Alternative.

Operation of the proposed action, a multi-modal bridge, would not result in exposure of persons to or generation of noise levels in excess of established standards because the project would operate passively and only maintenance and inspections would occur, which are minor activities that do not generate substantial noise levels. Therefore, no adverse noise effects would occur from operation of the Preferred Alternative. Thus, with implementation of mitigation, no adverse noise effects would occur from construction and operation of the Preferred Alternative.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Proximity to sensitive receptors would be the same under this alternative.

Therefore, under the Site Location A Alternative, construction-related noise impacts would be the same as the Preferred Alternative. Mitigation Measures NOISE-1 would be required under the Site Location A Alternative to reduce these impacts to a less than significant level. Thus, with implementation of mitigation, no adverse noise effects would occur under the Site Location A Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Proximity to sensitive receptors would be the same under this alternative. Therefore, under the Site Location B Alternative, construction-related noise impacts would be the same as the Preferred Alternative. Mitigation Measures NOISE-1 would be required under the Site Location B Alternative to reduce these impacts to a less than significant level. Thus, with implementation of mitigation, no adverse noise effects would occur under the Site Location B Alternative.

No Action Alternative

Under the No Action Alternative, the site would remain in its pre-project state. Therefore, there would be no increase in noise levels. Thus, the No Action Alternative would not result in an adverse effect on noise sensitive receptors; no mitigation is required.

Mitigation Measures

Mitigation Measure NOISE-1. Nighttime Construction Noise

During nighttime construction activities where the construction work zone falls within 500 feet or with a direct line of sight to residences, the contractor shall monitor nighttime construction noise and implement applicable measures as identified in the project's Noise Monitoring and Control Plan described below. As applicable, the contractor or City project manager shall obtain approval for construction outside of the City's Noise Ordinance from the Executive Director of the Board of Police Commissioners.

Mitigation Measure NOISE-2. Noise Monitoring and Control Plan

The contractor shall prepare and implement a Noise Monitoring and Control Plan. The plan shall identify personnel responsible for receiving and resolving noise complaints as well as noise complaint reporting requirements and methods for complaint logging, investigation, and status tracking. The plan shall also include potential noise reduction measures to be implemented as needed to ensure compliance with the approval from the Executive Director of the Board of Police Commissioners and to address potential night construction impacts. Such measures may include but not be limited to the following:

- Maintaining construction equipment in good working condition in order to minimize general noise emissions.
- Providing temporary sound wall, noise curtain, noise blanket, or other acoustical noise barrier of a sufficient height, length and configuration so as to provide substantial noise reduction and effectively block the line-of-sight between nearby noise-sensitive receivers and the work zone.
- Limiting the number of construction equipment operating at one time.
- As feasible, providing equipment with exhaust mufflers, noise shield, noise blanket, or other acoustical noise barrier or enclosure.
- Configuring traffic pattern to minimize backing movement and backup alarms.
- Using noise-producing signals, including horns, whistles, alarms, and bells for safety warning purposes only.
- Minimizing idling equipment.
- Locating material stockpiles and mobile equipment staging, parking, and maintenance areas as far as practicable form noise-sensitive receptors.
- As feasible, using electrically-powered equipment instead of pneumatic or internal combustion powered equipment.

4.4 Cultural Resources

4.4.1 Environmental Setting

The project area is located in an urban, built environment in the City of Los Angeles. Most of the project area consists of existing freeway, highway, ramps, bridge over-crossings, bicycle and equestrian paths, and other related transportation improvements. The I-5 Freeway and the Los Angeles River are prominent elements of the existing environment, while modern buildings and landscaping characterize much of the remaining project area.

The project is located within the Glendale Narrows section of the Los Angeles River, an approximately 6.2-mile-long, soft-bottom trapezoidal channel constructed in 1939. The Glendale Narrows reach is one segment of the 51-mile long Los Angeles County Drainage Area System completed in 1959. Though the majority of the Los Angeles River is completely lined with concrete, the invert of the Glendale Narrows reach was not channelized due to a high ground water table at the site.

A Historic Property Evaluation Report completed in 2013[3] determined that the channelized segment of the Los Angeles River within the project reach is not eligible for listing in the National Register of Historic Places for the following reasons:

[3] Greenwood and Associates (2013). *North Atwater Crossing Project - Historic Property Evaluation Report*

- The historical setting of the resource was significantly compromised by construction of the I-5 Golden State Freeway in the late 1950s. Construction of the 10-lane Freeway directly adjacent to the river channel severed the connection between the natural environment of Griffith Park and the waterway that had existed until that time.
- The segment does not appear eligible for state or local historic designation by merit of its association with important historical events or patterns of events.
- While the system as a whole may be viewed as historically important, this particular section of the Los Angeles River channel does not possess any special or noteworthy associations with the flood control program developed and implemented by the USACE, the organization primarily responsible for its implementation.
- The existing channel is of standard design and materials, and comparable in appearance and function to the one hundred-plus miles of channels which have carried all of the county's principal rivers since the mid twentieth century. This segment displays no unique or innovative design elements.

The Glendale Narrows reach was also utilized by the Gabrielino Indians. One of the largest Gabrielino settlements was located on the future site of the city of Los Angeles within the vicinity of the project reach.

4.4.2 Thresholds of Significance

An adverse effect to cultural resources would occur if construction and/or operation of the alternative would result in the following:

- Substantially affect the integrity of NRHP or NRHP-eligible structures through physical destruction or alteration.
- Destruction of sensitive cultural resources.

4.4.3 Environmental Consequences

Preferred Alternative

Architectural integrity of Glendale Narrows Reach of the Los Angeles River
Subsequent to the completion of construction a number of modifications have been made to the embankment so as to compromise the architectural integrity of the Glendale Narrows reach. In the mid-1970s, the eastern embankment approximately 0.5 miles upstream of the project site was modified for the construction of a 0.04 acre outfall to release treated wastewater from the Los Angeles-Glendale Water Reclamation Plant. In 1996, the City of Los Angeles constructed a 3.2 mile bike path on top of the west

embankment, from Riverside Dr. (at Victory) down to Los Feliz Blvd. The next mile and a half to Fletcher Drive was completed in 2000 with the completion of the Los Feliz overpass. The bike path required placement of guard rails along the embankment. The bike path across Los Feliz Blvd. required modification of the embankments. Furthermore, there are approximately 34 power line towers along the west and east embankments. A number of the towers have concrete footing on the embankments, requiring modifications to the embankments. Last, the proposed pedestrian/equestrian bridge is not the first non-motor vehicle bridge to be constructed across the Glendale Narrows reach. The Sunnynook Drive pedestrian crossing approximately one mile downstream of the proposed bridge is supported by approximately 6 piers and two abutments. The abutments and two piers are located on the embankments. Furthermore, there are approximately 34 power line towers along the west and east embankments. A number of the towers have concrete footing on the embankments. The proposed pedestrian/equestrian bridge would entail placement of one center pier in the channel invert, and one peer on the upper strata of the west embankment. Furthermore, in order to provide hydraulic mitigation, the applicant may need to construct an approximately 130 foot long, 6-inch high curb along along the west embankment upstream of the bridge site, and a 200 foot long, 12-inch high curb along the east embankment. The proposed modifications to the embankments are minor. Furthermore, the architectural integrity of the Glendale Narrows reach of the Los Angeles River has been compromised by multiple modifications subsequent to completion of construction. Moreover, the modifications would not change the essential characteristic of Glendale Narrows; the trapezoidal, soft bottom character would still be maintained.

Furthermore, a Historic Property Evaluation Report completed in 2013 determined that the channelized segment of the Los Angeles River within the project reach is not eligible for listing in the National Register of Historic Places. In a letter dated August 5, 2013, the Corps sough concurrence from the SHPO for the

- determination of non-eligibility
- delineation of the Area of Potential Effect
- determination of no effects to historic properties

In a letter dated September 9, 2013, the SHPO concurred with all three determinations above.

Earthmoving activities in the river

Construction of the center pier within the channel invert would require earthmoving activities such as excavation and grading. Paleontological artifacts could be present in the soft bottom channel due to prehistoric utilization of the project reach by Gabrielino Indians. One of the largest Gabrielino settlements was located on the future site of the city of Los Angeles within the vicinity of the project reach . However, Paleontological

artifacts, if present, would have been substantially disturbed when the levees were constructed in 1939, and subsequent maintenance activities which may have involved grading. Therefore, the channel invert is highly disturbed to such a degree that no significant cultural resources could remain. Based on the above and with implementation of Mitigation Measures identified below, earthmoving activities associated with the construction of the bridge would entail less than significant impacts to prehistoric cultural resources.

Construction staging areas
Construction activities may require the establishment of staging areas within the vicinity of the east embankment. The upland adjacent to the east embankment is fully built out. Since all potential staging areas within the vicinity of the embankment have been previously developed, the applicant would not need to undertake earthmoving activities or demolish structures in order to establish a staging area. Therefore, establishment staging areas would entail no impacts to cultural resources.

Based on the above the proposed modifications would entail less than significant impacts to cultural resources.

Site Location A Alternative
Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative.

Site Location B Alternative
Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative.

No Action Alternative
Under the No Action Alternative, the site would remain in its pre-project state. No ground disturbing activities would occur and no structures would be constructed. Therefore, there would be no construction-related impacts to cultural resources.

Mitigation Measures

Mitigation Measure CUL-5.
If human remains or other sensitive cultural resources are unearthed during earthmoving activities, the applicant shall cease earthmoving activities and contact the Corps. The Corps archaeologist will evaluate the findings and coordinate with the State Historic Preservation Officer or Native American tribes as appropriate. The applicant shall not resume earthmoving activities until the Corps completed the coordination process.

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

4.5 Erosion, Sedimentation and Groundwater

The following section analyzes erosion, sedimentation and groundwater within the vicinity of the proposed action and whether or not implementation of the No Action Alternative or three build alternatives would result in adverse environmental:

4.5.1 Environmental Setting

The project site is located within a potentially liquefiable zone. Potentially liquefiable soils are present at the project site at depths ranging from 20 to 25 feet. Based on borings conducted at the project site, the project site contains the following soil formations: Topanga Formation (Ttsl); Stream Channel Deposits (Og); and Artificial Fill. The western bank of the LA River consists of artificial fill underlain by alluvium, which is underlain by Topanga Formation Bedrock. On the eastern bank of the LA River, soils consist of artificial fill underlain by alluvium. The shallowest groundwater encountered at the project site was approximately 19 feet below ground surface.

Some of the Topanga Formation is clayey and potentially expansive, but these types of soils are at significant depths. Expansive soils typically pose a problem for light structures supported on shallow foundation such that the moisture change (due to irrigation, seasonal change, rainfall, etc) can expand/heave and push foundation upwards causing distress.

Methodology

A Geotechnical Exploration Report was prepared by Leighton Consulting, Inc. for the Preferred Alternative; conditions for the other build alternatives would be similar to the conditions associated with the Preferred Alternative given the close proximity of alternative locations. The analysis that follows is based upon the findings and recommendations included within the Geotechnical Exploration Report as well as standard practices employed for City projects.

4.5.2 Thresholds of Significance

Based on the existing conditions described above, adverse environmental effects would occur if the alternative:

- Substantially accelerates the natural processes of water erosion and sedimentation, resulting in sediment runoff or deposition.
- Disrupts ground water percolation or infiltration

4.5.3 Environmental Consequences

Preferred Alternative

The majority of ground disturbing activities would occur within the LA River, which is currently affected by water erosion. Construction of the proposed action would include

excavation, trenching, drilling, grading, and landscaping. During construction, the LA River channel would be redirected away from the work zone as necessary. These activities could result in the potential for erosion to occur at the project site, though soil exposure would be temporary and short-term in nature. The applicant would implement a Storm Water Pollution Prevention Plan (SWPPP) for erosion and sedimentation control. Best management practices (BMPs), such as silt fencing, sediment traps, sandbag barriers or other effective BMPs would also be undertaken to control runoff and erosion from any earthmoving activities that would occur. Implementation of such control measures would prevent substantial soil erosion or the loss of topsoil from exposed soils. After construction Mitigation Measures BIO-1, BIO-2, BIO-3, and BIO-4 would be implemented to promote the natural re-establishment of riparian vegetation in the channel. Other than the main bearing pier located in the LA River, no other structures would be placed in the River. The proposed action would not expose new soil that was not previously exposed to erosion effects of the River. As such, construction or operation of the proposed action would not result in a substantial amount of erosion, and impacts would be less than significant.

Due to soil liquefaction, the riverbanks are likely to experience displacement due to lateral spreading. However, the 2012 geotechnical exploration report prepared for the proposed action includes design recommendations and construction measures to ensure that the soils are suitable for construction of the proposed action. For example, the potentially liquefiable soils in the riverbed, at the proposed location of the main pier, would be removed and replaced with aggregate and in-situ ground improvement techniques would be used for the liquefiable soils on the riverbanks. As such, implementation of the proposed action would not have the potential to result in significant impacts associated with unstable soils and impacts would be less than significant. In addition, the proposed bridge is a heavy structure that would be supported on piles embedded at significant depth below the existing grade. As a result, potentially expansive soils would not affect construction and operation of the proposed action and impacts would be less than significant. Thus, no adverse erosion and sedimentation effects and no adverse groundwater level or groundwater quality effects would occur under the Preferred Alternative; no mitigation is required.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, construction-related erosion and sedimentation impacts would be the same as the Preferred Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, construction-related erosion and sedimentation impacts would be the same as the Preferred Alternative.

No Action Alternative

Under the No Action Alternative, the project area would remain as is. No construction, vegetation clearing, or excavation would occur.

Mitigation Measures

No mitigation measures are required.

4.6 Water Quality

4.6.1 Environmental Setting

The project reach is a 303(d)-listed water body. The 6.2-mile-long project reach is a perennial water body that conveys approximately 30 million gallons per day discharged from the Tillman Water Reclamation Plant, and the Glendale Water Reclamation Plant. Though the quality of water discharged from the treatment plant is suitable for industrial, and landscape uses, one study of water quality within the Los Angeles River found the high concentrations of nutrients including nitrate, nitrite, ammonia, and total phosphate within the discharged effluent. The project reach also receives input from numerous storm water outfalls. High concentrations of bacteria including total coliform, E. coli, and Enterococcus are associated with nuisance flow discharged from the storm water outfalls.

Methodology

Evaluation of the proposed action, as well as each of the other build alternatives and the No Build Alternative, is completed for each of the thresholds listed above. Information is based on existing water quality information for Reach 3 of the LA River, the Reach in which the project site is located.

4.6.2 Thresholds of Significance

Based on the existing conditions described above, impacts would be considered significant if the alternative:

- Caused a violation of state water quality standards or otherwise substantially degrades water quality.

4.6.3 Environmental Consequences

Preferred Alternative

Construction of the cable-stayed bridge under the Preferred Alternative would require a single concrete pier to be placed within the river's invert and one additional pier on the upper part of the west embankment outside of the invert. Activities in the channel invert that could affect water quality include excavation, trenching, drilling, and grading. There may be short-term impacts to water quality during construction of the pier structure. However, the work area would be isolated from the surface flows through the use of dewatering structures. Other standard stormwater detainment BMPs would also be implemented during construction. With the implementation of conditions of the Section 401 Water Quality Certification and Section 404 permits (required in general for projects affecting water quality), the in-water construction activities would result in less than significant impacts to water quality.

The bridge's long-term operation is expected to result in benefits to the River's water quality by reducing the use of the riverbed itself by horses and reducing associated wastes being introduced into the LA River. Thus, no adverse effects to water quality would occur under the Preferred Alternative; no mitigation is required.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, water quality impacts would be the same as the Preferred Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, water quality impacts would be the same as the Preferred Alternative.

No Action Alternative

Under the No Action Alternative, no bridge structure would be constructed. Therefore, the existing water quality parameters (turbidity, salinity, debris, etc. would remain unaffected.

Mitigation Measures

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

Mitigation Measure WQ-1. Work Area Isolation
The applicant shall sufficiently isolate the in-water work area from surface flows to minimize turbidity in the downstream water column, and implement all terms and conditions of the Section 401 Water Quality Certification, and Section 404 authorization.

Mitigation Measure WQ-2. Stormwater Run-off to State highway facilities
The applicant shall secure a permit from the California Department of Transportation if construction or operation of the bridge result in the discharge of storm water run-off onto State highway facilities.

4.7 Flood Risk Assessment

The following section analyzes the flood risk assessment within the vicinity of the project site and whether or not implementation of the No Action Alternative and three build alternatives would affect flooding risk and/or impede or redirect flood flows:

4.7.1 Environmental Setting

The proposed action is located at a section of the LA River known as the Glendale Narrows. The LA River channel in the vicinity of the project site consists of concrete-lined banks to control major flood events.

The City, in coordination with Los Angeles County, state, and federal agencies, has an extensive system for providing protection against flood hazards caused by wet weather flows. The system includes dams, open channels, flood control basins, storm drains, catch basins, culverts, pumping plants, debris basins, storage basins, and spreading grounds. The system drains wet and dry weather runoff from surface areas such as streets and routes flows into underground pipes and drains discharging to various streams and channels. Ultimately, runoff is discharged to the Pacific Ocean. However, even with flood control devices, portions of Los Angeles lie within 100- and 500-year flood zones as defined by the Federal Emergency Management Agency (FEMA).

Methodology
A Hydraulics and Water Surface Assessments Report was prepared by Fuscoe Engineering, Inc. for the Preferred Alternative; conditions for the other build alternatives would be similar to the conditions associated with the Preferred Alternative given the close proximity of alternative locations. The analysis that follows is based upon the findings and recommendations included within the Hydraulics and Water Surface Assessments Report as well as standard practices employed for City projects.

4.7.2 Thresholds of Significance

An adverse change in flood risk would occur from construction and/or operation of the alternative or any action that would result in the following:

- Exposes people or structures to a substantial risk of loss, injury or death involving flooding.

4.7.3 Environmental Consequences

Preferred Alternative

Construction of the proposed action would introduce one concrete pier into the LA River located in the middle of the River span approximately 93 feet east of the bridge's west abutment. A second pier would be located at the upper stratum of the west embankment. In order to evaluate potential impacts to the surface flow, including impacts as a result of siltation, a hydraulic analysis was prepared to compare the changes to the channel's hydraulic performance based on the proposed bridge project. Based upon the results from the hydraulic assessments conducted for the proposed action, the project has the potential to cause a 0.93-foot increase to the channel's design water surface elevation based upon the project's proposed bridge pier locations and configurations. The backwater effect, or upstream water elevation change, due to the new pier placement is estimated to propagate upstream approximately 2,200 feet, but in terms of substantial increases (i.e., greater than one-half foot) the backwater propagation is more on the order of approximately 500 feet. Therefore, the proposed action does have the potential to affect drainage and flow within the LA River at this location as a result of the new pier and potential siltation, which in turn translates to a potentially significant impact with a resulting loss in "freeboard protection"[4] up to 2,200 feet upstream of the proposed bridge location.

In order to mitigate the loss of freeboard protection and therefore minimize the potential risk from flooding upstream of the bridge, mitigation is required. Implementation of either Mitigation Measure FLOOD-1A or Mitigation Measure FLOOD-1B would continue to control flows within the River and reduce potentially significant impacts to a less than significant level. Thus, with implementation of mitigation, no adverse flood risk effects would occur under the Preferred Alternative.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, impacts to flooding risk would be the same as the Preferred Alternative. Therefore, with implementation of Mitigation Measure FLOOD-1A or Mitigation Measure FLOOD-1B, impacts would be

[4] Freeboard is the additional capacity in the River above the calculated capacity and is used to minimize the risk of flooding. Freeboard protection is the maintaining of this safety factor through the design of structures (such as the proposed project) in such a manner that the freeboard is not compromised and the risk of flooding is minimized.

less than significant.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, impacts to flooding risk would be the same as the Preferred Alternative. Therefore, with implementation of Mitigation Measure FLOOD-1A or Mitigation Measure FLOOD-1B, impacts would be less than significant.

No Action Alternative

Under the No Action Alternative, the project area would remain in pre-project conditions. There would be no construction and, therefore, no construction-related flood risk effects.

Mitigation Measures

Mitigation Measure FLOOD-1A. Provide Freeboard Minimums

If Mitigation Measure FLOOD-1B is not implemented, prior to placing the support pier for the multi-modal bridge into the Los Angeles River (River), a new 6-inch high curb element shall be constructed for a distance of 130 feet along the west bank upstream of the bridge site, and a new 12-inch high curb element shall be constructed for a distance of 200 feet along the east bank of the River.

Mitigation Measure FLOOD-1B. No Increased Flooding Risk

If Mitigation Measure FLOOD-1A is not implemented, during construction, and prior to placing the support piers for the multi-modal bridge into the Los Angeles River, a new 12-inch curb element and a 6-inch curb element for distances of 650 feet and then 2,650 feet, respectively, shall be constructed along the west (right) and east (left) banks upstream of the bridge site.

4.8 Public Safety (Hazardous Materials, Geologic Hazards and Emergency Response)

4.8.1 Environmental Setting

Currently, an equestrian crossing exists in the project vicinity. The existing crossing poses a hazard when equestrians try to cross the River when waters are fast moving. In addition, the slippery cement and algae-lined floor of the River poses a hazard to equestrians.

Known Hazardous Materials Sites in the Project Vicinity

No sites with known hazardous materials releases were identified on the project site or within the immediate vicinity of the proposed action. The EnviroStor database identified

11 leaking underground fuel tank (LUFT), eight cleanup sites in the project vicinity, and zero LUFTs and cleanup sites within a one-quarter mile radius of the project site. The following sites are located within the general vicinity of the project:

- Garrett Estate Property, located at 3941 Goodwin Avenue, is listed as a Voluntary Cleanup Site for sludge, PCBs and asbestos-containing materials in soil from warehousing uses; a No Further Action determination was issued in January 2001.
- Excello Plating Company, Inc., located at 4057 Goodwin Avenue, is listed as a Tiered Permit site for metals in soil and for contaminants stored at the site; the site was referred to the Regional Water Quality Control Board in August 2005.
- Adams Rite Products, Inc., located at 540 West Chevy Chase Drive, is listed as a Tiered Permit site and was referred to another agency.
- San Fernando Valley (Area 4) Pollack Federal Superfund Site, is listed as a National Priorities List site for tetrachloroethylene (PCE), trichloroethylene (TCA), trichloroethylene (TCE), chromium III and chromium IV in an aquifer used for drinking water, soil and a well used for drinking water from aerospace manufacturing and maintenance as well as metal plating; the site is undergoing operations and maintenance as of January 1999.
- Los Feliz Charter School for the Arts, located at 2709 Media Center Drive, is listed as a School Investigation site for arsenic, lead and diesel from manufacturing uses; the site is inactive and requires evaluation, as of December 2008.
- Franciscan Ceramics, located at 2901 Los Feliz Boulevard, is listed as a State Response site for lead, cadmium and zinc in soil from manufacturing and ceramics uses; the site is in operations maintenance as of December 1994.
- Wilshire Properties, located at 4685 San Fernando Road, is listed as a State Response site for arsenic, lead, diesel and gasoline in soil and soil vapor from metal planting; the site was certified in November 1985.
- Pacific Edison School, located at Pacific Avenue and Vine Street, is listed as a School Investigation site for metals, semivolatile organic compounds and volatile organic compounds in soil; the site received a No Further Action determination in September 2001.
- The status of the LUFT cases includes ten closed cases and one open-site case under remediation. All of the open and closed LUFT cases and cleanup sites are located at least one-half mile from the project site where no improvements are

proposed.

Methodology
The analysis that follows is based on existing conditions and whether or not implementation of the proposed action would affect health and safety for populations in the project vicinity with respect to hazardous materials.

4.8.2 Thresholds of Significance

An adverse effect to public health and safety would occur if construction and/or operation of the alternatives would result in the following:

- Fosters conditions that would substantially endanger public health and safety with respect to exposure to hazardous materials, geologic hazards, and emergency response.

4.8.3 Environmental Consequences

Preferred Alternative
The project site is not located on a site which is included on a list of hazardous materials sites compiled pursuant to the Department of Toxic Substances Control (Government Code Section 65962.5). Additional considerations for public health and safety are discussed below:

Hazardous Materials Used During Construction
The proposed action would involve the construction of a multi-modal bridge across the LA River. Construction activities would be short-term and limited in nature and may involve transport, storage, use or disposal of hazardous materials. Some examples of hazardous materials handling include fueling and servicing construction equipment on-site, and the transport of fuels, lubricating fluids, and solvents. Release of these materials could occur through spills or from runoff during storm events. As required by existing regulations, the project proponent will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will establish a protocol for proper emergency procedures and handling and disposal of hazardous materials if an accidental spill occurs during construction. The SWPPP will outline BMPs related to fueling, vehicle washing and handling, use, and storage of chemicals. Typical BMPs outlined in the SWPPP may include, but are not limited to:

- Having a spill prevention and control plan with a designated supervisor to oversee and enforce proper spill prevention measures;
- Providing spill response and prevention education for employees and subcontractors;

- Stocking appropriate clean-up materials onsite near material storage, unloading and use areas;
- Designating hazardous waste storage areas away from storm drains or watercourses;
- Minimizing production or generation of hazardous materials onsite or substituting chemicals used onsite with less hazardous chemicals;
- Designating areas for construction vehicle and equipment maintenance and fueling with appropriate control measures for runon and runoff; and
- Arranging for regular hazardous waste removal to minimize onsite storage.

Thus, no adverse effects to public health and safety related to hazardous materials during construction of the Preferred Alternative would occur; no mitigation is required.

Hazardous Materials at Sites in the Project Vicinity

Based on the EnviroStor database search, there are 11 LUFT sites, and 8 cleanup sites located in the general vicinity of the proposed action. None are anticipated to have an impact on the proposed action, and project construction would not affect ongoing remediation activities at the open sites. Should contaminated soils be encountered during construction activities, the soils would be excavated, treated or disposed of to the satisfaction of the applicable regulatory agencies, which could include the Los Angeles Fire Department, the LARWQCB, and/or California Department of Toxic Substances Control (DTSC), thereby eliminating any future risk of upset or accidental conditions. Likewise, if contaminated groundwater is encountered, it would be handled in compliance with applicable federal, state, and local regulations and would not pose a future risk of upset or accidental conditions. Adherence to regulations set forth by local, state, and federal regulatory agencies would reduce the potential for hazardous materials impacts to less than significant levels.

Operation of the proposed action would not affect ongoing remediation activities at the open LUFT sites nor require routine transport, use, or disposal of significant quantities of hazardous materials, including, but not limited to oils, pesticides, or chemicals; therefore, no impact is anticipated. Therefore, there would be no adverse effects on public health or safety from the transport, use, or disposal of hazardous materials in groundwater during construction of the Preferred Alternative; no mitigation is required.

Geologic Hazards

Adverse effects on public health and safety could occur from liquefaction and/or ground shaking associated with a seismic event or if the proposed action would cause or accelerate geologic hazards. The 2012 geotechnical exploration report prepared

specifically for the Preferred Alternative evaluated the potential for strong seismic ground shaking and provides recommendations to address these hazards. The facility would be designed by California-licensed professional civil and structural engineers. Construction work would be overseen by a licensed professional contractor, and as required by state regulations, compliance with safety standards would reduce the risk of seismic hazards. Designs and plans would also require reviews and permits per local, state and federal laws. In addition, compliance with applicable portions of existing codes pertaining to seismic building design and standards, such as the most recent edition of the California Building Code, the LAMC, and Bureau of Engineering's Standard Project Specifications would also reduce potential adverse effects associated with seismic ground shaking. As such, the construction and operation of the proposed action are expected to have a less than significant impact related to exposing people or structures to strong seismic ground shaking.

