

Project No. S8875-06-89  
May 22, 2006

Jeff Pizzi, Task Order Manager  
Caltrans – District 2  
1657 Riverside Drive  
Redding, California 96049

Subject: ANTLERS BRIDGE (BRIDGE 06-0089)  
KILOMETER POST 64.7/POST MILE 40.2  
CONTRACT NO. 03A0937  
TASK ORDER NO. 89, EA NO. 02-378900  
ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

Dear Mr. Pizzi:

In accordance with California Department of Transportation Contract No. 03A0937 and Task Order No. 89 (EA No. 02-378900), Geocon Consultants, Inc. has performed an asbestos and lead-containing paint (LCP) survey of the Antlers Bridge located at Kilometer Post 64.7 (Post Mile 40.2) on State Route 5 in Shasta County, California. The scope of services provided by Geocon included surveying the bridge for suspect asbestos-containing materials and LCP, collecting bulk samples, and submitting the samples to laboratories for analyses.

The accompanying report summarizes the services performed and laboratory analysis.

*The contents of this report reflect the views of Geocon Consultants, Inc., who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.*

Please contact us if you have questions concerning the contents of this report or if we may be of further service.

Sincerely,

**GEOCON CONSULTANTS, INC.**

David A. Watts, CAC  
Project Scientist

John E. Juhrend, PE, CEG  
Project Manager

DAW:JEJ:jaj

(5 + 3 CDs) Addressee

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# ASBESTOS AND LEAD-CONTAINING PAINT SURVEY REPORT

## 1.0 INTRODUCTION

This asbestos and lead-containing paint (LCP) survey report was prepared by Geocon Consultants, Inc. under Caltrans Contract No. 03A0937, Task Order No. 89 (TO-89), EA No. 02-378900.

### 1.1 Project Description

The project consists of the Antlers Bridge (Bridge 06-0089) located at Kilometer Post 64.7 (Post Mile 40.2) on State Route (SR) 5 in Shasta County, California. The project location is depicted on the Vicinity Map, Figure 1.

### 1.2 General Objectives

The purpose of the scope of services outlined in TO-89 was to determine the presence and quantity of asbestos and LCP on the bridge prior to demolition activities. The information obtained from this investigation will be used by Caltrans for waste profiling, determining California Occupational Safety and Health Administration (Cal/OSHA) applicability, and coordinating asbestos and LCP disturbance activities.

*It was not Geocon's intent during this inspection to conduct an evaluation of lead-based paint hazards in accordance with U.S. Department of Housing and Urban Development (HUD) guidelines. HUD protocol generally requires a very extensive sampling strategy that includes sampling of paint on each surface type.*

## 2.0 BACKGROUND

### 2.1 Asbestos

The *Code of Federal Regulations (CFR)*, 40 CFR 61, Subpart M, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Federal Occupational Safety and Health Administration (FED OSHA) classify asbestos-containing material (ACM) as any material or product that contains *greater than 1%* asbestos. Nonfriable ACM is classified by NESHAP as either Category I or Category II material defined as follows:

- **Category I** – asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.
- **Category II** – all remaining types of nonfriable asbestos-containing material not included in Category I that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Regulated asbestos-containing material (RACM), a hazardous waste, is classified as any manufactured material that contains *greater than 1%* asbestos by dry weight *and* is:

- Friable (can be crumbled, pulverized, or reduced to powder by hand pressure); or
- Category I material that has become friable; or
- Category I material that has been subjected to sanding grinding, cutting or abrading; or
- Category II nonfriable material that has a high probability of becoming crumbled, pulverized, or reduced to a powder during demolition or renovation activities.

Activities that disturb materials containing *any* amount of asbestos are subject to certain requirements of the Cal/OSHA asbestos standard contained in Title 8, CCR Section 1529. Typically, removal or disturbance of more than 100 square feet of material containing more than 0.1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the material contains 1% or less asbestos. When the asbestos content of a material exceeds 1%, virtually all requirements of the standard become effective.

Materials containing more than 1% asbestos are also subject to NESHAP regulations (40 CFR Part 61, Subpart M). RACM (friable ACM and nonfriable ACM that will become friable during demolition operations) must be removed from structures prior to demolition. Certain nonfriable ACM and materials containing 1% or less asbestos may remain in structures during demolition; however, there are waste handling/disposal issues and Cal/OSHA work requirements that may make it cost ineffective to do so. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

With respect to potential worker exposure, notification, and registration requirements, Cal/OSHA defines asbestos-containing construction material as construction material that contains more than 0.1% asbestos (Title 8, CCR 341.6).

## **2.2 Lead Paint**

Construction activities (including demolition) that disturb materials or paints containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR, Section 1532.1. Deteriorated paint is defined by Title 17, CCR, Division 1, Chapter 8, §35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from a component. Demolition of a deteriorated LCP component would require waste characterization and appropriate disposal. Intact LCP on a component is currently accepted by most landfill facilities; however, contractors are responsible for segregating and characterizing waste streams prior to disposal.

For a solid waste containing lead, the waste is classified as California hazardous when: 1) the total lead content equals or exceeds the respective Total Threshold Limit Concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg); or 2) the soluble lead content equals or exceeds the respective Soluble Threshold Limit Concentration (STLC) of 5 milligrams per liter (mg/l) based on the standard Waste Extraction Test (WET). A waste has the potential for exceeding the lead STLC when the waste's total lead content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when total lead is detected at a concentration greater than or equal to 50 mg/kg, and assuming that 100 percent of the total lead is soluble, soluble lead analysis is required. Lead-containing waste is classified as "Resource, Conservation, and Recovery Act" (RCRA) hazardous, or Federal hazardous, when the soluble lead content equals or exceeds the Federal regulatory level of 5 mg/l based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste. Per Section 25157.8 of the California Health and Safety Code (HSC), on or after January 1, 1999, no person shall dispose waste that contains total lead in excess of 350 mg/kg to land other than a Class I hazardous waste disposal facility.

Potential hazards exist to workers who remove or cut through LCP coatings during demolition. Dust containing hazardous concentrations of lead may be generated during scraping or cutting materials

coated with lead-containing paint. Torching of these materials may produce lead oxide fumes. Therefore, air monitoring and/or respiratory protection may be required during the demolition of materials coated with LCP. Guidelines regarding regulatory provisions for construction work where workers may be exposed to lead are presented in the Title 8, CCR, Section 1532.1.

### 3.0 SCOPE OF SERVICES

Mr. David Watts, a California-Certified Asbestos Consultant (CAC), certification No. 98-2404 (expiration September 16, 2006), and Certified Lead Paint Inspector/Assessor and Project Monitor with the California Department of Health Services (DHS), certification numbers I-1734 and M-1734 (expiration December 4, 2006), performed an asbestos and LCP survey at the bridge on April 26, 2006.

#### 3.1 Asbestos

Suspect ACM were grouped into homogeneous areas with representative samples randomly collected from each. In addition, each potential ACM was evaluated for condition (evidence of deterioration, physical damage, and water damage) and friability. A total of three bulk asbestos samples were collected.

Geocon's procedures for inspection and sampling in accordance with TO-89 are discussed below:

- Collected bulk asbestos samples after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to a labeled container. Note that when multiple samples were collected, the sampling locations were distributed throughout the homogeneous area (spaces where the material was observed).
- Relinquished bulk asbestos samples to EMSL Analytical, Inc., a California-licensed and Caltrans-approved subcontractor, for asbestos analysis in accordance with United States Environmental Protection Agency (EPA) Test Method 600/R-93/116 using polarized light microscopy (PLM) under standard chain-of-custody procedures. EMSL Analytical, Inc. is a laboratory accredited by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NIST-NVLAP) for bulk asbestos fiber analysis. The laboratory analyses were requested on a 7-workday turn-around-time.

Asbestos sample identification numbers, material descriptions, approximate quantities, friability assessments, conditions, and photo references are summarized on Table 1. Approximate sample locations are presented on Figure 2. Materials represented by the samples collected are shown in the Site Photographs.

In addition to asbestos survey activities, Geocon reviewed architectural plans of the bridge as part of our investigation. Geocon observed no evidence of asbestos use on the architectural plans provided by Caltrans.

### 3.2 Lead Paint

Two bulk paint samples were collected from suspect LCP observed at the bridge. Geocon's sampling procedures in accordance with TO-89 are discussed below:

- Collected bulk samples of suspect LCP using techniques presented in HUD guidelines. In addition, each painted area was evaluated for evidence of deterioration such as flaking or cracking.
- Relinquished bulk LCP samples to Advanced Technology Laboratories, a California-licensed and Caltrans-approved subcontractor, for lead analyses in accordance with EPA Test Method 6010B under standard chain-of-custody procedures. Advanced Technology Laboratories is accredited by the DHS for lead analysis. The laboratory analyses were requested on a 7-working-day turn-around-time.

Paint sample identification numbers, paint descriptions, approximate peeling/flaking quantities, and photo references are summarized on Table 2. The approximate sample locations are presented on Figure 2. Materials represented by the samples collected are shown in the Site Photographs.

In addition to LCP survey activities, Geocon reviewed architectural plans of the bridge as part of our investigation. Geocon observed evidence of the use of "red lead" paint on the architectural plans (1941 Paint Record) provided by Caltrans.

## **4.0 INVESTIGATIVE RESULTS**

### **4.1 Asbestos Analytical Results**

A summary of the analytical laboratory test results for asbestos is presented on Table 1. Asbestos was not detected in samples of the suspect materials collected during the survey. Reproductions of the laboratory report and chain-of-custody documentation are presented in Appendix A.

### **4.2 Paint Analytical Results**

A summary of the analytical laboratory test results for lead is presented on Table 2. The laboratory analyses reported that total lead at concentrations of 96,000 and 100,000 mg/kg and soluble (TCLP) lead at 400 mg/l in samples representing intact green paint observed on the bridge truss and girder systems.

Reproductions of the laboratory report and chain-of-custody documentation are presented in Appendix A.

## 5.0 RECOMMENDATIONS

Based on our findings, Geocon recommends the following:

### 5.1 Asbestos

Since no asbestos was detected during the survey, the Cal/OSHA asbestos standard does not apply for planned demolition activities at the bridge. In addition, demolition debris from the bridge would not be considered as a California hazardous waste based on asbestos content.

However, written notification to U.S. EPA Region IX and the California Air Resources Board is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not). For notification instructions, please see the following internet link: <http://www.arb.ca.gov/enf/asbestosform.htm>.

### 5.2 Lead Paint

Geocon recommends that all paints at the bridge be treated as lead-containing for purposes of determining the applicability of the Cal/OSHA lead standard during any future maintenance, renovation, and demolition activities. This recommendation is based on LCP sample results and the fact that lead was a common ingredient of paints manufactured before 1978 and is still an ingredient of some industrial paints. Construction activities (including demolition) that disturb materials containing *any* amount of lead are subject to certain requirements of the Cal/OSHA lead standard contained in Title 8, CCR Section 1532.1. Geocon recommends the use of personnel who have lead-related construction certification as supervisors or workers, as appropriate, from the California DHS for personnel performing “trigger tasks” as defined in Title 8 CCR Section 1532.1(d). Common trigger tasks include manual scraping or sanding, heat gun applications, power tool cleaning, spray painting with lead paint, abrasive blasting, welding, cutting, grinding, and torch burning. Contractors should consult the Cal/OSHA lead standard for additional guidance.

In accordance with Title 8, CCR, Section 1532.1(p), written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain lead-related work.

Contractors are responsible for informing the landfill of the contractor’s intent to dispose of RCRA waste, California hazardous waste, and/or architectural components containing intact LCP. Some landfills may require additional waste characterization. Contractors are responsible for segregating and characterizing waste streams prior to disposal.

## 6.0 REPORT LIMITATIONS

The asbestos and LCP survey was conducted in conformance with generally accepted standards of practice for identifying and evaluating asbestos and LCP in structures. Due to the nature of structure surveys, asbestos and LCP use, and laboratory analytical limitations, some ACM or LCP at the bridge may not have been identified. Spaces such as cavities, voids, crawlspaces, and pipe chases, may have been concealed to Geocon's investigator. Previous renovation work may have concealed or covered spaces or materials, or may have partially demolished materials and left debris in inaccessible areas. Additionally, renovation activities may have partially replaced ACM with indistinguishable non-ACM. Asbestos and/or LCP may exist in areas that were not accessible or sampled in conjunction with this TO.

During renovation or demolition operations, suspect materials may be uncovered which are different from those accessible for sampling during this assessment. Personnel in charge of renovation/demolition should be alerted to note materials uncovered during such activities that differ substantially from those included in this or previous assessment reports. If suspect ACM and/or LCP are found, additional sampling and analysis should be performed to determine if the materials contain asbestos or lead.

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, expressed or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.



DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO  
CORPS OF ENGINEERS  
1325 J STREET  
SACRAMENTO CA 95814-2922

REPLY TO  
ATTENTION OF

January 20, 2009

Regulatory Division (SPK-2007-01747)

California Department of Transportation  
Eric Akana, Project Manager  
1657 Riverside Drive (96001) MS 9f  
P.O. Box 496073  
Redding California 96049-6073

Dear Mr. Akana:

We are responding to your April 9, 2008, request for a Department of the Army permit for the Antlers Bridge Replacement project. This approximately 150-acre project involves activities, including discharges of dredged or fill material, in waters of the United States to replace the existing Antlers Bridge Structure with a new bridge and realign the existing roadway, and remove the old bridge once construction is complete. The project site is located on Interstate -5 from Post Mile (PM) 39.0 to PM 41.2 in Shasta Lake, Section 13, Township 35 North, Range 5 West, MDB&M, Lakehead, Shasta County, California.

Based on the information you provided, the proposed activity in approximately 0.42 acres (Permanent Impacts) and 6.7 acres (Temporary Impacts) of waters is authorized by Nationwide Permit Numbers 14 and 16. Your work must comply with the general terms and conditions listed on the enclosed Nationwide Permit information sheets and the following special conditions:

1. You shall develop a final comprehensive mitigation and monitoring plan, which must be approved by the Army Corps of Engineers prior to initiation of construction activities. The plan shall include mitigation location and design drawings, vegetation plans, including target species to be planted, and final success criteria, presented in the format of the Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines, dated December 30, 2004. The purpose of this requirement is to insure replacement of functions and values of the aquatic environment that would be lost through project implementation.

2. To insure your project complies with the Federal Endangered Species Act, you must implement all of the mitigating measures identified in the enclosed Fish and Wildlife Service letter of concurrence (Number 1-1-05-I-1998, dated November 9, 2005), including those ascribed to the Corps therein. If you are unable to implement any of these measures, you must immediately notify this office and the Fish and Wildlife Office so we may consult as appropriate, prior to initiating the work, in accordance with Federal law.

3. You must allow representatives from the Corps of Engineers to inspect the authorized activity and any mitigation, preservation, or avoidance areas at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
4. To document pre and post-project construction conditions, you shall submit numbered and dated photos of the waters (including both the permanently and temporary impacted areas) within the project site prior to project implementation and post-construction photos of the project site within 30 days after project completion.
5. All terms and conditions of the July 8, 2008, Section 401 Water Quality Certification are expressly incorporated as conditions of this permit.
6. To prevent unauthorized access and disturbance, you shall, prior to proceeding with any activity otherwise authorized by this permit, install fencing and appropriate signage around avoided waters of the U.S. All fencing surrounding avoidance areas shall allow unrestricted visibility of these areas to discourage vandalism or disposing of trash or other debris in these areas. An example of fencing includes chain link or other types.
7. You shall have a qualified biologist, who is aware of the locations of all waters of the United States within the project boundary monitor construction activities. The monitor shall ensure no unauthorized activities occur within avoided waters. The monitor shall have the authority to stop work immediately if any unauthorized fill occurs in waters of the United States, including wetlands. Our office shall be contacted immediately.
8. You shall remove all of the temporary rock material (89,323 cubic yards) and temporary 36-inch culvert placed within Shasta Lake to create the temporary construction access ramps for this project (6.7 acres) prior to construction completion. Additionally, prior to removing the existing bridge structure you shall provide a final bridge removal plan detailing how the bridge deconstruction would occur. The bridge removal plan will require approval by the U.S Army Corps of Engineers at least 30 days prior to the start of bridge demolition and you shall remove all material discharged into waters of the United States during the bridge deconstruction. To insure successful removal of all temporary fills within waters of the United States you shall provide number and dated pre and post-project construction condition surveys. These surveys shall consist of elevation data, sonar data, and/or underwater photography of the temporarily impacted areas. You shall provide this office a survey plan, for approval, at least 30 days prior to commencing these activities. The plan should detail the specific surveys which would be conducted based upon existing water levels and site conditions. The survey information shall be provided prior to the start of construction and within 30 days after project completion.
9. All equipment staging shall take place within Caltrans approved areas within the project boundary. Prior to construction implementation you shall ensure all equipment staging, demolition and disposal, excavation, off pavement detour, and borrow and fill areas, have been evaluated under National Environmental Policy Act (NEPA), Section 401 and 404 of the Clean Water Act, Section 7 of the Endangered Species Act and Section 106 of the National Historical Preservation Act and all required permits have been obtained.

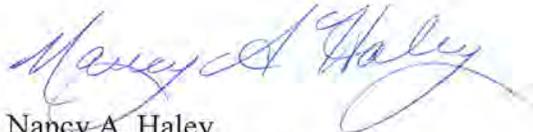
10. You must sign the enclosed Compliance Certification and return it to this office within 30 days after completion of the authorized work.

This verification is valid for two years from the date of this letter or until the Nationwide Permit is modified, reissued, or revoked, whichever comes first. Failure to comply with the General Conditions of this Nationwide Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing our customer survey at [http://www.spk.usace.army.mil/customer\\_survey.html](http://www.spk.usace.army.mil/customer_survey.html). Your passcode is "conigliaro".

Please reference identification number SPK-2007-01747 in any correspondence concerning this project. If you have any questions, please contact Paul Maniccia at our California, North Branch Office, email [paul.m.maniccia@usace.army.mil](mailto:paul.m.maniccia@usace.army.mil), or telephone 916-557-6704. You may also use our website: [www.spk.usace.army.mil/regulatory.html](http://www.spk.usace.army.mil/regulatory.html).

Sincerely,



Nancy A. Haley  
Chief, California North Branch

Enclosure(s)

Copy furnished without enclosure(s)

Andrew Jensen, Regional Water Quality Control Board, Redding Branch Office, 415 Knollcrest Drive, Suite 100, Redding, California 96002

Jason A. Brush, U.S. Environmental Protection Agency, Wetlands Regulatory Office, 75 Hawthorne Street (WTR-8), San Francisco, California 94105

Craig Martz, California Department of Fish and Game, 601 Locust Street, Redding, California 96001

Buford Holt, Bureau of Reclamation, Northern California Area Office, 16349 Shasta Dam Boulevard, Shasta Lake, California 96019-8400

Stacy L. Smith, Shasta-Trinity National Forest, 204 W. Alma Street, Mt. Shasta, California 96067

Amy Fesnock, U.S. Fish and Wildlife Service, Endangered Species Branch, 2800 Cottage Way Room W-2605, Sacramento California 95825-1846



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825-1846



In Reply Refer To:  
1-1-05-I-1998

NOV 9 2005

Candace Miller  
California Department of Transportation, District 3  
Post Office Box 911  
Marysville, California 95901

Subject: Informal Consultation for the Replacement of the Antlers Bridge at Interstate 5 at Shasta Lake near Lakehead, 02-SHA-5-PM40.2: EA02-378900, Shasta County, California

Dear Ms. Miller:

This is in response to your letter dated September 23, 2005, requesting the U.S. Fish and Wildlife Service's (Service) concurrence with the determination that the proposed action, the Replacement of the Antlers Bridge at Interstate 5 at Shasta Lake near Lakehead, is not likely to adversely affect the threatened bald eagle (*Haliaeetus leucocaphalus*) or any other listed threatened or endangered species, pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 *et. seq.*) (Act). The California Department of Transportation (Caltrans) and Federal Highway Administration is proposing to replace the Antlers Bridge with a new bridge built immediately east of the existing bridge, straighten the roadway on the south approach to the new bridge, and remove the existing bridge and old roadway upon completion of the new bridge and the new approach.

Our comments and conclusions are based on the September 2005, *Biological Evaluation for Bald Eagles: Project: Antlers Bridge Replacement*. Although there are twenty occupied bald eagle territories on Shasta Lake, the closest nest (Gregory Beach) is 0.75 miles east of the new bridge location. Shasta Lake is known as a significant wintering area for bald eagles, estimated at forty birds. Bald eagles are resident year-round in the Lakehead and Antlers Bridge area. There are no known winter roost sites in the project area; numerous roost sites are located away from the project site, the closest one is 0.75 miles east of the new bridge location.

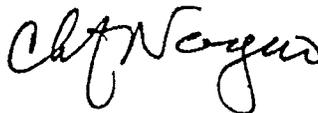
To ensure the project is not likely to adversely affect the bald eagle, Caltrans proposes to implement the following measures.

TAKE PRIDE  
IN AMERICA 

1. No potential nest or perch trees will be removed for the highway alignment.
2. Bridge construction will begin between September 1 and December 1 and will continue without interruption for the duration of the project. Continuous construction activities are not likely to adversely affect the normal behavior patterns of the eagle, such as sheltering, feeding, or mating, because such eagle activities would be initiated with the potentially disturbing construction activities in place.
3. Large pile driving will be restricted to August 15 through January 15 of each construction year.
4. In the event that the old bridge needs to be demolished via blasting instead of hydraulic hammers, the blasting will be restricted to August 15 through January 15 of each construction year.

Based upon the proposed conservation measures, we concur with your determination that the proposed project is not likely to adversely affect the bald eagle, due to the timing of the pile driving and blasting and the continuous construction of the bridge. Unless new information reveals effects of the proposed action that may affect listed species in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Act, is necessary. Please address any questions or concerns regarding this response to Amy Fesnock or Roberta Gerson, Branch Chief, at (916) 414-6600.

Sincerely,



Chris Nagano  
Deputy Assistant Field Supervisor

cc:

District Ranger, U.S. Forest Service, Shasta-Trinity National Forest, Shasta Lake Ranger District,  
Redding California

Nancy Hutchins, U.S. Forest Service, Shasta-Trinity National Forest, Shasta Lake Ranger  
District, Redding California

Bob Williams, California Department of Fish and Game, Region 1, Redding, California

## Summary of Fill within USACE Jurisdiction

### Temporary Impacts

#### **Construction Access Northwest of Bridge (Stepped Platforms)**

Fill for pads: 30,421 cubic yards; 48,696 square feet

H-piles\*: dimensions (TBD) Height will range from 6-43 feet above OG

\*The portion of pile below original ground will be permanent

#### **Construction Access Northeast of Bridge (Ramp)**

Fill: 23,145 cubic yards; 91,160 square feet

#### **Piles to anchor bridge pile templates**

4 round (hollow) steel piles 3 feet in diameter for each pier group. There are a total of 4 pier groups or a total of 16 piles: 7.1 square foot each pile or 113.6 square feet total.

#### **Miscellaneous piles for mooring barges**

H-piles, steel round piles

### Permanent Impacts

#### **Bridge piles**

12 concrete, steel reinforced piles, 13.1 feet in diameter

<u>Pile (pier)</u>	<u>Height (feet)</u>	<u>Volume (cy)</u>
2	82	409
2	82	409
3	122	606
3	149	741
3	112	557
3	151	754
4	137	683
4	134	667
4	134	667
4	131	654
5	102	511
5	102	511
<b>Total Volume</b>		<b>7,169</b>

**Road crossings (streams)**

A (ephemeral)	0 linear feet	0 square feet
B (ephemeral)	0 linear feet	0 square feet
C (ephemeral)	0 linear feet	0 square feet
D (ephemeral)	0 linear feet	0 square feet
E (ephemeral)	307 linear feet	356 square feet
F (ephemeral)	0 linear feet	0 square feet
G (ephemeral)	107 linear feet	134 square feet
H (perennial)	36 linear feet	153 square feet
I (ephemeral)	165 linear feet	330 square feet
J (ephemeral)	61 linear feet	31 square feet
<b>Totals</b>	<b>676 Lf</b>	<b>1, 004 sq.ft.</b>

**Discharge of (CIDH) pile spoils on lakebed**

Pier #2 (2 piles): 1,019 cubic yards; 13,758 square feet – 24 inches deep  
Pier #3 (4 piles): 2,038 cubic yards; 27,516 square feet – 24 inches deep  
Pier #4 (4 piles): 2,038 cubic yards; 27,516 square feet – 24 inches deep  
Pier #5 (2 piles): 1,019 cubic yards; 13,758 square feet – 24 inches deep



# California Regional Water Quality Control Board Central Valley Region

Karl E. Longley, ScD, P.E., Chair



Linda S. Adams  
Secretary for  
Environmental Protection

Redding Office  
415 Knollcrest Drive, Suite 100, Redding, California 96002  
(530) 224-4845 • Fax (530) 224-4857  
<http://www.waterboards.ca.gov/centralvalley>

Arnold Schwarzenegger  
Governor

8 July 2008

Mr. Christopher Quiney  
c/o Eric Akana,  
California Department of Transportation, District 2  
1657 Riverside Drive  
Redding, CA 96001

## **ACTION ON REQUEST FOR CLEAN WATER ACT §401 WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE ANTLERS BRIDGE REPLACEMENT PROJECT, WDID NO. 5A45CR00300, REDDING, SHASTA COUNTY**

### **ACTION:**

1.  Order for Standard Certification
2.  Order for Technically conditioned Certification
3.  Order for Denial of Certification

### **WATER QUALITY CERTIFICATION STANDARD CONDITIONS:**

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and §3867 of Title 23 of the California Code of Regulations (23 CCR).
2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR §3833, unless otherwise stated in writing by the certifying agency.
4. Certification is valid for the duration of the described project. The Discharger shall notify the Regional Water Board in writing within 7 days of project completion.

**ADDITIONAL CONDITIONS (for Certification Action 2):**

In addition to the four standard conditions, the applicant shall satisfy the following:

1. Discharger shall notify the Central Valley Regional Water Quality Control Board (Regional Water Board) within 7 days of the start of any in-water activities.
2. Except for activities permitted by the U.S. Army Corps of Engineers (Corps) under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.
3. The discharge of petroleum products or other excavated materials to surface waters is prohibited, unless otherwise specified. Discharger shall notify the Regional Water Board immediately of any spill of petroleum products or other organic or earthen materials.
4. All equipment or vehicles operated adjacent to, or within, the lake/river channel shall be checked and maintained daily to prevent leaks of petroleum products that if introduced to water, could impact the beneficial uses of the lake.
5. Spill response kits, including absorbent materials designated for spill containment and cleanup, shall be on-site in case of accidental spills. If a spill occurs, the responsible party shall notify Office of Emergency Services (OES) at 1-800-852-7550, and the Regional Water Board, immediately.
6. Activities shall not cause turbidity increases in surface waters to exceed:
  - (a) where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
  - (b) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
  - (c) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
  - (d) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

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Except that these limits will be eased during in-water working periods to allow a turbidity increase of **15 NTU** over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

7. Activities shall not cause settleable matter to exceed 0.1 mL/l in surface waters as measured in surface waters 300 feet downstream from the project.
8. Activities shall not cause visible oil, grease, or foam in the work area or downstream.
9. All areas disturbed by project activities shall be protected from washout or erosion.

10. In the event that project activities result in the deposition of soil materials or creation of a visible plume in surface waters, the following monitoring shall be conducted immediately upstream and 300 feet downstream of the work site, samples sent to the laboratory, and the results reported to this office within two weeks:

<b>Parameter</b>	<b>Unit</b>	<b>Type of Sample</b>	<b>Frequency of Sample</b>
<b>Turbidity</b>	<b>NTU</b>	<b>Grab</b>	Every 4 hours during in water work
<b>Settleable Material</b>	<b>mL/l</b>	<b>Grab</b>	Same as above.

11. Discharger shall notify the Regional Water Board immediately if the above criteria for turbidity, settleable matter, oil/grease, or foam are exceeded. In addition, the Discharger shall prepare a Notice of Discharge, to be submitted to the Regional Water Board, as a follow-up. Discharger shall outline mitigation measures implemented to comply with this certification.
12. All collected water quality data, lab sample results, notices of discharge, storm water inspection reports and associated photos, as well as any other relevant information, shall be compiled in a report, and submitted monthly to the Regional Water Board for review.
13. Discharger shall implement all compensatory and non-compensatory mitigation measures as outlined in the application submittal to the Regional Water Board.
14. Discharger shall provide the Regional Water Board with pre- and post-project photos of the work areas, taken from established photo points, upon completion of the project.
15. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under state law. For purposes §401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification.
16. In response to a suspected violation of any condition of this certification, the Regional Water Board may require the holder of any permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the Regional Water Board deems appropriate, provided that the burden, including costs, of the reports shall be a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.
17. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

18. Discharger shall comply with all Department of Fish and Game 1600 requirements for the project as required in Lake & Streambed Alteration Agreement No. R1-08-0093. Discharger shall comply with all requirements of Army Corps of Engineers Clean Water Act §404 permit.
19. Prior to the impacts to the 0.06 acre of stream, the Discharger shall provide the Regional Water Board with proof of payment to the in-lieu fee agreement with the Army Corps of Engineers and the National Fish and Wildlife Foundation, for an equivalent of 0.06-acre of stream habitat.
20. The Discharger shall comply with their General NPDES Permit No. 99-06-DWQ (NPDES No. CAS 000003) issued by the State Water Resources Control Board.

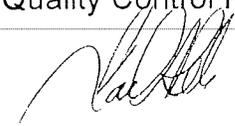
**REGIONAL WATER BOARD CONTACT PERSON:**

Andrew J. Jensen, M.S., Redding Branch Office, 415 Knollcrest Drive, Suite 100, Redding, California 96002, (530) 224-4783, ajensen@waterboards.ca.gov

**WATER QUALITY CERTIFICATION:**

I hereby issue an order certifying that any discharge from the Antlers Bridge Replacement Project (WDID No. 5A45CR00300) will comply with the applicable provisions of §301 ("Effluent Limitations"), §302 ("Water Quality Related Effluent Limitations"), §303 ("Water Quality Standards and Implementation Plans"), §306 ("National Standards of Performance"), and §307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges that have received State Water Quality Certification (General WDRs)".

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the applicant's project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Regional Water Board's Water Quality Control Plan (Basin Plan).

  
(for) PAMELA C. CREEDON  
Executive Officer

AJJ: knr

Enclosure: Project Information

cc: see attached list

cc: Mr. Matt Kelley, U.S. Army Corp of Engineers  
U.S. Fish and Wildlife Service, Sacramento  
Donna Cobb Department of Fish and Game, Region 1  
Mr. Bill Orme, State Water Resources Control Board, Certification Unit, Sacramento  
Bill Jennings, CALSPA, Stockton

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## PROJECT INFORMATION

**Application Date:** 24 March 2008

**Applicant:** Christopher Quiney, Eric Akana, Caltrans 1657 Riverside Drive Redding, CA 96001

**Applicant Representatives:** Not Applicable

**Project Name:** Antlers Bridge Replacement Project

**Regional Board:** Central Valley Regional Water Quality Control Board-Redding Branch Office

**Regional Board Application Number:** WDID No.5A45CR00300

**U.S. Corps Application Number:** Pending (individual permit)

**Type of Project:** Replacement of Antlers Bridge on I-5 in Lakehead. Realign of I-5 in the area.

**Project Location:** Interstate 5, Antler Bridge, near Lakehead in Shasta County, Section 13, Township 35N, Range 5W, M.D.B.&M., Latitude: 40°52'54. 49"N and Longitude: 122°22'51. 68"W

**County:** Shasta County

**Receiving Water (hydrologic unit):** Shasta Lake, which are a tributary to the Sacramento River. Shasta Dam Hydrologic Unit-Shasta Lake Hydrologic Area No. 506.10

**Water Body Type:** Lake

**Designated Beneficial Uses:** The Basin Plan for the Central Valley Regional Water Quality Control Board has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Hydropower Generation (POW); Water Contact Recreation (REC-1); Non-contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Spawning, Reproduction, and /or Early Development (SPWN); and Wildlife Habitat (WILD).

**Project Description (purpose/goal):** The project entails replacement of the Antlers Bridge (Bridge No. 06-0089) at Interstate 5 in Shasta Lake between Postmile 39.0 and 41.2 in Shasta County. The new bridge, a 5-span, concrete structure, will be built immediately east of the existing bridge. The project proposes to realign a 0.42-mile section of highway south of the bridge to improve safety. Traffic will remain on the existing bridge during construction. The existing bridge will be removed once the new bridge is placed in service. New right-of-way will be required due to the change in highway alignment.

**Preliminary Water Quality Concerns:** Turbidity, suspended matter, settleable matter, discharges of sediment, and various pollutants associated with construction activities.

**Non-Compensatory Mitigation:** The Discharger has permit coverage under the State Water Resources Control Board Construction Storm Water Program, and must prepare and implement a Storm Water Pollution Prevention Plan. Discharger will implement Best Management Practices (BMPs) to control sedimentation and erosion. All disturbed areas must have an effective combination of erosion and sediment control BMP's in place during the rainy season.

Discharger proposes to mitigate water quality concerns by incorporating Best Management Practices in the project area.

**Compensatory Mitigation:** The Discharger had been working with the Western Shasta Resource Conservation Service (WSRCD) to identify a mitigation project to offset project impacts of 0.06-acre of stream habitat. Unfortunately, the WSRCD did not have any projects currently, that meet the mitigation requirements. Therefore, in the interest of time, the Discharger will purchase the equivalent of 0.06-acre of credit through the in-lieu fee agreement with the Army Corps of Engineers and the National Fish and Wildlife Foundation.

In addition, the Discharger will provide \$30,000 and \$50,000 to California Department of Fish and Game, and Shasta-Trinity National Forest, respectively, for angling improvements and warm water fishery improvements within Shasta Lake.

Temporary impacts will be mitigated by restoring all impacted areas to their original topography and condition.

**Fill/Excavation Area:** Project implementation will permanently impact 0.06 acres, (2,231 linear feet) of unvegetated streambed and 1.2 acres of lake/reservoir and temporarily impact include 0.03 acres (268 linear feet) of unvegetated streambed and 6.7 acres (138 linear feet) of lake/reservoir.

**Dredge Volume:** Not applicable

**U.S. Army Corps of Engineers Permit Number:** The applicant proposes to utilize an individual permit for this project (Pending).

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**Regional Water Board Public Notice:** Information regarding this project was noticed on the Central Valley Water Board's website from 28 March 2008 to 18 April 2008. No comments were received.

**Department of Fish & Game Streambed Alteration Agreement:** Discharger applied for a Streambed Alteration Agreement with the Department of Fish and Game on 21 March 2008. The applicant must comply with all conditions in Lake and Streambed Alteration Agreement No. R1-08-0093.

**Possible Listed Species:** Based on the habitat suitability assessment conducted by

Geomatrix Consultants the following Federal Threatened or Endangered species have potential to occur in the project area: bald eagle

**Status of CEQA Compliance:** Caltrans prepared an Initial Study and Mitigated Negative Declaration in January 2007, which was approved on 29 September 2006 (SCH# 2006102048).

**Application Fee Provided:** A certification fee of \$11,655.00 was submitted on 24 March 2008 as required by 23 CCR §3833b(2)(A) and by 23 CCR § 2200(e).





U S Army Corps of  
Engineers  
Sacramento District

## Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits - March 19, 2007 includes corrections of May 8, 2007 and addition of regional conditions December 2007

### 16. Return Water From Upland Contained Disposal Areas.

Return water from an upland contained dredged material disposal area. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d), even though the disposal itself occurs on the upland and does not require a section 404 permit. This NWP satisfies the technical requirement for a section 404 permit for the return water where the quality of the return water is controlled by the state through the section 401 certification procedures. The dredging activity may require a section 404 permit (33 CFR 323.2(d)), and will require a section 10 permit if located in navigable waters of the United States. (Section 404)

#### A. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP.

##### 1. Navigation.

- (a) No activity may cause more than a minimal adverse effect on navigation.
- (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
- (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including

those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. **Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. **Shellfish Beds.** No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. **Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. **Management of Water Flows.** To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. **Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

**13. Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

**14. Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

**15. Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

**16. Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

**17. Endangered Species.**

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat

that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have “no effect” on listed species or critical habitat, or until Section 7 consultation has been completed.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal “takes” of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.

**18. Historic Properties.**

(a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed

activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

**19. Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NHPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NHPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is

required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NHPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

**20 Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NHPs. For example, if an NHP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NHPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented

water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

**21. Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

**22. Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

**23. Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

**24. Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

**25. Transfer of Nationwide Permit Verifications.** If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

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(Transferee)

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(Date)

**26. Compliance Certification.** Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;

(b) A statement that any required mitigation was completed in accordance with the permit conditions; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

**27. Pre-Construction Notification.**

(a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) Forty-five calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWP's 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification:  
The PCN must be in writing and include the following information:

- (1) Name, address and telephone numbers of the prospective permittee;
- (2) Location of the proposed project;
- (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);
- (4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the

project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination:

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP's and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic

Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

(5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any

compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

(a) **28. Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

## **B. Regional Conditions:**

### **I. Sacramento District (All States, except Colorado)**

1. When pre-construction notification (PCN) is required, the prospective permittee shall notify the Sacramento District in accordance with General Condition 27 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a completed application form (ENG Form 4345). In addition, the PCN shall include:

- a. A written statement explaining how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;
- b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and size (in acreage) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary

- high water mark or, if tidal waters, the high tide line should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation; and
- c. Pre-project color photographs of the project site taken from designated locations documented on the plan drawing.
2. The permittee shall complete compensatory mitigation required by special conditions of the NWP verification before or concurrent with construction of the authorized activity, except when specifically determined to be impracticable by the Sacramento District. When project mitigation involves use of a mitigation bank or in-lieu fee program, payment shall be made before commencing construction.
  3. The permittee shall record the NWP verification with the Registrar of Deeds or other appropriate official charged with the responsibility for maintaining records of title to or interest in real property against areas (1) designated to be preserved as part of mitigation for authorized impacts, including any associated covenants or restrictions, or (2) where structures such as boat ramps or docks, marinas, piers, and permanently moored vessels will be constructed in or adjacent to navigable waters (Section 10 and Section 404). The recordation shall also include a map showing the surveyed location of the authorized structure and any associated areas preserved to minimize or compensate for project impacts.
  4. The permittee shall place wetlands, other aquatic areas, and any vegetative buffers preserved as part of mitigation for impacts into a separate "preserve" parcel prior to discharging dredged or fill material into waters of the United States, except where specifically determined to be impracticable by the Sacramento District. Permanent legal protection shall be established for all preserve parcels, following Sacramento District approval of the legal instrument.
  5. The permittee shall allow Corps representatives to inspect the authorized activity and any mitigation areas at any time deemed necessary to determine compliance with the terms and conditions of the NWP verification. The permittee will be notified in advance of an inspection.
  6. For NWPs 29, 39, 40, 42, 43, 44, and 46, requests to waive the 300 linear foot limitation for intermittent or ephemeral waters of the U.S. shall include an evaluation of functions and services provided by the waterbody taking into account the watershed, measures to be implemented to avoid and minimize impacts, other measures to avoid and minimize that were found to be impracticable, and a mitigation plan for offsetting impacts.
  7. Road crossings shall be designed to ensure fish passage, especially for anadromous fisheries. Permittees shall employ bridge designs that span the stream or river, utilize pier or pile supported structures, or involve large bottomless culverts with a natural streambed, where the substrate and streamflow conditions approximate existing channel conditions. Approach fills in waters of the United States below the ordinary high water mark are not authorized under the NWPs, except where avoidance has specifically been determined to be impracticable by the Sacramento District.
  8. For NWP 12, clay blocks, bentonite, or other suitable material shall be used to seal the trench to prevent the utility line from draining waters of the United States, including wetlands.
  9. For NWP 13, bank stabilization shall include the use of vegetation or other biotechnical design to the maximum extent practicable. Activities involving hard-armoring of the bank toe or slope requires submission of a PCN per General Condition 27.
  10. For NWP 23, the PCN shall include a copy of the signed Categorical Exclusion document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act, Essential Fish Habitat under the Magnusen-Stevens Act, and Section 106 of the National Historic Preservation Act.
  11. For NWP 44, the discharge shall not cause the loss of more than 300 linear feet of streambed. For intermittent and ephemeral streams, the 300 linear foot limit may be waived in writing by the Sacramento District. This NWP does not authorize discharges in waters of the United States supporting anadromous fisheries.
  12. For NWPs 29 and 39, channelization or relocation of intermittent or perennial drainage, is not authorized, except when, as determined by the Sacramento District, the relocation would result in a net increase in functions of the aquatic ecosystem within the watershed.
  13. For NWP 33, temporary fills for construction access in waters of the United States supporting fisheries shall be accomplished with clean, washed spawning quality gravels where practicable as determined by the Sacramento District, in consultation with appropriate federal and state wildlife agencies.
  14. For NWP 46, the discharge shall not cause the loss of greater than 0.5 acres of waters of the United States or the loss of more than 300 linear feet of ditch, unless this 300 foot linear foot limit is waived in writing by the Sacramento District.
  15. For NWPs 29, 39, 40, 42, and 43, upland vegetated buffers shall be established and maintained in perpetuity, to the maximum extent practicable, next to all preserved open waters, streams and wetlands including created, restored, enhanced or preserved waters of the U.S., consistent with General Condition 20. Except in unusual circumstances, vegetated buffers shall be at least 50 feet in width.
  16. All NWPs except 3, 6, 20, 27, 32, 38, and 47, are revoked for activities in histosols and fens and in wetlands contiguous with fens. Fens are defined as slope wetlands with a histic epipedon that are hydrologically supported by groundwater. Fens are normally saturated throughout the growing season, although they may not be during drought conditions. For NWPs 3, 6, 20, 27, 32, and 38, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27.
  17. For all NWPs, when activities are proposed within 100 feet of the point of groundwater discharge of a natural spring, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27. A spring source is defined as any location where ground water emanates from a point in the ground. For purposes of this condition, springs do not include seeps or other discharges which lack a defined channel.