There is potential for liquefaction-induced settlement resulting from an earthquake occurring along any of several major active and potentially active faults in Southern California. Liquefaction typically occurs when near-surface (usually upper 50 feet) saturated, clean, fine-grained loose sands are subject to intense ground shaking. The shallowest groundwater encountered at the project site was at a depth of 19 feet below ground surface at the location of the proposed bridge. As indicated in the geotechnical exploration report, the project site is located within a potentially liquefiable zone. Potentially liquefiable soils are present at the project site at depths ranging from 20 to 25 feet. The 2012 geotechnical exploration report prepared specifically for the Preferred Alternative evaluated the potential for liquefaction and the proposed action includes design recommendations to ensure the structural integrity of the bridge from liquefaction-induced settlement resulting from seismic events. As such, construction and operation of the proposed action would not have the potential to result in significant impacts associated with liquefaction and impacts would be less than significant.

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. The project site is not located adjacent to any enclosed large bodies of water that could experience seiches during an earthquake. Thus, the potential for seiches impacting the project site and the construction and operation of the proposed action is considered very low and, therefore, the impact is less than significant. Tsunamis are tidal waves generated in large bodies of water caused by fault displacement or major ground movement. Hazardous tsunamis, which are rare along the Los Angeles coastline, have the potential to cause flooding in the low-lying coastal area. The project site and the construction and operation of the proposed action is located inland enough from the ocean that the potential to be affected by a tsunami is considered very low and, therefore, the impact is less than significant. *Therefore, no adverse effects to public health and safety from geologic hazards would occur; no mitigation is required.*

Emergency Response

The project would not require additional police protection beyond what is currently provided. Construction and operation of the proposed bridge may result in an increase in the number of people who use the bike and equestrian trails along the River, however, not to such an extent that police services would be affected. As such, impacts from the construction and operation of the proposed action would be less than significant. Construction and operation of the bridge would not result in the need for a new fire station or expansion of an existing fire station. As such, impacts from the construction and operation of the proposed action would be less than significant.

In the project area, the I-5 Freeway is a selected transportation route as identified in the Critical Facilities and Lifeline Systems map of the City of Los Angeles General Plan Safety Element. Main components of the bridge would be fabricated off-site and then transported and delivered to the project site. Delivery trucks would require the use of the eastern shoulder of the northbound I-5 Freeway adjacent to the project site and possible temporary northbound travel lane closure(s) directly adjacent to the shoulder. However, closures would be temporary and would occur at night on weekends. The majority of the I-5 Freeway would remain open during bridge component delivery. Therefore, emergency access would continue to be provided along the I-5 Freeway. No other roadway closures would be required during construction or operation of the Preferred Alternative. Thus, no adverse effects on public health and safety related to interference with implementation of emergency response plans or activities of police, fire protection, or other emergency services during construction or operation of the Preferred Alternative would occur; no mitigation is required.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Furthermore, implementation of the proposed action would enable safe, year-round passage into Griffith Park. Therefore, under the Site Location A Alternative, effects on public health and safety would be the same as the Preferred Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. Furthermore, implementation of the proposed action would enable safe, year-round passage into Griffith Park. Therefore, under the Site

Location B Alternative, effects on public health and safety would be the same as the Preferred Alternative.

No Action Alternative

Under the No Action Alternative, the project area would remain in its current conditions. There would be no construction and, therefore, no construction-related effects on public health and safety. The existing crossing currently poses a hazard when equestrians try to cross the River when waters are fast moving. In addition, the slippery cement and algae-lined floor of the River poses a hazard to equestrians. These hazards would remain the same.

Mitigation Measures

Mitigation Measure TRAF-1. Traffic Management Plan

A Traffic Management Plan (TMP) shall be prepared prior to the start of construction for review and approval by Caltrans District 7. The Traffic Management Plan shall outline provisions for maintaining LOS C or better conditions on the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The TMP shall include measures to offset traffic congestion and maintain traffic flow. The preliminary TMP shall include proposed Lane Closure Charts and Detour Plans and will be finalized by the time final designs are prepared.

Mitigation Measure TRAF-2. Detour Notification and Plans

At least 30 days prior to closure of the LA River Greenway Trail and the LA River Bike Path, signage and detour plans for non-motorized traffic shall be developed and posted at the trails. The detours shall include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction closure areas, and provide appropriate traffic systems and signage, traffic support, and safety elements.

4.9 Recreation

4.9.1 Environmental Setting

The project reach supports a two-lane bike/jogging trail on the western embankment. Furthermore, a number of pocket parks and river-themed access gates have been built as an interface between the adjacent neighborhood and the project reach. Accordingly, the project reach is readily accessible to the public and supports activities such as bicycling, jogging, horse riding, and walking. Furthermore, due to the presence of vegetation, the project reach provides opportunities for bird watching.

4.9.2 Thresholds of Significance

An adverse effect to recreational resources would occur if construction and/or operation of the

alternative would result in the following:

- Long term disruption of recreational activities, such as walking, jogging, biking, bird watching and equestrian activities.

4.9.3 Environmental Consequences

Preferred Alternative

Construction of the proposed cable-stayed bridge would provide a safe, year-round, multi-modal crossing of the LA River between Atwater Village and Griffith Park for pedestrians, equestrians, and bicyclists. During construction, workers would access the site from the North Atwater Park parking lot (at the end of Chevy Chase Drive) or along the River access road connecting from Los Feliz Boulevard, both of which are on the east side of the River. Access to North Atwater Park, via the existing trail on the east bank of the River, would be temporarily affected by the construction staging area and traffic during the construction period. Access to North Atwater Park would remain for people accessing the park via the street network to the north, south and east of the park.

Additionally, during construction, portions of the existing bicycle, pedestrian and equestrian trails would be temporarily closed during the heavy construction period, which includes constructing the bridge foundations, steel placement, and finishings. The trail on the east side of the River would provide the primary access point for construction, thereby affecting its use for recreational purposes. The heavy construction period, where access to the trail may be affected, would last approximately three to four months. Upon completion of construction, this portion of the recreational area would be returned to pre-project conditions.

During the closure of the trail on the east side of the River, signage would be posted notifying users of the closure and directing users to clearly marked detours. Additionally, the equestrian community located on the east side of the River would be provided with information about closures and detour options for connecting with the trail on the west side of the River and Griffith Park. Construction does have the potential to result in temporary loss of access to the recreational trail network along the River for a period of up to four months. However, with detours provided to recreational users, the effect of the temporary cloure would not be substantial or adverse.

Operation of the North Atwater Crossing project would provide enhanced recreational access along the River and to Griffith Park. Additionally, operation of the bridge may result in an increase in the number of people who use the bike and equestrian trails along the River; however, not to a level that would result in disruptions from over use or crowding. Therefore, operations would not increase demand for parks and recreational services, nor reduce, limit, or prevent access and use of recreational facilities in the surrounding areas. *Thus, the Preferred Alternative would not result in adverse recreation*

effects; no mitigation is required.

Site Location A Alternative
Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint, scope of construction activities, and construction staging areas and traffic patterns would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, recreation impacts would be the same as the Preferred Alternative.

Site Location B Alternative
Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint, scope of construction activities, and construction staging areas and traffic patterns would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, recreation impacts would be the same as the Preferred Alternative.

No Action Alternative
Under the No Action Alternative, the project area would remain in pre-project conditions. No construction activities would occur, and recreational resources and access to these resources would be unaffected under the No Action Alternative.

Mitigation Measures

Mitigation Measure TRAF-2. Detour Notification and Plans
At least 30 days prior to closure of the LA River Greenway Trail and the LA River Bike Path, signage and detour plans for non-motorized traffic shall be developed and posted at the trails. The detours shall include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction closure areas, and provide appropriate traffic systems and signage, traffic support, and safety elements.

4.10 Aesthetics

4.10.1 Environmental Setting

The proposed action would result in the construction of a crossing of the LA River approximately one-half mile upstream of where Los Feliz Boulevard crosses the LA River. The River generally runs in the north and south direction in the project vicinity. In addition to the LA River, major visual elements in the project area include the Verdugo Mountains, I-5 Freeway, LA River Bikeway, transmission lines, equestrian facilities, and

adjacent parks. Griffith Park, the LA River Bikeway and the ten-lane I-5 Freeway are located to the west of the River, and transmission lines and equestrian facilities are located to the east. As shown in **Figure 4.1**, distant views of the Verdugo Mountains are available from the project area, including from the northbound lanes along the I-5 Freeway as well as from the existing bicycle paths on the east and west sides of the River. Also within the existing viewshed of these uses are a series of high voltage power lines. The project site is not along or near any designated federal, state or locally-designated scenic highways.

Figure 4.1. View of Verdugo Mountains with Proposed Project

The nearest residential uses to the proposed action are within the Lincourt Stable property and are approximately 550 feet from the eastern edge of the project site. In addition, there is a residential neighborhood approximately 700 feet to the east of the project site.

Methodology

The existing visual environment in the vicinity of the proposed action was surveyed. Utilizing a visual simulation prepared for the proposed action, the existing visual resources and character were evaluated in order to determine whether implementation of the proposed action would adversely affect the visual character and resources.

4.10.2 Thresholds of Significance

An adverse aesthetic impact would occur if construction and/or operation of the alternative would result in the following:

- A substantial and permanent degradation of the existing visual character of the site.

4.10.3 Environmental Consequences

Preferred Alternative

The proposed action would be the first LA River bridge of the 21st Century and would have a unique and distinctive design. A cable stayed bridge is proposed, with a span of approximately 325 feet across the River. The proposed bridge would be a new structure in the foreground of distant views available from the bicycle paths and I-5 Freeway. Only one mast would be used to support the bridge deck. Although the mast would be 140 feet tall, it would be narrow and would not substantially obstruct views of the Verdugo Mountains. The Verdugo Mountains would still be visible from the bicycle and equestrian trails. In addition, the proposed action would provide a new viewing point for the public of the Verdugo Mountains. Therefore, construction and operation of the proposed action would not adversely affect views in the project area.

The bridge structure would be painted steel with wood decks and detailing. The bridge would be painted a neutral color so as not to compete with the River landscape. The wood would be finished and left in a natural color. The larger-scale steel structure would be a more sculptural element of the bridge. In accordance with the LA River Revitalization Master Plan, the proposed bridge would be a "signature" bridge expressing a distinct design and artistic sensibility that would become a landmark for the River. Views of this new bridge structure would be available from the neighboring bicycle paths and the I-5 Freeway; introduction of this bridge would alter views, however, the existing transmission lines currently detract from the visual quality of the project area. As such, the project would not substantially degrade the existing visual character or quality of the site and its surroundings. Furthermore, the proposed action is expected to enhance access to Griffith Park, the LA River, and the Verdugo Mountains and would not involve the destruction of any existing scenic resources. Therefore, no adverse effects would result from the construction and operation of the proposed action.

The majority of construction activities associated with the proposed action would occur during daylight hours and, therefore, would not require nighttime lighting. However, delivery and unloading of the bridge structure from the I-5 Freeway shoulder would occur during the nighttime hours and would therefore require nighttime lighting along the west side of the River on the night(s) of delivery. Lighting would be directed downward and be limited to the work area and would not be placed within the riverbed itself. Given the short-term nature of nighttime lighting, the limiting of nighttime lighting to the work area, and the distance from the nearest residences (approximately 550 to 700 feet on the east side of the I-5 Freeway and the LA River), and existing lighting associated with the surrounding area (such as the I-5 Freeway), the nighttime lighting during construction would be minimal and impacts would be less than significant.

Upon completion of construction, operational lighting for the bridge would be directed on to the structure itself and would only illuminate walking surfaces and the vertical mast. No lighting would be placed within the landscape area, in the riverbed, or anyplace that could create spill-over light onto the ground in the river habitat zone. All lighting will be light emitting diodes (LED) source with electricity generated from photovoltaics attached to the bridge structure. Given the distance from the nearest residences (approximately 550 to 700 feet) and existing lighting associated with the surrounding area (such as the I-5 Freeway), the potential light and glare impacts associated with operation of the proposed action would be less than significant. Thus, no adverse aesthetics effects would occur under the Preferred Alternative; no mitigation is required.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the viewshed would be similar to the Preferred Alternative. Therefore, under the Site Location A Alternative, aesthetics impacts would be the same as the Preferred Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the viewshed would be similar to the Preferred Alternative. Therefore, under the Site Location B Alternative, aesthetics impacts would be the same as the Preferred Alternative.

No Action Alternative

Under the No Action Alternative, the project area would remain in its current condition. No construction activities within the project area would occur, and visual conditions

within the project area would remain unchanged.

4.11 Traffic and Circulation

4.11.1 Environmental Setting

The project site is located within the vicinity of one freeway and two major local roadways; the I-5 Freeway is located directly to the west of the LA River, and Los Feliz Boulevard is located approximately one-half mile south of the project site while Colorado Boulevard is located approximately one-half mile north of the project site. I-5 connects with the Ventura Freeway (SR 134) approximately one and one-half mile north of the project site.

Methodology

A traffic impact study was prepared for the project and is included in Appendix B of this EA. For impacts to vehicular traffic on the I-5 Freeway, Highway Capacity Manual (HCM) Freeway Mainline Analysis methods were used to evaluate the impact of project construction activities during various hours of the day on the northbound I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The project as proposed will require the use of the adjacent freeway shoulder as well as one through lane on the adjacent I-5 Freeway mainline segment. For a conservative analysis, a maximum of two through lanes was used for evaluating project construction impacts. Given that the construction duration of the proposed action is less than 12 months, the analysis was limited to the following two traffic scenarios:

- Existing (2012) Conditions
- Existing (2012) Plus Project Conditions

Existing 24-hour traffic counts were obtained from Caltrans District 7 for the northbound I-5 freeway segment between Los Feliz Boulevard and Colorado Boulevard. Using the collected data, a LOS analysis was conducted. The analyses were conducted using the appropriate procedures from the HCM as per Caltrans' latest Traffic Impact Analysis Guidelines, as detailed in Appendix B. Caltrans desired LOS range for freeway mainline segments is at the transition between LOS C and LOS D for State highway facilities. If a segment is forecasted to fall to LOS D under project conditions, mitigation measures should be pursued. If the state highway facility is currently operating at less than the appropriate target LOS, the existing LOS shall be maintained.

4.11.2 Thresholds of Significance

Based on the existing conditions described above, an adverse transportation effect would occur if the proposed action:

- Causes an increase in traffic that is substantial in relation to the existing traffic load and

capacity of the street system.

Since this project is subject to the requirement of Caltrans for determining Level of Service (LOS) impacts on the I-5 Freeway, the proposed action would have a significant traffic impact if the traffic volume to roadway capacity ratio is increased, as shown in **Table 4.6** below.

Table 4.6. Caltrans Level of Service (LOS) Criteria*

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum V/C	Maximum Service Flow Rate (pc/hr/ln)
A	11	65.0	0.30	710
B	18	65.0	0.50	1170
C	26	64.6	0.71	1680
D	35	59.7	0.89	2090
E	45	52.2	1.0	2350

*Basic freeway segments at 65 mph

4.11.3 Environmental Consequences

Preferred Alternative

The proposed action would result in the construction of a multi-modal bridge to provide improved access and crossings between the east and west sides of the LA River in the Atwater Park area of the City of Los Angeles. The multi-modal bridge would serve pedestrians, bicyclists and equestrians and provide connections to the existing trail networks on the east and west sides of the River, as well as provide improved equestrian access to Griffith Park. No vehicle crossings would be permitted. Given that no vehicle crossings would be permitted and that no roadways would be affected by operation and use of the bridge crossing, no operational traffic impacts would occur.

During project construction, there is the potential for construction activities to affect the I-5 Freeway northbound lanes adjacent to the project area.

Based on the data collected for the mainline freeway segment adjacent to the project site, the northbound I-5 Freeway lanes are operating at LOS C or better during all hours of the day and days of the week. During construction of the proposed action, which would involve closure of the shoulder and up to two northbound lanes of traffic on the I-5 Freeway, the existing northbound segment north of Los Feliz Boulevard would maintain an acceptable LOS C or better during all hours and days with a few exceptions. The only exceptions occur when freeway mainline segment operations fall to LOS D during the 8:00 p.m. to 11:00 p.m. period from Monday through Thursday and during the 9:00 p.m. to 11:00 p.m. period on Sundays. During these limited time periods, the proposed action does have the potential to result in significant construction impacts. However, with implementation of Mitigation Measure TRAF-1, potentially significant impacts to the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard can be reduced

to a less than significant level.

Additionally, during construction the existing LA River Greenway Trail, located on the east side of the LA River, and the LA River Bike Path, located on the west of the LA River would be temporarily closed to facilitate staging for, and construction of, the bridge. The closure would block pedestrian and equestrian access to North Atwater Park from the south, and restrict bicycle travel along the LA River between Colorado Boulevard and Los Feliz Boulevard for approximately 8-10 months during the construction of the bridge structure and rehabilitation of the paths following bridge installation. During this approximately 8- to 10-month period of time, loss of access to these paths would result in temporary significant impacts. However, with implementation of Mitigation Measure TRAF-2, potentially significant temporary impacts associated with the closure of the LA River Greenway Trail and the LA River Bike Path could be reduced to less than significant levels. *Thus, with implementation of mitigation, construction and operation of the Preferred Alternative would not result in adverse traffic and circulation effects.*

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the scope of construction activities would be similar to the Preferred Alternative. Lane closures and level of service impacts would be the same. Therefore, under the Site Location A Alternative, transportation impacts would be the same as the Preferred Alternative. Mitigation Measures TRAF-1 and TRAF-2 would be required under the Site Location A Alternative to reduce these impacts to a less than significant level. **Thus, with implementation of mitigation, no adverse traffic and circulation effects would occur under the Site Location A Alternative.**

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the scope of construction activities would be similar to the Preferred Alternative. Lane closures and level of service impacts would be the same. Therefore, under the Site Location B Alternative, transportation impacts would be the same as the Preferred Alternative. Mitigation Measures TRAF-1 and TRAF-2 would be required under the Site Location B Alternative to reduce these impacts to a less than significant level. Thus, with implementation of mitigation, no adverse traffic and circulation effects would occur under the Site Location B Alternative.

No Action Alternative

Under the No Action Alternative, the project area would remain in its current conditions.

There would be no construction, and, therefore, no construction-related vehicle trips would be involved as part of this alternative.

Mitigation Measures

Mitigation Measure TRAF-1. Traffic Management Plan

A Traffic Management Plan (TMP) shall be prepared prior to the start of construction for review and approval by Caltrans District 7. The Traffic Management Plan shall outline provisions for maintaining LOS C or better conditions on the I-5 Freeway segment between Los Feliz Boulevard and Colorado Boulevard. The TMP shall include measures to offset traffic congestion and maintain traffic flow. The preliminary TMP shall include proposed Lane Closure Charts and Detour Plans and will be finalized by the time final designs are prepared.

Mitigation Measure TRAF-2. Detour Notification and Plans

At least 30 days prior to closure of the LA River Greenway Trail and the LA River Bike Path, signage and detour plans for non-motorized traffic shall be developed and posted at the trails. The detours shall include a public awareness campaign to notify regular river users of the forthcoming bikeway and pedestrian path closures, provide temporary alternate routes around the construction closure areas, and provide appropriate traffic systems and signage, traffic support, and safety elements.

4.12 Utilities

4.12.1 Environmental Setting

A variety of utilities such as power lines, telecommunications, and sewers traverse the project area. Overhead utilities include electrical and telephone lines. Buried utilities include water, gas, storm water, and sewer lines. The City's Bureau of Sanitation and private refuse companies manage the collection, transfer, and disposal of municipal solid waste.

4.12.2 Thresholds of Significance

An adverse effect upon utilities would occur if construction and/or operation of the alternative would result in the following:

- Widespread, long-term disruption of utility services

4.12.3 Environmental Consequences

Preferred Alternative

Construction and operation of the Preferred Alternative would not disrupt existing utility services. There would be no effect on water service, wastewater generation, or natural gas distribution and consumption from construction and operation of the proposed action. No utility lines cross the River in the location of the proposed bridge, and the existing high-

tension power lines along the east side of the River would remain in place and be unaffected by construction or use of the bridge. During construction, use of electric construction equipment may slightly increase electricity consumption. There would be no potential for utility disruptions as a result of construction and operation activities.

The only solid waste generated by the proposed action would occur during construction; the excavated materials at the project site may be retained on-site, at staging areas, or hauled off-site. The estimated amount of soil to be excavated from the site is 740 cubic yards, or approximately 200 tons. Soils would be disposed at an approved landfill. Therefore, impacts associated with solid waste generation and disposal during project construction would be short-term in nature and within the capacity available; therefore, the impact would be less than significant. Operation of the proposed action would not generate any solid waste; therefore, no operational impact is anticipated. *Thus, no adverse utility effects would occur under the Preferred Alternative; no mitigation is required.*

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. There would be no potential for utility disruptions as a result of construction activities. Therefore, under the Site Location A Alternative, utility impacts would be the same as the Preferred Alternative. *Thus, no adverse utility effects would occur under the Site Location A Alternative; no mitigation is required.*

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. There would be no potential for utility disruptions as a result of construction activities. Therefore, under the Site Location B Alternative, utility impacts would be the same as the Preferred Alternative. *Thus, no adverse utility effects would occur under the Site Location B Alternative; no mitigation is required.*

No Action Alternative

Under the No Action Alternative, the project area would remain in its current conditions. No additional water, electricity or natural gas would be consumed, and no additional wastewater or solid waste would be generated beyond existing levels. There would be no construction at the site, and therefore no potential for utility disruptions as a result of construction activities.

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")

Active Transportation Program Attachment 10: NEPA Final Draft EA (expected FONSI by 08/01/14)

4.13 Land Use

4.13.1 Environmental Setting

The project site is located within an urban area surrounded by developed properties. Land use to the north, east, and south consists primarily of residential, commercial, and industrial uses and heavily-travelled arterials. Just west of the proposed location is Griffith Park, a large open space area of over 4,000 acres containing native habitat that supports a diversity of wildlife. As such, Griffith Park has been designated a Sensitive Ecological Area (SEA) by Los Angeles County. The Conservation and Open Space Element of the Los Angeles County General Plan identifies SEAs containing biological resources and sets forth the goal of conserving these areas. The City of Los Angeles has adopted the same conservation areas as the County. While development within a SEA is not prohibited, the Plan does require development to be limited and controlled in order to avoid impacting valuable biological resources (County of Los Angeles, 2011).

The LA River Revitalization Master Plan includes revitalization measures for the 32 miles of the LA River in the City of Los Angeles. The project site is located in the Plan area and the proposed action is included in the LA River Revitalization Master Plan's priority list as Project No. 147.

4.13.2 Thresholds of Significance

An adverse effect on land use would occur if construction and/or operation of the alternative would result in the following:

- Physical division of an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purposed of avoiding or mitigating environmental effect.

4.13.3 Environmental Consequences

Preferred Alternative

The proposed cable-stayed bridge would maintain a clear span over the LA River and would place the minimum footprint within the River. Construction of the in-channel pier would temporarily vegetation within the 0.18 acre clearing area. However, the affected riparian vegetation is expected to quickly reestablish. The LA River would still function as a wildlife corridor for aquatic and riparian species and migratory birds. Therefore, impacts within an identified SEA would be less than significant. The new bridge structure would provide a connection between the Atwater Village community and Griffith Park and would not physically divide the community. *Thus, the Preferred Alternative would not result in an adverse land use effects; no mitigation is required.*

Site Location A Alternative
Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. Adopted land uses are the same for both project locations. Therefore, under the Site Location A Alternative, no inconsistency is expected from the construction and operation of the proposed action and the impact would be less than significant.

Site Location B Alternative
Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. Adopted land uses are the same for both project locations. Therefore, under the Site Location B Alternative, no inconsistency is expected from the construction and operation of the proposed action and the impact would be less than significant.

No Action Alternative
Under the No Action Alternative, the project site would remain in pre-project conditions. No construction would occur, and current operations are consistent with existing land uses.

4.14 Socioeconomics and Environmental Justice

4.14.1 Environmental Setting

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The project area is located in Census Tract 1881 and adjacent to six census tracts. The total population within these seven census tracks, according to 2010 U.S. Census data, is 27,811 persons. Selected demographic information from the 2010 U.S. Census and 2006-2010 American Community Survey for the seven census tracts are indicated in **Table 4.7**.

Table 4.7. Select Socioeconomic Parameters

	Total Population[1]	Minority (non-white)[1, 4]	ge Household Size[1]	n Household ncome[2]	t Low Income[3]
tract including project site					
1881	4,076	72.7%	2.41	$45,759	23.2%
tracts adjacent to project site					
1883	3,536	63.7%	2.51	$61,934	8.8%

3017.02	5,556	36.5%	2.77	$48,456	16.1%
3023.01	3,790	48.9%	2.71	$44,913	12.5%
3023.02	4,895	55.4%	2.79	$40,644	18.8%
3024.01	5,944	58.8%	2.69	$30,946	29.9%
9800.09	14	42.9%	1.71	117,905	0.0%
rage of census tracts adjacent to project site		51.0%	2.53	$57,466	14.4%

Notes:
1 U.S. Census Bureau, 2010 Census, Profile of General Population and Housing Characteristics, 2010 Census Summary File 1, Data Table DP-1
2 U.S. Census Bureau, 2006-2010 American Community Survey, Median Household Income in the Past 12 Months (In 2010 Inflation-Adjusted Dollars), Data Table B19013
3 U.S. Census Bureau, 2006-2010 American Community Survey, Ratio of Income to Poverty Level in the Past 12 Months, Data Table C17002
4 Persons not "white alone" within the "Not Hispanic or Latino" subgroup.

The 2010 U.S. Census indicated that the Census tract which includes the project site has a total minority population of 72.7 percent. The average minority population for the six census tracts adjacent the project site is 51.0 percent.

The census tract which includes the project site has a median household income of $45,759 and a poverty rate of 23.2 percent. The average median household income for the census tracts adjacent to the project site is $57,466, and the poverty rate is 14.4 percent.

Preferred Alternative

Utilizing year 2010 Census data, demographic characteristics for the seven Census tracts in the project vicinity were determined. Additionally, utilizing the American Community Survey, median household incomes for the same seven Census tracts were determined. The potential that each of these Census tracts would be adversely affected by the proposed action was determined, and based on the demographic characteristics, a determination as to whether or not effects would disproportionate was made.

4.14.2 Thresholds of Significance

Based on the existing conditions described above, adverse effects would occur if the alternative:

- Displaces a large number of people necessitating the construction of replacement housing elsewhere;
- Results in environmental impacts that are disproportionately high and adverse on minority and low income populations; or
- Substantially changes the existing socioeconomic profile.

4.14.3 Environmental Consequences

Preferred Alternative

Construction and operation of the proposed cable-stayed bridge would not result in population growth. No housing or people would be displaced by project implementation. Construction of the project would provide short-term construction work. Thus, Preferred Alternative would not displace populations or substantially change the existing socioeconomic profile; no mitigation is required.

The minority population (72.7 percent) for the Census tract that includes the project site is significantly higher than the average minority population (51.0 percent) for the six Census tracts adjacent to the project site. The median household income ($45,759) for the Census tract that includes the project site is lower than the average median household income ($57,466) for the six Census tracts adjacent to the project site. The poverty rate (23.2 percent) for the Census tract that includes the project site is significantly higher than the poverty rate (14.4 percent) for the six Census tracts adjacent to the project site. Thus, the proposed action could disproportionately affect low-income populations.

Per Executive Order 12898, Section 1-101, in order for environmental justice to be a concern the proposed action would have a "disproportionately high and adverse" effect on a minority or low-income population. While the proposed action could affect minority and low-income populations, the proposed action would not adversely affect these populations. Rather, the proposed action would provide a safe, year-round, multi-modal crossing of the LA River for pedestrians, equestrians, and bicyclists and provide recreational, cultural, access, and water quality benefits. Therefore, the Preferred Alternative would not result in adverse effects to minority or low-income populations; no mitigation is required.