## II. California Only

1. In the Lake Tahoe Basin, all NWP's are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.
2. In the Primary and Secondary Zones of the Legal Delta, NWP's 29 and 39 are revoked. New development activities in the Legal Delta will be reviewed through the Corps' standard permit process.

## III. Nevada Only

1. In the Lake Tahoe Basin, all NWP's are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

## IV. Utah Only

1. For all NWP's, except NWP 47, prospective permittees shall submit a PCN in accordance with General Condition 27 for any activity, in waters of the United States, below 4217 feet mean sea level (msl) adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.
2. A PCN is required for all bank stabilization activities in a perennial stream that would affect more than 100 linear feet of stream
3. For NWP 27, facilities for controlling stormwater runoff, construction of water parks such as kayak courses, and use of grout or concrete to construct in-stream structures are not authorized. A PCN is required for all projects exceeding 1500 linear feet as measured on the stream thalweg, using in stream structures exceeding 50 cubic yards per structure and/or incorporating grade control structures exceeding 1 foot vertical drop. For any stream restoration project, the post project stream sinuosity shall be appropriate to the geomorphology of the surrounding area and shall be equal to, or greater than, pre project sinuosity. Sinuosity is defined as the ratio of stream length to project reach length. Structures shall allow the passage of aquatic organisms, recreational water craft or other navigational activities unless specifically waived in writing by the District Engineer.

## V. Colorado Only

1. Final Regional Conditions Applicable to Specific Nationwide Permits within Colorado.
  - a. Nationwide Permit Nos. 12 and 14, Utility Line Activities and Linear Transportation Projects. In the Colorado River Basin, utility line and road activities crossing perennial water or special aquatic sites require notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification).
  - b. Nationwide Permit No. 13 Bank Stabilization. In Colorado, bank stabilization activities necessary for erosion prevention in streams that average less than 20 feet in width (measured between the ordinary high water marks) are limited to the placement of no more than 1/4 cubic yard of suitable fill\* material per running foot below the plane of the ordinary high water mark. Activities greater than 1/4 cubic yard may be authorized if the permittee notifies the District Engineer in accordance with General Condition 27 (Pre-Construction Notification) and the Corps determines the adverse

environmental effects are minimal. [\* See (g) for definition of Suitable Fill]

### c. Nationwide Permit No. 27 Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

- (1) For activities that include a fishery enhancement component, the Corps will send the Pre-Construction Notification to the Colorado Division of Wildlife (CDOW) for review. In accordance with General Condition 27 (Pre-Construction Notification), CDOW will have 10 days from the receipt of Corps notification to indicate that they will be commenting on the proposed project. CDOW will then have an additional 15 days after the initial 10-day period to provide those comments. If CDOW raises concerns, the applicant may either modify their plan, in coordination with CDOW, or apply for a standard individual permit.
- (2) For activities involving the length of a stream, the post-project stream sinuosity will not be significantly reduced, unless it is demonstrated that the reduction in sinuosity is consistent with the natural morphological evolution of the stream (sinuosity is the ratio of stream length to project reach length).
- (3) Structures will allow the upstream and downstream passage of aquatic organisms, including fish native to the reach, as well as recreational water craft or other navigational activities, unless specifically waived in writing by the District Engineer. The use of grout and/or concrete in building structures is not authorized by this nationwide permit.
- (4) The construction of water parks (i.e., kayak courses) and flood control projects are not authorized by this nationwide permit.

d. Nationwide Permits Nos. 29 and 39; Residential Developments and Commercial and Institutional Developments. A copy of the existing FEMA/locally-approved floodplain map must be submitted with the Pre-Construction Notification. When reviewing proposed developments, the Corps will utilize the most accurate and reliable FEMA/locally-approved pre-project floodplain mapping, not post-project floodplain mapping based on a CLOMR or LOMR. However, the Corps will accept revisions to existing floodplain mapping if the revisions resolve inaccuracies in the original floodplain mapping and if the revisions accurately reflect pre-project conditions.

### 2. Final Regional Conditions Applicable to All Nationwide Permits within Colorado

e. Removal of Temporary Fills. General Condition 13 (Removal of Temporary Fills) is amended by adding the following: When temporary fills are placed in wetlands in Colorado, a horizontal marker (i.e. fabric, certified weed-free straw, etc.) must be used to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

f. Spawning Areas. General Condition 3 (Spawning Areas) is amended by adding the following: In Colorado, all Designated Critical Resource Waters (see enclosure 1) are considered important spawning areas. Therefore, in accordance with General Condition 19 (Designated Critical Resource Waters), the discharge of dredged or fill material is not authorized by the following nationwide permits in these waters: NWP's 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50. In addition, in accordance with General Condition 27 (Pre-Construction Notification), notification to the District Engineer is required for use of the following nationwide permits in these waters: NWP's 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37 and 38".

g. Suitable Fill. In Colorado, use of broken concrete as fill material requires notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification). Permittees must demonstrate that soft engineering methods utilizing native or non-manmade materials are not practicable (with respect to cost, existing technology, and logistics), before broken concrete is allowed as suitable fill. Use of broken concrete with exposed rebar is prohibited in perennial waters and special aquatic sites.

h. Invasive Aquatic Species. General Condition 11 is amended by adding the following condition for work in perennial or intermittent waters of the United States: If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond, or wetland within 10 days of initiating work, one of the following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers:

- (1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days. OR
- (2) Remove all mud and debris from Equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of Sparquat 256 (5 ounces Sparquat per gallon of water). Treated equipment must be kept moist for at least 10 minutes. OR
- (3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

### 3. Final Regional Conditions for Revocation/Special Notification Specific to Certain Geographic Areas

i. Fens: All Nationwide permits, except permit Nos. 3, 6, 20, 27, 32, 38 and 47, are revoked in fens and wetlands adjacent to fens. Use of nationwide permit Nos. 3, 20, 27 and 38, requires notification to the District Engineer, in accordance with General Condition 27 (Pre-Construction Notification), and the permittee may not begin the activity until the Corps determines the adverse environmental effects are minimal. The following defines a fen:

Fen soils (histosols) are normally saturated throughout the growing season, although they may

not be during drought conditions. The primary source of hydrology for fens is groundwater. Histosols are defined in accordance with the U.S. Department of Agriculture, Natural Resources Conservation Service publications on Keys to Soil Taxonomy and Field Indicators of Hydric Soils in the United States (<http://soils.usda.gov/technical/classification/taxonomy>).

j. Springs: Within the state of Colorado, all NWP's, except permit 47 (original 'C'), require preconstruction notification pursuant to General Condition 27 for discharges of dredged or fill material within 100 feet of the point of groundwater discharge of natural springs. A spring source is defined as any location where groundwater emanates from a point in the ground. For purposes of this regional condition, springs do not include seeps or other discharges which do not have a defined channel.

### 4. Additional Information

The following provides additional information regarding minimization of impacts and compliance with existing general Conditions:

a. Permittees are reminded of the existing General Condition No. 6 which prohibits the use of unsuitable material. Organic debris, building waste, asphalt, car bodies, and trash are not suitable material. Also, General Condition 12 requires appropriate erosion and sediment controls (i.e. all fills must be permanently stabilized to prevent erosion and siltation into waters and wetlands at the earliest practicable date). Streambed material or other small aggregate material placed along a bank as stabilization will not meet General Condition 12. Also, use of erosion control mats that contain plastic netting may not meet General Condition 12 if deemed harmful to wildlife.

b. Designated Critical Resource Waters in Colorado. In Colorado, a list of designated Critical Resource Waters has been published in accordance with General Condition 19 (Designated Critical Resource Waters). This list will be published on the Albuquerque District Regulatory home page (<http://www.spa.usace.army.mil/reg/>)

c. Federally-Listed Threatened and Endangered Species. General condition 17 requires that non-federal permittees notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project. Information on such species, to include occurrence by county in Colorado, may be found at the following U.S. Fish and Wildlife Service website: [http://www.fws.gov/mountain%2Dprairie/endspp/name\\_county\\_search.htm](http://www.fws.gov/mountain%2Dprairie/endspp/name_county_search.htm)

### C. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWP's do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWP's do not grant any property rights or exclusive privileges.
4. NWP's do not authorize any injury to the property or rights of others.
5. NWP's do not authorize interference with any existing or proposed Federal project.

#### D. Definitions

**Best management practices (BMPs):** Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

**Compensatory mitigation:** The restoration, establishment (creation), enhancement, or preservation of aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Currently serviceable:** Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

**Discharge:** The term "discharge" means any discharge of dredged or fill material.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Ephemeral stream:** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

**Establishment (creation):** The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

**Historic Property:** Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

**Independent utility:** A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

**Intermittent stream:** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

**Loss of waters of the United States:** Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

**Non-tidal wetland:** A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

**Open water:** For purposes of the NWP's, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

**Ordinary High Water Mark:** An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

**Perennial stream:** A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

**Practicable:** Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

**Pre-construction notification:** A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or

by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

**Preservation:** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**Riffle and pool complex:** Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

**Riparian areas:** Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects waterbodies with their adjacent uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 20.)

**Shellfish seeding:** The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

**Single and complete project:** The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete project must have independent utility (see definition). For linear projects, a “single and complete project” is all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a

single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

**Stormwater management:** Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

**Stormwater management facilities:** Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

**Stream bed:** The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

**Stream channelization:** The manipulation of a stream’s course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

**Structure:** An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

**Tidal wetland:** A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

**Vegetated shallows:** Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

**Waterbody:** For purposes of the NWP, a waterbody is a jurisdictional water of the United States that, during a year with normal patterns of precipitation, has water flowing or standing above ground to the extent that an ordinary high water mark (OHWM) or other indicators of jurisdiction can be determined, as well as any wetland area (see 33 CFR 328.3(b)). If a

jurisdictional wetland is adjacent--meaning bordering, contiguous, or neighboring--to a jurisdictional waterbody displaying an OHWM or other indicators of jurisdiction, that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.



U S Army Corps of  
Engineers  
Sacramento District

## Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits - March 19, 2007 includes corrections of May 8, 2007 and addition of regional conditions December 2007

**14. Linear Transportation Projects.** Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

**Notification:** The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 27.) (Sections 10 and 404)

**Note:** Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4)

### A. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact

the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP.

#### 1. Navigation.

(a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. **Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. **Shellfish Beds.** No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

6. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. **Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or

restricting its flow must be minimized to the maximum extent practicable.

**9. Management of Water Flows.** To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

**10. Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

**11. Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

**12. Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

**13. Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

**14. Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

**15. Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

**16. Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

**17. Endangered Species.**

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No

activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.

**18. Historic Properties.**

(a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to

notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

**19. Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWP 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

**20 Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the

aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWP. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

**21. Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR

330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

**22. Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

**23. Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

**24. Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

**25. Transfer of Nationwide Permit Verifications.** If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

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(Transferee)

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(Date)

**26. Compliance Certification.** Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

- (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;
- (b) A statement that any required mitigation was completed in accordance with the permit conditions; and
- (c) The signature of the permittee certifying the completion of the work and mitigation.

**27. Pre-Construction Notification.**

(a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) Forty-five calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) **Contents of Pre-Construction Notification:** The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);

(4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic

property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination:

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

(5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

(e) In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant

submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

(a) **28. Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

## **B. Regional Conditions:**

### **I. Sacramento District (All States, except Colorado)**

1. When pre-construction notification (PCN) is required, the prospective permittee shall notify the Sacramento District in accordance with General Condition 27 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a completed application form (ENG Form 4345). In addition, the PCN shall include:
  - a. A written statement explaining how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;
  - b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and size (in acreage) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the high tide line should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation; and
  - c. Pre-project color photographs of the project site taken from designated locations documented on the plan drawing.
2. The permittee shall complete compensatory mitigation required by special conditions of the NWP verification before or concurrent with construction of the authorized activity, except when specifically determined to be impracticable by the Sacramento District. When project mitigation involves use of a mitigation bank or in-lieu fee program, payment shall be made before commencing construction.
3. The permittee shall record the NWP verification with the Registrar of Deeds or other appropriate official charged with the responsibility for maintaining records of title to or interest in real property against areas (1) designated to be preserved as part of mitigation for authorized impacts, including any associated covenants or restrictions, or (2) where structures such as boat ramps or docks, marinas, piers, and permanently moored vessels will be constructed in or adjacent to navigable waters (Section 10 and Section 404). The recordation shall also include a map showing the surveyed location of the authorized structure and any associated areas preserved to minimize or compensate for project impacts.
4. The permittee shall place wetlands, other aquatic areas, and any vegetative buffers preserved as part of mitigation for impacts into a separate "preserve" parcel prior to discharging dredged or fill material into waters of the United States, except where specifically determined to be impracticable by the Sacramento District. Permanent legal protection shall be established for all preserve parcels, following Sacramento District approval of the legal instrument.
5. The permittee shall allow Corps representatives to inspect the authorized activity and any mitigation areas at any time deemed necessary to determine compliance with the terms and conditions of the NWP verification. The permittee will be notified in advance of an inspection.
6. For NWPs 29, 39, 40, 42, 43, 44, and 46, requests to waive the 300 linear foot limitation for intermittent or ephemeral waters of the U.S. shall include an evaluation of functions and services provided by the waterbody taking into account the watershed, measures to be implemented to avoid and minimize impacts, other measures to avoid and minimize that were found to be impracticable, and a mitigation plan for offsetting impacts.
7. Road crossings shall be designed to ensure fish passage, especially for anadromous fisheries. Permittees shall employ bridge designs that span the stream or river, utilize pier or pile supported structures, or involve large bottomless culverts with a natural streambed, where the substrate and streamflow conditions approximate existing channel conditions. Approach fills in waters of the United States below the ordinary high water mark are not authorized under the NWPs, except where avoidance has specifically been determined to be impracticable by the Sacramento District.
8. For NWP 12, clay blocks, bentonite, or other suitable material shall be used to seal the trench to prevent the utility line from draining waters of the United States, including wetlands.
9. For NWP 13, bank stabilization shall include the use of vegetation or other biotechnical design to the maximum extent practicable. Activities involving hard-armoring of the bank toe or slope requires submission of a PCN per General Condition 27.
10. For NWP 23, the PCN shall include a copy of the signed Categorical Exclusion document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act, Essential Fish Habitat under the Magnussen-Stevens Act, and Section 106 of the National Historic Preservation Act.
11. For NWP 44, the discharge shall not cause the loss of more than 300 linear feet of streambed. For intermittent and ephemeral streams, the 300 linear foot limit may be waived in writing by the Sacramento District. This NWP does not authorize discharges in waters of the United States supporting anadromous fisheries.
12. For NWPs 29 and 39, channelization or relocation of intermittent or perennial drainage, is not authorized, except when, as determined by the Sacramento District, the relocation would result in a net increase in functions of the aquatic ecosystem within the watershed.
13. For NWP 33, temporary fills for construction access in waters of the United States supporting fisheries shall be accomplished with clean, washed spawning quality gravels where practicable as determined by the Sacramento District, in consultation with appropriate federal and state wildlife agencies.

14. For NWP 46, the discharge shall not cause the loss of greater than 0.5 acres of waters of the United States or the loss of more than 300 linear feet of ditch, unless this 300 foot linear foot limit is waived in writing by the Sacramento District.

15. For NWPs 29, 39, 40, 42, and 43, upland vegetated buffers shall be established and maintained in perpetuity, to the maximum extent practicable, next to all preserved open waters, streams and wetlands including created, restored, enhanced or preserved waters of the U.S., consistent with General Condition 20. Except in unusual circumstances, vegetated buffers shall be at least 50 feet in width.

16. All NWPs except 3, 6, 20, 27, 32, 38, and 47, are revoked for activities in histosols and fens and in wetlands contiguous with fens. Fens are defined as slope wetlands with a histic epipedon that are hydrologically supported by groundwater. Fens are normally saturated throughout the growing season, although they may not be during drought conditions. For NWPs 3, 6, 20, 27, 32, and 38, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27.

17. For all NWPs, when activities are proposed within 100 feet of the point of groundwater discharge of a natural spring, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27. A spring source is defined as any location where ground water emanates from a point in the ground. For purposes of this condition, springs do not include seeps or other discharges which lack a defined channel.

## II. California Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

2. In the Primary and Secondary Zones of the Legal Delta, NWPs 29 and 39 are revoked. New development activities in the Legal Delta will be reviewed through the Corps' standard permit process.

## III. Nevada Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

## IV. Utah Only

1. For all NWPs, except NWP 47, prospective permittees shall submit a PCN in accordance with General Condition 27 for any activity, in waters of the United States, below 4217 feet mean sea level (msl) adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.

2. A PCN is required for all bank stabilization activities in a perennial stream that would affect more than 100 linear feet of stream

3. For NWP 27, facilities for controlling stormwater runoff, construction of water parks such as kayak courses, and use of grout or concrete to construct in-stream structures are not authorized. A PCN is required for all projects exceeding 1500 linear feet as measured on the stream thalweg, using in stream structures exceeding 50 cubic yards per structure and/or incorporating grade control structures exceeding 1 foot vertical

drop. For any stream restoration project, the post project stream sinuosity shall be appropriate to the geomorphology of the surrounding area and shall be equal to, or greater than, pre project sinuosity. Sinuosity is defined as the ratio of stream length to project reach length. Structures shall allow the passage of aquatic organisms, recreational water craft or other navigational activities unless specifically waived in writing by the District Engineer.

## V. Colorado Only

1. Final Regional Conditions Applicable to Specific Nationwide Permits within Colorado.

a. Nationwide Permit Nos. 12 and 14, Utility Line Activities and Linear Transportation Projects. In the Colorado River Basin, utility line and road activities crossing perennial water or special aquatic sites require notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification).

b. Nationwide Permit No. 13 Bank Stabilization. In Colorado, bank stabilization activities necessary for erosion prevention in streams that average less than 20 feet in width (measured between the ordinary high water marks) are limited to the placement of no more than 1/4 cubic yard of suitable fill\* material per running foot below the plane of the ordinary high water mark. Activities greater than 1/4 cubic yard may be authorized if the permittee notifies the District Engineer in accordance with General Condition 27 (Pre-Construction Notification) and the Corps determines the adverse environmental effects are minimal. [\* See (g) for definition of Suitable Fill]

c. Nationwide Permit No. 27 Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

(1) For activities that include a fishery enhancement component, the Corps will send the Pre-Construction Notification to the Colorado Division of Wildlife (CDOW) for review. In accordance with General Condition 27 (Pre-Construction Notification), CDOW will have 10 days from the receipt of Corps notification to indicate that they will be commenting on the proposed project. CDOW will then have an additional 15 days after the initial 10-day period to provide those comments. If CDOW raises concerns, the applicant may either modify their plan, in coordination with CDOW, or apply for a standard individual permit.

(2) For activities involving the length of a stream, the post-project stream sinuosity will not be significantly reduced, unless it is demonstrated that the reduction in sinuosity is consistent with the natural morphological evolution of the stream (sinuosity is the ratio of stream length to project reach length).

(3) Structures will allow the upstream and downstream passage of aquatic organisms, including fish native to the reach, as well as recreational water craft or other navigational activities, unless specifically waived in writing by the District Engineer. The use of grout and/or concrete in

building structures is not authorized by this nationwide permit.

(4) The construction of water parks (i.e., kayak courses) and flood control projects are not authorized by this nationwide permit.

d. Nationwide Permits Nos. 29 and 39; Residential Developments and Commercial and Institutional Developments. A copy of the existing FEMA/locally-approved floodplain map must be submitted with the Pre-Construction Notification. When reviewing proposed developments, the Corps will utilize the most accurate and reliable FEMA/locally-approved pre-project floodplain mapping, not post-project floodplain mapping based on a CLOMR or LOMR. However, the Corps will accept revisions to existing floodplain mapping if the revisions resolve inaccuracies in the original floodplain mapping and if the revisions accurately reflect pre-project conditions.

## 2. Final Regional Conditions Applicable to All Nationwide Permits within Colorado

e. Removal of Temporary Fills. General Condition 13 (Removal of Temporary Fills) is amended by adding the following: When temporary fills are placed in wetlands in Colorado, a horizontal marker (i.e. fabric, certified weed-free straw, etc.) must be used to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

f. Spawning Areas. General Condition 3 (Spawning Areas) is amended by adding the following: In Colorado, all Designated Critical Resource Waters (see enclosure 1) are considered important spawning areas. Therefore, in accordance with General Condition 19 (Designated Critical Resource Waters), the discharge of dredged or fill material is not authorized by the following nationwide permits in these waters: NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50. In addition, in accordance with General Condition 27 (Pre-Construction Notification), notification to the District Engineer is required for use of the following nationwide permits in these waters: NWP 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37 and 38”.

g. Suitable Fill. In Colorado, use of broken concrete as fill material requires notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification). Permittees must demonstrate that soft engineering methods utilizing native or non-manmade materials are not practicable (with respect to cost, existing technology, and logistics), before broken concrete is allowed as suitable fill. Use of broken concrete with exposed rebar is prohibited in perennial waters and special aquatic sites.

h. Invasive Aquatic Species. General Condition 11 is amended by adding the following condition for work in perennial or intermittent waters of the United States: If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond, or wetland within 10 days of initiating work, one the

following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers:

(1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days. OR

(2) Remove all mud and debris from Equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of Sparquat 256 (5 ounces Sparquat per gallon of water). Treated equipment must be kept moist for at least 10 minutes. OR

(3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

## 3. Final Regional Conditions for Revocation/Special Notification Specific to Certain Geographic Areas

i. Fens: All Nationwide permits, except permit Nos. 3, 6, 20, 27, 32, 38 and 47, are revoked in fens and wetlands adjacent to fens. Use of nationwide permit Nos. 3, 20, 27 and 38, requires notification to the District Engineer, in accordance with General Condition 27 (Pre-Construction Notification), and the permittee may not begin the activity until the Corps determines the adverse environmental effects are minimal. The following defines a fen:

Fen soils (histosols) are normally saturated throughout the growing season, although they may not be during drought conditions. The primary source of hydrology for fens is groundwater. Histosols are defined in accordance with the U.S. Department of Agriculture, Natural Resources Conservation Service publications on Keys to Soil Taxonomy and Field Indicators of Hydric Soils in the United States (<http://soils.usda.gov/technical/classification/taxonomy>).

j. Springs: Within the state of Colorado, all NWPs, except permit 47 (original ‘C’), require preconstruction notification pursuant to General Condition 27 for discharges of dredged or fill material within 100 feet of the point of groundwater discharge of natural springs. A spring source is defined as any location where groundwater emanates from a point in the ground. For purposes of this regional condition, springs do not include seeps or other discharges which do not have a defined channel.

## 4. Additional Information

The following provides additional information regarding minimization of impacts and compliance with existing general Conditions:

a. Permittees are reminded of the existing General Condition No. 6 which prohibits the use of unsuitable material. Organic debris, building waste, asphalt, car bodies, and trash are not suitable material. Also, General Condition 12 requires appropriate erosion and sediment controls (i.e. all fills must be permanently stabilized to

prevent erosion and siltation into waters and wetlands at the earliest practicable date). Streambed material or other small aggregate material placed along a bank as stabilization will not meet General Condition 12. Also, use of erosion control mats that contain plastic netting may not meet General Condition 12 if deemed harmful to wildlife.

b. Designated Critical Resource Waters in Colorado. In Colorado, a list of designated Critical Resource Waters has been published in accordance with General Condition 19 (Designated Critical Resource Waters). This list will be published on the Albuquerque District Regulatory home page (<http://www.spa.usace.army.mil/reg/>)

c. Federally-Listed Threatened and Endangered Species. General condition 17 requires that non-federal permittees notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project. Information on such species, to include occurrence by county in Colorado, may be found at the following U.S. Fish and Wildlife Service website:  
[http://www.fws.gov/mountain%2Dprairie/endspp/name\\_county\\_search.htm](http://www.fws.gov/mountain%2Dprairie/endspp/name_county_search.htm)

### C. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

### D. Definitions

**Best management practices (BMPs):** Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

**Compensatory mitigation:** The restoration, establishment (creation), enhancement, or preservation of aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Currently serviceable:** Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

**Discharge:** The term “discharge” means any discharge of dredged or fill material.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic

resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Ephemeral stream:** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

**Establishment (creation):** The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

**Historic Property:** Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

**Independent utility:** A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

**Intermittent stream:** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

**Loss of waters of the United States:** Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

**Non-tidal wetland:** A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands

contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

**Open water:** For purposes of the NWP, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

**Ordinary High Water Mark:** An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

**Perennial stream:** A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

**Practicable:** Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

**Pre-construction notification:** A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

**Preservation:** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**Riffle and pool complex:** Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

**Riparian areas:** Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects waterbodies with their adjacent uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 20.)

**Shellfish seeding:** The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

**Single and complete project:** The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete project must have independent utility (see definition). For linear projects, a “single and complete project” is all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

**Stormwater management:** Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

**Stormwater management facilities:** Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

**Stream bed:** The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

**Stream channelization:** The manipulation of a stream’s course, condition, capacity, or location that causes more than minimal

interruption of normal stream processes. A channelized stream remains a water of the United States.

**Structure:** An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

**Tidal wetland:** A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

**Vegetated shallows:** Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

**Waterbody:** For purposes of the NWP, a waterbody is a jurisdictional water of the United States that, during a year with normal patterns of precipitation, has water flowing or standing above ground to the extent that an ordinary high water mark (OHWM) or other indicators of jurisdiction can be determined, as well as any wetland area (see 33 CFR 328.3(b)). If a jurisdictional wetland is adjacent--meaning bordering, contiguous, or neighboring--to a jurisdictional waterbody displaying an OHWM or other indicators of jurisdiction, that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.



CALIFORNIA DEPARTMENT OF FISH AND GAME  
CEQA FINDINGS FOR THE  
AGREEMENT REGARDING PROPOSED LAKE OR STREAMBED  
ALTERATION NO. R1-08-0093

**Introduction**

The California Environmental Quality Act (**CEQA**) (Public Resources Code section 21000, *et seq.*) and the State CEQA Guidelines (**Guidelines**) (Section 15000, *et seq.*, Title 14, California Code of Regulations) require that no public agency shall approve or carry out a project for which a mitigated negative declaration (MND) has been completed that identifies one or more significant effects, unless such an agency makes the following finding as to each significant effect:

Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.

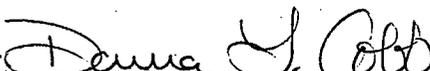
As the lead agency for the project, the **California Department of Transportation (Caltrans)** adopted the MND for the Project on **January 19, 2007**. Caltrans found that the Project will not result in significant environmental effects with the mitigation measures required in, or incorporated into the Project.

The California Department of Fish and Game (DFG) is issuing a Lake or Streambed Alteration Agreement (Agreement) to the project applicant, **Mr. Eric Akana representing the California Department of Transportation**. The project is located on **the Sacramento River Arm of Shasta Lake, tributary to the Pacific Ocean, Shasta County**, in Sections 13 and 24, Township 35 North, Range 5 West, MDB&M.

Because DFG is issuing the Agreement, it is a "responsible agency" under CEQA for the Project. As a CEQA Responsible Agency, DFG is required by Guidelines §15096 to review the environmental document certified by the lead agency approving the projects or activities addressed in the Agreement and to make certain findings concerning a project's potential to cause significant, adverse environmental effects. However, when considering alternatives and mitigation measures approved by the lead agency, a responsible agency is more limited than the lead agency. In issuing the Agreement, DFG is responsible only for ensuring that the direct or indirect environmental effects addressed in the Agreement are adequately mitigated or avoided. Consequently, the findings adopted or independently made by DFG with respect to the approval of Agreements Regarding Proposed Lake or Streambed Alterations are more limited than the findings of the lead agency funding, approving, or carrying out the project activities addressed in such Agreements.

**Findings**

DFG has considered the MND adopted by Caltrans. As part of this review, DFG prepared an addendum to the MND to evaluate potential project effects on nesting bald eagles and determined that none of the conditions described in Guidelines §15162 would require the preparation of a subsequent or supplemental document. DFG has therefore independently concluded that the Agreement should be issued under the terms and conditions specified in the MND. In this regard, DFG hereby adopts any findings of Caltrans, as set forth in the MND and record of project approval, insofar as those findings pertain to the Project's impacts on biological resources.

Signed:   
for Mark Stopher  
Habitat Conservation Program Manager  
Northern Region

Date: 09/09/08



DEPARTMENT OF FISH AND GAME

http://www.dfg.ca.gov
NORTHERN CALIFORNIA-NORTH COAST REGION
601 Locust Street
Redding, California 96001
(530) 225-2367



NOTIFICATION NO. R1-08-0093

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AGREEMENT REGARDING PROPOSED LAKE OR STREAMBED ALTERATION

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called the Department, and Mr. Eric Akana, representing the State of California, Department of Transportation, hereinafter jointly and severally called the Responsible Party, is as follows:

WHEREAS, pursuant to Division 2, Chapter 6, Section 1602 of California Fish and Game Code (Code), the Responsible Party, on the 21st day of March, 2008, notified the Department that he intends to divert or obstruct the natural flow of, or change the bed, channel, or bank of, or use material from the streambed of, the following waters: Sacramento River Arm of Shasta Lake and an unnamed drainage, tributary to the Sacramento River, in the County of Shasta. These waters are located in Sections 13 and 24, Township 35 North, Range 5 West, MDB&M; and

WHEREAS, the Department has determined that without implementation of the conditions contained within this Agreement, such operations may substantially adversely affect existing fish and wildlife resources including, but not limited to: Bald eagles (Haliaeetus leucocephalus), osprey (Pandion haliaetus), cliff swallows (Hirundo pyrrhonota) resident rainbow trout (Oncorhynchus mykiss) spotted bass (Micropterus punctulatus henshalli) white sturgeon (Acipenser transmontanus) as well as other non-game and game fishes, amphibians, reptiles, aquatic invertebrates, birds, black-tailed deer (Odocoileus hemionus columbianus) and other aquatic and riparian species.

THEREFORE, the Department hereby proposes measures to protect fish and wildlife resources during the Responsible Party's work. The Responsible Party hereby agrees to accept and conduct all activities in accordance with the following:

NOTIFICATION MATERIALS AND PROJECT DESCRIPTION:

1) Responsible Party's notification (Notification of Lake or Streambed Alteration, received March 21, 2008) together with all maps, plans, photographs, drawings, and all other supporting documents submitted with notification to describe the activity (including but not limited to the Final Initial Study/Mitigated Negative Declaration (SCH #2006102048) and Environmental Assessment/Finding of No Significant Impact dated January 19, 2007 and the Antlers Bridge Replacement Natural Environment Study dated June 1, 2006 submitted by the Federal Highway Administration and the California Department of Transportation), are hereby incorporated by reference into this Agreement. Responsible Party shall conduct project activities within the work areas and using the mitigative features described in the notification and supporting documents, unless such project activities, work areas or mitigative features are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this Agreement.

2) Work under this Agreement is limited to those activities associated with the replacement of the Antlers Bridge over the Sacramento River Arm of Shasta Lake (Bridge No. 06-0089) located near the community of Lakehead, Shasta County, in accordance with the submitted plans and diagrams. The full scope of the proposed project includes construction of a new five-span cast-in-place segmental concrete box girder bridge immediately east of the existing structure as well as the realignment of a 0.42 mile segment of Interstate 5 south of the bridge to improve safety. Traffic will remain on the existing bridge during construction. The existing bridge will be removed once traffic is diverted to the new structure.

Temporary easements will be required for access and staging areas to facilitate construction. Areas at the northwest and northeast quadrants of the existing bridge have been designated for construction staging and lake access points. It is anticipated that the contractor will set up a temporary concrete batch plant at the northwest staging area. Due to the long bridge span and fluctuating lake level, construction will utilize barges and a temporary work trestle. Access to the lake will be needed from both sides of the bridge due to height restrictions imposed by the existing bridge during full pool. The Antlers Public Boat Ramp will not be available for construction use. Access to the lake will be via temporary ramps and/or platforms constructed at various elevations on the lakeshore. A paved temporary access ramp will be constructed adjacent to the Antlers Public Boat Ramp east of the bridge. This will require placement of four 36-inch diameter culverts below the full pool elevation of the lake where the ramp crosses an ephemeral stream. No disturbance will occur within the streambed above full pool elevation. Construction of an access ramp on the west side of the bridge will require an earth retaining system due to the steepness of the lakeshore at this location. The earth retaining system will consist of vertical steel H-piles set in concrete with horizontal members between the piles. The retaining system will be backfilled with dirt and rock. All of the materials except the portion of the H-pile and concrete below grade will be removed upon completion of construction.

A temporary work trestle capable of supporting vehicles and heavy equipment will be erected on the east side of the existing bridge and will span the entire lake except for a gap in the middle to allow for boat traffic. The trestle will be supported by approximately eighty-four 36-inch diameter round steel piles. The piles will be driven to a depth of approximately 40 feet. The method of pile installation could be percussive, vibratory, oscillation, or a combination of these methods. The deck of the trestle will be constructed of wood or steel and could be located either above or below the full pool elevation of the lake. The trestle will be removed entirely upon completion of the project. In the event of an extremely low water year, some of the construction and demolition work could be accomplished by equipment accessing and working within the lakebed. This work could involve excavations with cranes, drill rigs, excavators, and loaders, delivery of concrete and steel to the pile location, removal of piles, and construction of temporary ramp fills.

The new bridge will have four piers, three of which will be situated within the full pool elevation of the lake. The piers are comprised of concrete piles 12.1-feet in diameter. The piers at each end of the bridge will be comprised of two piles each and the middle piers will be comprised of four piles. Prior to beginning work on the bridge piers, a test pile will be installed to verify geologic conditions. The test pile will be 6.5-feet in

diameter and will be driven to a depth of 75 feet. Following an assessment of the test pile, construction will begin on the bridge piers. Bridge foundation piles will be installed to a depth of approximately 100 feet below the lakebed. The steel pile shells will be installed using a combination of pile driving and drilling. Some dewatering during construction of the bridge foundation is anticipated. However, dewatering operations will be dependent on factors such as lake level and method of pile installation. The methods of pile installation could be percussive, vibratory, oscillation, or a combination of these methods. The rocky material displaced by the drilling will be deposited on the lake bottom, except pier number 2 which is located at the south end of the lake at full pool elevation. Spoils from this pier will be removed from the lake and deposited at an upland location. Each pile will require a template to keep the pile shell plumb during installation. It is anticipated that each template will be held in place with four 48-inch diameter round steel piles. Once the steel shells are in place, the template will be removed, reinforcing steel will be installed within the shell, and concrete will be poured. Once the piles have cured, the steel shells will be removed to the elevation of the lakebed for aesthetic purposes. The bridge superstructure will be comprised of cast-in-place concrete segments constructed using the balanced cantilever method.

Realignment of the highway segment south of the new bridge will require reconstruction of the existing highway drainage system. Six drainages will be affected. Of these, only Drainage A falls within the Department's jurisdiction under Fish and Game Code section 1602. Work within this drainage will involve extending the culvert approximately 10 feet at the inlet and replacing the sediment basin and vertical riser pipe at a new location.

Water will be drafted from Shasta Lake for dust suppression, mixing concrete, and for cooling concrete during the initial curing process. Approximately 6 million gallons will be purchased from the Shasta County Water Agency for these purposes. Water used for cooling concrete during the curing process will be circulated through a closed system of plastic pipes within the concrete and will not come into contact with green concrete. Cooling water will be discharged directly back into the lake following circulation.

Demolition of the existing bridge will occur after traffic has been shifted to the new structure. The contractor may choose to use explosives to demolish both the steel superstructure and the reinforced concrete piers. The use of explosives could cause the steel superstructure, or portions of the superstructure, to fall into the lake. All bridge debris will be removed from the lake bottom following demolition.

### **IMPACTS:**

3) The Responsible Party **shall not impact more than 2,231 linear feet (0.06 acre) of stream habitat** during construction of the proposed project. In addition to impacts on intermittent watercourses, percussive pile driving may result in unavoidable adverse effects on fisheries within the Sacramento River Arm of Shasta Lake.

**COMPENSATORY MITIGATION:**

4) The Responsible Party proposes to replace the loss of 2, 231 linear feet of stream habitat at a 1:1 ratio by participating in the US Army Corps of Engineers' (USACE) in lieu fee program or through a mitigation bank approved by the ACOE and the Department. The Responsible Party shall provide proof of payment to the in lieu fee program or purchase of mitigation credits for an equivalent of 0.06 acres of stream habitat prior to the start of construction.

5) To offset potential adverse effects on fisheries within Shasta Lake, the Responsible Party will provide the following:

- \$50,000 to the Shasta-Trinity National Forest for warm-water fishery improvements in Shasta Lake.
- \$30,000 to the Department of Fish and Game for a three-year program to pen raise white sturgeon fingerlings for stocking in Shasta Lake.

**PROJECT TIMING:**

6) All work within the intermittent drainages south of the bridge shall be confined to the period commencing May 15, and ending October 15, of any year in which this Agreement is valid, provided that the channels are dry or at low flow. If weather conditions permit and the banks remain dry and flows remain low, the Responsible Party may perform work within the stream channel or on the banks after October 15 provided a written request is made to the Department at least 14 days before the proposed work period variance. Written approval from the Department for the proposed work period variance must be received by the Responsible Party prior to the start or continuation of work after October 15. In no event shall work in the channel or on the banks continue after the onset of wet weather and the end of the summer low flow period.