Thus, no adverse socioeconomic and environmental justice effects would occur under the Preferred Alternative.

Site Location A Alternative

Construction of the Site Location A Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 350 feet north of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would be similar to the Preferred Alternative. The socioeconomic profile would be the same. Therefore, under the Site Location A Alternative, socioeconomic and environmental justice impacts would be the same as the Preferred Alternative.

Site Location B Alternative

Construction of the Site Location B Alternative would be similar to the Preferred Alternative except that the cable-stayed bridge would be constructed approximately 170 feet south of the location of the Preferred Alternative. The bridge structure would be the same, and the size of the construction footprint and scope of construction activities would

be similar to the Preferred Alternative. The socioeconomic profile would be the same. Therefore, under the Site Location B Alternative, socioeconomic and environmental justice impacts would be the same as the Preferred Alternative.

No Action Alternative

Under the No Action Alternative, the project site would remain in pre-project conditions. No construction would occur.

5.0 CUMULATIVE IMPACTS

The federal CEQ regulations require that the implementation of NEPA include an analysis of cumulative impacts. Federal regulations define "cumulative impact" as:

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[5]

This section identifies the current and future projects that have a potential to lead to cumulative impacts. CEQ guidance indicates that cumulative impact is the total effect on a given resource, ecosystem, or human community of all actions taken, including actions unrelated to the proposed action.[6,7] For each environmental issue area, the scope of analysis for cumulative impacts can vary. Therefore, in the analysis that follows, the scope of analysis is discussed, followed by whether or not implementation of the alternatives would have the potential to result in adverse cumulative effects.

5.1 Past

The Glendale Narrows reach of the Los Angeles River is an approximately 6-mile long, soft-bottom, trapezoidal channel that traverses Griffith Park. Subsequent to its construction in 1939 and the completion of the Los Angeles County Drainage Area project in 1959, the adjacent area became highly urbanized with residential, commercial, and industrial land uses currently abutting the structure. Projects within the physical structure are limited to nine bridge crossings, 1 pedestrian crossing, and utility crossings.

5.2 Present

[5] 40 CFR 1508.7
[6] Council on Environmental Quality, Executive Office of the President, Considering Cumulative Effects under the National Environmental Policy Act. 1997
[7] Council on Environmental Quality, Executive Office of the President, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. 2005

Originally devoid of vegetation subsequent to completion of construction, the Corps periodically trimmed and removed vegetation from the project reach until the 1980s. The Corps also undertook limited trimming operations during the latter half of the 1990s. No large-scale vegetation maintenance activities took place within the project reach thereafter. As a result, Glendale Narrows currently supports approximately 63 acres of vegetation composed of native and non-native trees, shrubs, and tall grasses, making it a regional destination for recreational enthusiasts and birdwatchers. The vegetation in the river has also diminished flood conveyance capacity within the Glendale Narrows reach.

The increase of urbanization in areas adjacent to Glendale Narrows has also affected water quality. Glendale Narrows is a 303(d)-listed water body. Wet weather and dry weather flows numerous storm water outfalls have resulted in high concentrations of nutrients including nitrate, nitrite, ammonia, and total phosphate within the discharged effluent . High concentrations of bacteria including are associated with nuisance flow discharged from the storm water outfalls.

Development has also changed the flow regime of Glendale Narrows from ephemeral to perennial. The 6.2-mile-long reach is a perennial water body that conveys approximately 30 million gallons per day discharged from the Tillman Water Reclamation Plant, and the Glendale Water Reclamation Plant.

The construction of the proposed crossing would result in temporary impacts associated with biological resources, air quality, noise, hydrology and water quality and traffic. The environmental resources would return to pre-project conditions upon completion of construction and implementation of mitigation measures. During operations, the proposed action would result in either no impacts or de minimis impacts. As such, implementation of the proposed action, or alternatives to the proposed action, would not create or contribute to cumulative adverse environmental effects.

5.3 Future

Future projects within Glendale Narrows include maintenance of existing infrastructure. For example, bridges across the Glendale Narrows may be expanded or retrofitted to serve future needs.

Furthermore, there is an increasing awareness of the recreational, economic and environmental importance of the Los Angeles River to the social milieu of the city. To that end, the city of Los Angeles plans to implement projects designed to create access and facilitate interaction with the River per the Los Angeles River Master Revitalization Plan. Revitalization of the Los Angeles River is intended to spur renewed investments including job growth and economic development. Furthermore, with the exception of the 2.4-mile-long reach transecting the Sepulveda Basin, Glendale Narrows is the only substantial segment of the Los Angeles River closely resembling a natural river system.

Therefore, many of the projects identified in the Revitalization Plan including parks, recreations trails, and pedestrian bridges are focused on the Glendale Narrows area. Furthermore, the Corps and the city of Los Angeles have initiated a feasibility study to evaluate restoration of the riparian ecosystem within Glendale Narrows and restore more natural hydrologic and hydraulic processes.

Full implementation of projects identified in the Los Angeles River Master Revitalization Plan and the Los Angeles River Ecosystem Restoration Study could result in beneficial but significant cumulative impacts. A joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was prepared for the Master Revitalization Plan. An EIS/EIR is also being prepared for the Ecosystem Restoration Study.

A number of past, present and foreseeable future activities have either occurred or are planned at near the proposed North Atwater Crossing project. These activities, and the respective status of each activity, are shown in **Table 6-1**.

Table 6.1. Past, Present and Future Activities

Project Name	Details	Anticipated Construction Period (Start – End)
Northeast Interceptor Sewer Phase 2A	Construct two new sewers by tunneling from an existing service area in Griffith Park on the west side of the I-5 Freeway immediately north of the off ramp from the northbound I-5 to Crystal Springs Drive.	09/01/2014 – 12/31/2018
Taylor Yard Bikeway and Pedestrian Bridge over LA River	Construction of a new 400-foot long pedestrian bridge with a bikeway connecting the existing bikeway along the west bank of the LA River to an existing road on the eastside of the LA River. The bridge will include a LA Department of Water and Power recycled water line.	04/16/2014 – 12/31/2014
Glendale-Hyperion/LA River Bridge Improvement	Rehabilitation along the historic corridor of Hyperion Avenue and Glendale Boulevard. Work includes seismic retrofit and widening of bridges, streamlining of the approach roadway, and upgrading of various elements to meet current infrastructure standards.	04/18/2016 – 12/31/2020
Griffith Park Crystal Springs – New Baseball Fields	Construction of two new youth baseball fields within the north Griffith Park Crystal Springs Picnic Area northeast of the existing Pote Baseball Field.	07/30/2015 – 07/30/2017
River Glen Opportunity Area	#130 in the LA River Revitalization Master Plan (2007)	Conceptual
River Glen River Park	#131 in the LA River Revitalization Master Plan (2007)	Conceptual
River Glen Regional Gateway	#132 in the LA River Revitalization Master Plan (2007)	Conceptual
River Glen opportunity Area	#133 in the LA River Revitalization Master	Conceptual

Outdoor Classroom	Plan (2007)	
River Glen opportunity Area Riverside Street	#134 in the LA River Revitalization Master Plan (2007)	Conceptual
Brazil Street and San Fernando Road enhanced intersection	#135 in the LA River Revitalization Master Plan (2007)	Conceptual
Brazil Street Industrial Green Street	#136 in the LA River Revitalization Master Plan (2007)	Conceptual
West End of Brazi Street Paseo	#137 in the LA River Revitalization Master Plan (2007)	Conceptual
134 Freeway to Colorado Greenway Promenade	#138 in the LA River Revitalization Master Plan (2007)	Conceptual
Acquisition of property near Brazil and the River	#139 in the LA River Revitalization Master Plan (2007)	Conceptual
Electronics Street Industrial Green Street	#140 in the LA River Revitalization Master Plan (2007)	Conceptual
West end of Electronics Street Paseo	#141 in the LA River Revitalization Master Plan (2007)	Conceptual
Colorado Ave Non-Motorized Bridge	#142 in the LA River Revitalization Master Plan (2007)	Conceptual
North Atwater Greenway	#143 in the LA River Revitalization Master Plan (2007)	Conceptual
Goodwin Ave. Primary Local Green Street	#144 in the LA River Revitalization Master Plan (2007)	Conceptual
North Atwater Park Expansion and Creek Restoration	#145 in the LA River Revitalization Master Plan (2007)	Completed April 2012
Los Feliz Equestrian/Non-motorized Bridge	#147 in the LA River Revitalization Master Plan (2007)	Conceptual
Los Feliz Boulevard Arterial Green Street	#148 in the LA River Revitalization Master Plan (2007)	Conceptual
Los Feliz Boulevard River Bridge	#149 in the LA River Revitalization Master Plan (2007)	Conceptual
Legion Lane Park	#150 in the LA River Revitalization Master Plan (2007)	Conceptual
Sunnynook River Park	#151 in the LA River Revitalization Master Plan (2007)	In Construction; expected completion in spring 2013
Silver Lake Boulevard primary Local Green Street	#152 in the LA River Revitalization Master Plan (2007)	Conceptual
Silver Lake Boulevard Pocket Park	#153 in the LA River Revitalization Master Plan (2007)	Conceptual
Fletcher Avenue and San fernando Road Enhanced Intersection	#154 in the LA River Revitalization Master Plan (2007)	Conceptual
Fletcher Drive Arterial Green Street	#155 in the LA River Revitalization Master Plan (2007)	Conceptual
Fletcher Drive River Bridge	#156 in the LA River Revitalization Master Plan (2007)	Conceptual
Los Angeles River Ecosystem Restoration Feasibility Study	The Army Corps in partnership with the City of LA is in the process of studying an 11 mile stretch of the LA River (Griffith Park to 1st Street) for ecosystem restoration and recreation elements	In Progress; Study will be completed in December 2013 and will recommend a project
LA River Recreation Zone in the Glendale Narrows	A pilot program in the Glendale Narrows that will feature recreation zones for activities yet to be determined	In Progress; expected to be implemented in summer 2013

6.0 PUBLIC NOTICE AND RESPONSE TO COMMENTS

Electronic and hard copies of the public notice soliciting comments were distributed on February 21, 2013 (See attachment ???). The notification list included adjacent property owners, resource agencies, nongovernmental organizations, and offices of elected officials (See Attachment ???). Comments were accepted from February 21, 2013 to March 8, 2013. A total of six comments were received.

Mr. Gerry Hans (Friends of Griffith Park). In an e-mail received on Friday, February 22, 2013, Mr. Hans clarified that North Atwater Park was part of the original land grant for Griffith Park. In the interest of accuracy Mr. Hans suggested that the phrase "North Atwater area of Griffith Park" be used in place of North Atwater Park.

> Response: The Corps appreciates and notes this distinction. However, per the city of Los Angeles Department of Recreation and Parks, North Atwater Park is listed as a separate entity (even though it is indeed part of the original land grant). It also is managed under a separate budget line than Griffith Park itself. The Griffith Park listing website makes no mention of North Atwater Park being within its confines, nor does any of the the park signage throughout that playground site. As a result, use of the term "North Atwater Park" remains unchanged throughout this document.

Mr. Mark Mauceri (Greater Griffith Park Neighborhood Council). In an e-mail received on Friday, February 22, 2013, Mr. Mauceri noted that per the city of Los Angeles Department of Recreation and Parks, North Atwater Park is listed as a separate entity (even though it is indeed part of the original land grant). It also is managed under a separate budget line than Griffith Park itself. The Griffith Park listing website makes no mention of North Atwater Park being within its confines, nor does any of the the park signage throughout that playground site.

> Response: The Corps appreciates and notes this distinction.

Ms. Linda Demmers (Greater Griffith Park Neighborhood Council). In an e-mail received on Friday, February 22, 2013, Ms. Demmers requested continued receipt of official documents related to Griffith Park.

> Response: The Corps will notify Ms. Demmers on future projects in the Glendale Narrows section of the Los Angeles River.

Mr. Jeff Horikawa. In an e-mail received on Saturday, February 27, 2013, Mr. Horikawa expressed support for the proposed bridge.

Response: The Corps appreciates and notes this distinction.

Ms. Christine Anthony. In an e-mail received on March 2, 2013, Ms. Anthony noted potential impacts to nesting birds and water quality.

Response: As documented above the Corps is aware of potential impacts to nesting birds for vegetation clearing activities within the bird nesting season, and has proposed to include as a condition of the Section 408 permit Mitigation Measure BIO-5 to avoid and minimize impacts to nesting birds. As documented above the Corps is aware of potential impacts to water quality during construction, and would include as a condition of the Section 408 permit Mitigation Measure WQ-1 which requires isolation of the construction area within the channel invert from surface flows.

Ms. Dianna Watson (CalTrans). In a letter dated February 27, 2013, Ms. Watson indicated that storm water runoff is not permitted unto state highway facilities without a storm water management plan. Furthermore, transport of heavy equipment and oversized transport vehicles on state highways would require a permit from Caltrans.

Response: The Corps would include as a condition of the Section 408 permit Mitigation Measure WQ-2 and TRAF-1 which requires coordination with Caltrans for storm water run-off and traffic related issues.

7.0 List of Preparers

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Section 10
References

American Public Works Association, Southern California Chapter. *Standard Specifications for Public Works Construction* (Greenbook).

American Public Works Association, Southern California Chapter. *Work Area Traffic Control Handbook* (WATCH), 2001.

California Air Pollution Control Officers Association. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008.

California Air Resources Board, AB 32 Fact Sheet – California Global Warming Solutions Act of 2006. Accessed August 2012 at http://www.arb.ca.gov/cc/factsheets/ab32factsheet.pdf.

California Air Resources Board, 2011 State Area Designation Maps, Accessed August 2009 at http://www.arb.ca.gov/desig/adm/adm.htm#state.

California Department of Conservation (CDC), Division of Land Resources Protection. *California Agricultural Land Evaluation and Site Assessment Model*, 1997.

California State Department of Conservation Farmland Mapping and Monitoring Program website. Accessed in July 2012 at http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx.

California, Department of Conservation (CDC), Division of Mines and Geology. Special Publication 42: "Fault Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Map". Released 1997, Supplemented in 1999, Interim revision 2007. Accessed July 2012 at http://www.consrv.ca.gov/CGS/rghm/ap/index.htm.

California Department of Fish and Game. *California Natural Diversity Database*. Commercial Version, dated March 1, 2009.

California Department of Resources Recycling and Recovery. Solid Waste Information System website. Accessed July 2012 at http://www.calrecycle.ca.gov/SWFacilities/Directory/

California Department of Transportation (CALTRANS). California Scenic Highway Mapping System website. Accessed July 2012 at http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.

California Department of Transportation (Caltrans). *Transportation and Construction Induced Vibration Manual*. 2004.

California Environmental Protection Agency, Department of Toxic Substances Control Board (DTSC). EnviroStor Data Management System. Last accessed July 2012 at http://www.envirostor.dtsc.ca.gov.

California Integrated Waste Management Act of 1989. Assembly Bill 939.

California Natural Diversity Database (CNDDB). 2012. California Department of Fish and Game. Accessed August 10, 2012 at: http://www.dfg.ca.gov/biogeodata/cnddb/.

Los Angeles County Department of Public Works, Summary Water Quality Data - Storm Water Quality Data Tables (1994-2000). Accessed August 2009 at http://ladpw.org/wmd/npdes/9400_wq_tbl/Table_4-12.pdf.

City of Los Angeles. *Climate LA – Municipal Program Implementing the Green LA Climate Action Plan*, 2008.

City of Los Angeles, *City of Los Angeles Municipal Code*.

City of Los Angeles, Department of City Planning. *Historic-Cultural Monuments (HCM) Listing.* Last updated September 2007. Accessed in July 2012 at http://preservation.lacity.org/files/HCMDatabase090707.pdf.

City of Los Angeles, Department of City Planning. *General Plan*, including community plans and technical elements. Last accessed in July 2012 at http://cityplanning.lacity.org.

City of Los Angeles, Department of City Planning. Planning and Zoning Code. Last accessed in July 2012 at City's web page at http://cityofla.org/PLN/.

City of Los Angeles, Department of City Planning. ZIMAS (Zone Information and Map Access System). Last accessed in July 2012 at http://zimas.lacity.org.

City of Los Angeles, Department of Public Works, Bureau of Engineering. *Los Angeles River Revitalization Master Plan*, 2007, www.lariver.org.

City of Los Angeles, Department of Public Works Bureau of Sanitation. *Solid Waste Integrated Resources Plan*, www.zerowaste.lacity.org.

City of Los Angeles, Department of Public Works Bureau of Sanitation. Recycling, www.lacitysan.org/solid_resources/recycling.

City of Los Angeles, Department of Public Works Bureau of Sanitation and Department of Water and Power. *Integrated Resources Plan*. Prepared by CH:CDM. July 2004.

City of Los Angeles, Department of Public Works Bureau of Sanitation and Department of Water and Power. *Integrated Resources Draft Environmental Impact Report* (IRP

DEIR). November 2005.

City of Los Angeles, Department of Public Works Bureau of Sanitation. *Los Angeles River Total Maximum Daily Loads (TMDLs) for the LA River*.

City of Los Angeles, Department of Recreation and Parks. 1978. *Griffith Park Master Plan.* Accessed August 2012 at http://www.laparks.org/dos/parks/griffithPK/gp_masterplan.htm.

City of Los Angeles, Department of Recreation and Parks. 2008. *Griffith Park Wildlife Management Plan*. Developed by Cooper Ecological Monitoring. Accessed August 2012 at: http://www.laparks.org/dos/parks/griffithpk/wildlife/index.html.

City of Los Angeles, Department of Recreation and Parks. *Bat Survey of Griffith Park.* Prepared by S. Remington and D. Cooper. Accessed August 12 at: http://www.friendsofgriffithpark.org/GPNHS/GP%202009%20Bat%20Survey%20Report.pdf. 2009.

City of Los Angeles, Environmental Affairs Department. *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles*. 2006. Accessed July 2012 at http://lacity.org/ead/EADWeb-AQD/thresholdsguide.htm.

City of Los Angeles, *Green LA -- An Action Plan to Lead the Nation in Fighting Global Warming*, 2007.

City of Los Angeles, NavigateLA website. Planning Department Parcel Profile Report. July 2012.

County of Los Angeles, *Draft General Plan*, 2008.

County of Los Angeles Department of Public Works, *2007 Annual Report on the Countywide Siting Summary Plan and Countywide Siting Element*, June 2008.

County of Los Angeles, Department of Regional Planning. *Los Angeles County Draft. General Plan – Figure 6.3 Significant Ecological Areas.* 2008.

County of Los Angeles *2011 Draft General Plan 2035, Chapter 6: Conservation and Open Space Element.* 2011.

Dallman, Suzanne, Ph.D. and Tom Piechota, Ph.D., P.E. *Stormwater: Asset Not Liability*. Los Angeles: LASGRWC, 1999. Last accessed June 2009 at http://www.lasgrwc.org/publications.html.

DTSC EnviroStor Data Management System. Last accessed July 2012 at http://www.envirostor.dtsc.ca.gov/public.

Los Angeles County Airport Land Use Commission. Burbank/Glendale/Pasadena Airport,

Airport Influence Area Map, 2003. http://planning.lacounty.gov/assets/upl/project/aluc_airport-burbank.pdf

Federal Emergency Management Agency, Flood Insurance Rate Map (FIRM), Community Panel Number 060371566 F, September 2008.

Federal Highway Administration. *Roadway Construction Noise Model User's Guide*. January 2006.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. 2006.

FOLAR. *State of the River 2: The Fish Study*. 2008.

Friends of Griffith Park. 2007. Birds of Griffith Park. Accessed September 2012 at: http://www.friendsofgriffithpark.org/GPNHS/GriffithBirds.htm.

Riparian Habitat Joint Venture. 2009. *California Riparian Habitat Restoration Handbook, Second Edition.* Accessed July 2012 at: http://www.riverpartners.org/documents/Restoration_Handbook_Final_Dec09.pdf.

South Coast Air Quality Management District (SCAQMD). *Appendix C – Mass Rate LST Look-up Tables*, October 21, 2009.

SCAQMD. California Emissions Estimator Model (CalEEMod), Version 2011.1.1. Prepared by ENVIRON International Corporation. Last accessed August 2012 at http://www.caleemod.com/.

SCAQMD. *CEQA Air Quality Handbook*, April 1993 (amended March 2011)

SCAQMD. *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, October 2008.

SCAQMD. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds, 2011.

SCAQMD. *Final 2007 Air Quality Management Plan*, June 2007.

SCAQMD. *Final Localized Significance Threshold Methodology*, June 2003 (Revised July 2008).

SCAQMD. *White Paper on Potential Control Strategies to Address Cumulative Impacts From Air Pollution*, Appendix D: Cumulative Impact Analysis Requirements Pursuant to CEQA, August 2003.

State Water Resources Control Board (SWRCB) LUST and UST listings on Geotracker website. Accessed in July 2012 at http:geotracker.swrcb.ca.gov.

The Thomas Guide. *Los Angeles County Street Guide*, 2010.

U.S. Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974.

U.S. Environmental Protection Agency website EnviroMapper for Envirofacts. Accessed in July 2012 at http://www.epa.gov/enviro/html/em/index.html.

USFWS. 2012. Critical Habitat Portal. Accessed August 10, 2012 at: http://criticalhabitat.fws.gov/crithab/.

APPENDIX A
AIR QUALITY

APPENDIX B
TRAFFIC AND CIRCULATION

Los Angeles County Bicycle Coalition
634 S. Spring St. Suite 821
Los Angeles, CA 90014
Phone 213.629.2142
Facsimile 213.629.2259
www.la-bike.org

May 16, 2014

Ms. Teresa McWilliam
Caltrans, Division of Local Assistance, MS-1
Attention: Chief, Office of Active Transportation and Special Programs
P.O. Box 942874
Sacramento, CA 95814

Support for LA River La Kretz Crossing (North Atwater Multimodal Bridge)
Active Transportation Program

Dear Ms. McWilliam:

The Los Angeles County Bicycle Coalition (LACBC) strongly supports the River Revitalization Corporation's application to the Active Transportation Program for the La Kretz Crossing, an iconic bridge that serves all non-motorized modes equally: pedestrians, equestrians and bicyclists. The Los Angeles River bike path is a regional destination trail facility, however it is hard to access from park-poor communities on the east bank of the river. This project will provide a safe, convenient connection from residential communities on the east side to both the bike path and all the other recreational opportunities in Griffith Park. As the Los Angeles River bike path is extended closer into downtown and toward the studios in the San Fernando Valley, the existing commuter use of the bike path will only multiply.

LACBC is one of the original supporters of the River Revitalization Corporation's Greenway 2020 campaign to complete all 51 miles of bike path along the Los Angeles River by the year 2020. This bridge is an opportunity to catalyze interest in completing this broader goal while leveraging significant private resources to do so. We are excited by the potential of this project specifically and the River Corporation's public-private partnership model generally. LACBC urges the State to provide the remaining funds needed to implement this project right away.

If you have any questions about this support, I can be reached at (213) 629-2142, ext. 127.

Sincerely,

Eric Bruins
Planning and Policy Director

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

Arthur T. Leahy
Chief Executive Officer
213.922.6888 Tel
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Metro

May 12, 2014

Malcolm Dougherty
Director
California Department of Transportation
P.O. Box 942873
Sacramento, CA 94273-0001

RE: Letter of Support for North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing") Active Transportation Program (ATP) Application

Dear Director Dougherty:

The Los Angeles County Metropolitan Transportation Authority (Metro) is pleased to support the Active Transportation Program (ATP) funding request for the North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing") in the City of Los Angeles. Metro is committed to promoting sustainability through direct actions to implement policies, programs and projects as well as through collaboration with local jurisdictions and agencies to meet the mandate to reduce greenhouse gas emissions as well as to increase mobility, safety and the social and economic vitality of our communities.

Active transportation is a key planning priority within Metro and aligns with regional mobility strategies and plans. The 2012-2035 Regional Transportation Plan/Sustainable Communities Strategies(RTP/SCS) adopted by the Southern California Association of Governments(SCAG) identifies active transportation as a key component. In furthering regional goals, Metro has developed multiple initiatives and programs to systematically address the challenges associated with bicyling and walking trips, including the Countywide Sustainability Planning Policy, the First/Last Mile Strategic Plan, the Safe Routes to School Pilot program and through financial commitments as Part of the Long Range Transportation Plan (LRTP) and the bi-annual Call for Projects process which funds local bicycle and pedestrian projects that are consistent with both local and regional plans.

We find this project to be consistent with the SCAG RTP/SCS and the LRTP and endorse the Los Angeles River Revitalization Corporation's efforts and contribution towards a sustainable transportation future. We respectfully request a favorable consideration of the North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing") for the ATP grant.

Sincerely,

Arthur T. Leahy
Chief Executive Officer

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May 16, 2014

Teresa McWilliam
California Department of Transportation (CALTRANS)
Division of Local Assistance, MS 1
Attn: Office of Active Transportation and Special Programs
P.O. Box 942874
Sacramento, CA 94274-0001

RE: ACTIVE TRANSPORTATION PROGRAM GRANT APPLICATION FOR THE LA KRETZ CROSSING (N. ATWATER BRIDGE) PROJECT OF THE LOS ANGELES RIVER REVITALIZATION CORPORATION

Dear Ms. McWilliam:

On behalf of the agency responsible for developing and implementing the City of Los Angeles's long-range Los Angeles River Revitalization Master Plan (Plan), which was adopted by our City Council in 2007, I am writing to express my strong support for the Los Angeles River Revitalization Corporation's (LARRC) application for Active Transportation Program grant funds for the La Kretz Crossing project.

The Plan focuses on the first 32 miles of the River, which flow through the City of Los Angeles and identifies more than 240 potential projects. The LARRC was established as a recommendation of the Plan has emerged as a strong partner in advancing river revitalization; we are grateful for their leadership in building projects of the Plan, including La Kretz Crossing, which is Project No. 147.

La Kretz Crossing is a non-motorized multimodal bridge project that will provide pedestrian and equestrian access to Griffith Park and cyclist access from the existing Los Angeles River Bike Path to the North Atwater community. La Kretz Crossing will provide safe, year-round passage into Griffith Park, in the Hollywood Community Plan Area, linking to 4,200 acres of recreational open space and 53 miles of networked trails. The bridge will safely accommodate pedestrians, equestrians and bicyclists. The iconic, cable-stayed design will become a remarkable feature of our landscape and a cherished destination for residents and visitors.

The project is a long-standing priority of the local community and is the first example of privately-initiated river infrastructure that will be donated to the City upon its completion. Because it connects to existing active transportation facilities and leverages new kinds of funding, I believe that La Kretz Crossing reflects the kind of multi-sector partnership that will maximize the value of the State of California's investment and hope that you see the exciting potential in this. Please do not hesitate to contact me should you have any questions: (213) 485-5762 and Carol.Armstrong@lacity.org. Thank you.

Sincerely,

Carol S. Armstrong, Ph.D.
Director, Los Angeles River Project Office

Cc:

Carolyn Ramsay, Chief of Staff to Hon. Tom LaBonge, Assistant President Pro Tempore, LA City Council (District 4)
Jeanne Minn, Chief of Staff to Hon. Mitch O'Farrell, Chair, Arts, Parks, Health, Aging, and River Committee (District 13)
Jennifer Samson, Los Angeles River Revitalization Corporation

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LA n Sync

United to Improve Community Life

May 15, 2014

Ms. Teresa McWilliam
Caltrans, Division of Local Assistance, MS-1
Attention: Office of Active Transportation and Special Programs
P.O. Box 942874
Sacramento, CA 95814

Dear Ms. McWilliam,

LA n Sync is an effective coalition of philanthropy, nonprofits, businesses, academic institutions and government – united in our determination to meet LA's most pressing public needs and dedicated to improving the lives of all Angelenos. This broad group of civic leaders is dedicated to Los Angeles' future and shares the task of building it, with civic pride and solidarity.

Our LA n Sync coalition, whose partners are listed on the attached list, is united in enthusiastic support for the Los Angeles River Revitalization Corporation (LARRC) La Kretz Crossing project.

La Kretz Crossing is a non-motorized multimodal bridge project providing pedestrians, bicycle and equestrian access to Griffith Park and the Los Angeles River Bike Path to the North Atwater community. La Kretz Crossing will provide safe, year-round passage into Griffith Park, in the Hollywood Community Plan Area. The bridge will accommodate pedestrians, equestrians and bicyclists. The iconic, cable-stayed pre-fabricated bridge will span approximately 390 feet across the LA River. It is approximately 325 feet long and 36 feet wide, with two separate paths: one designated for equestrian use, and the other shared by pedestrians and bicyclists.

This project is the result of years of planning in collaboration with multiple communities and will result in a positive impact to many Angelenos. We have confidence that LARRC will succeed in carrying out the work identified in their grant application.

The time is right for a walkable and bikeable LA River. La Kretz Crossing will go a long way toward making this happen. We look forward to working with and supporting the LARRC and its other key partners on this project.

Sincerely,

Leonard J. Aube, Executive Director, Annenberg Foundation

UNITED TO IMPROVE COMMUNITY LIFE
LA n Sync
SEAL OF APPROVAL
#1015

LA n Sync

United to Improve Community Life

Partners

Academia

- Los Angeles Community College District, Department of Economic Development and Workforce Education
- UCLA, Center for the Study of Social Policy
- USC, Center on Philanthropy and Public Policy

Nonprofit/Service/Policy Agencies

- The Advancement Project
- California Budget Project
- Community Development Corporation
- Community Partners
- First 5 LA
- Youth Policy Institute

Philanthropy

- Ahmanson Foundation
- Annenberg Foundation
- California Community Foundation
- The California Endowment
- The California Wellness Foundation
- Conrad N. Hilton Foundation
- The Goldhirsh Foundation
- W.M. Keck Foundation
- The Los Angeles Fund for Public Education
- Ralph M. Parsons Foundation
- Rose Hills Foundation
- Southern California Grantmakers
- Weingart Foundation

Public Sector

- City of Los Angeles, Mayor's Office
- City of Los Angeles, Department of Cultural Affairs
- City of Los Angeles, Department of Recreation and Parks
- County of Los Angeles
- Housing Authority of the City of Los Angeles
- Housing Authority of the County of Los Angeles
- League of California Cities, Los Angeles Division
- Los Angeles Chamber of Commerce
- Los Angeles County Economic Development Corporation
- Los Angeles County Office of Education
- Los Angeles Police Department
- Los Angeles Unified School District
- Los Angeles World Airports
- Metropolitan Transit Authority

Private/Business

- Anschutz Entertainment Group
- The Capital Group Companies
- Center for Smart Manufacturing Innovation
- Creative Artists Agency
- Phillips and Associates

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#1015

Lynn Brown
1547 N. Sierra Bonita Ave.
Los Angeles, CA. 90046
(323) 876-6858 Phone & Fax

May 3, 2014

CALTRANS,
Division of Local Assistance MS 1
Office of Active Transportation and Spec. Prog
P.O. Box 942874
Sacramento CA 94274-0001
Attn: Teresa McWilliam

Dear Ms. McWilliam,

I am the Vice President of the L.A. Equine Advisory Committee (LAEAC), an official L.A. City Council designated Committee. I also served for the last 20 years as the Trail Coordinator for Equestrian Trails Inc., an organization of over 4,000 members. I must speak for myself in this letter as there is not time to bring the La Kretz Bridge issue before both Boards. However, in January, 2012, the LAEC wrote a letter of support to build a multimodal (pedestrian, bicycle, and equestrian) bridge over the Los Angeles River in the vicinity of North Atwater and Griffith Park.

This project is an important enhancement in both public safety and expansion of recreational enjoyment of the Atwater and Griffith Park Rancho Communities. It furthers the efforts by RRC that are transforming the Los Angeles River. This multimodal bridge provides access for pedestrians and bicycles in addition to a separated path for equestrians creating a huge asset to the City of Los Angeles. This Bridge has the potential to transform land values. Once there is safe access across the river, home owners will take advantage of the horse keeping K Overlay for this area as they have done for the Rancho community of Burbank where home values skyrocketed.

Equestrians from all over the City and the L.A.P.D. Mounted Unit will now be able to safely cross the River to the Griffith Park tunnel instead of descending into the slippery and dangerous River channel as they do now. This fulfills a need that has been voiced for approximately 25 years. We wholeheartedly support this long over due and much wanted project.

Sincerely,

LYNN BROWN

May 19, 2014

CALTRANS
Division of Local Assistance, MS 1
Attn: Office of Active Transportation and Spec. Prog.
P.O. Box 942874
Sacramento, CA 94274-0001
Attn: Teresa McWilliam

Support for the La Kretz Crossing (North Atwater Multi-modal Bridge) Project

Dear Ms. McWilliam:

On behalf of the Mountains Recreation and Conservation Authority (MRCA), I am writing to express our enthusiastic support for the La Kretz Crossing (N. Atwater Multi-modal Bridge) project. It is my understanding that the La Kretz Crossing is a non-motorized multi-modal bridge project that will provide the North Atwater community with pedestrian and equestrian access to Griffith Park and cyclist access to and from the Los Angeles River Bike Path. La Kretz Crossing will provide safe, year-round passage into Griffith Park, in the Hollywood Community Plan Area linking to 4,200 acres of recreational open space and 53-miles of networked trails.

The iconic cable-stayed bridge will span approximately 390 feet across the Los Angeles River, with two separate paths: one designated for equestrian use, and the other shared by pedestrians and bicyclists. The intention of this new bridge is to connect communities to each other and to existing and future parks and amenities along the Los Angeles River.

As a long-time partner of the Los Angeles River Revitalization Corporation (LARRC), the MRCA can attest to the effectiveness of the LARRC to bringing new audiences and vision to the Los Angeles River (River). We are confident that the LARRC can effectively execute the building of the La Kretz Crossing, which will connect to a regional network of recreational trails and paths that provide alternative modes of transportation. MRCA believes that this project will provide desired cohesion between existing and planned green space and recreational areas along the River. The bridge would provide safe access to active living for the immediate neighbors, who typically struggle with overcrowded neighborhoods and low income, as compared to the whole of Los Angeles County. Additionally, the bridge will provide a unique view of the River allowing MRCA naturalists to interpret it from this new perspective during public programs.

I am hereby writing to encourage your support for the award of Active Transportation Program funding to LARRC's application for the La Kretz Crossing, which is a key component of Los Angeles River Revitalization and will greatly advance active living for a healthier, more connected City of Los Angeles.

Sincerely,

Joseph T. Edmiston, FAICP, Hon. ASLA
Executive Officer

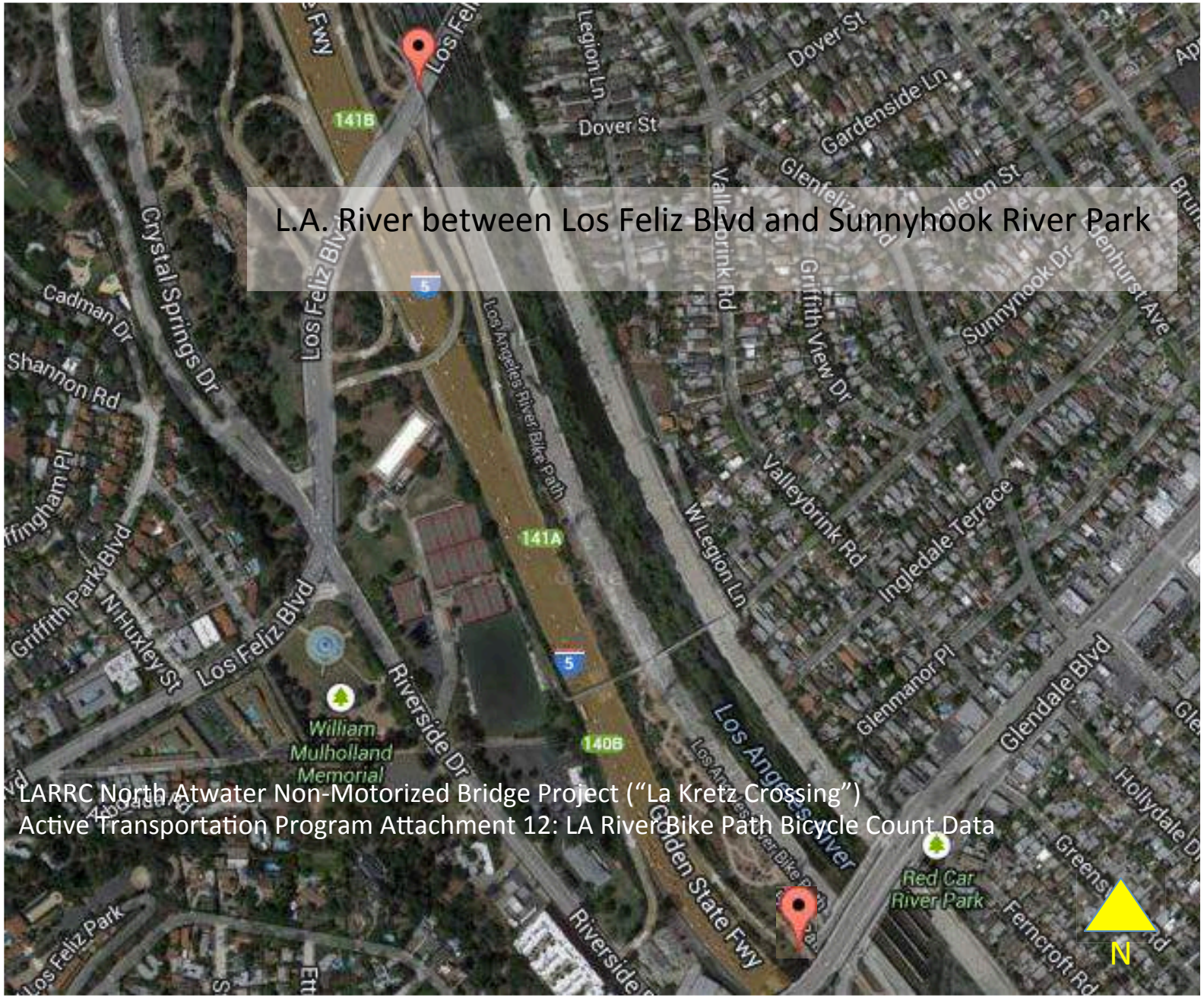
cc: Jennifer Samson, LARRC

LARRC North Atwater Non-Motorized Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 12: LA River Bike Path Bicycle Count Data

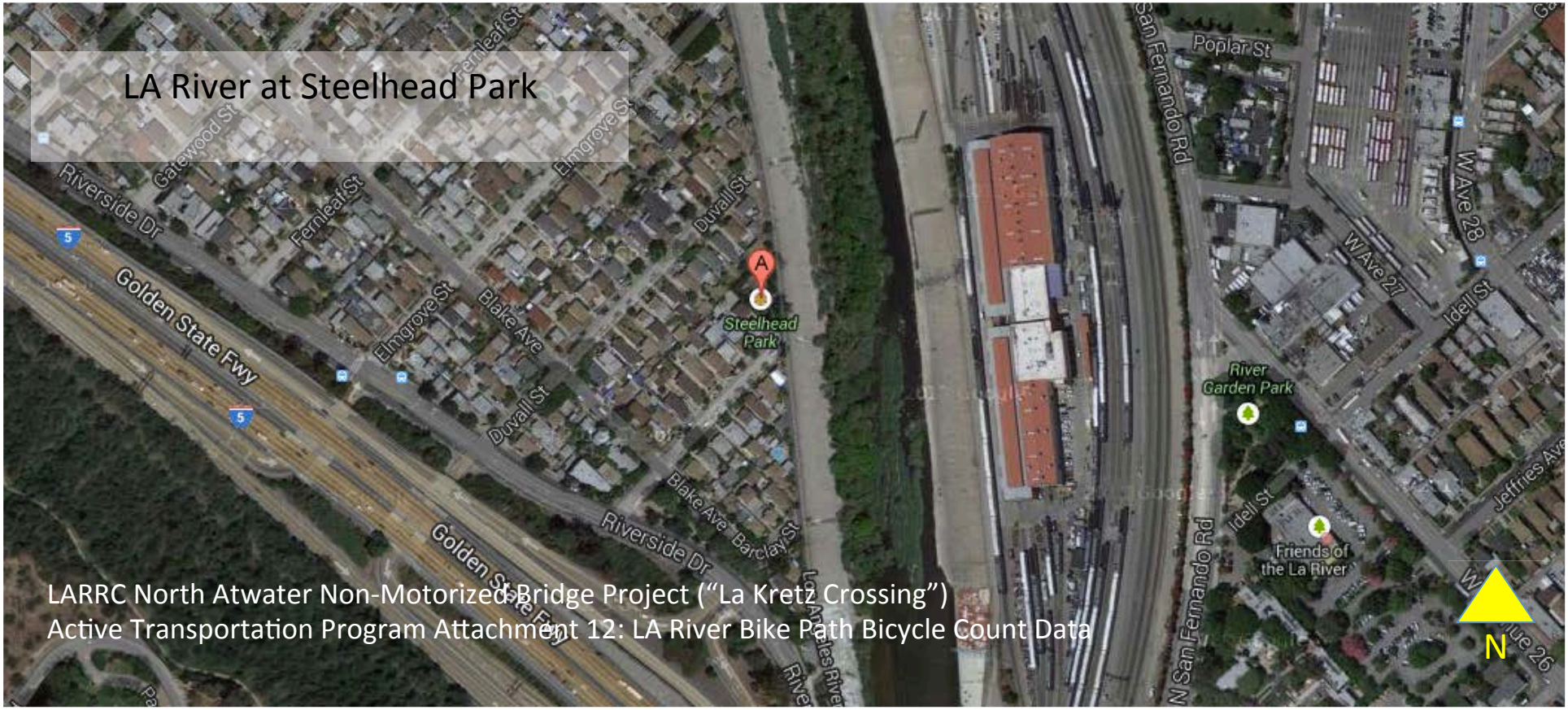
Location immediately south of proposed bridge	2 – hour Count Data (Average of locations) (2011 LACBC)	Data Period
LA River at Los Feliz Blvd Northbound	65	4-6PM Peak (Tuesday)
LA River at Los Feliz Blvd Southbound	70	4-6PM Peak (Tuesday)
LA River at Los Feliz Blvd Eastbound	29	4-6PM Peak (Tuesday)
LA River at Los Feliz Blvd Westbound	19	4-6PM Peak (Tuesday)
LA River at Los Feliz Blvd Northbound	94	Saturday Mid-day
LA River at Los Feliz Blvd Southbound	67	Saturday Mid-day
LA River at Los Feliz Blvd Eastbound	14	Saturday Mid-day
LA River at Los Feliz Blvd Westbound	28	Saturday Mid-day

LARRC North Atwater Non-Motorized Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 12: LA River Bike Path Bicycle Count Data

Location immediately south of proposed bridge	2 – hour Count Data (Average of locations) (2013 LACBC)	Data Period
Los Feliz/Sunnynook Northbound	77	4-6PM Peak (Tuesday)
Los Feliz/Sunnynook Southbound	86	4-6PM Peak (Tuesday)
Los Feliz/Sunnynook Northbound	30	7-9AM (Tuesday)
Los Feliz/Sunnynook Southbound	61	7-9AM (Tuesday)
Los Feliz/Sunnynook Northbound	76	Saturday Mid-day
Los Feliz/Sunnynook Southbound	90	Saturday Mid-day
LA River at Steelhead Park Northbound	51	4-6PM Peak (Tuesday)
LA River at Steelhead Park Southbound	71	4-6PM Peak (Tuesday)
LA River at Steelhead Park Northbound	39	7-9AM (Tuesday)
LA River at Steelhead Park Southbound	36	7-9AM (Tuesday)
LA River at Steelhead Park Northbound	63	Saturday Mid-day
LA River at Steelhead Park Southbound	64	Saturday Mid-day



LARRC North Atwater Non-Motorized Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 12: LA River Bike Path Bicycle Count Data



LARRC North Atwater Non-Motorized Bridge Project ("La Kretz Crossing")
Active Transportation Program Attachment 12: LA River Bike Path Bicycle Count Data

METHODOLOGICAL APPROACH TO IDENTIFYING AND QUANTIFYING PROJECT BENEFITS, BENEFIT/COST RATIO AND GREENHOUSE GAS REDUCTION

1. Summary of Benefit/Cost Analysis

The total costs associated with the construction of the North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing"), a multi-modal pedestrian/equestrian/bicycle non-motorized bridge over the L.A. River is $9,038,333. The result of the analysis shows a substantial positive benefit-to-cost ratio of 7.37, meaning that for every one dollar of investment, $7.37 in benefits is realized. The benefit-to-cost ratio based only on the Active Transportation Program grant request of $3,660,000 is 18.2, meaning that for every one dollar of Caltrans investment, there is a return of $18.20.

Based on the analysis presented below, and on the range of project benefits that are summarized and monetized in Table 9 (p.17) La Kretz Crossing will provide $2,801,035 worth of annual benefits over a 20-year project life, for a total of $66,595,335.

Much of the benefit from this project comes from shifting drivers onto their bicycles and feet for both work and non-work trips, causing a reduction in vehicle miles travel (VMT), which in turn lowers greenhouse gas and criteria pollutants, increasing public health outcomes. A route shift from on-road to off-road bicycling and walking, made possible by this bridge, will also reduce injury accidents and fatalities during the project life.

Because the bridge will last up to 100 years—much longer than the 20-year project life assumed for this analysis—and because some benefits are not monetized (notably the estimated avoidance of one horse fatality and two horse/rider injuries and associated rescue costs) and others are calculated conservatively, these benefits are understated. In addition, there are many other benefits, such as decreased auto costs, economic development and tourism benefits, that are not counted because they are not included in the stated goals of the Active Transportation Program.

One hundred percent of the benefits of this bridge project, each of which is consistent with the California Transportation Commission's (CTC) Alternative Transportation Program goals, will accrue to disadvantaged communities within the project study area, though benefits are not restricted to those communities.

2. Analytic Approach

In order to estimate the benefits attributable to construction of La Kretz Crossing, this analysis first determined how many new bicycle and pedestrian trips, and associated bicycle miles traveled (BMT) and pedestrian miles traveled (PMT) would result from the effects of this bridge project, after factoring out population growth. From that estimate, a reduction in vehicle miles traveled (VMT) was calculated, and other benefits (safety, health, air quality) were derived. The steps of this analysis are outlined below.

Scenarios analyzed: This analysis compares three sets of assumptions in order to arrive at a "net project-related benefit" for a range of benefit types. The scenarios are:

- **Existing Conditions:** A profile of the project area today, based on available data;
- **Scenario A**: Year 2025 with forecast population growth, but without the project and including only modest active transportation infrastructure investment; and
- **Scenario B:** Year 2025 with forecast population growth + Project + substantial infrastructure investment catalyzed by the project.

Section 3 summarizes the research and consultation conducted to prepare the analysis in a comprehensive manner. Given limited available and/or usable data, the inability to prepare and run a subregional model, and in consideration of an appropriate level of effort for this grant application, some simplifying assumptions were required.

The assumptions relate to the project benefit types, and are presented in the following order in Section 4 of this document:

- Project area, project life and project analysis year
- Population growth
- Travel characteristics (existing and 2025)
    - Mode share
    - Trip generation
    - Trip length
- Safety-related assumptions
    - Bicycle/pedestrian injury accidents and fatalities
- Air quality assumptions
    - Greenhouse gas emission factors
    - Criteria pollutant emission factors

Section 5 presents the approach to monetizing identified project-related benefits for:

- Mobility (the value of having new access to the L.A. River Bike Path)
- Accidents/fatalities avoided
- Public health outcomes
- Criteria pollutants and greenhouse gas emissions reduced

Section 6 compiles project area statistics (demographics, health data and transportation factors). It also includes detail on current bicycle counts for the L.A. River Bike Path in the vicinity of the project area, in order to demonstrate the potential that a new access point (La Kretz Crossing) has.

Section 7 populates the three scenarios (Existing Conditions, Scenarios A and B) with the available transportation data, and derives the net active transportation changes attributable to construction of the La Kretz Crossing pedestrian/equestrian/bicycle bridge. These scenarios are presented in Tables 4-6. Table 7 compares the scenarios and summarizes the net project impacts by subtracting Scenario A figures from Scenario B figures.

Section 8 includes tables for air quality benefit (including criteria pollutants and greenhouse gas reductions, summarized in Table 8) and the final comprehensive set of monetized net benefits due to this project (Table 9).

3. Data Sources and Information Used for this Analysis

The types of data collected and analyzed include:

- Demographic data (e.g., population, household income, percent of state median household income)
- Population growth forecasts
- Transportation-related data (auto/pedestrian/bike collisions, walk and bike miles traveled, auto ownership, mode share,)
- Health-related data (prevalence of childhood obesity, rate of diabetes mortality, serious emotional disturbance—all of which are positively impacted by increased physical activity)

Agency Consultations

As preparation for this grant, consultations were conducted with the appropriate technical and program staff (program specialists, modeling, active transportation, air quality, etc.) from the following agencies and organizations:

- Federal Highway Administration (FHWA)
- California Transportation Commission (CTC)
- California Department of Transportation (Caltrans) Active Transportation Program (ATP) - Sacramento
- State Parks and Recreation
- California Air Resources Board (CARB)
- Caltrans District 7 – Los Angeles
- Southern California Association of Governments (SCAG)
- South Coast Air Quality Management District (SCAQMD)
- Los Angeles County Metropolitan Transportation Authority (LACMTA or Metro)
- Los Angeles County Department of Public Health
- Metro (Portland, OR)
- Healthy Eating Active Living Cities Campaign (Portland, OR)
- Victoria Transport Policy Institute (Todd Litman)

Relevant Plans, Legislation and Guidance

- California Sustainable Communities and Climate Protection Act
- California Strategic Highway Safety Plan
- Caltrans' Complete Streets Policy
- SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (2012), including Active Transportation Chapter
- Metro Bicycle Transportation Strategic Plan (2006)
- Los Angeles River Revitalization Master Plan (2007)
- Los Angeles County Metro Bicycle Master Plan (2006)
- City of Los Angeles Department of Public Works 2011 Bicycle Master Plan (2011)
- City of Glendale Bikeway Master Plan (1995)
- SCAQMD Carl Moyer Program Guidance http://www.arb.ca.gov/msprog/moyer/guidelines/current.htm

Best Available Research, White Papers, Technical Reports, and other Data Sources
Some of these sources were consulted, but found to be too complex, data-intensive or otherwise inappropriate or insufficient for this analysis.

- National Household Travel Survey Add-On (NHTS-CA) (2009)
- American Community Survey (2010 Census Data and other data sets)
- UC Berkley SafeTREC Transportation Injury Mapping System (TIMS) http://tims.berkeley.edu/
- SCAG 2008 Traffic Data: 2008 Traffic Counts, Average Person Trip Lengths by County (personal communication from Mike Ainsworth, SCAG)
- SCAG Regional Travel Demand Model and 2008 Model Validation (June 2012) http://www.scag.ca.gov/Documents/ValidationSummaryReport_SCAG2008Val_2012_06_05.pdf
- Methods to Find the Cost-Effectiveness of Funding Air Quality Projects: *Emission Factor Tables* (California Air Resources Board: May 2013) http://www.arb.ca.gov/planning/tsaq/eval/evaltables.pdf
- City of Los Angeles Health Atlas Maps (http://planning.lacity.org/cwd/framwk/healthwellness/ListofMaps.htm)
- Benefit-Cost Analysis of Bicycle Facilities, Translating Demand and Benefits Research into Guidelines http://www.pedbikeinfo.org/bikecost/methodology.cfm
- T. Fleming (Allatt), S. Turner and L. Tarjomi (2013), *Reallocation of Road Space*, Research Report 530, NZ Transport Agency (www.nzta.govt.nz); at www.nzta.govt.nz/resources/research/reports/530/docs/RR-530-Reallocation-of-road-space.pdf.
- Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis- Under Executive Order 128766* United States Government (Revised November 2013)
- Richard J. Jackson, MD, MPH, et al., *Urban River Parkways: An Underutilized Tool for Improving Public Health (*UCLA Fielding School of Public Health: 2012)
- Litman, Todd *Evaluating Active Transport Benefits and Costs* (Victoria Transport Policy Institute:2014)
- World Health Organization (WHO) Health Economic Assessment Tool (HEAT)

4. Assumptions Used in this Analysis to Develop Scenarios for Comparison

The analysis required several simplifying assumptions, which are described below.

Project Area, Project Life and Population Forecasts

- **Project area:** The project area includes the following zip codes: 90027 (Griffith Park and residential area to the south); 90039 (Atwater Village area, east of Project Area into northern Downtown Los Angeles); and 91204 (Glendale, east and north of project). Because geographies overlap and mismatch within the project study area, which consists of the communities within a 2-mile (bicycle-friendly) radius from the bridge site, the analysis assumes that only 50% of benefits would accrue to the project. However, even if only 25% of benefits were to be assumed, the project still results in an overwhelmingly positive cost/benefit ratio.

- **Project life: 20 years (2015-2035):** The type of bridge selected for construction was based in part on cost factors that included longevity of the structure itself. The useful life of this cable-stayed bridge is estimated to be 100 years. Half of that figure—resulting in a 50-year project life—for purposes of

determining the duration of expected benefits would therefore be very conservative. However, since transportation and population forecasts are more reliable inside a 20-year range, a 20-year project life has been assumed. This will have the effect of underestimating some project benefits.

- **Project Analysis Year - 2025 project life mid-point used for calculations:** The analysis assumes the project life extends from 2015 to 2035, and uses the project life midpoint year of 2025 as representative of annualized VMT reduction. This results in an over-estimate of the first decade of benefits, but will under-estimate the second decade of benefits, and is a reasonable proxy for annual calculations, which will be summed.

- **Population growth assumptions:** Because California Department of Finance (DOF) projections for Los Angeles County has readily available 5-year increment data covering the project life being analyzed (2015-2035) this concept-level analysis will use the DOF growth rate of 9.10% for Los Angeles County (2010-2015) as the midpoint growth assumption for all years in the project life. DOF forecasts are in the range of forecasts for L.A. County, City of L.A. and City of Glendale forecasts included in the SCAG 2012 RTP s and so are appropriate for this use. http://www.dof.ca.gov/research/demographic/reports/projections/P-1/

Transportation Assumptions

- **Mode share assumptions:** This analysis requires an estimate of the increase in mode share for non-motorized transportation. In order to make the the best possible determination of utilitarian (commute and errands) trips vs. recreational trips, it uses 2009 National Household Travel Survey Add-On (NHTS-CA) Survey data to establish per person trip generation rates and trip distributions by time of day. In some cases, we make assumptions about trip lengths and destinations, based on available trend data, active transportation research, knowledge of the project area, and professional judgment.

  Because recent mode share data was available by zip code in the American Community Survey (2008-2012), Tables 4-6 (Existing Conditions, and Scenarios A and B) show it, as a point of information. However, net project-related increases in active transportation trips and miles traveled are based off the more data-rich and therefore likely more accurate and representative NHST-CA data.