7) If work is performed within the stream channel or on the banks after October 15 as provided above, the Responsible Party shall do all of the following:

- Stage erosion and sediment control materials at the work site.
- Monitor the seventy-two (72) hour forecast from the National Weather Service. When the 72-hour forecast indicates a probability of precipitation of 60% or greater, or at the onset of any precipitation, ground-disturbing activities shall cease and erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetlands

8) Installation of piles 48-inches in diameter and larger as well as all template and trestle piles with a percussive pile driver shall be confined to the period August 15 through January 15 of any year in which this Agreement is valid. If blasting is required during demolition of the existing bridge, use of explosives shall be confined to this same period.

9) Non-explosive demolition of the existing bridge shall be scheduled to occur between the August 15 and March 1 to avoid impacts on nesting swallows and other migratory birds. At no time shall occupied nests be destroyed as a result of project construction or demolition work.

10. To avoid impacts on bats that roost within the bridge piers, all points of entry into the piers shall be sealed prior to demolition when bats are not present (October 1 through February 28). A qualified biologist shall confirm bats are not present prior to demolition.

#### **VEGETATION REMOVAL:**

11) Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Removal of trees greater than 12-inches DBH shall occur between August 15 and December 31 during the first year of construction. Clearing and grubbing of remaining vegetation shall occur after August 15 and before March 1 of any year in which this Agreement is valid.

12) Environmentally Sensitive Area (ESA) fencing will be in place prior to construction to protect watercourse zones and maintain vegetative screening between the northwest staging area and the existing osprey nest. ESAs will be identified on the construction plans to clearly delineate the limits of the work area.

13) All removed vegetation and debris shall be moved outside the normal high-water mark prior to inundation by water. All removed vegetation and debris shall be disposed of according to State and local laws and ordinances.

14) All areas of riparian habitat subject to temporary disturbance during construction will be revegetated with suitable native plant species upon completion of the project.

#### **DEWATERING AND FLOW DIVERSION:**

15) The work area shall be isolated from the waters of the lake or flowing watercourses by use of coffer dams, gravel work pads, or clear water diversions. Dewatering activities shall comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) permit issued for the project by the Regional Water Quality Control Board.

16) No equipment will be operated within the wetted area of the lake or the live stream channel.

17) Groundwater and subsurface flow encountered during excavation for the bridge piles, piers, pier shells, coffer dams or abutments shall be pumped to a natural or excavated settling basin or containment structure on stable soil outside of the wetted lakebed. The settling basin shall not be allowed to drain to or be pumped to the lake or stream until the stored water is less turbid than the receiving water into which it is released.

18) A qualified fisheries biologist shall be employed to monitor coffer dam dewatering for the purpose of capturing and relocating any fish that may be trapped within the structure. The fisheries biologist shall possess all necessary permits required for this effort.

**WATER DRAFTING:**

- 19) Drafting trucks shall not enter the wetted portions of the lakebed.
- 20) No riparian vegetation shall be removed, other than minor pruning, to gain equipment access to the diversion point.
- 21) Pump intakes for water drafting and coffer dam dewatering shall be fitted with a fish screen that conforms to the Department's Fish Screen Criteria (June 2000) and NMFS Southwest Region's Water Drafting Specifications (August 2001).

**INSTREAM STRUCTURES:**

- 22) Installation of work trestles, ramps, bridges, culverts or other structures shall be such that water flow is not impaired and passage of fish and all aquatic lifeforms is assured at all times.
- 23) Structures and associated equipment not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
- 24) Rock energy dissipaters shall be installed at the outlets of all culverts to protect the stream channel from erosion and scour.

**ROCK SLOPE PROTECTION (RSP) AND ENERGY DISSIPATION DEVICES:**

- 25) RSP and energy dissipation materials shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course boulders and prevent instability (typically at least 1/3 diameter of footing course boulders). RSP slopes and footing trenches shall feature an underlayment of appropriate grade geo-textile fabric to protect fill from tractive forces. Excavation spoils shall not be side-cast into the channel nor is any manipulation of the substrate of the channel authorized except as herein expressly provided. Energy dissipation devices within the stream banks shall be replanted or seeded to encourage regrowth of riparian vegetation.

**HABITAT AND SPECIES PROTECTION:**

- 26) To minimize deer and other wildlife mortality when crossing I-5, the Responsible Party shall install chain link fencing, seven feet in height supported by steel posts on both sides of the highway from the south abutment of the new bridge to a point approximately 0.5 mile south. A bench will be constructed under the south abutment to provide a safe passage under the highway. One-way deer gates will be installed at strategic locations to provide an exit should deer enter the fenced portion of the highway.
- 27) A total of 16 pre-cast concrete bat houses will be attached to the new structure to provide permanent replacement habitat for bats. Monitoring surveys will be conducted

for two seasons following construction to determine if bats are utilizing the new structure, and if so, the number and species of bats.

28) The Responsible Party shall submit a hydroacoustic monitoring plan for percussive pile driving activities to the Department for written approval prior to conducting these activities.

29) The Responsible Party shall conduct hydroacoustic monitoring to document peak Sound Pressure Levels ( $SPL_{peak}$ ) and Sound Exposure Levels (SEL) generated within the water column for all piles 48-inches in diameter and larger as well as all template and trestle piles when a percussive pile driver is used within 50 meters of the water. Hydroacoustic data shall be reported to the Department on a weekly basis. If underwater sound pressure levels for each pile type and size do not vary to a large degree, the Responsible Party may request approval from the Department to discontinue hydroacoustic monitoring. A final monitoring report shall be submitted within 30 days of completion of percussive work.

30) Measures to attenuate underwater sound pressures shall be employed whenever inwater pile driving activities will use a percussive pile driver. An energy attenuation system shall be used to attenuate sound pressures resulting from underwater blasting and percussive driving of piles 48 inches in diameter and larger as well as all template and trestle piles. The energy attenuation system will consist of one of the following: 1) unconfined air bubble curtain system, 2) isolation pile air bubble curtain, 3) dewatered isolation pile, or 4) dewatered coffer dam.

31) A qualified fisheries biologist shall be on-site to monitor percussive driving of piles 48 inches in diameter and larger as well as all template and trestle piles and any underwater blasting. The biologist shall record any observations of injured or dead fish in the vicinity of the work area and shall count the number of individuals and species involved. If possible, the monitor shall collect any fish that are killed or injured. Specimens shall be refrigerated and the Department notified within 24 hours of the incident.

#### Bald Eagles and Osprey

32) No take of bald eagles or osprey is authorized by this Agreement, including adult birds, their eggs or nestlings.

33) No potential nest or perch trees will be removed during construction.

34) Percussive driving of piles 48 inches in diameter and larger as well as all template and trestle piles and any demolition blasting shall be restricted to the period of August 15 through January 15 of each construction year to avoid nesting, rearing and foraging activities.

35) To acclimate the birds to construction activities prior to nesting, continuous, routine construction activities at the northwest staging area must begin between August 15 and December 1 of each construction year. The Responsible Party shall monitor the osprey nest during construction.

36) The Responsible Party shall provide funding in the amount of \$76,000 to the Shasta-Trinity National Forest to conduct the following activities relative to the bald eagle:

- Monitor the nest at the Gregory Beach Campground during the three-year construction period,
- Implement forest stand improvements at the existing nest site to protect the nest tree in the event of a fire,
- Provide improved bald eagle foraging opportunities away from the project area by raising and releasing trout upstream from the Antlers Marina.

#### **PETROLEUM, CHEMICAL AND OTHER POLLUTION:**

- 37) Staging, storage, and re-fueling areas for machinery, equipment, and materials shall be located outside of the lakebed or stream channels.
- 38) No equipment or machinery shall be operated within the wetted portion of the lake or any flowing stream.
- 39) Any equipment or vehicles driven and/or operated within or adjacent to the lakebed or stream channels shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat.
- 40) The clean-up of all petroleum and/or chemical spills shall begin immediately. The Department shall be notified immediately by the Responsible Party of any spills and shall be consulted regarding clean-up procedures.
- 41) Prior to demolition, loose lead-based paint will be removed from the steel superstructure of the existing bridge and disposed of properly. All bridge debris will be removed from the lake bottom following completion of demolition.
- 42) The Responsible Party shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Responsible Party to ensure compliance.
- 43) No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

#### **EROSION AND SEDIMENT CONTROL:**

- 44) The project shall at all times feature adequate erosion and sediment control devices to prevent the degradation of water quality. When earthwork operations in a disturbed area have been completed, the Responsible Party shall implement appropriate water pollution control practices within 15 days, or before predicted precipitation, whichever occurs first.

45) The Responsible Party shall prepare a Storm Water Pollution Prevention Plan (SWPPP) prior to conducting any work that may cause water pollution and shall prevent the discharge of sediment, and/or muddy, turbid, or silt-laden waters resulting from the project, into the stream channel or lakebed. Where necessary to prevent such discharge, the Responsible Party shall properly install and maintain sediment barriers (including but not limited to filter fabric fencing, fiber mats, rice straw or fiber rolls) capable of preventing downstream sedimentation/turbidity. Said devices shall be cleaned of all trapped sediment as necessary to maintain proper function. Recovered sediment shall be disposed of where it shall not return to the waters of the State.

46) Soils exposed by project operations shall be treated to prevent sediment runoff and transport. Erosion control measures shall comply with contract specifications and may include applications of seed, rice straw, compost, fiber, commercial fertilizer, stabilizing emulsion and mulch, or combinations thereof. All exposed soils and fills shall be reseeded with a mix of native grasses and other species common to the area, free from seeds of noxious or invasive weed species, and applied at a rate which will ensure establishment.

47) National Weather Service forecasts shall be monitored by the Responsible Party to determine the chance of precipitation. When the 72-hour forecast indicates a probability of precipitation of 60% or greater, erosion control measures shall be implemented to stabilize exposed soils and prevent the mobilization of sediment into the stream channel or adjacent wetlands.

48) Upon Department determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective Department approved control devices are installed, or abatement procedures are initiated.

#### **ADMINISTRATIVE PROVISIONS:**

49) If the Responsible Party's work changes from that stated in the notification specified above, this Agreement is no longer valid and a new notification shall be submitted to the Department. Failure to comply with the provisions of this Agreement and with other pertinent Code sections, including but not limited to Code sections 5650, 5652, 5901, 5937, and 5948, may result in prosecution.

50) Nothing in this Agreement authorizes the Responsible Party to trespass on any land or property, nor does it relieve the Responsible Party of responsibility for compliance with applicable federal, state, or local laws or ordinances. A consummated Agreement does not constitute Department endorsement of the proposed operation, or assure the Department's concurrence with permits required from other agencies.

51) The U.S. Army Corps of Engineers (Corps) has permitting requirements for certain instream projects under Section 404 of the Federal Clean Water Act. If this project features the placement of dredged or fill materials into the channels of streams (below the ordinary high water mark) that are waters of the United States, a permit may be required by the Corps. If there is any question regarding the possibility of the project meeting the above limitations, the Responsible Party should contact the Corps prior to beginning work. This Agreement in no way represents permitting requirements by the Corps. It is the responsibility of the Responsible Party to contact the Corps,

and to comply with the provisions of any 404 Permit issued, if required by the Corps. For information, contact the Corps office in your area.

52) The provisions contained in this Agreement constitute the limit of activities agreed to and resolved by this Agreement. The signing of this Agreement does not imply that the Responsible Party is precluded from doing other activities at the site. However, activities not specifically agreed to and resolved by this Agreement shall be subject to separate notification pursuant to Code sections 1600 *et seq.*

53) In accordance with Code section 1605, the Responsible Party may request one extension of this Agreement, provided that the request is made in writing prior to the expiration of its original term. The Department shall grant the extension if the appropriate extension fee is paid unless it determines that the Agreement requires modification because the measures contained in the Agreement no longer protect the fish and wildlife resources that the activity may substantially adversely affect. If the Responsible Party fails to request the extension prior to the Agreement's termination then the Responsible Party shall submit a new notification with fees and required information to the Department. Any activity conducted under an expired Agreement is a violation of Code section 1600 *et seq.*

54) The Responsible Party shall provide a copy of this Agreement to all contractors, subcontractors, and the Responsible Party's project supervisors. Copies of the Agreement and any amendment thereto shall be readily available at work sites at all times during periods of active work and must be presented to any Department personnel, or personnel from another agency upon demand.

55) The Department reserves the right to enter the project site at any time to ensure compliance with measures of this Agreement.

56) All provisions of this Agreement remain in force throughout the term of the Agreement. Any provisions of the Agreement may be amended or the Agreement may be terminated at any time provided such amendment and/or termination are agreed to in writing by both parties. Mutually approved amendments become part of the original Agreement and are subject to all previously negotiated provisions.

57) The Responsible Party shall notify the Department, in writing, at least five (5) days prior to initiation of construction (project) activities and at least five (5) days prior to completion of construction (project) activities. Notification shall be faxed to the Department at (530) 225-0324, Attn: Craig P. Martz, Staff Environmental Scientist, or via e-mail at [cmartz@dfg.ca.gov](mailto:cmartz@dfg.ca.gov).

58) It is understood the Department will enter into this Streambed Alteration Agreement for purposes of establishing protective features for fish and wildlife. The decision to proceed with the project is the sole responsibility of the Responsible Party, and is not required by this Agreement. It is further agreed all liability and/or incurred cost related to or arising out of the Responsible Party's project and the fish and wildlife protective measures of this Agreement, remain the sole responsibility of the Responsible Party. The Responsible Party agrees to hold harmless the State of California and the Department of Fish and Game against any related claim made by any party or parties for personal injury or any other damages.

59) This Agreement is not intended as an approval of a project or of specific project features by the Department of Fish and Game. Independent review and recommendations will be provided by the Department as appropriate on those projects where local, state, or federal permits or other environmental reports are required.

60) All persons and organizations named herein as the Responsible Party shall be jointly and severally liable for the performance and execution of all provisions of this Agreement.

### **SUSPENSION AND CANCELLATION:**

61) Suspension and Cancellation. The Department may suspend or cancel this Agreement if the Department determines that circumstances warrant suspension or cancellation. The circumstances that might warrant suspension or cancellation include, but are not limited to, the following:

- a) Failure by the Responsible Party, or his/her employees, agents, representatives, contractors, and/or subcontractors, to comply with any of the terms and measures of this Agreement.
- b) The Department determines that the information the Responsible Party provided to the Department to develop this Agreement, or the information contained in a notification, is incomplete or inaccurate.
- c) The Department obtains new information that shows the work authorized by this Agreement could substantially adversely affect fish and wildlife resources, notwithstanding Responsible Party's compliance with the Agreement.
- d) The Department determines that measures to protect fish and wildlife resources different from those included in this Agreement are necessary to protect those resources.
- e) There is a substantial change in conditions. For purposes of this Agreement, "substantial change in conditions" shall mean one or more of the following: 1) the work described in this Agreement is substantially changed; 2) conditions affecting fish and wildlife resources substantially change; and/or 3) the work conducted under this Agreement have adversely affected, or will adversely affect, fish and wildlife resources, notwithstanding that Responsible Party has complied, or will comply with, the terms and measures of this Agreement.

62) Scope of Suspension. At the discretion of the Department, any action to suspend this Agreement may be limited in scope to address the specific problem or problems resulting in the suspension. Hence, the Department may limit the suspension to specified work or specified areas. The Department shall notify Responsible Party of any suspension of the Agreement, or any part thereof, in writing. Any suspension shall take effect immediately upon receipt of such notice by Responsible Party, or in accordance with the instructions contained in the notice. Such notice will identify the reason or reasons for the suspension, the actions necessary to correct the problem, and the scope of the suspension.

63) Reinstatement Following Suspension. The Department may lift any suspension when it has determined that Responsible Party has adequately addressed the problem or problems resulting in the suspension and that reinstatement of the Agreement will not cause harm to fish and wildlife resources.

This Agreement becomes effective on the date of Department's signature and terminates October 31, 2013. It is anticipated that project activities will extend until October 31, 2015. This Agreement may be renewed for a period not to exceed 5 years upon receipt of a written request and appropriate renewal fee by the Department.

CONCURRENCE

RESPONSIBLE PARTY

CALIFORNIA DEPARTMENT OF FISH AND GAME

Eric E. Skona  
(Signature)

for Dennis J. Cobb  
Mark Stopher  
Habitat Conservation Program Manager

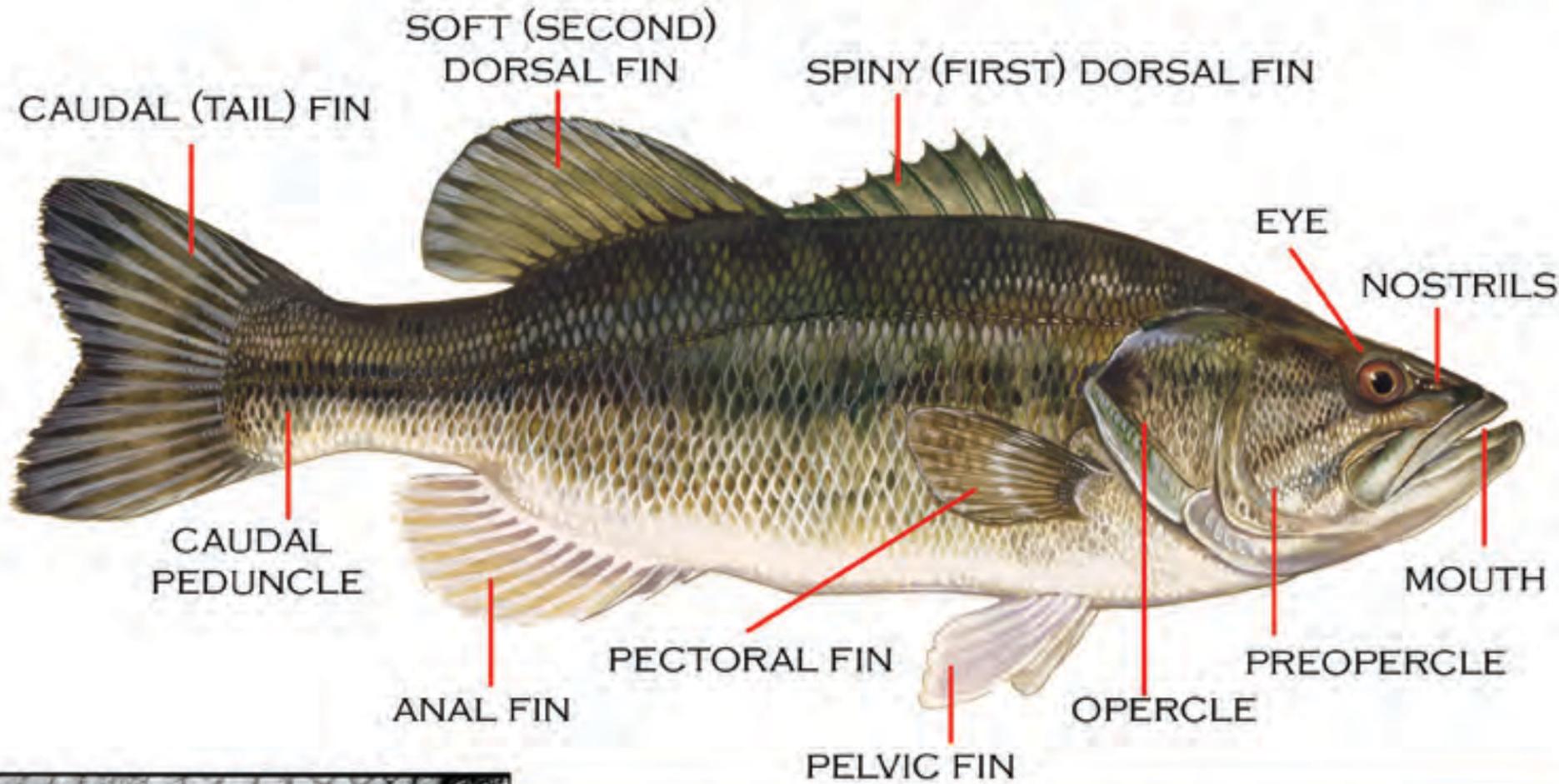
ERIC E. SKONA  
(Print Name)