  The active transportation mode share in the SCAG region increased as follows:

  - **NHTS-CA data** (from 15,715 responses in the SCAG region) shows an increase in bicycling for all trips from 2000-2009 of 9% on an annualized basis; walk trips increased about 6% per year during the same period. (Source: SCAG 2012 RTP/SCS, Active Transportation Chapter, p. 42). The analysis incorporates this assumption into its calculations of Scenario B.
  - **Bicycle Commuters:** SCAG regional active transportation mode share for commute trips to work has risen from 0.50% of work trips in 2005 to 0.70% of trips in 2009. This is a 40% increase in only 4 years. (Source: US Census, 2005-2009, cited on p. 5, SCAG 2012 RTP AT Chapter)
  - **Pedestrian Commuters:** The percentage of those who walked to work in the SCAG region rose 19% in 4 years— from 2.10% in 2005 to 2.5% in 2009. (US Census, 2005-2009, cited on p. 5, SCAG 2012 RTP AT Chapter)

- **Assumption of robust increase in AT mode share in Project Area:** While the 75% increase (2000- 2009) in active transportation mode share shown by NHTS-CA data cannot be expected to occur across the entire

SCAG region for the next two decades, there are several reasons why we could reasonably expect this to occur in the project area for Scenario B:

- The project area saw relatively small growth in the shift to walking and cycling, compared to the region. This means that the area is still looking forward to that "bump" from the initial wave of pedestrian and bicycle infrastructure investment. The La Kretz Crossing project is a step in that process of improving the active transportation environment substantially, and increasing network access to and from desired locations.
- A lower than median household income and high percentage of households with no vehicle support higher bicycle/pedestrian growth assumptions. The importance of this is underscored the costs of vehicle ownership rise.
- Bicycle commuting on the Class 1 L.A. River Bike Way is a safe and convenient way to access the jobs in downtown Los Angeles.

- **Trip generation assumptions.** Population is multiplied by trip generation rates that come from Table 3-27, SCAG Regional Model (2008) Trip Generation Comparative Statistics for Los Angeles County. Those rates are 1.81 non-work trips per person, and 1.59 work trips per person.

- **All-Trip length assumptions:** Non-work walk and bike trip distance assumptions are taken from NHTS-CA Trip Charts: "TravelDistancebyMode" table. This analysis assumes a modest increase in the length of all trips. For walkers, it assumes an increase from the current 0.3 miles per trip to 0.5 (Scenario A, modest investment, no project) to 0.8 (Scenario B, with project providing catalyst to infrastructure investment). For cyclists, it assumes an increase from 1.5 miles per trip (current) to 2.0 miles (Scenario A) to 2.5 miles (Scenario B).

- **Travel to Work trip length assumptions**: This analysis assumes that work-related bicycle and pedestrian trip lengths will rise under Scenario B, which includes the Project, and a more robust infrastructure investment. A most rise in pedestrian trip lengths, from 0.75 to 1 mile is assumed. A trip length for bicycle commuters is estimated to double, from 5 miles to 10 miles per round trip. This is based on the length of the facility, available access points, and the attractiveness of a Class 1 Bike Path.

Reduced Injuries/Fatalities Assumptions

- **Decreased bicyclist injury accidents and fatalities assumptions:** Based on the nature of parallel bicycle routes, the job and recreation access afforded by this bridge, and the attractiveness of a separated Class I Bike Path for longer trips and recreational trips, a conservative assumption would be that 10% of the five-year bicycle accidents (i.e., 14 injury accidents) would move onto the bridge and be avoided. The life of this bridge is expected to be 100 years; however taking a conservative 20-year project life, and assuming (again, conservatively) that bicycle mode share would rise 76% by 2025, the bridge could result in 112 fewer injury accidents for cyclists over 20 years.

- **Decreased pedestrian injury accidents and fatalities assumptions:** The assumption for pedestrians is similar to that for bicycles, but uses a more conservative 5% diversion to the L.A. River Bike Path, in recognition of the range of pedestrian destinations on-street, would still reduce pedestrian injuries by 18. It is conservatively estimated that of these avoided bicycle and pedestrian accidents, four of them would have been fatalities.

Greenhouse Gas and Criteria Pollutant Assumptions

- **Greenhouse Gas (GHG) and Criteria Pollutant Reduction Emission Factors:** Transportation actions are among the most important strategies identified by the California Air Resources Board (CARB) and by SCAG, the SCAQMD and Los Angeles city and county planning agencies. California's Sustainable Communities and Climate Protection Act, (Senate Bill 375), calls for SCAG to include a Sustainable Communities Strategy (SCS) that reduces greenhouse gas (GHG) emissions from passenger vehicles by
    - To be conservative, this analysis uses the set of CARB emission factors *with* the Low Carbon Fuel Standard/Pavley amendments. These factors incorporate cleaner fleets in the future for GHG. This lessens the benefit from VMT reduction, but is more realistic and appropriate.
    - Based on assumed project life, year 2025 represents a midpoint. The gms/mile for Year 2025 CARB EMFAC 2011 Low Carbon CO2 emissions factor (grams/mile) = 226.2766376 for SCAG region. This equates to 0.4988546 lbs. /mile.

- **California Air Resources Board (CARB) Criteria Pollutant Emission Factors (EMFAC 2011):** For every vehicle mile traveled and every vehicle trip that is shifted to non-motorized transportation, there will be fewer criteria pollutants in the air. This is especially important for residents within the area around the project site, which is in the 90th percentile for most environmentally burdened areas in the state (CalEnvironScreen scores). For criteria pollutants (ROG, NOx, PM2.5 and CO) this analysis uses CARB emissions factors (May 2013, Table 3 – Average Auto Emission Factors) for the fleet of light-duty passenger vehicles, light-duty trucks and motorcycles, using the factors in the project-life column labeled 16-20 years (2011-2030 is the period calculated in the CARB table).

GHG and criteria pollutants that will be used in this analysis to calculate tons of emissions reduced are shown in Table 1 below.

Table 1: Criteria Pollutant Emission Factors for 20-year Life LARRC La Kretz Crossing Bridge Project

EMFAC 11 Average Auto Emission Factors (CARB, May 2013)		
Pollutant	**16-20 Year Project Life Average Emission Factor**	
ROG	VMT (g/mile)	0.119
	Commute trip ends (g/trip end)	0.462
	Average trip end (g/trip end)	0.353
Nox	VMT (g/mile)	0.13
	Commute trip ends (g/trip end)	0.162
	Average trip end (g/trip end)	0.162
PM2.5	VMT (g/mile)	0.087
	running exhaust only (g/mile)	0.002
	tire and brake wear (g/mile)	0.018
	road dust (g/mile)	0.022
	Commute trip ends (g/trip end)	0.004
	Average trip end (g/trip end)	0.004
CO	VMT (g/mile)	1.356
	Commute trip ends (g/trip end)	3.593
	Average trip end (g/trip end)	2.504
GHG	Low Carbon Fuel Standard/Pavley Factor (g/mile)	226.2766376

Source: Table 3, CARB Emission Factor Tables, May 2013 http://www.arb.ca.gov/planning/tsaq/eval/evaltables.pdf

5. Monetizing Project Benefits

Based upon a broad literature review, an approach to monetizing quantified benefits was developed and presented below.

- **Public health benefits per mile, walking and bicycling:** Public health values vary widely in the literature, although they are universally acknowledged to be significant. Although there are studies that show a health benefit as high as $1.92/mile of cycling and $3.70 /mile of walking (2008 USD, based on a 2010 New Zealand estimate of health benefits, cited above) this analysis uses a very conservative figure supplied by Todd Litman (cited above): $0.50 per mile of increased walking and $0.20 per mile of increased bicycling.

- **Mobility benefits of bicycle commute trips:** The Pedestrian and Bicycle Information Center (Center) reports "Bicycle commuters are willing to spend 20.38 extra minutes per trip to travel on an off-street bicycle trail when the alternative is riding on a street with parked cars. (Appendix D of NCHRP Report 552)" They assume an hourly value of time of $12, making the per-trip benefit $4.08. They multiply the per-trip benefit by existing and future bicycle commuters, multiply by two (trip to and from work) and multiply by 5 days per week and 47 weeks per year, to derive an annual benefit. The Center's approach assumes conditions like that in the La Kretz Crossing project area, in that no comparable bicycle facility exists nearby.
  http://www.pedbikeinfo.org/bikecost/docs/Translating%20Demand%20and%20Benefits%20Research%20into%20Guidelines.pdf

  This analysis incorporates the Center's guidance on monetizing mobility benefits for bicycle facilities, although it assumes only 45, rather than 47 weeks of commuting per year. It also assumes that the Bridge access to the L.A. River Bike Path benefits all bicycle commuters who use it, not just new commuters. It assumes that, with the Project, 935 daily bike-to-work trips are made. This is based on the relative share (12%) of bike-to-work trips compared to walk-to-work trips found in the ACS 2008-2012 data as inflated for Scenario B (under mode share assumptions discussed above.). Thus 12% of 7,789 Scenario B daily bicycle trips in the project area, or 935 daily trips, are assumed to be bicycle commute trips. Finally, the analysis assumes that 20% of the total estimated 935 Scenario B bicycle to work round trips per day will be attracted to the Bike Path by the existence of the bridge (i.e., 187 trips per day, or 42,075 annual commute trips).

- **Value of reduced pedestrian/bicycle injury:** For both pedestrian and bicycle injury avoided, this analysis assumes a benefit of $49,000 in avoided costs. This is based on a study showing that the average bicycle injury in Minnesota costs $49,000, including hospitalization, loss of productivity, and pain and suffering.http://www.health.state.mn.us/injury/best/best.cfm?gcBest=bike

- **Value of bicycle and pedestrian fatalities avoided:** Each avoided fatal accident yields a monetary benefit of $1.41 M. Source: National Safety Council, 2012 estimate of economic cost in 2010 dollars of lost wages, productivity, medical and administrative expenses. Cited in Portland Metro Active Transportation Plan, Appendix 4 Final Report (CH2MHills: June 2013), Table 2, p.10

- **Value of reduction of each metric ton of greenhouse gas:** This analysis uses the Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis- Under Executive Order 128766* United States Government (Revised November 2013). $47 (2007$) per metric ton of C02, for year 2025, with 3% average discount rate

- **Value of reduction of weighted ton of criteria pollutants:** The South Coast Air Quality Management District (SCAQMD) Carl Moyer Program identifies a maximum cost effectiveness of $17,772 per weighted ton of emissions reduced, for emissions reductions occurring after July 2014. The $17,772 figure represents the upper limit on what is considered to be cost effective (i.e., the benefits outweigh the costs) for actions that the regulated community may be required to make to reduce emissions. This analysis takes an extremely conservative approach, and estimates the value of a ton of weighted emissions at $886, which represents 5% of the cost effectiveness threshold. Current Carl Moyer Program guidelines can be accessed at http://www.arb.ca.gov/msprog/moyer/guidelines/2011gl/2011cmp_appg_04_01_14.pdf

  The formula for calculating the Annual Weighted Surplus Emission Reductions is:
  Weighted Emissions Reductions = NOx reductions (tons/year) +ROG reductions (tons/yr. + [20* PM.2.5 reductions tons/year]. Based on the EMFAC emissions per mile of VMT avoided due to this project, we calculate 77,099 annual weighted metric tons of surplus emission reductions.

6. Data Compilation

In this section, project area data is presented that provides a profile of the project area communities (Table 2) and a snapshot of bicycle use of the L.A. River Bike Path, based on 2013 count data (Table 3).

Project Area Demographics, Health Profile and Active Transportation Mode Share (Work Trips)

Demographic characteristics of the project area are included in Table 2. These income, health and transportation factors form the foundation for calculating benefits that relate directly to the project benefits associated with the following categories directly relevant to the goals of the Active Transportation Program: Increased percentage of population biking and walking; increased safety for equestrians, cyclists and walkers; increased mobility (especially for non-recreational cyclists); support for regional and state GHG reduction goals; project benefits (public health and environmental quality) accruing to disadvantaged communities; and delivery of a broad spectrum of benefits to equestrians, cyclists and walkers.

Table 2: Project Area Data

Zip Code	90027 (Griffith Park & South)	90039 (Atwater Village to Silver Lake)	91204 (Glendale)
DEMOGRAPHICS [1]			
Total Population (2010)	45,702	28,260	16,241
Total households (2010)	21,691	11,804	5,732
Median HH Income	$47,210	$64,073	$39,850
Percent of State Median HH Income	76.8%	104%	64.9%
Speak English "less than very well"	28.5%	22.4%	46.7%
HEALTH FACTORS[2]			
Obesity Rate in Adults	16.4-21.5% (LA County Data)	16.4-21.5% (LA County Data)	16.4-21.5% (LA County Data)
Prevalence of Childhood Obesity (2010)	18.3-24% (City of LA Health Atlas)	24-27.9% (City of LA Health Atlas)	No corresponding data
Rate of Diabetes Mortality per 100,000 (2004-2008)	Less than 18.39	18.39-24.74	No data
Prevalence of Serious Emotional Disturbance/Serious Mental Illness	>.05% - .06%	>0.06% - 0.17% (highest bracket)	>0.06% - 0.17% (highest bracket)
TRANSPORTATION FACTORS			
Motor Vehicle Collisions w/ped/bike under 18 yrs., per 10K residents under 18 yrs. (2001-2010)	9.40-13.90 (second highest bracket)	9.40-13.90 (second highest bracket)	No corresponding data
Workers 16 years and over	24,056	15,431	7,508
Percent of workers 16 and over in households with no vehicles available	8.0	3.6% (4.9% of females)	6.1%
Walked to work	7.9%	2.9	8.2%
Bicycled to work	1.2%	1.0	0.1%

[1]Source: 2008-2012 American Community Survey 5-Year Estimates, Table S0801; Households from Table DP02; Median HH Income from DP03; Percent of State Median HH Income is compared to DP03 2008-2012 5-Year Estimates of California Median HH Income of $61,400 (in 2012 Inflation –Adjusted Dollars);
[2]Health data from City of Los Angeles Health Atlas Maps http://planning.lacity.org/cwd/framwk/healthwellness/ListofMaps.htm

Current Bicycle Use of the Los Angeles River Bike Path in the Project Area

This section uses available count data to calculate existing active transportation miles traveled on the L.A. River Bike Path in the project area to understand how facility is used today, without the proposed bridge access. It is provided as context for viewing the opportunity presented by this bridge, which creates a new access point in the middle of a 1.4-mile segment now inaccessible to cyclists, walkers and equestrians in the North Atwater Village area.

The figure of 806,850 annual bicycle miles, as estimated in Table 3 is significant, and represents the attractiveness of the L.A. River Bike Path for both recreational and other purposes. Trip purposes are imputed based on day of travel, yielding 495,000 utilitarian trips (commute trips, shopping, errands) and 311,850 miles of recreational bicycling per year.

Obviously, these bicycle counts do not include pedestrians, so pedestrian usage is unrepresented. For purposes of this analysis, it is important to note that the bridge itself will create access to pedestrians. Since it is difficult for pedestrians to access the 1.4-mile uninterrupted segment adjacent to North Atwater Village, the new access will offer an entirely new travel option and recreational opportunity for the communities nearby.

Weekday Bicycle Counts: Manual bicycle counts were conducted by Los Angeles County Bicycle Coalition (LACBC) in 2013, along the Los Angeles River Bike Path at the following locations: at Steelhead Park, just north of downtown L.A.; at a site just south of the project between Los Feliz Blvd. and Sunnynook Park; and in 2011 at Los Feliz Blvd. All three locations are south of the project site. The SCAG/Metro Bike Count Data Clearinghouse data can be reviewed online at www.bikecounts.luskin.ucla/edu and provides a basis for estimating future project benefits. The 2-hour morning period average volumes ranged from 13 to 20 cyclists per hour (southbound) and from 18-31 cyclists per hour (northbound). Two-hour afternoon period average volumes ranged from 26 to 39 cyclists per hour (southbound) and 36-47 cyclists per hour (northbound).

Based on NHTS-CA trip distribution data, the 254 counted bicycle trips, northbound and southbound, in the morning and evening peak period, at the location immediately south of the project site (L.A. River Bike Path between Los Feliz Blvd. and Sunnynook Park) represent 57.70% of daily trips. Therefore, weekday bicycle trips are estimated to be 440 per day, at this location.

Saturday Bicycle Counts: Saturday counts, also conducted for two hours at each location, show average hourly counts ranging from 32-35 cyclists per hour (southbound) and 32-45 cyclists per hour (northbound).

Based on NHTS-CA trip distribution data, the 166 counted bicycle trips, northbound and southbound, in the mid-day 2-hour period, at the location immediately south of the project site (L.A. River Bike Path between Los Feliz Blvd. and Sunnynook Park) represent 33.50% of daily trips. Therefore, Saturday bicycle trips are estimated to be 495 per day, at this location.

Table 3: Estimated Annual (2013) Bicycle Miles Traveled on L.A. River Bike Path, Near Project Location,

Bicycle Counts: 2013 LA River Bike Path Count Data, Annualized						
Location immediately south of proposed bridge	2- hour Count Data (Average of locations) (2013 LACBC Counts)	Data Period	% of daily trips represented (NHTS-CA)	Estimated 100% of daily trips (n/s)	Estimated average miles per trip (based on facility access points)	Annual Estimated Bicycle Miles Traveled*
Los Feliz/Sunnynook Southbound	30	7-9 AM Peak (Tuesday)				
Los Feliz/Sunnynook Northbound	61	7-9 AM Peak (Tuesday)	23.40%			
Los Feliz/Sunnynook Southbound	77	4-6 PM Peak (Tuesday)				495,000 (Utilitarian trips)
Los Feliz/Sunnynook Northbound	86	4-6 PM Peak (Tuesday)	34.30%	440	5	
Los Feliz/Sunnynook Southbound	76	Saturday Mid-day				311,850 (Recreational trips)
Los Feliz/Sunnynook Northbound	90	Saturday Mid-day	33.50%	495	7	
ANNUAL BICYCLE VMT South of Project Area						**806,850**
* Annual estimates for weekdays assume only 45 weeks per year, to account for inclement weather. Annual figure for Saturday was doubled to include Sunday trips. It is assumed that these trips are primarily recreational, and therefore likely to be longer trips.						

7. Scenario Development: Estimating Current and Future Bicycle and Pedestrian Trips and Miles in the Project Area

Scenarios analyzed: This analysis compares three sets of assumptions in order to arrive at a "net project-related benefit" for a range of benefit types. The scenarios are:

- **Existing Conditions:** A profile of the project area today, based on available data;
- **Scenario A**: Year 2025 with forecast population growth, but without the project and including only modest active transportation infrastructure investment; and
- **Scenario B:** Year 2025 with forecast population growth + Project + substantial infrastructure investment catalyzed by the project.

The next set of tables, Tables 4-7, was constructed in order to demonstrate how annual and project-life active transportation trips are affected by population growth, and by the project in Year 2025.

Table 4 (Existing Conditions) shows estimated existing active transportation miles in the project area, based on trip generation, mode share and population factors available.

Table 5 (Scenario A) calculates future active transportation miles traveled due to population increase only, in project area using existing active transportation mode share, and only slight changes to assumed trip lengths.

Table 6 (Scenario B) calculates future active transportation miles traveled, with the same population increase, an increase in the active transportation mode share due to project-related positive impacts in project area, and increased trip lengths as well.

Finally, Table 7 compares the three scenarios, and subtracts Scenario A from Scenario B numbers to estimate changes in active transportation trips and miles traveled that can be reasonably attributed to the construction of La Kretz Crossing, and the access it provides to an extensive and growing regional network of Class 1 bicycle and pedestrian paths, as well as equestrian trails.

Table 4: EXISTING CONDITIONS: Estimated Annual Current Walk/Bike Miles Traveled, In Project Area

LA KRETZ CROSSING: EXISTING CONDITIONS Estimated Pedestrian/Bicycle Trips Mile (2010/2012)							
Zip Code	**90027**	**90039**	**91204**	**Project Area Totals**	**Estimated miles per trip**	**Annual Miles**	**50% Reduction for Project Area Focus**
2010 Population	45,702	28,260	16,241	90,203			
2010 Workers 16 & Over	24,056	15,431	7,508	46,995			
Walked to work mode share (2008-12)	7.90%	2.90%	8.20%	6.33%			
Bicycled to work mode share (2008-12)	1.20%	1.00%	0.10%	0.77%			
Walk commutes per day (2008-12 ACS walk share)*(Trips per worker)	3,022	712	979	4,712	1.5	1,590,331	795,165
Bike commutes per day (2008-12 ACS bike share) * (Trips per worker)	459	245	12	716	5	805,814	402,907
Non-work trips- 1.81 per person*	82,721	51,151	29,396	163,267			
Trips per worker (1.59)	38,249	24,535	11,938	74,722			
Total Zip Code Trips per person	120,970	75,686	41,334	237,989			
2009 All Trips - walk mode share**	19.24%	19.24%	19.24%	19.24%			
2009 All Trips - bicycle mode share**	1.70%	1.70%	1.70%	1.70%			
2009 Walk Trips (ALL) PER DAY	23,275	14,562	7,953	45,789	0.3	5,013,915	2,506,957
2009 Bike Trips (ALL) PER DAY	2,056	1,287	703	4,046	1.5	2,215,087	1,107,544
*Los Angeles County, Table 3-27, SCAG Regional Model, Year 2008 Trip Generation Comparative Statistics							
**All Trips Walk/Bike Mode Share is NHTS-CA Survey 2009 data, cited in SCAG RTP Active Transportation Chapter (p.42). Non-work walk and bike trip distance is from NHTS-CA Trip Charts: Travel Distance by Mode.							

Table 5: Scenario A: Estimated Annual (2025) Walk/Bike Miles Traveled, In Project Area (2025 Population Growth, No Project, Modest Active Transportation Investment)

Scenario A: Estimated Pedestrian/Bicycle Trips Mile (2025 Population Growth, No Project, Modest AT Investment)							
Zip Code	**90027**	**90039**	**91204**	**Project Area Totals**	**Estimated miles per trip**	**Annual Miles**	**50% Reduction for Project Area Focus**
2025 Forecast Population (9.1% increase – Cal DOF)	49,861	30,832	17,719	98,411			
2025 Forecast Workers 16 & Over (9.1% increase Cal DOF)	26,245	16,835	8,191	51,272			
Walked to work mode share (2008-12)	7.90%	2.90%	8.20%	6.33%			
Bicycled to work mode share (2008-12)	1.20%	1.00%	0.10%	0.77%			
Walk commutes per day (2008-12 ACS walk share)*(Trips per worker)	3,297	776	1,068	5,141	1.5	1,735,051	867,525
Bike commutes per day (2008-12 ACS bike share) * (Trips per worker)	501	268	13	781	5	879,143	439,572
Non-work trips- 1.81 per person*	90,248	55,805	32,071	178,125			
Trips per worker (1.59)	41,730	26,768	13,024	81,522			
Total Zip Code Trips per person	131,978	82,573	45,095	259,647			
2009 All Trips - walk mode share**	19.24%	19.24%	19.24%	19.24%			
2009 All Trips - bicycle mode share**	1.70%	1.70%	1.70%	1.70%			
Scenario A Walk Trips (ALL) PER DAY **	25,393	15,887	8,676	49,956	0.5	9,116,968	4,558,484
Scenario A Bike Trips (ALL) PER DAY **	2,244	1,404	767	4,414	2	3,222,213	1,611,107
*Los Angeles County, Table 3-27, SCAG Regional Model, Year 2008 Trip Generation Comparative Statistics							
**All Trips Walk/Bike Mode Share is NHTS-CA Survey 2009 data, cited in SCAG RTP Active Transportation Chapter (p.42). Non-work walk and bike trip distance is from NHTS-CA Trip Charts: Travel Distance by Mode table							

Table 6: Scenario B: Estimated Annual (2025) Walk/Bike Miles Traveled, In Project Area (2025 Population Growth, With Project + Substantial Active Transportation Investment)

Scenario B: Estimated Pedestrian/Bicycle Trips Mile (2025 Population Growth, With Project as AT Investment Catalyst)							
Zip Code	**90027**	**90039**	**91204**	**Project Area Totals**	**Estimated miles per trip**	**Annual Miles**	**50% Reduction for Project Area Focus**
2025 Forecast Population (9.1% increase)	49,861	30,832	17,719	98,411			
2025 Forecast Workers 16 & Over (9.1% increase)	26,245	16,835	8,191	51,272			
Walked to work mode share (Increased 6.3% over ACS 2008-12, based on SCAG projection of NHTS-CA data) **	8.40%	3.08%	8.72%	6.73%			
Bicycle to work mode share (2025 estimate increased 3.9% over ACS 2008-12, based on SCAG projection of NHTS-CA data)**	1.25%	1.04%	0.10%	0.80%			
Walk commutes per day (2008-12 ACS walk share)*(Trips per worker)	3,504	825	1,135	5,465	2	2,459,145	1,229,573
Bike commutes per day (2008-12 ACS bike share)*(Trips per worker)	520	278	14	812	10	1,826,859	913,430
Non-work trips- 1.81 per person*	90,248	55,805	32,071	178,125			
Trips per worker (1.59)	41,730	26,768	13,024	81,522			
Total Zip Code Trips per person	131,978	82,573	45,095	259,647			
2025 Estimated (Increased) All Trips - walk mode share**	20.45%	20.45%	20.45%	20.45%			
2025 Estimated (Increased) All Trips - bicycle mode share**	3.00%	3.00%	3.00%	3.00%			
Scenario B Walk Trips (ALL) PER DAY **	26,992	16,888	9,223	53,103	0.8	15,506,14	7,753,070
Scenario B Bike Trips (ALL) PER DAY **	3,959	2,477	1,353	7,789	2.5	7,107,824	3,553,912

*Los Angeles County, Table 3-27, SCAG Regional Model, Year 2008 Trip Generation Comparative Statistics

**Increase in Walk/Bike Mode Share is based on 6.3% and 3.9% SCAG-estimated 2035 increase from NHTS-CA Survey 2009 data, cited in SCAG RTP Active Transportation Chapter (p.42). This analysis assumes that 2035 increases are achieved by 2025 because of Bridge Project connectivity and leveraging of related investments, and that River Bike Path increases bike mode share to 3% for all trips. Non-work walk and bike trip distance is increased from NHTS-CA Trip Charts: Travel Distance by Mode table, based on planned improvements to current non-friendly active transportation environment in project area.

Table 7: Comparison of Existing Conditions with Year 2025 Without and With Project

Comparison of Existing Conditions with Scenarios A & B (Year 2025 Without and With Project) Calculated for 50% of Project Area Zip Codes				
	Miles Traveled: Existing Conditions (2009, 2012) (Table 4)	**Miles Traveled: Scenario A: 2025 No Project (Table 5)**	**Miles Traveled: Scenario B: 2025 With Project (Table 6)**	**Year 2025 Annualized Project-Dependent Active Transportation Miles Traveled (Table 6 minus Table 5)**
2010 Population	90,203	98,411	98,411	
2010 Workers 16 & Over	46,995	51,272	51,272	
Walking Trips	45,789	49,956	53,103	3,147
Bicycling Trips	4,046	4,414	7,789	3,375
Walk Miles VMT Avoided (Work Trip Only)	795,165	867,525	1,229,573	362,047
Bicycle Miles VMT Avoided (Work Trip Only)	402,907	439,572	913,430	473,858
Walk Miles – VMT Avoided (ALL TRIPS)	2,506,957	4,558,484	7,753,070	**3,194,586**
Bicycle Miles – VMT Avoided (ALL TRIPS)	1,107,544	1,611,107	3,553,912	**1,942,805**
TOTAL WALK + BIKE VMT Avoided (ALL TRIPS)	3,614,501	6,169,591	11,306,982	**5,137,391**

The next step is to use the estimated VMT avoided due to the project (from Table 7, above) to calculate a range of VMT-related benefits. Table 8 summarizes the air quality benefits based on accepted emission factors.