09/09/08  
(Date)

Project Manager / CALTRANS  
(Title/Organization)

9/2/08  
(Date)

# ANTLERS BRIDGE GIRDER LARGEMOUTH BASS GRAPHICS RESEARCH PACKAGE

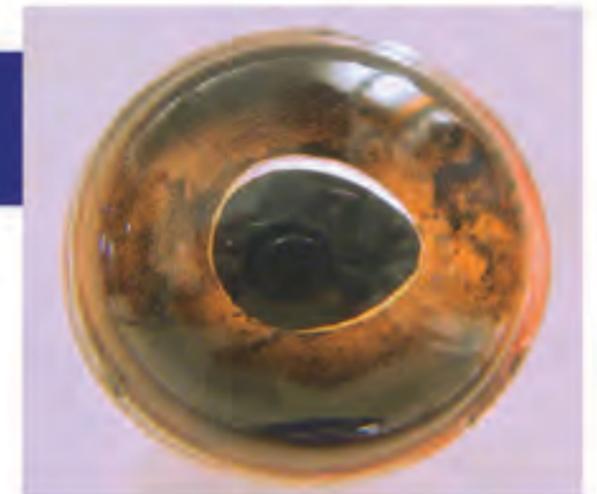
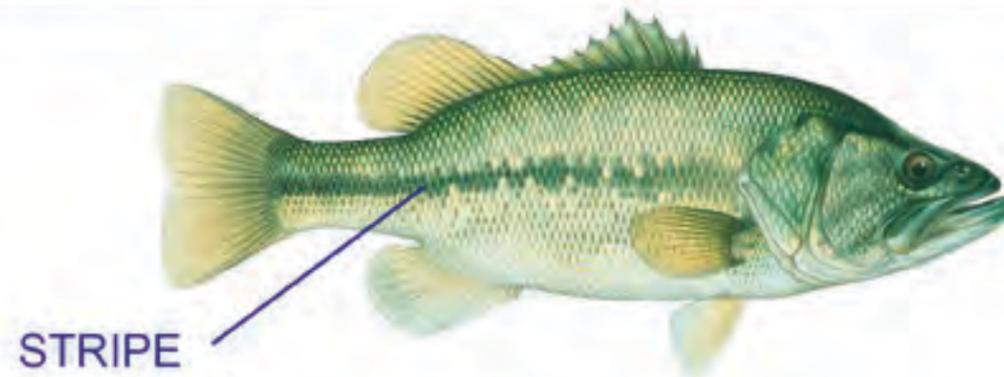


GILL (OPERCLE)



SCALES

## LARGEMOUTH BASS - ANATOMY



EYE



GOOD FIRST DORSAL FIN



TAIL FLIPPING UPWARD

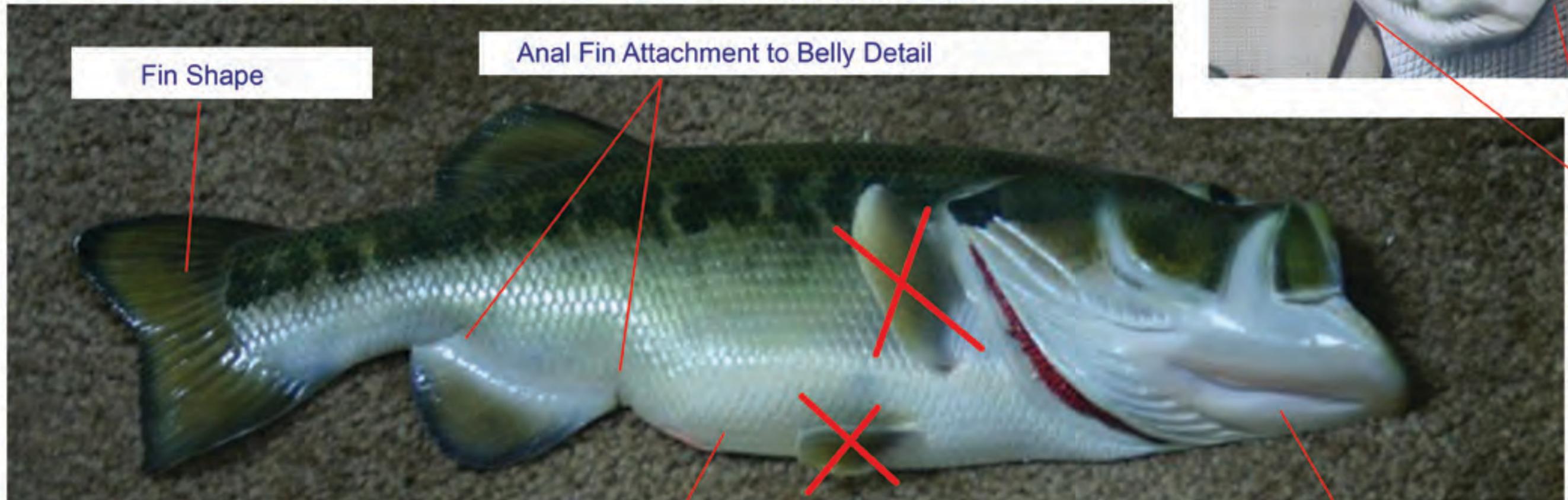
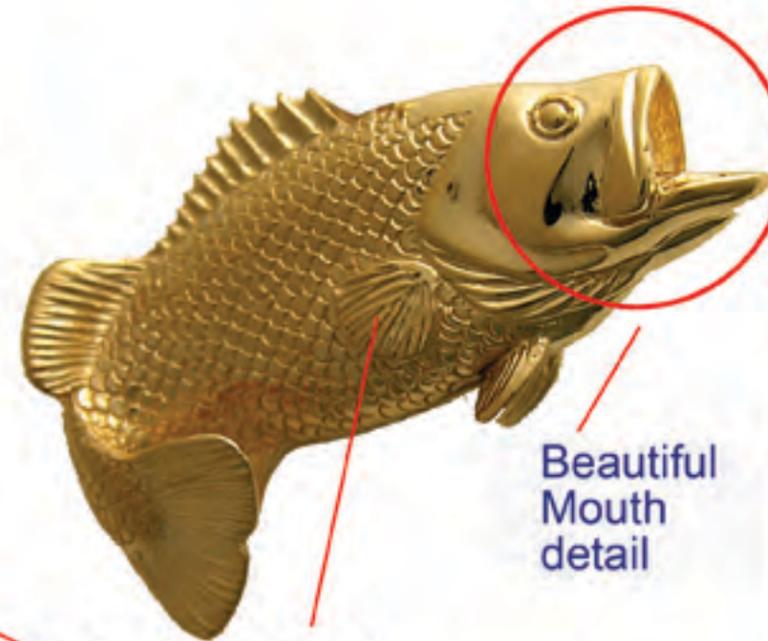