Table 8: AIR QUALITY BENEFITS: Annual Tons of Pollutants Reduced with Project

LARRC La Kretz Crossing	NET ANNUAL IMPACTS DUE TO PROJECT	ROG		NOx		PM2.5**	CO		CO2
Air Quality Analysis		**grams/mile**	**G/trip end**	**grams/mile**	**G/trip end**	**grams/mile**	**grams/mile**	**G/trip end**	**grams/mile**
CARB EMFAC11 Factors (Table 1)		0.119	0.353	0.13	0.162	0.129	1.356	2.504	226.2766376
Total Annual VT shifted to AT (Table 7)	6,523		2,302		1,056.67			16,332.67	
Total Annual VMT shifted to AT (Table 7)	5,137,391	611,350		667,861		662,723	6,966,302		1,162,471,562
TOTAL EMISSIONS REDUCED (GRAMS/YEAR)		613,652		668,917		662,723	6,982,635		1,162,471,562
TOTAL EMISSIONS REDUCED (LBS/YEAR)		1,353		1,475		1461	15,394		2,562,811
TOTAL EMISSIONS REDUCED (METRIC TONS/YEAR)		**0.614**		**0.669**		**0.663**	**6.983**		**1,162**

* Using average trip ends for these calculations
** PM2.5 composite includes VMT, running exhaust, tire and brake wear, road dust

Finally, Table 9 summarizes and monetizes the comprehensive results of all previous calculations, using standard practice or explaining proposed alternative approach. As Table 9 illustrates, the estimated annual benefits from this project are valued at approximately $2.8 M. Over the 20-year life of the project, over $66 M of benefits may be realized.

Table 9: Summary of Monetized Project Benefits by Year and Project Life (20 Years)

Benefit due to La Kretz Crossing Implementation (factoring out population growth)	2025 Annual Benefit or Basis of Benefit	Per unit value ($)	2025 Annualized Value of Benefit	20 Years of Annual Benefit (Extending 2025 Midpoint)	20 Year Value of Annual Benefit (Extending 2025 Midpoint)
Net New Walk Trips (All Trips)	3,147			69,945	
Net New Bike Trips (All Trips)	3,375			67,508	
Total Net AT Trips	6,523			130,453	
Total Net Pedestrian Miles Traveled	3,194,586			63,891,714	
Total Net Bicycle Miles Traveled	1,942,805			38,856,102	
Total Net VMT Reduced (Total Walk + Bike Trips)	5,137,391			102,747,816	
Benefit of Increased Bicycle Mobility (Per Bike Commuter Trips on L.A. River Bike Path; based on 20% of 2025 Scenario B Bike-to-Work Trips)	42,075	$4.08	$171,666	3,433,320	$14,007,946
Reduced Vehicle-Involved Bicycle/Pedestrian Crashes with Serious Injuries (1)	6	$49,000	$294,000	120	$5,880,000
Reduced Vehicle-Involved Bicycle/Pedestrian Crashes with Fatalities (2)	0.20	$1,410,000	$282,000	4	$5,640,000
Increased fitness & health - walking ($0.50 per walk/mile) (3)	3,194,586	$0.50	$1,597,293	63,891,714	$31,945,857
Increased fitness & health - biking ($0.20 per bike mile) (3)	1,942,805	$0.20	$388,561	38,856,102	$7,771,220
SCAQMD Carl Moyer Weighted Surplus Emissions Reduction (Metric Tons) (Assume 5% of Max. Cost Effectiveness) (4)	15	$886	$12,880	290.73	$257,590
CO Reduction Metric Tons	7	not monetized	0	140	0
CO2 (GHG) Reduction (Metric Ton) (5)	1,162	$47	$54,636	23,249	$1,092,722
Total			**$2,801,035**		**$66,595,335**

(1) The average bicycle injury in Minnesota costs $49,000, including hospitalization, loss of productivity, and pain and suffering.http://www.health.state.mn.us/injury/best/best.cfm?gcBest=bike

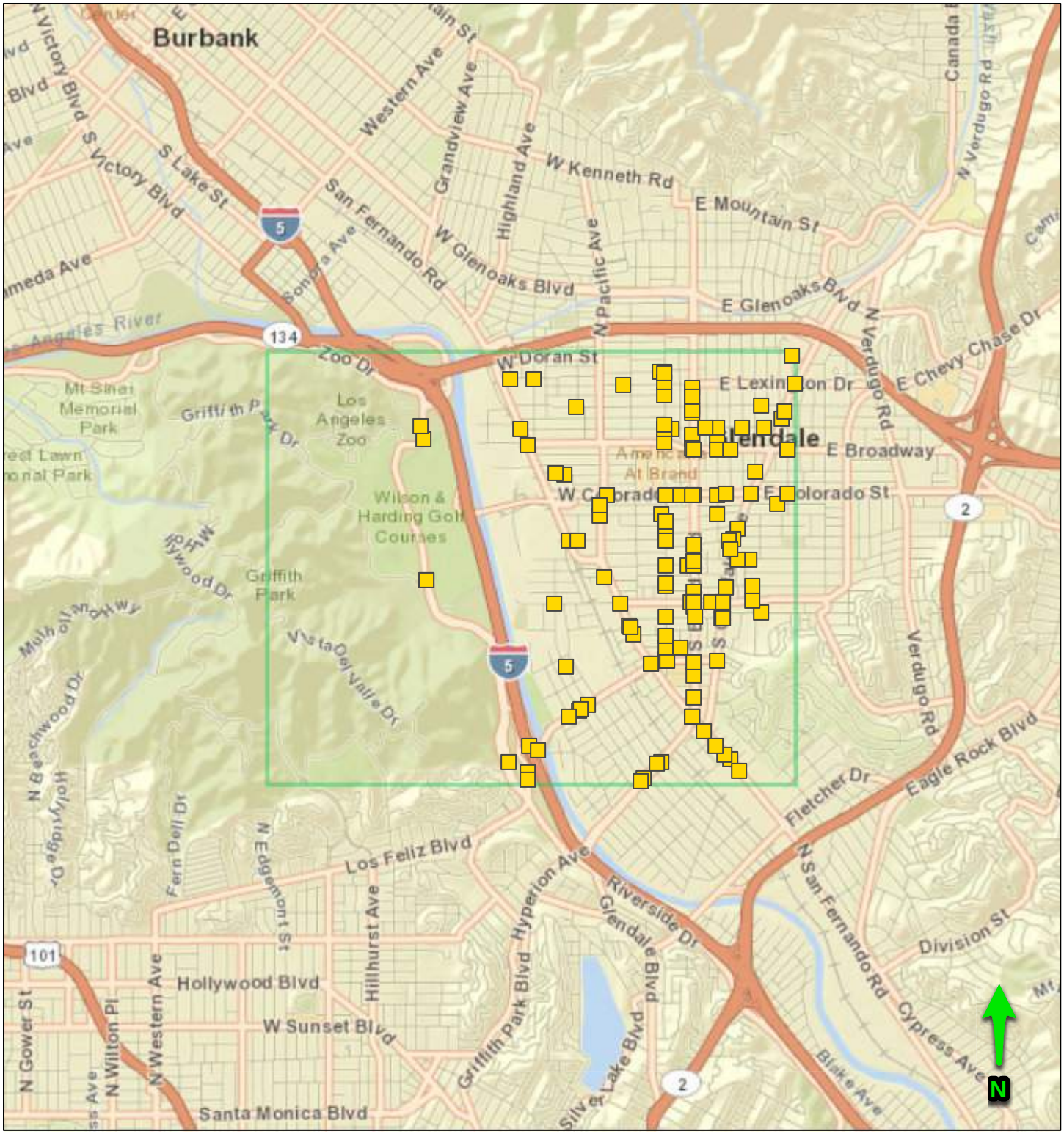
(2) National Safety Council, 2012 estimate of economic cost in 2010 dollars of lost wages, productivity, medical and administrative expenses. Cited in Portland Metro Active Transportation Plan, Appendix 4 Final Report (CH2MHills: June 2013), Table 2, p.10

(3) Todd Litman, Evaluating Active Transport Benefits and Costs, Table 17, p.44 (VTPI: 2014)

(4) Assumes benefit is 5% of $17,772 cost effectiveness per weighted ton of emissions (NOx, ROG and PM2.5), or $886 per weighted ton. http://www.arb.ca.gov/msprog/moyer/guidelines/2011gl/2011cmp_appg_04_01_14.pdf

(5) Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis- Under Executive Order 128766* United States Government (Revised November 2013). $47 (2007$) per metric ton of CO2, for year 2025, with 3% average discount rate.

SWITRS Collisions from 1-1-08 to 12-31-12, ALL, LOS ANGELES



May 7, 2014

1:62,243

0 0.5 1 2 mi

0 0.75 1.5 3 km

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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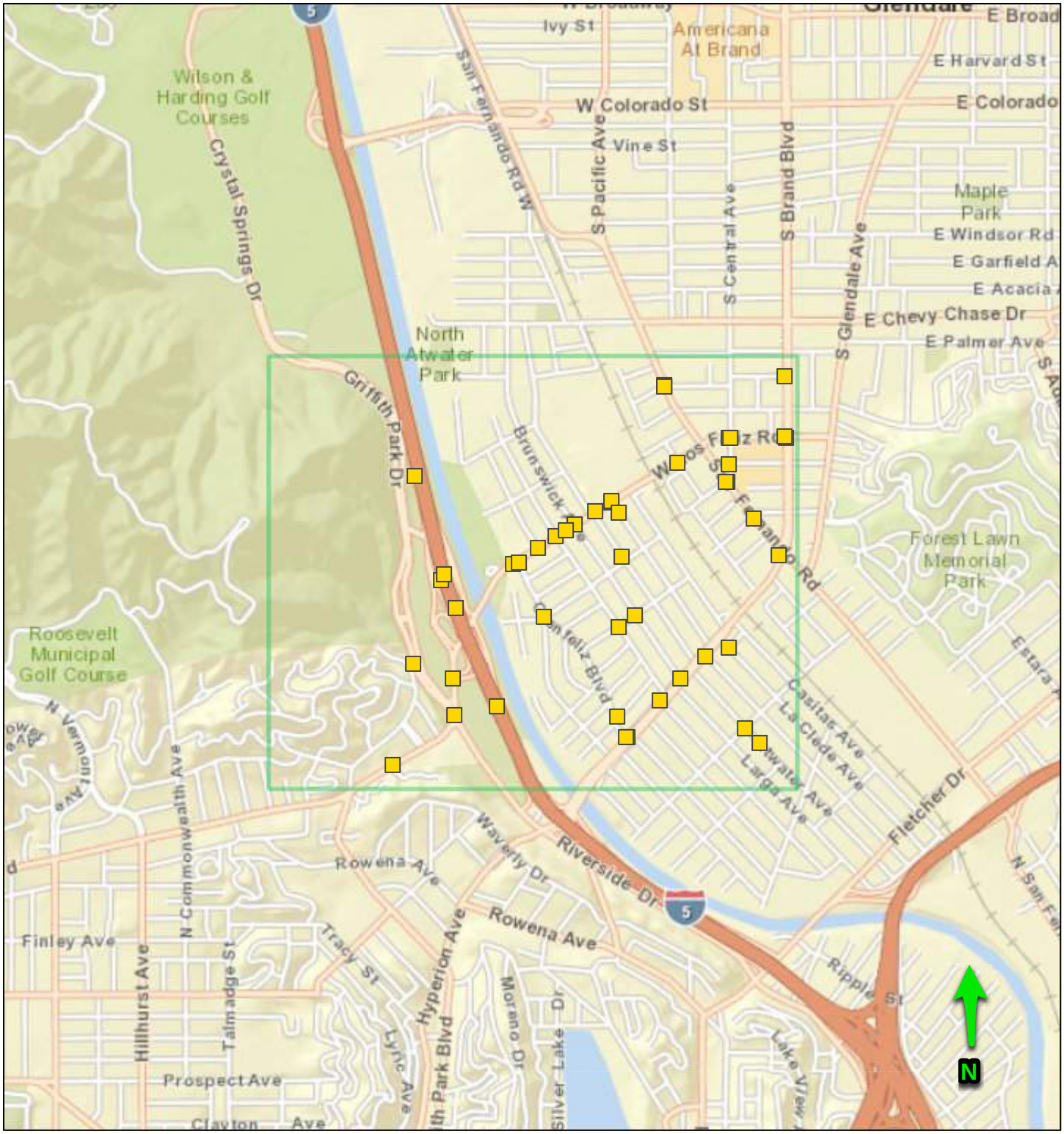
SWITRS Collisions from 1-1-08 to 12-31-12, ALL, LOS ANGELES



May 7, 2014

1:31,121

0 0.275 0.55 1.1 mi

0 0.425 0.85 1.7 km

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Project Number	Potential Project (see Note 1, below)	Potential Project Categories*	Public or Private Land **	Land Acquisition Required? ***	Project Readiness ****	Total Project Cost (Range, in $million) (see Note 4, below)		Could Potentially Proceed Prior to Completion of the US Army Corps Feasibility Study	Could Potentially Proceed as a Federal Demonstration Project (see Note 2, below)	City Council District	Neighborhood Council	County Super-visory District	State Assembly District	State Senate District	Federal Congressional District
121	South Mariposa Street Pocket Park	BT, EO, HR, PR, SG, WQ, WR	Mixed	a, c	e, g	1	2	X		4	(City of Glendale)	5	43	21	29
122	Glendale Riverwalk Non-Motorized Bridge	BT	PUBLIC	b	f	2	4	X		4	Greater Griffith Park	3	43	21	29
123	Ferraro Fields Opportunity Area	BT, EO, FR, HR, PG, PR, PT, RB, SG, UI, WQ, WR	PUBLIC	a, b	e, f	--	--		X	4	Greater Griffith Park	3	43	21	29
124	Ferraro Fields Park	BT, EO, HR, PR, WQ	PUBLIC	a	e	10	15	X	X	4	Greater Griffith Park	3	43	21	29
125	River Glen Opportunity Area	BT, EO, FR, HR, PG, PR, PT, RB, SG, UI, WQ, WR	Mixed	a, b, c	e, f, g	130	180			4	Atwater Village	3	43	21	29
126	Doran Street Industrial Green Street	BT, SG, WQ	PUBLIC	a	e	2	3	X		4	Atwater Village	3	43	21	29
127	Doran Street and San Fernando Road Enhanced Intersection	BT	PUBLIC	a	e	0.5	1	X		4	Atwater Village	3	43	21	29
128	Verdugo Wash Non-Motorized Bridge	BT	PUBLIC	b	f	2	4	X		4	Atwater Village	3	43	21	29
129	River Glen Wetlands	BT, EO, HR, PR, WQ, WR	Mixed	b, c	f, g	50	70			4	Atwater Village	3	43	21	29
130	River Glen River Park	BT, EO, HR, PR, WQ, WR	Mixed	a, b, c	e, f, g	5	10			4	Atwater Village	3	43	21	29
131	River Glen Non-Motorized Bridge	BT	PUBLIC	a	e	2	4	X		4	Greater Griffith Park	3	43	21	29
132	River Glen Regional Gateway	PG	PUBLIC	a	e	1	2	X		4	Atwater Village	3	43	21	29
133	River Glen Opportunity Area Outdoor Classroom	EO, WQ	PUBLIC	a	e	0.5	1	X		4	(City of Glendale)	3	43	21	29
134	River Glen Opportunity Area Riverside Street	BT, HR, SG, UI, WQ	Private	c	g	6	8	X		4	Atwater Village	3	43	21	29
135	Brazil Street and San Fernando Road Enhanced Intersection	BT	PUBLIC	a	e	0.5	1	X		4	Atwater Village	3	43	21	29
136	Brazil Street Industrial Green Street	BT, SG, WQ	PUBLIC	a	e	2	3	X		4	Atwater Village	3	43	21	29
137	West end of Brazil Street Paseo	PG, WQ	Mixed	a, c	e, g	2	3	X		4	Atwater Village	3	43	21	29
138	134 Freeway to Colorado Greenway Promenade	BT, EO, HR, PR, PT, WQ	Mixed	a	e	5	8	X		4	Atwater Village	3	43	21	29
139	Acquisition of property near Brazil and the River	HR, PR, UI, WQ	Private	c	g	20	40	X		4	Atwater Village	3	43	21	29
140	Electronics Street Industrial Green Street	BT, SG, WQ	PUBLIC	a	e	2	3	X		4	Atwater Village	3	43	21	29
141	West end of Electronics Street Paseo	PG, WQ	Mixed	a, c	e, g	2	3	X		4	Atwater Village	3	43	21	29
142	Colorado Ave Non-Motorized Bridge	BT	PUBLIC	b	f	4	6	X		4	Atwater Village	3	43	21	29
143	North Atwater Greenway	BT, EO, HR, PR, WQ	PUBLIC	a, b	e, f	10	15		X	4	Atwater Village	3	43	21	29
144	Goodwin Avenue Primary Local Green Street	BT, SG, WQ	PUBLIC	a	e	2	4	X		4, 13	Atwater Village	3	43	21	29
145	N. Atwater Park – River Vista Expansion	BT, EO, HR, PR, WQ, WR	PUBLIC	a	e	7	10	X	X	4	Atwater Village	3	43	21	29
146	Verdant St. Non-Motorized Bridge	BT	PUBLIC	a	e	2	4	X		4	Atwater Village	3	43	21	29
147	Los Feliz Equestrian/ Non-Motorized Bridge	BT	PUBLIC	a	e	2	4	X		4	Atwater Village	3	43	21	29, 31
148	Los Feliz Boulevard Arterial Green Street	BT, SG, WQ	PUBLIC	a	e	10	15	X		4, 13	Atwater Village	3	43, 45	21	31, 33
149	Los Feliz Boulevard River Bridge	RB	PUBLIC	a	e	15	20	X		4	Atwater Village	3	43, 45	21	31
150	Legion Lane Park	BT, EO, HR, PR, WQ	Mixed	a, c	e, g	5	7	X		13	Atwater Village	3	45	21	31
151	Sunnynook River Park	BT, EO, HR, PR, WQ	PUBLIC	a	e	10	15	X		4	Greater Griffith Park	3	43	21	31
152	Silver Lake Boulevard Primary Local Green Street	BT, SG, WQ	PUBLIC	a	e	3	5	X		13	Glassel Park	1	45	21, 22	31
153	Silver Lake Boulevard Pocket Park	BT, EO, HR, PR, SG, WQ, WR	Mixed	a, c	e, g	1	2	X		13	Atwater Village	1	45	21, 22	31
154	Fletcher Avenue and San Fernando Road Enhanced Intersection	BT	PUBLIC	a	e	0.5	1	X		1, 13	Atwater Village	1	45	22	31
155	Fletcher Driver Arterial Green Street	BT, SG, WQ	PUBLIC	a	e	7	10	X		1, 4, 13	Elysian Velley Riverside	1	45	22	31
156	Fletcher Drive River Bridge	RB	PUBLIC	a	e	8	12	X		13	Elysian Valley Riverside,Atwater Village	1	45	22	31
157	Fletcher Avenue and on/off ramp to the 2 Freeway Enhanced Intersection	BT	PUBLIC	a	e	0.5	1	X		13	Atwater Village	1	45	22	31
158	Fletcher Drive under 5 Freeway Portal	PG	PUBLIC	b	f	0.5	0.7	X		4, 13	Silver Lake	1	45	22	31
159	Silver Lake Primary Local Green Street	PG, WQ	PUBLIC	a	e	5	10	X		4, 13	Lake	1	45	21, 22	31
160	West end of Edward Way Paseo	PG, WQ	PUBLIC	a	e	2	3	X		1	Glassell Park	1	45	22	31
161	Media Center Drive and Railway Portal	PG	PUBLIC	a	e	0.5	0.7	X		1	Glassell Park	1	45	22	31
162	Edward Way and Railway Portal	PG	PUBLIC	a	e	0.5	0.7	X		1	Glassell Park	1	45	22	31
163	West end of Media Center Drive Paseo	PG, WQ	PUBLIC	a	e	2	3	X		1	Glassell Park	1	45	22	31
164	Taylor Yard Opportunity Area	BT, EO, FR, HR, PG, PR, PT, RB, SG, UI, WQ, WR	Mixed	a, b, c	e, f, g	450	500		X	1, 13	Glassel Park, Greater Cypress Park, Elysian Valley Riverside	1	45	21, 22	31
165	Taylor Yard River Park	BT, EO, HR, PR, WQ, WR	Private	c	g	60	90		X	1	Park	1	45	22	31
166	Taylor Yard Regional Gateway	PG	PUBLIC	a	e	2	3	X		1, 13	Greater Cypress Park	1	45	22	31
167	Taylor Yard Outdoor Classroom	EO, WQ	Private	c	g	0.5	1	X		1	Greater Cypress Park	1	45	21, 22	31
168	Newell Street under 5 Freeway Portal	PG	PUBLIC	b	f	0.5	0.7	X		13	Elysian Valley Riverside	1	45	22	31
169	Blimp Street Paseo	PG, WQ	PUBLIC	a	e	2	3	X		13	Elysian Valley Riverside	1	45	21, 22	31
170	Acquisition of property, Elysian Valley industrial properties	HR, PR, UI, WQ	Private	c	g	20	40	X		13	Elysian Valley Riverside	1	45	21	31
171	Taylor Yard Non-Motorized Bridge	BT	PUBLIC	b	f	4	6	X		1, 13	Elysian Valley Riverside	1	45	22	31
172	Riverside Park	BT, EO, HR, PR, WQ	PUBLIC	a	e	10	15	X		13	Greater Echo Park Elysian	1	45	21	31
173	Dorris Place Primary Local Green Street	BT, SG, WQ	PUBLIC	a	e	1	2	X		13	Elysian Valley Riverside	1	45	21	31
174	Dorris Place Pocket Park	BT, EO, HR, PR, SG, WQ, WR	Mixed	a, c	e, g	1	2	X		13	Elysian Valley Riverside	1	45	21	31
175	Dorris Place Outdoor Classroom	EO, WQ	PUBLIC	a	e	0.5	1	X		13	Elysian Valley Riverside	1	45	21	31
176	East end of Dorris Street Paseo	PG, WQ	PUBLIC	a	e	2	3	X		13	Elysian Valley Riverside	1	45	21	31
177	Dorris Place Sanitation Yard Park	BT, EO, HR, PR, WQ, WR	PUBLIC	a	e	7	10	X		13	Elysian Valley Riverside	1	45	21	31
178	San Fernando Road and Elm Enhanced Intersection (at Taylor Yard)	BT	PUBLIC	a	e	0.5	1	X		1	Greater Cypress Park	1	45	22	31
179	Taylor Yard Promenade	BT, EO, HR, PR, PT, WQ	Mixed	b, c	f, g	20	30			1	Greater Cypress Park	1	45	22	31
180	Arroyo Seco Confluence Opportunity Area	BT, EO, FR, HR, PG, PR, PT, RB, SG, UI, WQ, WR	Mixed	a, b, c	e, f, g	--	--			1	Greater Cypress Park, Elysian Valley Riverside, Lincoln Heights, Historic Cultural	1	45	21 , 22	31

La Kretz Crossing

Attachment 17: List of Relevant Plans with Links to On-line Access

a. Metro Bicycle Transportation Strategic Plan (2006): http://media.metro.net/board/Items/2006/02_february/20060215P&PItem6%20Atta.pdf
b. Los Angeles County Metro Bicycle Master Plan (2006): http://media.metro.net/projects_studies/bikeway_planning/images/BTSP.pdf
c. Los Angeles River Revitalization Master Plan (2007): http://boe.lacity.org/lariverrmp/CommunityOutreach/masterplan_download.htm
d. City of Los Angeles Department of Public Works 2011 Bicycle Master Plan (2011): http://clkrep.lacity.org/onlinedocs/2010/10-2385-S2_MISC_07-11-2011.pdf

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program

Attachment 18: Public Process Documentation

a. LARRC's outreach plan
b. LARRC's public outreach
c. LA River Revitalization Master Plan outreach process
d. Historic outreach process

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program

LARRC's Outreach Plan

Los Angeles River Revitalization Corporation
Atwater Multi-Modal Bridge Project

Outreach/Public Participation Plan

1. Background

The Los Angeles River Revitalization Corporation (RRC) is trying to design and build a multi-modal non-motorized bridge across the Los Angeles River on behalf of a private investor/donor The bridge would be built in the vicinity of Atwater Park and an area currently used by equestrians to cross the River and access Griffith Park. Public support is a key component of the projectt.

The desire for an equestrian bridge in this area has been known for some time, and in 1999 the City of Los Angeles Bureau of Engineering developed a conceptual plan for such a bridge and started the process of implementation. Many of the equestrians that utilize the current crossing are familiar with the 1999 plan and were supportive of it. A major difference between the 1999 and current proposed bridge is that the current project would not only support equestrians, but also pedestrians and bicyclists.

2. Framework for Outreach

The goal of reaching consensus among all stakeholders will take a balanced, nuanced approach that recognizes all parties and allows for all voices to be heard, but manages the process in such a way that the limitations of the capital budget and desire of the donor are recognized. Our approach will be to chart a course that realistically manages expectations by making clear from the outset the unique framework in which the bridge is being designed, that is, on a fixed budget, a short timeframe, and the vision of the donor who is footing the entire bill.

Outreach to stakeholders can be split into two broad categories: 1) agency/governmental organizations and 2) non-profit organizations and individual stakeholders. The agencies that will need to be involved have a stake in the process by nature of their mission and jurisdiction. Depending upon the location and ultimate design of the bridge, it may be necessary to obtain permits from these agencies. Many of the non-profit organizations and individuals have been working and recreating on the River for years, or live nearby. They have been responsible for many of the changes that have resulted in the desire for the bridge and clearly feel that they have a stake in what happens on the River.

Putting both groups together in a large meeting is often not the best way to introduce a new project as often they have diverse interests and concerns that may be competing with each other. Often it is better to have smaller meetings with individual agencies or groups so that the specific concerns and interests can be separately addressed without it being in a public forum. This is the tactic that the RRC and design team are taking. Individual briefings with agency staff such as the U.S. Army Corps of Engineers and City of Los Angeles departments have facilitated candid

discussion of the requirements for approval and installation of the bridge. Likewise, a meeting of primarily equestrians arranged by City Council District 4 at the proposed location on the River allowed for the design team to informally go over the bridge design and the desire of the donor to accommodate more than just equestrians in the design if the bridge. A list of meetings that has taken place is attached.

When a large public outreach meeting does take place, most of the participants will have already heard of the project, and their support obtained.

3. Stakeholders

The agencies that have an interest in the bridge are as follows:

Federal Government

Army Corps of Engineers: Responsible for maintenance of flood control channels, issues permits for maintenance and alterations of streams, rivers, or channels; implements studies and major projects with local sponsors.

State of California

California Department of Transportation (Caltrans): The right of way from the Interstate 5 freeway extends into the maintenance road of the River.

Department of Fish and Game: Issues permits to protect fish and wildlife when stream alterations take place; determines state listing for species of special concern or endangerment, provides grants for restoration and studies.

Santa Monica Mountains Conservancy/ Mountains Recreation and Conservation Authority: Acquire, protect, restore, and develop land for habitat and recreation in the upper Los Angeles watershed. The MRCA maintains and polices a number of parks along the River.

Water Resources Control Board/Los Angeles Regional Water Quality Control Board: Protect surface and groundwater quality; issue National Pollutant Discharge Elimination Permits (NPDES) under authority from the EPA; issue Total Maximum Daily Load (TMDL) regulations for discharge of pollutants into water bodies. The Regional Board may come into play if there is discharge into the River especially during construction.

Los Angeles County

Department of Public Works and Flood Control District: Manages flood hazard, maintains streams and channels. Lead agency for the L. A. River Master Plan now managed by Watershed Management Division. Issues permits for activities in and along the River.

City of Los Angeles

Department of Public Works Bureau of Engineering: Created Los Angeles River Revitalization Master Plan, a visionary plan to bring economic, recreational and habitat to the River. Los Angeles River Project Office is primarily responsible for now implementing the plan.

Department of Public Works Bureau of Sanitation: Through its Watershed Protection Division is responsible for implementing TMDLs along the River and the projects identified (including North Atwater Park) through the passage of City Proposition O.

Department of Water and Power: DWP owns the rights to the water itself in the River through a concept known as pueblo rights. DWP has rights of way along the River corridor with its high power lines that traverse the maintenance road.

Non-profit Organizations

Non-governmental organizations and individuals likely to have a stake in the project are as follows:

Equestrian groups: The LA Equestrian Center is adjacent to the project and equestrians are often organized through the use of facilities such as Saddle and Sirloin or local chapters of larger organizations such as ETI.

Friends of the Los Angeles River: Founded in 1985, the first organization to advocate restoration and enhancement of the Los Angeles River. FoLAR conducts an annual clean-up event every year.

Friends of Griffith Park: Formed primarily in reaction to a proposed master plan for the park, they advocate keeping the park in as natural a state as possible and ensuring that it is properly maintained.

Los Angeles County Bike Coalition: Advocating for safe bicycle paths throughout the County, they sponsor an annual River ride.

Los Angeles Conservation Corps: Hire and train youth in conservation projects; help with many phases of park and river projects and responsible for the River (Keepers) Rangers providing clean up services on the River.

Neighborhood Councils: Represent the constituents of LA City neighborhoods; organized and chartered through the City Council Districts.

North East Trees: Planting and maintaining an urban forest, primarily in northeast Los Angeles; responsible for most of the greening along the L. A. River in the area of the Glendale Narrows and many of the mini-parks.

The City Project: Involved in open space and environmental justice issues in Los Angeles, the City Project has done extensive mapping of parks, open space, and access for minorities to

recreational amenities. They have advocated for converting the City Recreation and Parks maintenance yard next to Atwater Park into open space along the River.

The River Project: Advocates for parks along the River and restoration.

Trust for Public Land: Facilitates the purchase of lands for public use; identifies potential properties for such purposes; performs outreach to affected community groups. Have identified and purchased numerous properties along the River now owned and managed by public agencies and local governments.

The Council for Watershed Health: Facilitates communication among all stakeholders primarily in the watersheds of the Los Angeles and San Gabriel Rivers, advocates for education and improvements in the watersheds

.

4. Meeting Logistics

Reaching all these individuals and then getting them to come to meetings is always a challenge. Meetings with agencies have been arranged at their offices to maximize their attendance. The team has tried to get a broad cross-section of staff from management to line staff. This ensures that the same message is being conveyed and that management support at the level of decision-makers is obtained and communicated to those employees necessary for actually issuing permits.

The non-profits and key individuals with a stake in the project are also being contacted and called or met with separately. This is to be sure that they feel that they are "in the know" and have been consulted with first before there are large public meetings.

Public meetings provide a "net" to capture anyone that has not been contacted already. One such meeting, the River Cooperation Committee, was held during working hours and was open to the public where a number of agencies and individuals attended. The RRC bridge team presented the project and while there were questions, the public seemed largely supportive. The City and County, officially members of the committee, unanimously approved the project.

Councilmember LaBonge plans to hold a series of town hall style meetings in early summer and has indicated that he will make the project part of those briefings. The design team presented there.

5. Documentation

Attendance and minutes of all the meetings is being documented and this is an essential part of this plan, which will be updated as the project progresses. In addition, letters of support will be requested from groups to assist in moving the project forward. A final report will be assembled with all the documentation.

6. Current Steps

As of the end of October 2011, the following are the next steps to be taken:

1. Document and distribute to the team all letters of support gathered to date.
    a. Look for an fill gaps based on the list of non-profits, above
    b. Determine which groups need a simple phone call or email v presentation
    c. Split up the list among team members based on personal connections

2. Have a card or one page check-off for support at upcoming River events including the cleanup on Saturday, October 29

3. Update the power point presentation to convey the excitement and opportunity that the bridge represents:
    a. Show examples from around the world (3-4) of other landmark, iconic bridges
    b. Have renderings of the bridge in context of the site to illustrate the beauty of the bridge
    c. List the criteria for selection of the current design
    d. Give nod to historic element of wood planking
    e. Separation of users and access
    f. Loading of the bridge – number of horses and people
    g. Connection between North Atwater Park and Griffith Park

4. List all public meetings attended to date (including public City meetings) and upcoming meetings.

5. Be thoroughly prepared for Nov 9 meeting of Friends of Griffith Park by having the list above, completed.

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program

LARRC's Public Outreach

Meeting Notes & Action Items
USACE & LACDPW Joint Meeting
Atwater Bridge [FEI Job No. 00880.06]

Meeting Date: March 8, 2011 (Meeting Notes Issued March 18, 2011)

Meeting Purpose: To re-introduce Atwater Bridge project to both key permitting agencies, United States of America Corps of Engineering (USACE) and Los Angeles County Department of Public Works (LACDPW), with intent to: (1) vet out any project "feasibility" issues; and (2) formulate the key agency approval requirements and associated agency approval timelines.

Attendees:

Phil Serpa,	USACE Asset Mgmt	(213-452-3402)
Lisa Sandoval,	USACE Asset Mgmt	(213-452-3147)
Elizabeth Moriarty,	USACE Counsel	(213-452-3955)
Arnecia Williams,	USACE Engineering	(213-452-3747)
Kerry Casey,	USACE Engineering	(213-452-3574)
Veronica Chan,	USACE Regulatory	(213-452-3292)
Juan Sarda,	LACDPW Flood Ctrl	(626-458-7149)
Daniel Tellalian,	River Corporation (RC)	(213-700-7105)
Paul Atkins,	Gardiner & Theobald Inc. (GT)	(310-598-1944)
Jan Dyer,	Mia Lehrer (MLA)	(213-384-3844)
Mia Lehrer (By Phone),	Mia Lehrer (MLA)	(213-384-3844)
Steve Chucovich,	Buro Happold (BH)	(310-945 4837)
Andy Willrodt,	Fuscoe Eng. (FEI)	(213-542-4261)

Attachments: Meeting Sign-In Sheet
USACE 404/408 Permit Guidelines

Key Discussion Points

1. Project Introduction: Steve lead group discussion (with supporting exhibits) briefly outlining project scope, intent, timing and funding. Exchange followed dealing with various project stake holder sensitivities (e.g. pedestrian use/access, bicycle use/access, equestrian use/access). New project would have two key components: a new bridge feature spanning across river channel and river channel terracing improvements as part of the larger Los Angeles River Ecologic Restoration Master Plan concept currently under study/development (See Action Item.) The new bridge feature would entail a 32' to 34' wide bridge structure that would accommodate both bikes/pedestrians and equestrian functions via a restyled 40' x

400' easement feature. Also, all construction practices would accommodate USACE/LACDPW Los Angeles River seasonal construction moratoriums.

2. Pre-Existing 19' x 400' easement: Steve identified that based 1999 project plan improvement documents from previous version of similar project at same location progressed to a point where an 19' x 400' "access/placement" easement for a narrower bridge concept was executed between City of Los Angeles and USACE implying that previous project concept was accepted with some degree of agency approvals. See Action Item.

3. USACE Key Approvals: Elizabeth & Phil lead a discussion identifying both NEPA and key USACE approvals, specifically NEPA entitlement, and 404/408 permits. USACE would be lead agency in that permit plan review and rigor would be driven by USACE requirements and that LACDPW would require Flood Control Permit, but would be subordinate to USACE requirements.
   a. NEPA Entitlement Requirement: Project would entail some kind of entitlement approval (e.g. EA/EIS). After 30% package was submitted to USACE, USACE would review and determine best entitlement vehicle for project.
   b. 404 Permit: Permit process accesses project impacts and mitigation of impacts with respect to existing aquatic/ecological features and 'high water mark' within the channel. Approval process is typically two to three (2-3) months after document submittal to USACE. This process begins with an ecological/wetland survey & delineation within prescribed project area. After Ecological Study delineation is submitted to USACE, the USACE will review and determine best appropriate 408 Permit process for project.
   c. 408 Permit: Permit process accesses project impacts and mitigation of impacts with respect to channel discharge conveyance. Depending upon degree of project impacts to channel's discharge conveyance, the local USACE (LA District) assess whether project requires only local 408 permit review/processing vs. the more extensive USACE review involving both local district plus Washington DC office review/approvals. After the initial permit document submittal to USACE, the 408 Permit approval process is typically six to eight (6-8) months for the "local" 408 Permit vs. say twelve to eighteen (12-18) months for the more rigorous 408 Permit review. After a "30% package" is submitted to USACE, the USACE will review and determine best appropriate 408 Permit process for project within approximately eight (8) weeks. See Action Item.

4. LACDPW Key Approvals: Juan lead a brief discussion acknowledging that LACDPW would want a Flood Control Permit for the proposed project including the development/execution of an LAC "User Agreement" perfecting the liability and the placement bridge/terracing features within the channel ROW. The proposed bridge location straddles three (3) Property Ownership entities within the channel ROW including City of Los Angeles, County of Los Angeles. See Action Item. The LACDPW Flood Permit could be run concurrently with the

USACE permit process with the expectations that LACDPW Flood Permit and User Agreement could be perfected within three to four (3-4) months after USACE plan approvals.

5. Jointly USACE & LACDPW acknowledged that some kind of preliminary package (i.e. 30% CD package) is required to fully vet all required permit approval steps and associated time lines. And generally agreed by all attendees that any "terracing work" within channel would in fact trigger both 404 & 408 permits. Whereas "bridge only" could remove need for 404 permit and possibly need for the more rigorous 408 permit. In either scenario, the "User Agreement" coupled with a Flood Permit would be required by LACDPW.

6. Phil Serpa advised that USACE would be seeking funding for dealing with the 408 permit applications based upon the resources that will need to be employed by them.

Action Items

Lead	Action Item	Due Date
BH	Research and find copy of actual easement instrument and circulate to USACE & LACDPW.	11/03/24
MLA	To follow up with Cathy Birdman/Carol Armstrong to identify latest LAR Eco Study's targeted areas for 'channel reformation and terracing' and determine how the proposed project fits into the Eco Study's master plan.	11/03/24
FEI	To follow up with Lisa Sandoval and Juan Sarda to verify existing ROW stakeholders given proposed bridge & channel terracing locations. This finding could affect LACDPW permit process and "User Agreement" applicability.	11/03/24
FEI	Work with USACE contacts to obtain pertinent channel discharge data and cursory determine what degree of "free board" exists between high flow water surface and existing top of channel. Free Board determination will be used by BH to assess if a bridge concept is viable that allows to project to be exempt from 408 permit requirements.	11/03/24
FEI	To arrange a further meeting with the USACE and LACDPW upon completion of the above actions to seek any clarifications that may be required and an indication of the USACE's costs for processing the permit applications.	11/03/24

SIGN IN SHEET

ARNECIA WILLIAMS	ENGINEERING	213-452-3747
KERRY CASEY	"	213 452 3574
Elizabeth Moriarty	COE Counsel	" " 3955
Phil Serpa	COE Asset Mgmt	213/452-3402
Veronica Chan	USACE Regulatory	213 452 3292
ANDY WILLRODT	FUSCOE ENG.	213 542-~~4260~~ 4260,
Lisa Sandoval	COE Asset Mgmt	(213) 452-3147
JOAN M SARDA	LA COUNTY FCD	(626) 458-7149
DANIEL TELLALIAN	LA RIVER CORP	(213) 700-7105
JAN DYER	MLA	
Steve Chucrin		

MIA LEHRER

+ associates

landscape architecture

AW 3-24-2011 R/L COMMENTS

Meeting Notes

Meeting Date: March 21, 2011

Meeting Location: Office of Tom LaBonge – Council District 4

Recorded By: Ben Feldmann

Project: Atwater Multimodal Bridge (AMB)

Present/Distribution:

√ Present	Name	Company	Fax/E-mail
√	Mia Lehrer	MLA	miay@aol.com
√	`Ben Feldmann	MLA	ben@mlagreen.com
√	Daniel Tellalian	LARC	dtellalian@emergingmarket.us
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√	Andy Willrodt	Fuscoe	awillrodt@fuscoe.com
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√	Kathleen Bullard	Tetra Tech	kathleen.bullard@tetratech.com
√	Carolyn Ramsay	CD4	carolyn.ramsay@lacity.org
√	Tom LaBonge	CD4	Tom.labonge@lacity.org
√	Uriel "Uri" Jimenez	BOE	Uriel.jimenez@lacity.org

Remarks: The foregoing conveys our understanding of the items discussed and the decisions reached during the meeting. We assume our understanding to be correct unless notice to the contrary is brought to our attention within 48 hours.

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ROW (RIGHTS-OF-WAY)

I. New Business

Item #	Action/By	Date	Description Summary
01	MLA		Project Coordination for DWP Meeting 3/22
02	Tetra Tech		Cal Trans Assessors Map
03	BOE		Detailed list of Parcel Ownership

II. Pending Issues

Item #	Action/By	Date	Description Summary
01	Tetra Tech		ACOE review process (404, 408A, or 408B)?

III. Next meeting

Outreach meeting to be arranged by Office of Tom LaBonge: 10-14 days

NOTES:

- Daniel Tellalian gave opening remarks; request to Tom LaBonge for support on 3 items: 1) Turn Key – governance and maintenance upon completion of bridge 2) Community Outreach – host meetings with local stake holder groups; especially equestrian community 3) Legal Understanding/Process – permits for easement and clarification of ownership.

- Tom LaBonge supports the project and requested that the presentation, for the purposes of outreach, combine other projects related to the LA River including: North Atwater Park, Sunny Nook Bridge, Headworks.

Community Outreach

- Atwater Village has a long history and large population of equestrian riders. Alex, owner of Paddock Stables, should be included in outreach. Police locate their horses here. K District is very important. Saddle & Sirloin is an important equestrian group to outreach with. Carolyn will lead effort, with support by ML+A, to contact equestrian groups as well as LAPD (mounted division) to continue to develop outreach plan.

- Tom wants to be sure bridge will not only meet demand from local horse community (200 horses) but can also be sufficient for special events (500 horses). It is recognized that even with special events, horse circulation would stagger so as not to undermine bridge structure.

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- Mia voiced need for outside approval for the project, beyond the River Corp. Expressed concern for gaining support from Lupe Vela.

Legal Understanding

(Clarification from Uriel Jimenez, 3/24)

At first review, it appears that there are five total ownerships that are involved.

1. State (at the west end next to freeway)
2. City (in the river - at the west side)
3. ~~Private (in the river)~~ LOS ANGELES COUNTY DPW
4. ~~Private (in the river)~~
5. Private (at the east side of the river)

The rights required for the above are anticipated as follows:

1. State - encroachment permit
2. City - ordinance declaring public ownership (of the river) to public **use - a bridge.**
3. ~~Private - an easement~~ LACDPW - FLOOD PERMIT COUPLED WITH USER AGREEMENT
4. ~~Private - an easement~~
5. Private - an easement

I'm also considering as given that permits from the County Flood Control District and the Army Corps will be acquired as needed.

- Need to clarify conditions as to what triggers the various ACOE reviews (404, 408A, 408B) when modifying the River Channel. Although ACOE gave indication that only 404 review would be required if project kept out of the trapezoidal section of the river channel, chance still exists that it may require 408A or 408B.
- Proceed with next steps to clarify ownership of small private parcels within the river.

Permits Needed

1. CalTrans – Encroachment permit
2. DWP – Encroachment permit
3. County Flood Control – Use and maintenance permit as well as the Flood permit which occurs when we are actually working in the channel – 3-6 months each. Flood permit process commences after all environmental documentation is complete.
4. ACOE – project review and approval; ~~define declaration~~ REFER TO MEETING MINUTES FOR 3/8/11 MEETING WITH ACOE (USACE) AND LACDPW.

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- Ira noted project should acquire a memorandum of understanding/agreement for easements.

- Uri confirmed that BOE can compile list of parcel ownership and easements within ~~two~~ 3-4 WEEKS, ~~months~~. This process will run concurrently with design planning.
AFTER RECEIPT OF BRIDGE LOCATION INFORMATION.

Turn Key

- Daniel noted that we will eventually declare a "transfer of asset" to turn ownership over from the River Corporation to the City. Tom expressed concerns for graffiti.

Bridge Design

- Tom urged that the design of bridge should not include a separate space for bicyclist, but rather have cyclists walk their bike across pedestrian space. This decision will reduce the width of bridge.

River Terraces

- River Terraces, aka Water Quality Terraces, will be described as a conceptual future phase, but not included within the project so as to expedite the approval process and move into construction. Bridge would be designed so as not to preclude adding the River Terraces at a future phase, in that the foundation would allow for a retrofit of the channel without impacting bridge structure.

- Ira noted that the terraces would require a longer run, approximately 1000' in either direction, in order to allow for the terraces to have enough space to appropriately transition back to the existing profile of the channel beyond the project area.

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Outreach/Meeting Summary
Atwater Multi-Modal Bridge Project

March 7, 2011 – Army Corps of Engineers

Attending: Jan Dyer MLA, Steve Chucovich Buro Happold, Andy Willrodt, Fuscoe Engineering, Phil Serpa USACE, Lisa Sandoval, USACE, Arnecia Williams, USACE, Elizabeth Moriarty, USACE, Phil Serpa, USACE, Veronica Chan, USACE, Daniel Tellalian, River Corporation, Juan Sarda, LACDPW, Paul Atkins, Gardiner & Theobald Inc.

Recap: Project was presented to the agencies to solicit input and to identify issues.

March 9, 2011 – CD 1 Offices

Attending: Mia Lehrer, Jan Dyer, Steve Chucovich, Jill Sourial, Lupe Vela

Recap: Project was explained to Jill and Lupe and input was requested. Comments from Lupe were that she had concerns that the bicyclists will be hesitant to share the bridge with pedestrians. Safety needs to be addressed. She suggested that there be a committee of city agencies that meet regularly on this project.

March 21, 2011 – CD 4 Offices

Attending: Tom LaBonge, Carolyn Ramsay, Uriel "Uri" Jimenez, Steve Chucovich, Mia Lehrer, Ben Feldmann, Daniel Tellalian, River Corporation, Paul Atkins, Andy Willrodt, Ira Artz, Kathleen Bullard, Omar Brownson

Recap: Project was explained to Councilmember LaBonge & Carolyn Ramsay and input on outreach was requested.

March 22, 2011 – DWP

Attending: Marvin Moon (Director), Nick Demos, Saif Islam, Reynan Ledesma (Real Estate), Jim Gokey, Jim Magula, Kelli Bernard, Carolyn Ramsay, Jan Dyer, Ben Feldmann, Daniel Tellalian, Steve Chucovich, Kathleen Bullard

Recap: Project was explained to DWP and sought input with regard to DWP right-of-way, maintenance concerns, and avoiding issues with regard to DWP access and safety. DWP had no initial concerns for the project and gave input with regard to bridge siting and process for obtaining an encroachment request.

March 25, 2011 - CD 4 Offices

Attending: Carolyn Ramsay, Mia Lehrer, Jan Dyer

Recap: Project was explained to Carolyn Ramsay and input on outreach was requested. Carolyn Ramsay provided a list of members of the

equestrian community who she feels should be met with and will be setting a date and time for the team to present to the Griffith Park group.

March 31, 2011 – River Cooperation Committee Meeting

The team presented the project to the River Cooperation Committee. Support by the committee was unanimous.

April 7, 2011 – Equestrian Community

The team presented the project to the equestrian community and requested input and comments. The parties present were supportive of the bridge project. Input such as locating the equestrian access to the bridge on the southern side of the bridge was received. Once the design evolves more this group will be presented to again.

April 28, 2011 – City of LA BOE

Attending: Steve Chucovich, Kathleen Bullard, Larry Hsu, David Castillo
Recap: The team met with the LA River Project Office and Real Estate to explore results of title search and rights of way.

May 3, 2011 – City of LA River Task Force

The team presented the project to the Task Force that is made up of primarily City departments, and meets every other month. Strong support was voiced for the project.

May 10, 2011 – Army Corps of Engineers

Attending: Ira Artz, Kathleen Bullard, Kerry Casey, Terri Kaplan, Phil Serpa
Recap: The Corps will do what it can to keep the permitting process local, but conservatively, the team should plan for Washington, DC review process that can take 18 months.

July 14, 2011 – City of LA BOE

Attending: Steve Chucovich, Kathleen Bullard, Larry Hsu, Shailesh "Sunny" Patel, Shirish Mistry
Recap: A meeting with the Structural Engineering Division to discuss their review requirements for the bridge.

July 19, 2011 – Griffith Park Saddle and Sirloin BBQ at Traveltown Museum

Attending: Steve Chucovich presented, included people from various community groups and City agencies.
Recap: A meeting to discuss various activities occurring or scheduled to occur in and around Griffith Park and CD4 as a whole.

September 6, 2011 – City of LA BOE

Attending: Steve Chucovich, Kathleen Bullard, Larry Hsu, Omar Brownson, Uriel "Uri" Jimenez

Recap: A meeting with the Real Estate Division to discuss title and eventual ownership issues.

October 20, 2011 – Cultural Affairs Commission

Attending: Omar Brownson, Mia Lehrer, Steve Chucovich

Recap: Presentation to the Commission on the cable stay bridge design, obtained conceptual approval, although issue of Griffith Park's monument status was raised.

October 29, 2011 – River Cleanup Event Sponsored by Councilmembers LaBonge and Garcetti

Attending: Steve Chucovich, Omar Brownson, Ben Feldmann, Megan Whalen (City River Project)

Recap: A clean-up event primarily by the community group PAVA with information booths from RRC, Greater Griffith Park Neighborhood Council, and Atwater Village Neighborhood Council.

Add additional meetings here.

River Revitalization Corporation and U.S. Army Corps of Engineers
Meeting Minutes of January 20, 2012

Attendees: Please see attached list.

The meeting started at 1:30 and was held at the Corps offices.

Discussion:

Rick Leifield opened the discussion noting that the Corps maintains the River in this reach. As a result of Hurricane Katrina, the Corps realized that modifications were made to Corps projects without approval, so the procedures have been tightened and modifications must be approved in advance.

A 408 permit arises out of Section 408 of the Flood Control Act.

- Major modifications require headquarters (Washington DC) approval.
- Minor modifications can be made at the District level. The LA District would like to keep this as a minor modification and approve it locally.

The Corps will want to review the hydrology and plans, and are mostly concerned about how the project would change the water surface. Because the River does not currently meet the conveyance requirements for the 100-year flood, we need to be cautious to not make the condition worse.

Terri Kaplan mentioned that a real estate instrument (such as an easement) would not be issued until the engineers allow the project. Once engineering allows it, Asset Management would convey the easement.

Daniel Tellalian noted that the River Revitalization Corporation will be the 408 applicant. Rick Leifield then requested that all future communications should be sent through the RRC. The permit would yield the easement and therefore the easement would go to the RRC. The Corporation would later convey the bridge and the easement to the City.

Terri Kaplan noted that the easement could be an agreement that would have words such as permission to "construct, repair, maintain, replace." There is no actual fee title that the Corps holds to the property so the real estate instrument would follow the Corps' rights; that is, since they hold an easement then they would issue the RRC a "consent to easement." A sample of the terms of the consent to easement and the actual 408 permit has been given to RRC for the drilling permit. Terri would create the easement instrument; it typically has a period of 25 years. The RRC would need to also obtain permission from the underlying fee owner, plus anyone else that holds an easement.

The question was asked about how a major modification is defined, and Rick Leifield said that the language is somewhat vague, but a major modification would result in significant changes to the project. It would be ideal if we effectively keep the water surface profile the same; anything else creates an approval challenge.

Ira Artz mentioned that the team has already held a number of meetings with the Corps on this project and asked, “Is a minor impact to the water that is mitigated could still be considered minor for 408 purposes?” In this case, the mitigation would ensure that the bridge would not increase flooding potential from its current condition. Rick Leifield said that headquarters was about to release a new Engineering Circular (EC) that would clarify this.

Andy Wilrodt discussed the HEC-RAS model, and the bridge piers result in an increase to the water surface elevation (WSE) of 0.91 feet at the bridge, with a diminishing increase as the backwater propagates upstream, reaching “no increase” over 1,000 feet upstream. Andy suggested adding a curb to the River side of the top-of-bank to mitigate the increased WSE.

Rick Leifield asked about changing the cross-section of the River at this location, from a trapezoidal to a rectangular channel, to increase conveyance. The team noted, however, that (1) such a modification would itself probably be considered “major,” and (2) it would be quite expensive.

Ira Artz asked if the RRC team was looking at the requirements correctly, and Rick Leifield indicated we were. To clarify, the regulations state that 2 feet of freeboard is needed for a non-levee reach and 3 feet of freeboard is required for a levee reach. Since at least the east side of the River is now considered a levee, the requirement is for 3 feet. The River was originally designed to 2.5 feet of freeboard.

Ira Artz further asked, “What will be the determination for the freeboard requirements?”

Rick Leifield answered that the current levee can’t be FEMA-certified. The River is undersized, and doesn’t convey the original design event in its current condition. Worse, the “100-year event” is actually larger than the design event. The discussion that followed focused on freeboard not really being an issue; rather, the analysis needs to show that the WSE is not impacted, or, the impacts are mitigated (e.g., with a curb or other increase in the conveyance capacity). Importantly, we would not be evaluating against the “100-year” discharge but rather the design discharge. Andy Wilrodt said that 1800’ of curbing gets us to 3 feet of freeboard, but 3300 feet would be needed to contain the full backwater impact.

Discussion turned to the 404 permit. Dan Swenson said that if a structure is put into the channel, then a 404 permit is needed, and that it would likely be a Nationwide 404 permit for construction especially since the extent of the impacts is less than ½ acre. The main task that needs to happen for this permit is to finalize the project description (design). Since vegetation would need to be removed around the pier (and best not to put back in at this location) we would need to mitigate elsewhere in the watershed with aquatic (not upland) vegetation.

It was noted that there is an environmental benefit to keeping the horses out of the River due to reduced bacteria loading. There was discussion about whether the concrete weir/berm that currently traverses the River could be removed; it is where horses now cross, but it is unclear what the function of that berm is.

On timing and sequencing, it was noted that the 408 permit needs to be completed, then the 404 permit can be applied for. The 404 takes about 120 days. The 408 will be reviewed, and the Corps will likely ask for resubmittal of a few items. Rick Leifield noted that we have not exhausted all mitigations for raising the water one foot.

Steve Chucovich noted that Atwater Park upstream is changing as well. The bridge is higher than the historic top of grade because it ramps up. If we stay within 600 feet of the bridge, we can model this very well, but when we go to 1000 feet upstream, due to changes such as Atwater Park, the geometries quickly get complex. He thought if we raise the curb one foot and rebuild the bike path 1000 feet back, this should still be a minor modification.

Rick Leifield said that he wants a clear trail of communication so the 408 permit should come on RRC's letterhead and sent to him. He wants to look at the comments generated by the Corps staff so far, get the latest submittal, examine everything, and then give an answer. Steve Vaughn will be handling the logistics of the 408 permit.

Terri Kaplan requested that a copy of the real estate information generated so far be sent to her. (Note: Post meeting, on 1/25/12 the RRC submitted a copy of the Fuscoe design survey to Terri Kaplan under separate cover).

To reiterate:

- Real estate information is sent to Terri Kaplan
- The 408 permit is sent to Rick Leifield
- The 404 permit is sent to Dan Swenson

NEPA is handled through the 404 process and Dan Swenson can clarify what form it needs to take.