TAIL FLIPPING UPWARD

## GRAPHICS RESEARCH FOR LARGEST BASS

NOTE: PRESERVED FISH CAN LOOK LIFELESS ESPECIALLY THE GILLS  
FINAL SCULPTURE NEEDS TO LOOK MORE ALIVE

# SCULPTURED LARGEMOUTH BASS EXAMPLES



Good Detail Under Mouth

Beautiful Mouth detail

Pectoral Fin detail

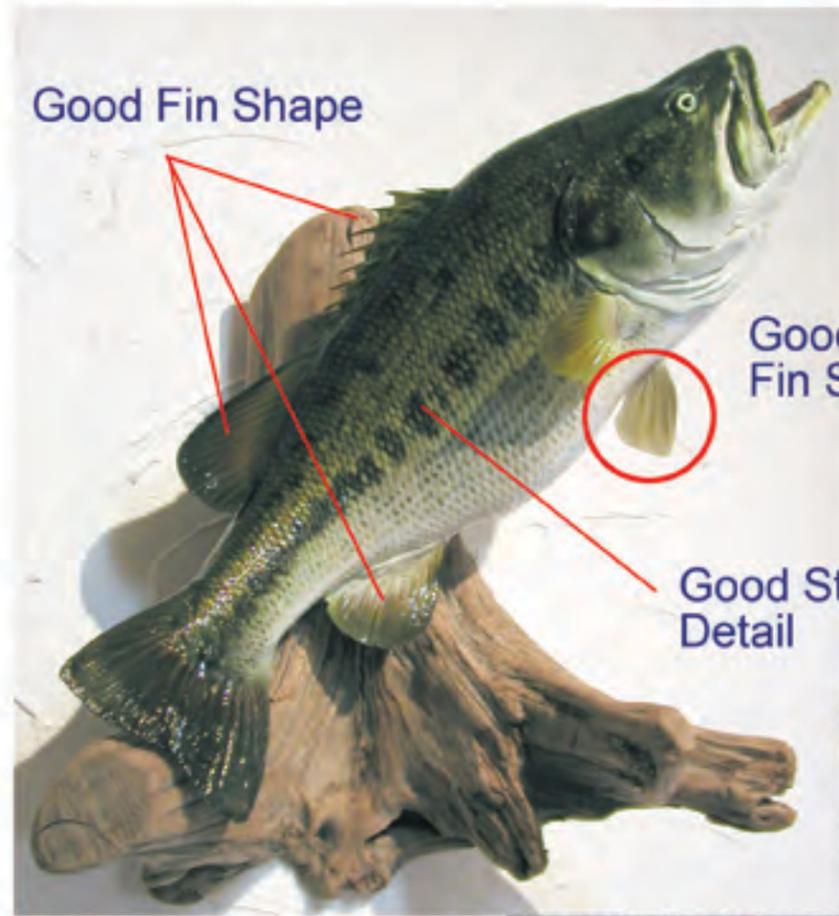
Fin Shape

Anal Fin Attachment to Belly Detail

Nice Depth

Round the Belly From Flat Plane

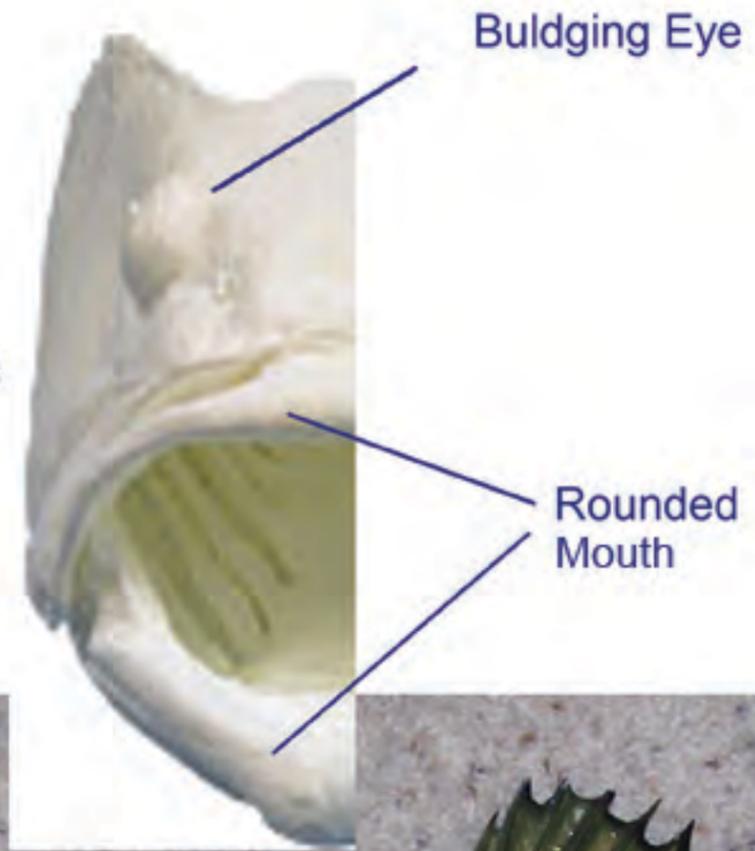
Underside of Mouth Detail



Good Fin Shape

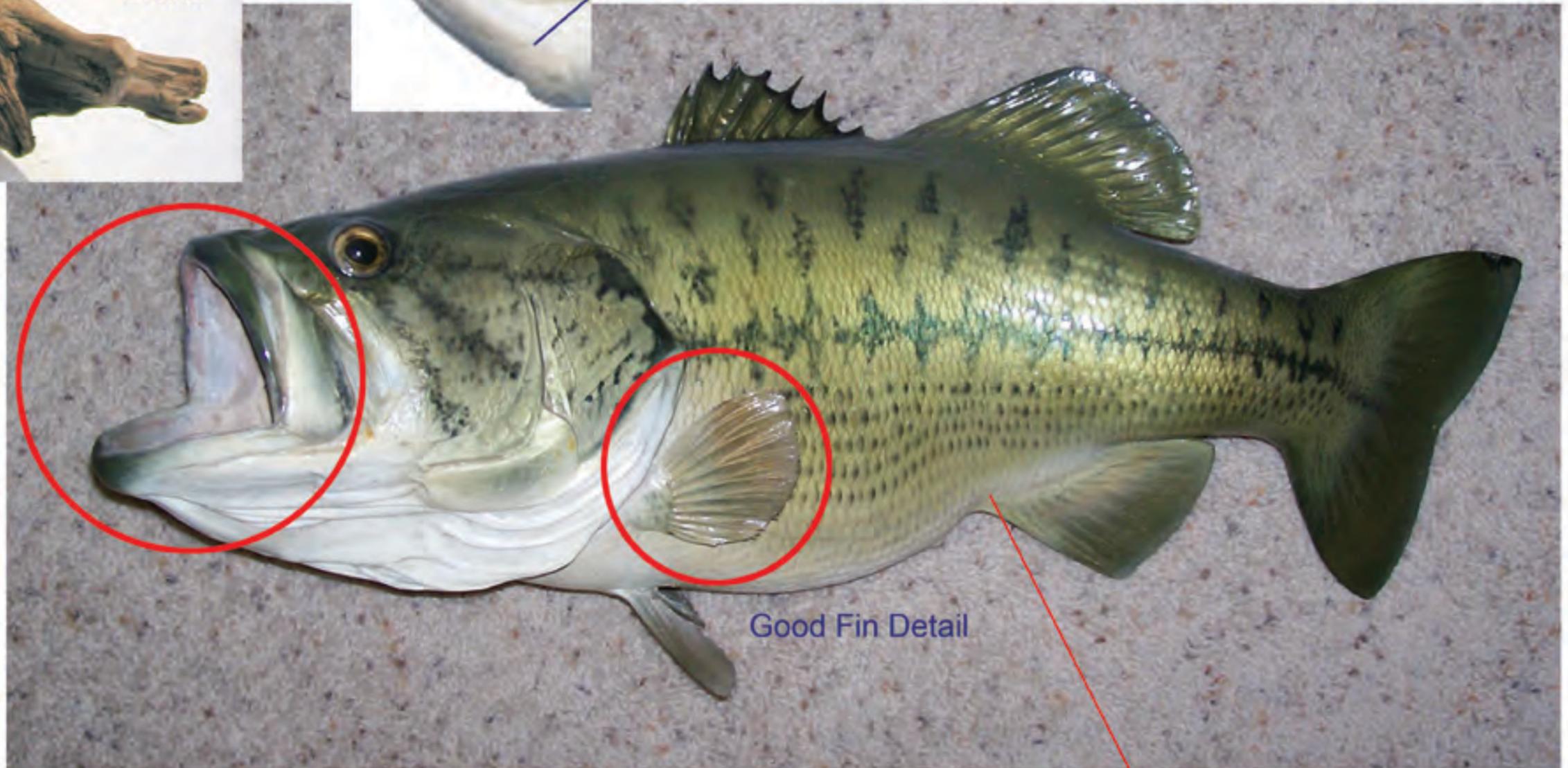
Good Pelvic Fin Shape

Good Stripe Detail



Bulging Eye

Rounded Mouth



Mouth Has Good Attitude

Good Fin Detail

Note Detail



GOOD DISPLAY OF ANATOMICAL FEATURES

LIVE CAUGHT BASS

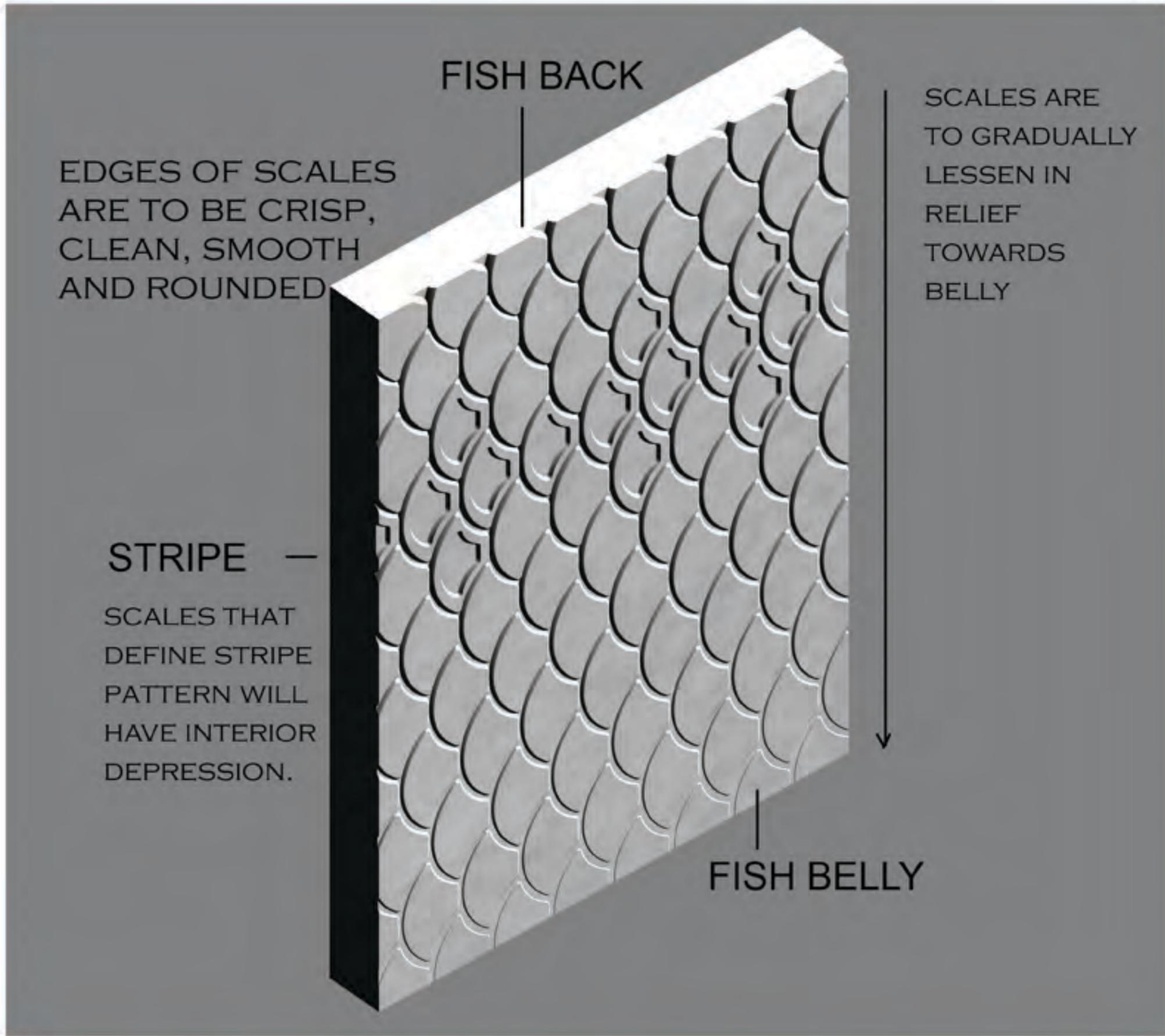


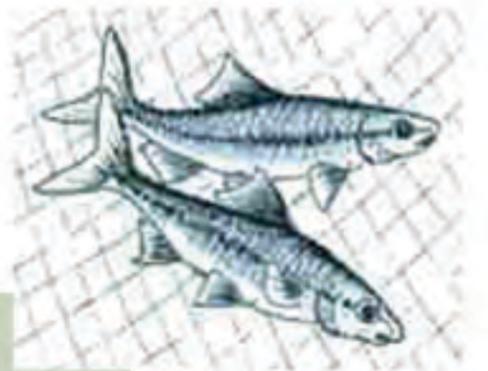
PECTORAL AND PELVIC FIN



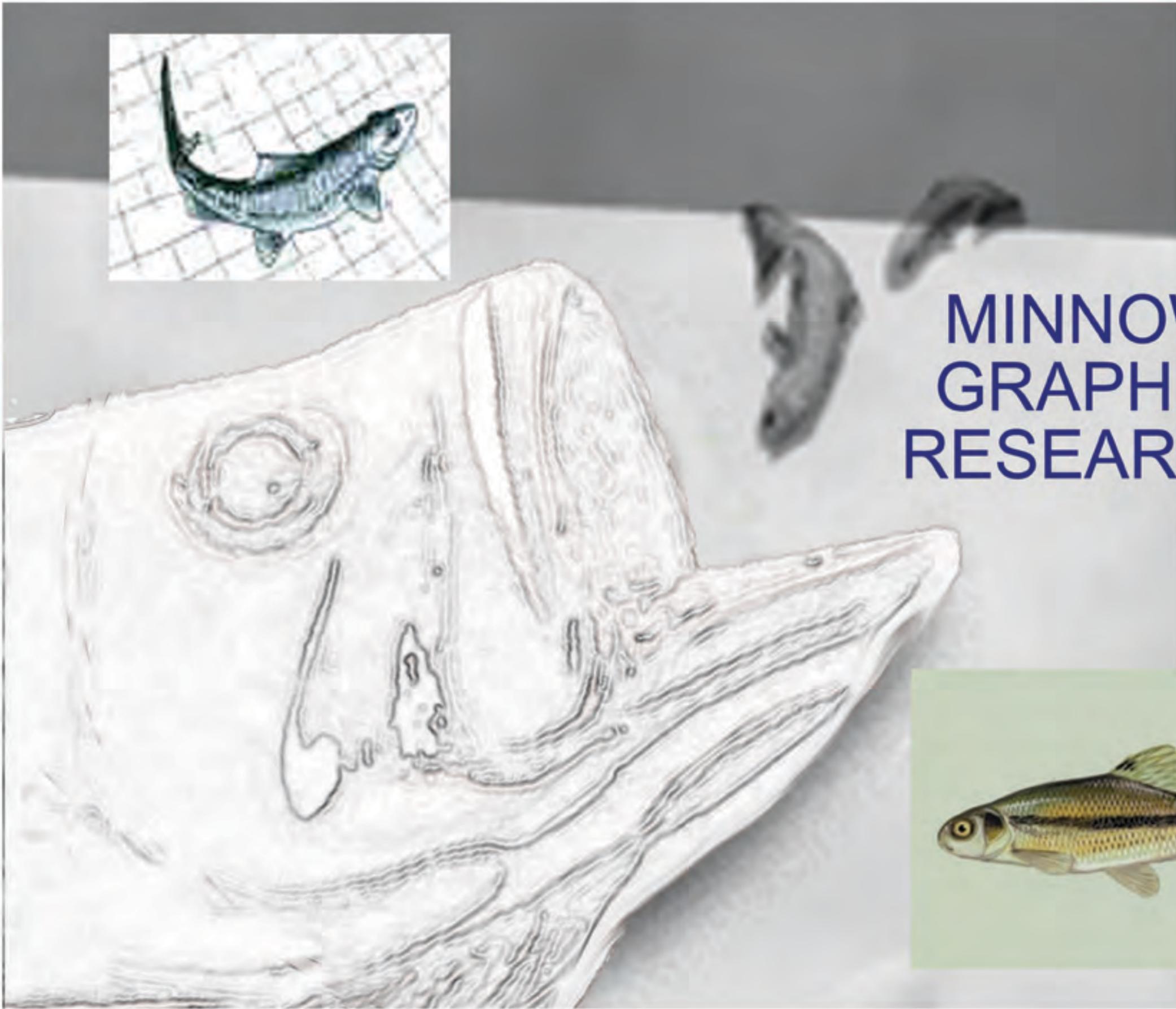
# LARGEMOUTH BASS MOTIF - ARTIST CONCEPTUAL





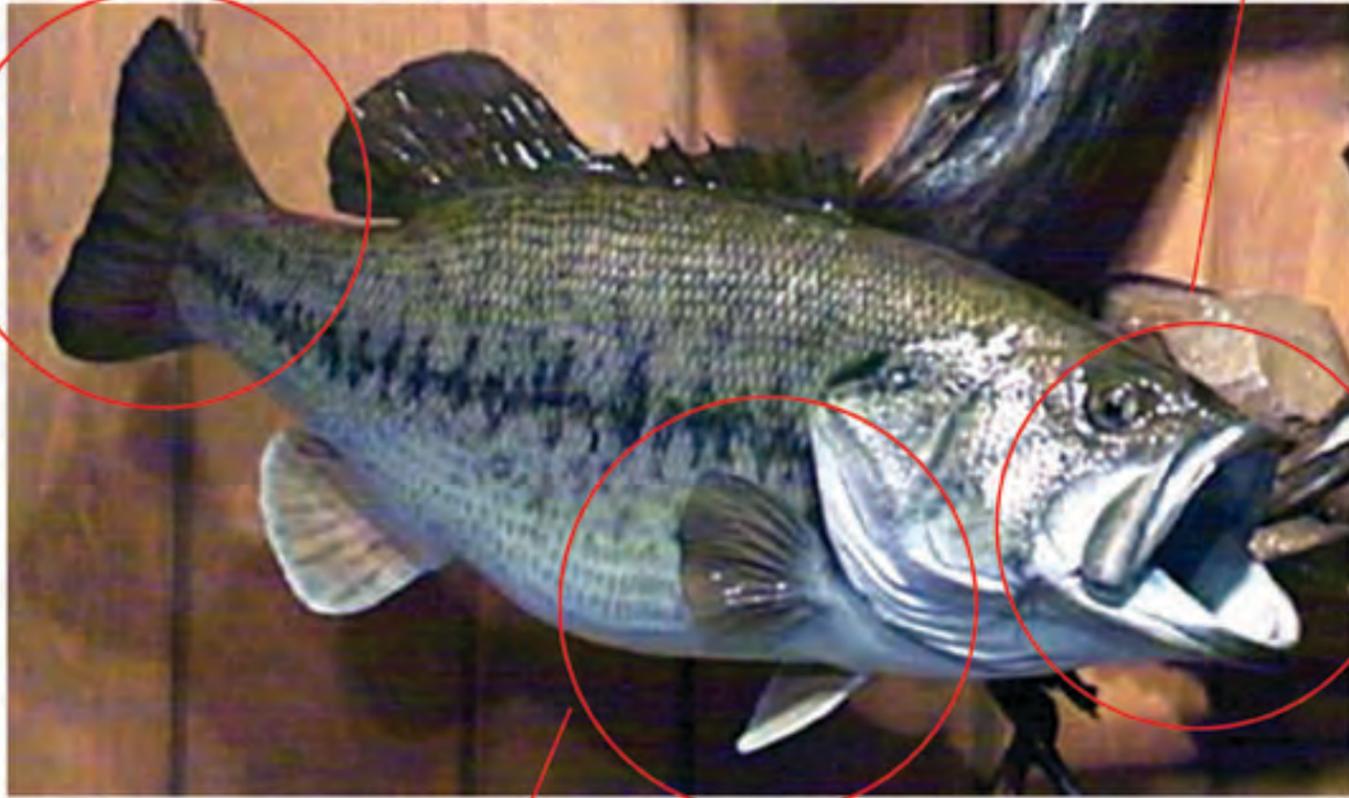


# MINNOW GRAPHIC RESEARCH



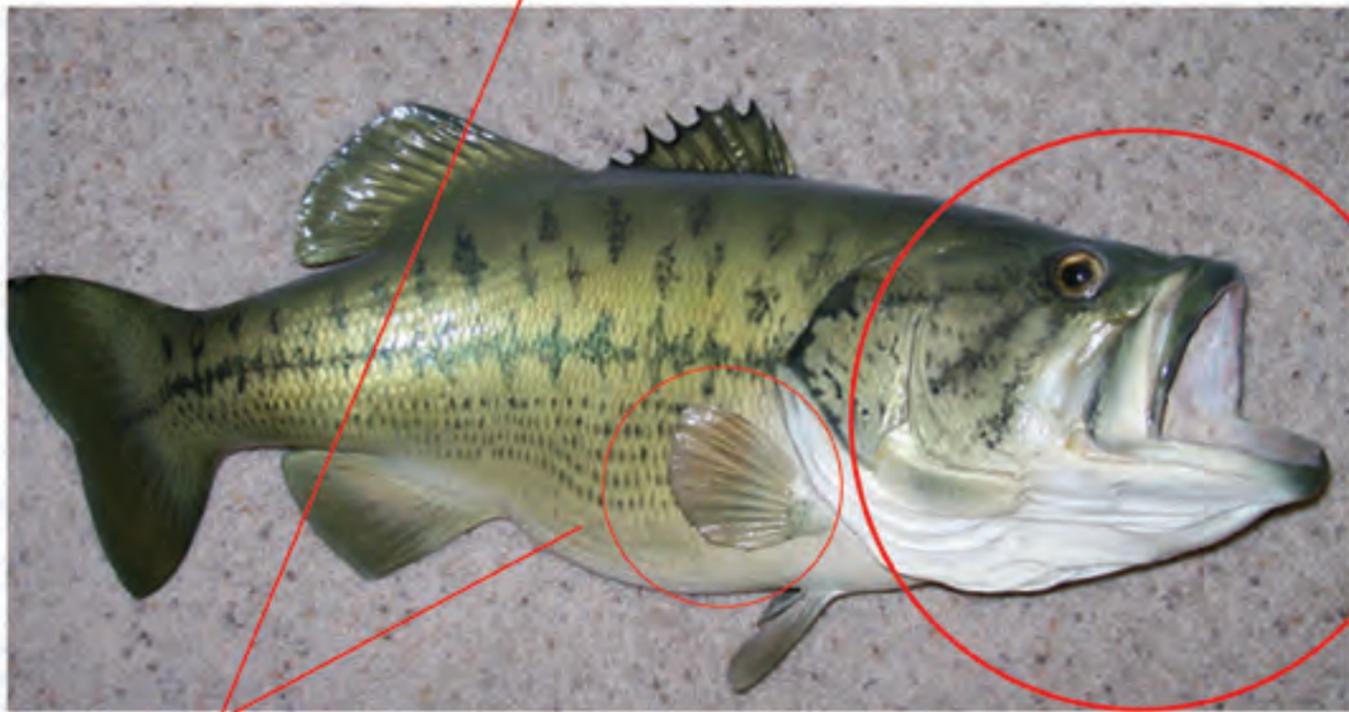
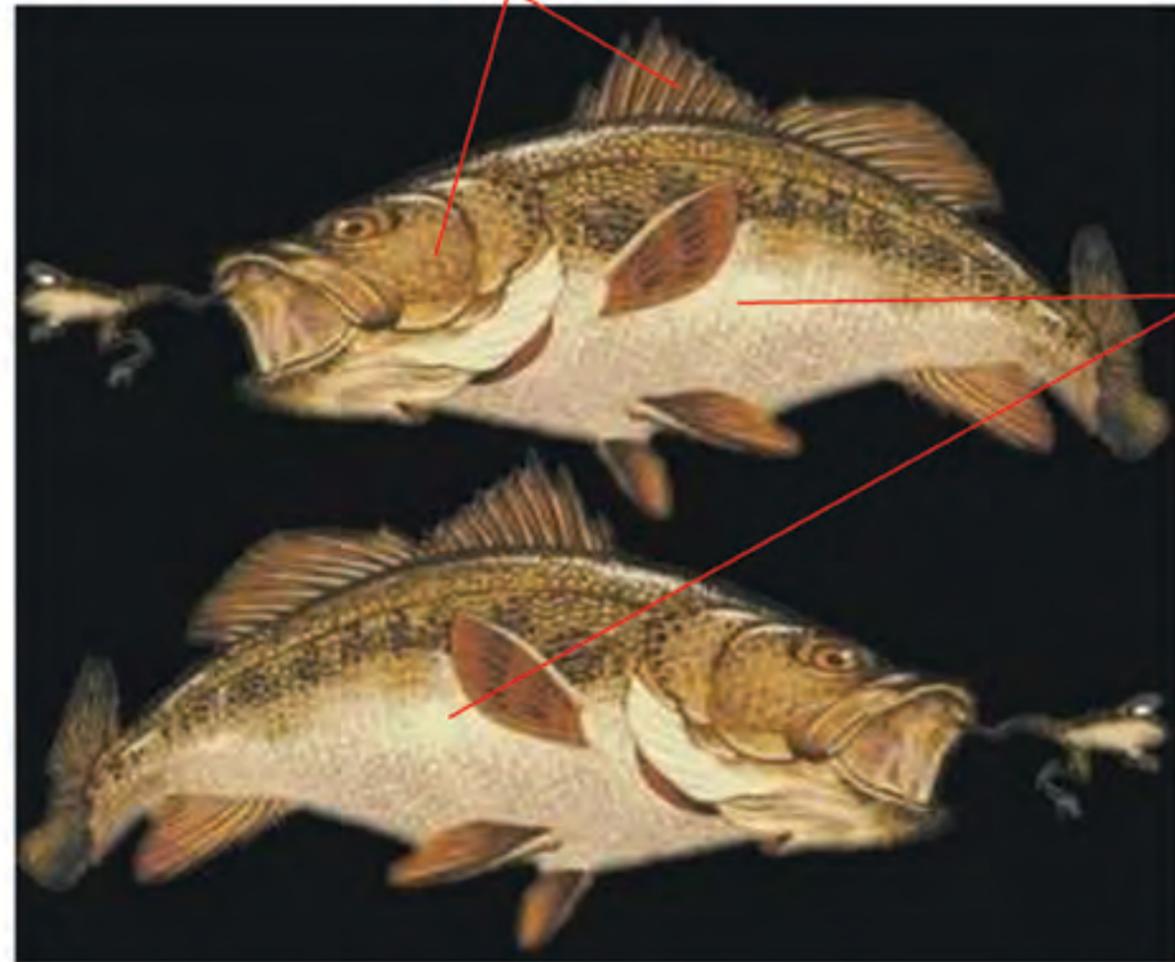
Tail Flipping Upward

Open Mouth



Good Detail

Good Dynamic Action



Pectoral fin Against Belly

Open Mouth

Round Back Out From Flat Plane & From Fin

Good 3D Fin Detail



# Optional Disposal Sites

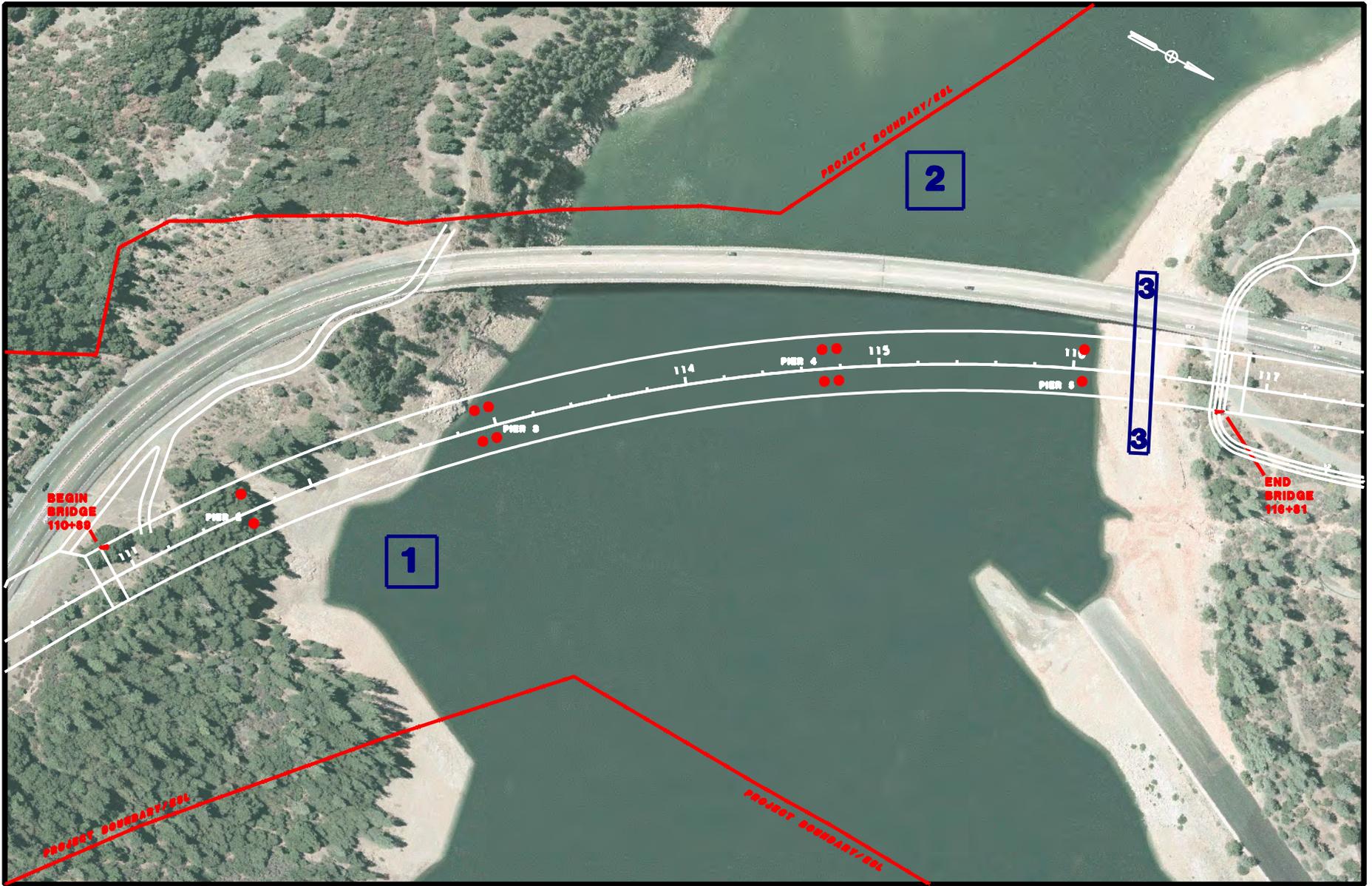
## Drill Tailings (Rocky Material)

### Location of Disposal Sites (As shown on sheet 2 of 2):

1. Site 1 – Shall be no larger than 0.068 hectares (0.17 acres). Location is approximately 26 meters x 26 meters (86 feet x 86 feet) with rock stacked to a maximum height of 1.1 meters (3.5 feet high).
2. Site 2 – Shall be no larger than 0.085 hectares (0.21 acres). Location is approximately 29 meters x 29 meters (95 feet x 95 feet) with rock stacked to a maximum height of 1.1 meters (3.5 feet high).
3. Site 3 – Shall be no larger than 0.085 hectares (0.21 acres). Location is approximately 3 meters x 279 meters (30 feet x 914 feet) with rock stacked to a maximum height of 1.1 meters (3.5 feet high).

### Limitation of Disposal Site Usage:

- Disposal of any material shall conform to the limitations set forth in the Army Corp of Engineer, 404 Individual Permit. Any information provided in this handout shall be superseded by any information contained in the Army Corp of Engineer, 404 Individual Permit.
- Overburden sands and gravel shall be removed and deposited at an upland location. Remaining rocky material may be deposited at the sites provided.
- A combination of the available disposal sites may be used. The maximum area of Disposal Sites shall not exceed 0.153 hectares (0.38 acres).
- Heights of disposal sites may not exceed 1.1 meters (3.5 feet).
- If lake water levels cover disposal site locations, deposition must be made through a down tube or tremie placed within the confines of the silt confinement area.
- If lake water levels are below the disposal site locations, rocky material may be dumped in the designated disposal site locations.
- Exact locations and dimensions of the disposal site shall be determined by the Engineer.