Daniel Tellalian mentioned that this project is a proof of concept for the City to show that it is worthwhile to work on the River. It was noted that this is an entirely new situation for the Corps in that traditional sponsors are typically government agencies. However, since local sponsors don't have funding at this time, non-traditional private donors are stepping up and most Corps rules don't cover this situation. For example, the Park Service has just accepted several million dollars to repair the Washington monument. Rick Leifield pointed out however, that there is a little-know authority that the Corps has to accept funds for a project, and that they are doing this with Heal the Bay to install trash racks on Compton Creek. WRDA Section 214 allows the Corps to accept funds to expedite permits and inspection and completed works funds also come under this.

The meeting adjourned at 2:45.

Attendees

RRC North Atwater Bridge Meeting - January 20, 2012

Name	Organization	Email
Ira Artz	Tetra Tech	ira.artz@tetratech.com
Dan Swenson	USACE-Regulatory	Daniel.p.swenson@usace.army.mil
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Kerry Casey	USACE H&H	kerry.t.casey@usace.army.mil
Steve Vaughn	USACE, ED-DB Permits	stephen.h.vaughn@usace.army.mil
Dick Thompson	City of Hope	rthompson@coh.org

Atwater Bridge Community Meeting
2/26/13

Name	Zip Code/Organization	Email Address or Phone
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Karen Slayton	the Children's Ranch	kslayton@charter.net

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program

LA River Revitalization Master Plan Outreach Process

ENGAGING THE COMMUNITY IN THE PLANNING PROCESS

top - City Engineer Gary Lee Moore presents at the First Youth Conference on the Los Angeles River on Oct. 12, 2006 at the Los Angeles Convention Center. (First Council District, October 2006)

bottom - Councilmember Garcetti shares his vision during a River community meeting. (2006)

A TRANSPARENT PLANNING EFFORT THAT GALVANIZES PUBLIC SUPPORT

Community input and public support are vital to the success of any Los Angeles River revitalization effort. This Plan cannot be implemented successfully if surrounding communities do not embrace the various revitalization projects and understand that their participation in long-term stewardship is critical to making the River a safe and desirable place for everyone to experience. The planning effort has been organized to be transparent and to ensure that participants can see that their ideas have been incorporated into recommendations.

A FRAMEWORK FOR INVOLVING STAKEHOLDERS AND THE PUBLIC

The planning process has engaged the community at multiple levels. The structure for involving stakeholders and community residents included the following:

- A City Department Task Force of 50 members, met monthly during the 18-month planning period.
- An Advisory Committee of 40 members with representatives from neighborhood and homeowners' associations, business groups, and other community leaders.
- A Stakeholder Committee of more than 50 representatives of advocacy organizations, such as environmental groups, organizations that focus on environmental justice, and River advocacy.
- A Peer Review Committee comprised of six leading experts in urban river revitalization and restoration.
- A total of 20 community meetings/public workshops, held in various neighborhoods along the River. All of the workshops included an initial presentation on the latest planning concepts and potential project features, followed by an interactive exercise in which the participants could write their opinions and ideas on maps, comment forms, and project boards. Participants worked through all of the planning stages, from visions and dreams, through neighborhood design elements, River channel modifications, and the identification and development of Opportunity Area proposals.
- Community events, such as neighborhood council meetings, an urban watershed forum, and meetings on a wide variety of River projects.
- A youth summit conference was held with over 500 participants.

Through September 2006, a total of 788 comments were received; the largest percentage of comments focusing on public enjoyment/recreation (23 percent) and environment and natural system restoration (18 percent).

PROVIDING FEEDBACK: COMMUNICATING PROGRESS OF THE PLANNING EFFORT

Methods used to communicate the planning efforts to the public included:

- Press conferences and coverage in the local, national, and global media;
- Newsletters and other community notifications; and distributed on a regular basis
- An interactive web site available through the Ad Hoc Committee on the Los Angeles River's web site at www.lariver.org.

The outreach effort has garnered an enthusiastic and wide range of responses, from the general to the specific. A consistent pattern of interest emerged regarding primary concern for how the surrounding communities and the general public would safely use the River for recreation and enjoyment. Most feedback concerned improving public access, creating more open/green space, dedicating space for athletics, beautifying the River with landscaping, restoring it to a more natural condition, preserving existing neighborhoods, finding socially-conscious solutions to homelessness, and keeping the River and its environment clean and safe. Other areas of interest focused on public art, community education, water quality, flood control, wildlife habitat, land use changes, and River management.

In addition to the public outreach conducted as part of this Plan, outreach was conducted by the Alianza de los Pueblos del Rio, a collaborative organization funded by the Packard Foundation to concentrate outreach efforts in the Latino community. The Alianza hosted three public workshops in August 2006, and involved organizations such as the Mujeres de la Tierra, the William C. Velasquez Institute, the Anahuak Youth Soccer Association, and the Center for Law in the Public Interest.

Residents draw their ideas for a revitalized River. (2006)

top - A June 2006 public meeting in the San Fernando Valley (2006)

middle - Residents consider precedents from other cities. (2006)

bottom -Councilmember Reyes, with students, launched the First Youth Conference on the Los Angeles River on Oct. 12, 2006 at the Los Angeles Convention Center. (First Council District, October 2006)

LOS ANGELES RIVER MASTER PLAN ADVISORY COMMITTEE

Alicia Brown, Solano Canyon resident
Al Nodal, Director, Not a Cornfield, and Arts Consultant
Belinda Faustinos, Rivers and Mountains Conservancy
Beth Steckler, Livable Places
Bob Bates, Inner City Arts
Bruce Ackerman, Economic Alliance of the San Fernando Valley
Bill Fain, Johnson Fain Partners
Chris Kroll, Coastal Conservancy
Christine Lee, Korean Culture Center
Clara Irazabal, School of Policy, Planning, and Development, University of Southern California
Dilara Rodriquez, Transportation Consultant
Diego Cardoso, Los Angeles County Metropolitan Transportation Authority
Don Dickerson, Dickerson and Associates
Dr. Tim Dagodag, Department of Urban Studies and Planning, California State University, Northridge
Glen Dake, Silverlake Neighborhood Council
James Rojas, Latino Urban Forum
Joanne Kumamoto, Little Tokyo Business District
Joe Edmiston, Santa Monica Mountains Conservancy
Kathleen Bullard, CH2MHill
Mark Pestrella, Watershed Division, County of Los Angeles, Public Works
Marybeth Vergara, Parks for People and the Trust for Public Land
Matt Benjamin, Los Angeles Bicycle Coalition
Nicole Possert, Highland Park Heritage Trust
Pieter Severynen, North East Trees
Robert E. Brendza, BNSF Rail
Robert Scott, Civic Center Group and VICA
Ron Gastelum, Los Angeles Area Chamber of Commerce
Suellen Cheng, El Pueblo de Los Angeles Historic Monument
Shelley Backlar, Friends of the Los Angeles River
Tara Devine, Central City East Association
Trish Smith, The Nature Conservancy
Veda Ward, Leisure Studies and Recreation Department, California State University, Northridge

LOS ANGELES RIVER MASTER PLAN PEER REVIEW COMMITTEE

Michael Banner, Urban Land Institute
Michael Drennan, Brown and Caldwell
Phil Enquist, Skidmore Owings and Merrill
Arthur Golding, University of Southern California School of Architecture
Mary Margaret Jones, Hargreaves and Associates
Paul Rookwood, Wallace, Roberts & Todd

LOS ANGELES MASTER PLAN STAKEHOLDERS AND CONTRIBUTORS

Alianza de los Pueblos del Rio
- Irma Muñoz

Alliance for a Livable LA
American Institute of Architects
American Society of Civil Engineers
- Carl Blum

American Society of Landscape Architects
- Stephanie Landangren

Anahuak Youth Soccer Association
- Raúl Macias

Apollo Alliance
- Elsa Barboza

Arts Community Land Activism, Westlake
Arroyo Seco Foundation
- Tim Brick

Friends of Atwater Village
- Cesar Portillo
- Netty Carr
- Ann Lawson
- Sandra Caravella
- Luis Lopez

Audubon Society, Los Angeles Chapter
- Garry George

Audubon Center, North East Los Angeles
- Elva Yañez

CARECEN
- Angela Sanbrano

Center for Law in the Public Interest/The City Project
- Robert García

Central City Neighborhood Partners
Central City Association
- Victor Franco, Jr.

Clinica Msr. Oscar A. Romero
Council District One Field Office
- Sonia Jimenez
- Natalie Reyes
- Matthew Hernandez

Coastal Conservancy
- David Hayes
- Christopher Kroll

Cypress Park and Glassell Park Community Design Ordinance Committee
- Lynne Dwyer
- Helene Schpak
- Alissa Smith

California State Parks
- Ruth Coleman
- Ron Schafer
- Dianne Martinez
- Sean Woods

Collective Space, Macarthur Park
Department of Water and Power, Retired
LeVal Lund
Economic Alliance of the Valley
El Centro del Pueblo, Echo Park
Elysian Valley United
Steve Zimmer
Albert Vargas
Cecilia Dominquez
Fernandeno Tataviam Band of Mission Indians
Rudy Ortega Jr.
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Lewis McAdams
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Mark Gold
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Lincoln Heights Pedestrian Study
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Meredith Leonard
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Los Angeles First Five
Los Angeles Chamber of Commerce
Ron Gastelum
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Los Angeles County Bicycle Coalition
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Los Angeles Neighborhood Land Trust
Los Angeles Downtown Arts District
Tim Keating
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Mary Benson
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Mujeres de la Tierra
Irma Muñoz
National Hispanic Education Council
Salvador Ramirez
Natural Resources Defense Council
Joel Reynolds
Tim Grabiel
Neighborhood Councils and Other Local Constituents
Diane Edwards, Echo Park
Frank Wada, Lincoln Heights
Edgar Garcia, Lincoln Heights
Jennifer Gill, MacArthur Park
Glen Dake , Greater Silverlake
Michael Cortez, Canoga Park
George Magallanes, Boyle Heights
Joel Simon, Encino
Walt Sweeney, Reseda
Tammy Flores, Sylmar
Leonard Shaffer, Tarzana
John Popowich, Winnetka
Northeast Trees
Larry Smith
Holly Harper
Carrie Sutkin
San Fernando Valley Historical Society
Midge Gisel
Santa Monica Bay Restoration Commission
Jessica Hall
Sierra Club
Marcia Hanscom
Southern California Institute of Architecture (SCI-Arc)
Lane Barden
Southern California Wetlands Recovery Project Wetlands Recovery Project
Mary Loquvam
The River Project
Melanie Winter
TreePeople
Andy Lipkis
Rebecca Drayse
Trust for Public Land
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University of California at Los Angeles, Institute of the Environment
Stephanie Pincetl
University of California at Los Angeles Labor Center
United Chambers of Commerce of the San Fernando Valley
Debi Schultze
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Mary Nichols
University of Southern California
Jennifer Wolch
John Wilson
William C. Velásquez Institute
Antonio Gonzales
Celia Brugman Azucena
High Schools:
Bishop Mora Salesian High School
Cals Charter High School
Canoga High School
Cathedral High School
Community Charter High School
Compton Unified School District
Daily High School
Eagle Rock High School
Foshay Learning Center
Franklin High School
Grant High School
Holy Family High School
John Marshall High School
La Salle High School
Lincoln High School
Manuel Arts High School
Pilgrim Day High School
Ramona Convent High School
Reseda High School
Roosevelt High School

LARRC North Atwater Non-Motorized Multimodal Bridge Project ("La Kretz Crossing")
Active Transportation Program

Historic Outreach Process and Documentation

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CITY ENGINEER
650 SOUTH SPRING ST., SUITE 200
LOS ANGELES, CA 90014-1911

April 1, 1999

The Honorable Scott Wildman
Office of the State Assembly
109 East Harvard Street
Suite 205
Glendale, CA. 91205

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 2
To WILL HERON	From CLARK ROBINS
Co.	Co.
Dept.	Phone # (213) 847-8773
Fax # (818) 295-3810	Fax #

Dear Mr. Wildman:

EQUESTRIAN BRIDGE OVER L.A. RIVER NORTH OF LOS FELIZ BOULEVARD FROM ATWATER VILLAGE TO GRIFFITH PARK

In an effort to gain funding from sources such as the Assembly Bill 18 for the above titled project, the following is provided for your information and use.

In the last ten years, park equestrian riders have had to contend with a dangerous condition in the Los Angeles River just north of Los Feliz Boulevard. About 3,100 feet north of Los Feliz Boulevard there is an area of the River that is being used as a horse crossing for equestrian riders who ride and maintain their horses in the Atwater Village area. With the construction of the Tillman Water Reclamation Plant and L.A. Glendale Water Reclamation Plant, the once dry L.A. River began flowing continuously. Everyday equestrians cross this sometimes fast moving river to exercise their horses in Griffith Park. Inevitably, some of these horses slip and fall due to the slippery cement and algae lined floor of the river basin. Though steps have been taken to limit such accidents, there still remains a significant hazard, considering the future population growth and rise of the water level in the L.A. River.

The only way to address these concerns would be to construct an equestrian bridge across the Los Angeles River. The bridge project is needed to provide a safer crossing across the river in order to access some 57 miles of bridal trails at Griffith Park. These trails serve the equestrian facilities in Atwater Village along the eastern banks of the L.A. River. With three major riding establishments, including the Paddock Riding Club, Saddle and Sirloin Club and River Ridge Club, the equestrian facilities encompass approximately 35 acres. These facilities have a combined boarding of 550 horses with both public and private ridership, 60 percent being full time riders.

The City of Los Angeles, Bureau of Engineering has a preliminary proposal conceptually approved by the U.S. Army Corps of Engineers, the agency having jurisdiction over the use of the Los Angeles River. The City, as a result of Councilman Ferraro's office working with the community, has arranged for $50,000 funding for the preliminary planning, and is seeking additional funding for completion of contract documents and construction of this project.

Once funding is procured, the City can obtain a permit from the U.S. Army Corps of Engineers within 13 weeks.The construction of the bridge will take about one year to complete, since all bridge work within the channel can only be done during the dry season (i.e. between April 15 thru October 15). Therefore, the completion of the project would take place in the early fall of 2000. Please see the attached project schedule.

Preliminary estimates are such that a steel reinforced concrete bridge will cost about $1,350,000. Cost estimate breakdown is summarized below:

1. Engineering and Right-of-way Support	$ 258,000
2. Right-of-way Acquisition	$ 100,000
3. Construction	$ 860,000
4. Construction Management	$ 132,000
Grand Total Estimate:	**$1,350,000**

The bridge project is endorsed by the Griffith Park Horse Protection Association and the riding clubs of Paddock, River Ridge and Saddle and Sirloin. These organizations, along with the Atwater Chamber of Commerce, Crystal Springs Equestrian Association, and Atwater Village Residents Association have volunteered their support in the design and review process and also by sponsoring fund-raising activities. There is no opposition to the proposed project.

While funding has not been identified for the construction of the bridge, various sources are being pursued including Federal Funds, an application to the Los Angeles County Open Space District for competitive funds under the Proposition A-2 measure, and private donations and/or fund raising activities.

Enclosed are the project schedule, preliminary plan, vicinity map and rendering for your reference. If you have any questions, please contact Cef Serafin at (213) 847-8966 or Farid Baher at (213) 847-8968.

Sincerely,

Thomas K. Conner
City Engineer

By: Clark W. Robins, Division Engineer
Structural & Geotechnical Engineering Division

TKC:CWR:FRB:cs/wildman.wpd
Enclosure
cc: Congressman Xavier Becerra, U.S. Representative 30th District
State Senator Adam B. Schiff, 21th District
Michael Cathey, Atwater Chamber of Commerce

ATWATER VILLAGE RESIDENTS ASSOCIATION

P.O. Box 39654. Los Angeles, CA 90039

September 2, 1999

TO WHOM IT MAY CONCERN:

Our association's Board of Directors has unanimously voted to support the construction of an equestrian bridge across the Los Angeles River.

This bridge would connect our historical equestrian section with Griffith Park, giving riders a safe crossing of the river.so they can enjoy riding in the park.

It would also provide a convenient pedestrian crossing into the park, supplementing our pedestrian bridge at Sunnynook Drive, south of Los Feliz Boulevard. It may prove that the pedestrian portion of the bridge would necessarily have to be separated from the equestrian one.

Sincerely,

Neil Malmberg
President

Marlene Vasconcelos
Secretary

RADCLIFF FRANDSEN & DONGELL
LAWYERS

SAN FRANCISCO
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50 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111
TELEPHONE (415) 399-8393
FACSIMILE (415) 989-5465

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47, VIA BARBERINI
00187 ROMA, ITALIA
TELEPHONE (39) 06-42741613
FACSIMILE (39) 06-42814339

October 1, 1999

Assemblyman Wildman
California State Assembly

Dear Assemblyman:

I am writing to express my support in favor of constructing the equestrian bridge over the Los Angeles River in the Atwater Village area.

I board my horse in the neighborhood and need to cross the river in order to gain access to the trails in Griffith Park. Particularly during the winter months, the crossing becomes dangerous because of the significant amount of water in the river. After having crossed and ridden in the park, I have found myself on several occasions re-crossing the river back to the barn when the height of the water and the current was significantly greater than on the first crossing. This happens because water is periodically released from the damn upstream. The only alternative to crossing in the river is a pedestrian and automobile bridge located on Los Feliz Boulevard which presents a significant hazard, as it was not designed to accommodate equestrian traffic.

For all of the above reasons, the equestrian bridge is a necessity, and long overdue.

Sincerely yours,

Michael A. Angel

MAA:smp

BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

822 KENNETH HAHN HALL OF ADMINISTRATION / LOS ANGELES, CALIFORNIA 90012
Telephone (213) 974-4444 / FAX (213) 626-6941

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DON KNABE
CHAIRMAN OF THE BOARD
SUPERVISOR, FOURTH DISTRICT

September 21, 1999

The Honorable Scott Wildman
Assemblyman, 43rd District
109 East Harvard, Suite 305
Glendale, CA 91205

Dear Assemblyman Wildman:

As a long-time equestrian in the Griffith Park community, I am writing to voice my support for funding which will enable the construction of a multi-use bridge entitled the Los Angeles River Crystal Springs Atwater Cross.

The construction of this bridge is long overdue. Previously, funding had been encumbered for soon to be completed engineering plans; however funding is still required for construction. In addition, it is my understanding that a private fundraising campaign is now in the process of occurring.

From a public safety standpoint, it would be beneficial to all that this bridge project come to fruition.

Your support would be appreciated in furthering this project.

Sincerely,

Linda Tarnoff

LINDA TARNOFF
Deputy
Los Angeles County Supervisor Don Knabe

GEORGE W. DYCK, D.V.M.
ROBERT M. RAGSDALE, D.V.M.
26062 Bouquet Canyon Road
Saugus, CA 91350
(818) 362-9439

Scott Wildman, State Assemblyman
Sacramento, CA

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Sincerely,

George W Dyck
George W. Dyck, D.V.M.

Robert Ragsdale
Robert M. Ragsdale, D.V.M.

GD/jmg

Rec 9-18-99

BOARD OF RECREATION AND
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Los Angeles, CA 90039 - 1297

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FAX - (818) 247-4740

STEPHEN E. KLIPPEL
ASSISTANT GENERAL MANAGER

SEP - 7 1999

August 27, 1999

Honorable Scott Wildman
Assemblyman, Forty-Third District
109 East Harvard Street, Suite 305
Glendale, CA 91205

Dear Mr. Wildman:

I am writing to express the full endorsement of the City of Los Angeles Department of Recreation and Parks for the building of an equestrian bridge over the Los Angeles River. The location of the bridge would be at Tunnel #1 of the south end of Griffith Park's Crystal Springs Picnic Area.

In 1968, the Department acquired a permit from the L.A. Army Corps of Engineers to establish a bridle trail across the L.A. River channel. At that time, a small stream of water, several yards wide, ran through the channel on a seasonal basis. Currently, the bottom of the L.A. River channel is completely submerged, from embankment to embankment, year round. This condition was created due to the activation of two water reclamation plants, one in Glendale, the other in the San Fernando Valley's Sepulveda Basin Area. These plants continuously discharge treated water down the system. This condition has made it virtually impossible to maintain a safe bridle trail crossing and has caused several equestrian injuries that resulted in litigation in their favor.

The only access into Griffith Park for equestrians that reside or stable their horses on the eastern side of the L.A. River is to cross at the Los Feliz Boulevard bridge and follow the boulevard to the Los Feliz Gateway of Griffith Park. This route exposes horse and rider to extreme danger from vehicle traffic along the heavily used boulevard. The only way to ensure a safe crossing into Griffith Park is to erect an equestrian bridge over the Los Angeles River.

The Los Angeles City Engineer has been working on plans and we believe with financial support, this project could become a reality. Should you have any questions, or wish to discuss this further, please call Mr. Patrick Kennedy, Principal Grounds Maintenance Supervisor, at (213) 485-4809.

Very truly yours,

STEPHEN E. KLIPPEL
Assistant General Manager

SEK:AG:ls

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CITY COUNCIL OF THE CITY OF LOS ANGELES

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JOHN FERRARO
COUNCILMAN 4TH DISTRICT

RM. 514, CITY HALL
LOS ANGELES, CA 90012
(213) 485-3337
FAX (213) 624-7810

March 31, 1999

Honorable Scott Wildman
Assembly Member, 43rd District
109 East Harvard Street, Suite 305
Glendale, CA 91205

Dear Assembly Member Wildman:

RE: Funding for the Los Angeles River Equestrian Bridge/AB18

As I am sure you are aware my staff has been working with your staff as well as other elected officials to find a funding source for the proposed equestrian bridge spanning the Los Angeles River from Atwater Village to Griffith Park.

It has come to my attention that an opportunity may exist through Assembly Bill 18 to acquire funding for the proposed equestrian bridge. I would like to ask that you pursue AB 18 as a potential funding source for this vital piece of regional infrastructure.

Thank you for your assistance in this matter.

Sincerely,

JOHN FERRARO
Councilman, 4th District

JF:vrp

Trujillo, Georgine

From: Andalon, Daniel
Sent: Friday, October 08, 1999 11:42 AM
To: Trujillo, Georgine; 'swildman@concentric.net'; 'scott wildman/arlene irlando'
Cc: Sarkisian, Sunday; Heron, William
Subject: FW: LA River Bridge (Glendale)

Message Flag: Follow up
Flag Status: Flagged

Is this the issue you were dealing with yesterday's meeting?

Danny Andalon

-----Original Message-----

From: **Assemblymember Wildman Constituent Mailbox**
Sent: Friday, October 08, 1999 11:39 AM
To: Andalon, Daniel
Subject: FW: LA River Bridge (Glendale)

-----Original Message-----

From: **Cathy Naugle [SMTP:rex@imageworks.com]**
Sent: Thursday, October 07, 1999 8:01 PM
To: Scott.Wildman@lcmail1.leg.ca.gov
Subject: LA River Bridge (Glendale)

As one of the many horse owners who enjoys riding in Griffith Park, I ask for your support in helping us to find a way to build a bridge across the LA River near Los Feliz Blvd.

The Park is so near yet so far. Every time I cross the River on horseback, I say a prayer....and I'm not the most religious person, however, I know there is always a good chance my horse will slip and fall in the River which means I could also be another statistic - there are way too many people being hurt because of the swift running water. In the late 70's and I believe early 80's, the River was safe to cross - the water level was lower and not as rapid. That is not true now. The bridge would allow a safe access to the Park for everyone, including the Sheriff's Mounted Unit, which I would think would be of major concern to the City and State. You are putting the Mounted Unit at risk every time they cross the River from our side to the Park.

I would be most happy to work with you in any way to make this Bridge a reality by 2001. Please feel free to call on me for any support or work.

Again, we desperately need the BRIDGE. Please help us. We will work with you to make it happen!

My home e-mail address is: LipzanrRex@aol.com

My work e-mail address is: rex@imageworks.com

ATWATER VILLAGE
RESIDENTS ASSOCIATION
P.O. Box 39654. Los Angeles, CA 90039

September 2, 1999

TO WHOM IT MAY CONCERN:

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GD/jmg

Rec 9-18-99

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STEPHEN E. KLIPPEL
ASSISTANT GENERAL MANAGER

SEP - 7 1999

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Assistant General Manager

SEK:AG:ls

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Councilman, 4th District

JF:vrp

Trujillo, Georgine

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To: Trujillo, Georgine; 'swildman@concentric.net'; 'scott wildman/arlene irlando'
Cc: Sarkisian, Sunday; Heron, William
Subject: FW: LA River Bridge (Glendale)

Message Flag: Follow up
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Danny Andalon

-----Original Message-----

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Again, we desperately need the BRIDGE. Please help us. We will work with you to make it happen!

My home e-mail address is: LipzanrRex@aol.com

My work e-mail address is: rex@imageworks.com

Jennifer Samson <jsamson@larivercorp.com>

RE: La Kretz Crossing (N. Atwater Multi-modal Bridge in Los Angeles)

Clark, Virginia@CCC <Virginia.Clark@ccc.ca.gov> Tue, May 13, 2014 at 1:21 PM
To: JENNIFER SAMSON <jsamson@larivercorp.com>
Cc: "calocalcorps@gmail.com" <calocalcorps@gmail.com>, "Soria, Rhody@CCC" <Rhody.Soria@ccc.ca.gov>

Jennifer,

The CCC will not be opting to participate in this ATP project

Thank you

Virginia Clark

Region Deputy, Region 1

California Conservation Corps

(916) 341-3147

fx(877) 834-4177

virginia.clark@ccc.ca.gov

P PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL

Visit our web site at www.ccc.ca.gov for more information about the California Conservation Corps

Visit our web site at www.WatershedStewards.com for more information about the Watershed Stewards Program

---

From: JENNIFER SAMSON [mailto:jsamson@larivercorp.com]
Sent: Friday, May 09, 2014 11:14 AM
To: Clark, Virginia@CCC
Cc: Gangi Redman; calocalcorps@gmail.com; Bruce Saito
Subject: ATP: La Kretz Crossing (N. Atwater Multi-modal Bridge in Los Angeles)

Hello Virginia,

RE: La Kretz Crossing (N. Atwater Multi-modal Bridge in Los Angeles)

Cynthia Vitale <Cynthia@csgcalifornia.com> Sat, May 10, 2014 at 12:15 PM
To: "JENNIFER SAMSON (jsamson@larivercorp.com)" <jsamson@larivercorp.com>
Cc: Bruce Saito <bsaito@lacorps.org>, Paige Brokaw <Paige@csgcalifornia.com>, "Virginia Clark (Virginia.clark@ccc.ca.gov)" <Virginia.clark@ccc.ca.gov>, "calocalcorps@gmail.com" <calocalcorps@gmail.com>, Cynthia Vitale <Cynthia@csgcalifornia.com>

Hi Jennifer,

This email is an additional confirmation that you have contacted the local corps and that LA Conservation Corps would like to participate on this project. Please use this information to complete your application, and feel free to attach this email to your final application.

Thanks,
Cynthia

Cynthia Vitale

Conservation Strategy Group

1100 11th Street, Suite 200

Sacramento, CA 95814

(916) 558-1516 ext. 126

This electronic message contains information from Conservation Strategy Group, LLC, which is confidential or privileged. The information is intended to be sent to the individual or entity named above. If you are not the intended recipient, be aware that any disclosure, copying or distribution or use of the contents of this information is prohibited. If you have received this electronic transmission in error, please notify us by telephone at 916-558-1516.

From: Bruce Saito [mailto:bsaito@lacorps.org]
Sent: Friday, May 09, 2014 4:29 PM
To: Paige Brokaw; Cynthia Vitale
Subject: FW: La Kretz Crossing (N. Atwater Multi-modal Bridge in Los Angeles)