**Caltrans**  
SUBAPP 43



**ANTLER BRIDGE REPLACEMENT PROJECT**  
**02-378904**

**OPTIONAL DISPOSAL SITE**  
**DRILL TAILINGS (ROCK ONLY)**

EXACT LOCATIONS TO BE DETERMINED BY THE ENGINEER  
SHEET 2 OF 2

Authorization ID: SLK378  
Contact ID: CALTRANS  
Issue Date: 01/28/2009  
Expiration Date: 12/31/2018

FS-2700-4 (03/06)  
OMB 0596-0082  
Use Codes 533, 522, 531

**U.S. DEPARTMENT OF AGRICULTURE**  
**Forest Service**  
**SPECIAL USE PERMIT**  
**AUTHORITY:**  
**ORGANIC ADMINISTRATION ACT June 4, 1897**

State of California, Department of Transportation (hereinafter called the Holder) is hereby authorized to use or occupy National Forest System lands, subject to the conditions set out below, on the Shasta-Trinity National Forest.

This permit covers up to 144 acres, and/or .22 miles and is described as: portions of Sections 13 and 24, T. 35N., R. 5W., M.D.B.M., as shown on the location map attached to and made a part of this permit, and is issued for the purpose of:

Construction of new Antlers Interstate-5 bridge over Shasta Lake, Shasta County, CA;  
Demolition and removal of existing Interstate bridge; re-vegetation and restoration of all construction and staging areas. All work subject to the Environmental Assessment and FONSI dated January 19, 2007, and the Exhibits (A – E) hereby attached or required and made a part of this permit.

The above described or defined area shall be referred to herein as the "permit area."

**TERMS AND CONDITIONS**

**I. AUTHORITY AND GENERAL TERMS OF THE PERMIT**

A. Authority. This permit is issued pursuant to the authorities enumerated at Title 36, Code of Federal Regulations, Section 251 Subpart B, as amended. This permit, and the activities or use authorized, shall be subject to the terms and conditions of the Secretary's regulations and any subsequent amendment to them.

B. Authorized Officer. The authorized officer is the Forest Supervisor or a delegated subordinate officer.

C. License. This permit is a license for the use of federally owned land and does not grant any permanent, possessory interest in real property, nor shall this permit constitute a contract for purposes of the Contract Disputes Act of 1978 (41 U.S.C. 611). Loss of the privileges granted by this permit by revocation, termination, or suspension is not compensable to the holder.

D. Amendment. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to

incorporate new terms, conditions, and stipulations as may be required by law, regulation, land management plans, or other management decisions.

E. Existing Rights. This permit is subject to all valid rights and claims of third parties. The United States is not liable to the holder for the exercise of any such right or claim.

F. Nonexclusive Use and Public Access. Unless expressly provided for in additional terms, use of the permit area is not exclusive. The Forest Service reserves the right to use or allow others to use any part of the permit area, including roads, for any purpose, provided, such use does not materially interfere with the holder's authorized use. A final determination of conflicting uses is reserved to the Forest Service.

G. Forest Service Right of Entry and Inspection. The Forest Service has the right of unrestricted access of the permitted area or facility to ensure compliance with laws, regulations, and ordinances and the terms and conditions of this permit.

H. Assignability. This permit is not assignable or transferable. If the holder through death, voluntary sale or transfer, enforcement of contract, foreclosure, or other valid legal proceeding ceases to be the owner of the improvements, this permit shall terminate.

I. Permit Limitations. Nothing in this permit allows or implies permission to build or maintain any structure or facility, or to conduct any activity unless specifically provided for in this permit. Any use not specifically identified in this permit must be approved by the authorized officer in the form of a new permit or permit amendment.

## II. TENURE AND ISSUANCE OF A NEW PERMIT

A. Expiration at the End of the Authorized Period. This permit will expire at midnight on **December 31, 2018**. Expiration shall occur by operation of law and shall not require notice, any decision document, or any environmental analysis or other documentation.

B. Minimum Use or Occupancy of the Permit Area. Use or occupancy of the permit area shall be exercised at least 1 day each year, unless otherwise authorized in writing under additional terms of this permit.

C. Notification to Authorized Officer. If the holder desires issuance of a new permit after expiration, the holder shall notify the authorized officer in writing not less than six (6) months prior to the expiration date of this permit.

D. Conditions for Issuance of a New Permit. At the expiration or termination of an existing permit, a new permit may be issued to the holder of the previous permit or to a new holder subject to the following conditions:

1. The authorized use is compatible with the land use allocation in the Forest Land and Resource Management Plan.

2. The permit area is being used for the purposes previously authorized.
3. The permit area is being operated and maintained in accordance with the provisions of the permit.
4. The holder has shown previous good faith compliance with the terms and conditions of all prior or other existing permits, and has not engaged in any activity or transaction contrary to Federal contracts, permits laws, or regulations.

E. Discretion of Forest Service. Notwithstanding any provisions of any prior or other permit, the authorized officer may prescribe new terms, conditions, and stipulations when a new permit is issued. The decision whether to issue a new permit to a holder or successor in interest is at the absolute discretion of the Forest Service.

F. Construction. Any construction authorized by this permit may commence by **August 15, 2009** and shall be completed by **December 31, 2018**. If construction is not completed within the prescribed time, this permit may be revoked or suspended.

### III. RESPONSIBILITIES OF THE HOLDER

A. Compliance with Laws, Regulations, and other Legal Requirements. The holder shall comply with all applicable Federal, State, and local laws, regulations, and standards, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*, the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S. C. 9601 *et seq.*, and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, and maintenance of any facility, improvement, or equipment on the property.

B. Plans. Plans for development, layout, construction, reconstruction, or alteration of improvements on the permit area, as well as revisions of such plans, must be prepared by a qualified individual acceptable to the authorized officer and shall be approved in writing prior to commencement of work. The holder may be required to furnish as-built plans, maps, or surveys, or other similar information, upon completion of construction.

C. Maintenance. The holder shall maintain the improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this authorization. If requested, the holder shall comply with inspection requirements deemed appropriate by the authorized officer.

D. Hazard Analysis. The holder has a continuing responsibility to identify all hazardous conditions on the permit area which would affect the improvements, resources, or pose a risk of injury to individuals. Any non-emergency actions to abate such hazards shall be performed after consultation with the authorized officer. In emergency situations, the holder shall notify the authorized officer of its actions as soon as possible, but not more than 48 hours, after such actions have been taken.

E. Change of Address. The holder shall immediately notify the authorized officer of a change in address.

F. Change in Ownership. This permit is not assignable and terminates upon change of ownership of the improvements or control of the business entity. The holder shall immediately notify the authorized officer when a change in ownership or control of business entity is pending. Notification by the present holder and potential owner shall be executed using Form SF-299 Application for Transportation and Utility Systems and Facilities of Federal Lands, or Form FS-2700-3a, Holder Initiated Revocation of Existing Authorization, Request for a Special Use Permit. Upon receipt of the proper documentation, the authorized officer may issue a permit to the party who acquires ownership of, or a controlling interest in, the improvements or business entity.

#### **IV. LIABILITY**

For purposes of this section, "holder" includes the holder's heirs, assigns, agents, employees, and contractors.

A. The holder assumes all risk of loss to the authorized improvements.

B. The holder shall indemnify, defend, and hold the United States harmless for any violations incurred under any such laws and regulations or for judgments, claims, or demands assessed against the United States in connection with the holder's use or occupancy of the property. The holder's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property in connection with the occupancy or use of the property during the term of this permit. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. This paragraph shall survive the termination or revocation of this authorization, regardless of cause.

C. The holder has an affirmative duty to protect from damage the land, property, and interests of the United States.

The holder shall maintain \$2,000,000 worth of insurance coverage, naming the United States additionally insured on the policy(ies), to partially fund the indemnification obligations of the holder for any and all losses due to personal injury, loss of life, or property damage, including fire suppression and hazardous waste costs. The holder shall furnish proof of insurance (such as a surety bond, or certificate of insurance) to the authorized officer prior to execution of this permit and verify annually, and in writing, the insurance obligation to the authorized officer. The authorized officer may allow the holder to replace, repair, restore, or otherwise undertake necessary curative actions, to the satisfaction of the authorized officer, in order to mitigate damages in addition to or as an alternative to monetary indemnification.

D. In the event of any breach of the conditions of this authorization by the holder, the authorized officer may, on reasonable notice, cure the breach for the account at the expense of the holder. If

the Forest Service at any time pays any sum of money or does any act which will require payment of money, or incurs any expense, including reasonable attorney's fees, in instituting, prosecuting, and/or defending any action or proceeding to enforce the United States rights hereunder, the sum or sums so paid by the United States, with all interests, costs and damages shall, at the election of the Forest Service, be deemed to be additional fees hereunder and shall be due from the holder to the Forest Service on the first day of the month following such election.

E. With respect to roads, the holder shall be proportionally liable for damages to all roads and trails of the United States open to public use caused by the holder's use to the same extent as provided above, except that liability shall not include reasonable and ordinary wear and tear.

F. The Forest Service has no duty to inspect the permit area or to warn of hazards and, if the Forest Service does inspect the permit area, it shall incur no additional duty nor liability for identified or non-identified hazards. This covenant may be enforced by the United States in a court of competent jurisdiction.

## V. TERMINATION, REVOCATION, AND SUSPENSION

A. General. For purposes of this permit, "termination", "revocation", and "suspension" refer to the cessation of uses and privileges under the permit.

"Termination" refers to the cessation of the permit under its own terms without the necessity for any decision or action by the authorized officer. Termination occurs automatically when, by the terms of the permit, a fixed or agreed upon condition, event, or time occurs. For example, the permit terminates at expiration. Terminations are not appealable.

"Revocation" refers to an action by the authorized officer to end the permit because of noncompliance with any of the prescribed terms, or for reasons in the public interest. Revocations are appealable.

"Suspension" refers to a revocation which is temporary and the privileges may be restored upon the occurrence of prescribed actions or conditions. Suspensions are appealable.

B. Revocation or Suspension. The Forest Service may suspend or revoke this permit in whole or part for:

1. Noncompliance with Federal, State, or local laws and regulations.
2. Noncompliance with the terms and conditions of this permit.
3. Reasons in the public interest.
4. Abandonment or other failure of the holder to otherwise exercise the privileges granted.

C. Opportunity to Take Corrective Action. Prior to revocation or suspension for cause pursuant to Section V (B), the authorized officer shall give the holder written notice of the grounds for each action and a reasonable time, not to exceed 90 days, to complete the corrective action prescribed by the authorized officer.

D. Removal of Improvements. Prior to abandonment of the improvements or within a reasonable time following revocation or termination of this authorization, the holder shall prepare, for approval by the authorized officer, an abandonment plan for the permit area. The abandonment plan shall address removal of improvements and restoration of the permit area and prescribed time frames for these actions. If the holder fails to remove the improvements or restore the site within the prescribed time period, they become the property of the United States and may be sold, destroyed or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all cost associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site.

## VI. FEES

A. Termination for Nonpayment. This permit shall automatically terminate without the necessity of prior notice when fees are 90 calendar days from the due date in arrears.

B. Land Use Fees for this use have been exempted or waived in full pursuant to 36 CFR 251.57, or revisions thereto, and direction in FSH 2709.11, chapter 30.

## VII. OTHER PROVISIONS

A. Members of Congress. No Member of or Delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except when the authorized use provides a general benefit to a corporation.

B. Appeals and Remedies. Any discretionary decisions or determinations by the authorized officer are subject to the appeal regulations at 36 CFR 251, Subpart C, or revisions thereto.

C. Superior Clauses. In the event of any conflict between any of the preceding printed clauses or any provision thereof and any of the following clauses or any provision thereof, the preceding printed clauses shall control.

D. Site Development Schedule (Exhibit C). The holder shall prepare by July 1, 2009 a schedule for the progressive development and installation of facilities on the permitted site. This schedule shall be made a part of this authorization. The holder may accelerate the scheduled date for installation of any improvement authorized, provided the other scheduled priorities are met and that all priority installations authorized are completed to the satisfaction of the Forest Service and ready for public use prior to the scheduled due date.

All required plans and specifications for site improvements, and structures included in the development schedule shall be properly certified and submitted to the Forest Service at least forty-five (45) days before the construction date stipulated in the development schedule.

E. Cooperative Work. All or parts of the work described in the Re-vegetation and Restoration Plan and mitigations for bald eagle and fisheries habitat, for which the holder is responsible may, upon written request by the holder and approval by the authorized officer, be performed by the Forest Service on a basis of cooperation under authority of section 5, Act of April 24, 1950, 64 Stat. 82, 16 U.S.C. 572. The holder agrees to make advance deposits into a cooperative work fund at such times and in such amounts as requested by the Forest Service, the total deposits to be sufficient to cover the cost of the work including necessary overhead charges. Any excess of deposits over the cost of work will be refunded.

F. Explosives

1. ~~Only exploding bridgewire (EBWs) shall be used for blasting except for hand charging of snow release zones.~~

2. In the use of explosives, the holder shall exercise the utmost care not to endanger life or property and shall comply with the requirements of the Forest Service. The holder shall be responsible for any and all damages resulting from the use of explosives and shall adopt precautions that will prevent damage to surrounding objects. The holder shall furnish and erect special signs to warn the public of blasting operations. Such signs shall be placed and maintained so as to be clearly evident to the public during all critical periods of the blasting operations, and shall include a warning statement to have radio transmitters turned off.

3. All storage places for explosives shall be marked "DANGEROUS EXPLOSIVES." The method of storing and handling explosives shall conform to procedures contained in the "Blasters Guide EM-7100-14," and Title 27, Code of Federal Regulations, parts 1 to 199, Alcohol, Tobacco Products, and Firearms (Bureau of Alcohol, Tobacco and Firearms (BATF)).

4. When using explosives, the holder shall adopt precautions which will prevent damage to landscape features and other surrounding objects. When directed by the Forest officer in charge, trees within an area designated to be cleared shall be left as a protective screen for surrounding vegetation during blasting operations. Trees so left shall be removed and disposed of after blasting has been completed. When necessary, and at any point of special danger, the holder shall use suitable mats or some other approved method to smother blasts.

G. Surveys, Land Corners. The holder shall protect, in place, all public land survey monuments, private property corners, and Forest boundary markers. In the event that any such land markers or monuments are destroyed in the exercise of the privileges permitted by this authorization, depending on the type of monument destroyed, the holder shall see that they are reestablished or referenced in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service.

Further, the holder shall cause such official survey records as are affected to be amended as provided by law. Nothing in this clause shall relieve the holder's liability for the willful destruction or modification of any Government survey marker as provided at 18 U.S.C. 1858.

H. Removal and Planting of Vegetation and Other Resources. The holder shall obtain prior written approval from the authorized officer before removing or altering vegetation or other resources. The holder shall obtain prior written approval from the authorized officer before planting trees, shrubs, or other vegetation within the authorized area.

I. Re-vegetation of Ground Cover and Surface Restoration. The holder shall be responsible for prevention and control of soil erosion and gulying on lands covered by this authorization and adjacent thereto, resulting from construction, operation, maintenance, and termination of the authorized use. The holder shall so construct permitted improvements to avoid the accumulation of excessive heads of water and to avoid encroachment on streams. The holder shall re-vegetate or otherwise stabilize all ground where the soil has been exposed as a result of the holder's construction, maintenance, operation, or termination of the authorized use and shall construct and maintain necessary preventive measures to supplement the vegetation.

J. Timber Payment. All National Forest timber cut or destroyed in the construction of the permitted improvements shall be paid for at current stumpage rates for similar timber in the National Forest. Young-growth timber below merchantable size will be paid for at current damage-appraisal value; and all slash and debris resulting from the cutting or destruction of such timber shall be disposed of as necessary or as the Forest Service may direct.

K. Pesticide Use. Pesticides may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash fish, etc., without the prior written approval of the Forest Service. A request for approval of planned uses of pesticides will be submitted annually by the holder on the due date established by the authorized officer. The report will cover a 12-month period of planned use beginning 3 months after the reporting date. Information essential for review will be provided in the form specified. Exceptions to this schedule may be allowed, subject to emergency request and approval, only when unexpected outbreaks of pests require control measures which were not anticipated at the time an annual report was submitted. Only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned will be considered for use on National Forest System lands. Label instructions will be strictly followed in the application of pesticides and disposal of excess materials and containers.

L. Water Rights. This authorization does not convey any legal interest in water rights as defined by applicable State law.

M. Authorization Termination of Withdrawn Land. Any lands described in this authorization which have been withdrawn for waterpower purposes under the Act of March 3, 1879, or Act of June 25, 1910 (or are embraced in an application or license under the Federal Power Act of June 10, 1920), or have been withdrawn under the Reclamation Act of June 17, 1902, are subject at any time to use in connection with the development of hydropower or for reclamation purposes. This authorization, therefore, is issued with the specific understanding that (1) its use shall not interfere with such hydropower or reclamation development and that (2) the authorization may be, if necessary, terminated upon ninety (90) days notice when in the judgment of the Federal Energy Regulatory Commission, or of the Bureau of Reclamation in the event of reclamation withdrawals, the lands occupied are needed for use in connection with the generation of hydroelectric power, reclamation developments, or other purposes contemplated by the act or

acts under which the lands have been withdrawn. No claim shall be made against the United States or power licensees for or on account of prospective profits or for any injury or damage to properties, improvements, or operations due to such development. The holder will be allowed ninety (90) days in which to remove the improvements.

N. Fire-Control Plan (Exhibit D). The holder shall prepare a fire plan for approval by the authorized officer which shall set forth in detail the plan for prevention, reporting, control, and extinguishing of fires on the authorized areas and within the holder's area of responsibility defined on an attached map. Such plans shall be reviewed and revised at intervals of not more than three (3) years.

O. Protection of Habitat of Endangered, Threatened, and Sensitive Species. Location of areas needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act of 1973, as amended, or as sensitive by the Regional Forester under authority of FSM 2670, derived from ESA Section 7 consultation, may be shown on a separate map, hereby made a part of this authorization, or identified on the ground. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the authorization holder.

If protection measures prove inadequate, if other such areas are discovered, or if new species are listed as Federally threatened or endangered or as sensitive by the Regional Forester, the authorized officer may specify additional protection regardless of when such facts become known. Discovery of such areas by either party shall be promptly reported to the other party.

P. Archaeological-Paleontological Discoveries. The holder shall immediately notify the authorized officer of any and all antiquities or other objects of historic or scientific interest. These include, but are not limited to, historic or prehistoric ruins, fossils, or artifacts discovered as the result of operations under this authorization, and shall leave such discoveries intact until authorized to proceed by the authorized officer. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the holder.

Q. Signs. Signs or advertising devices erected on National Forest System lands shall have prior approval by the Forest Service as to location, design, size, color, and message. Erected signs shall be maintained or renewed as necessary to neat and presentable standards, as determined by the Forest Service.

R. Performance by Holder, Successors, or Assigns. Notwithstanding the expiration or any renewal of this authorization or its earlier relinquishment, abandonment, or other termination, the provisions of this authorization, to the extent applicable, shall continue in effect and shall be binding on the holder, successors, or assigns, until they have fully performed their respective obligations and liabilities accruing before or on account of the expiration, or prior termination, of the authorization.

S. Performance by Other Than Holder. The acquisition or assumption by another party under an agreement with the holder of any right or obligation of the holder under this authorization shall be ineffective as to the Forest Service unless and until approved by the authorized Forest officer. A subsequent acquisition or assumption shall not:

1. Operate to relieve the holder of the responsibilities or liabilities they have assumed hereunder, or

2. Be given unless such other party (1) is acceptable to the Forest Service as a holder, and assumes in writing all of the obligations to the Forest Service under the terms of this authorization as to the incomplete portion thereof, or (2) acquires the rights in trust as security and subject to such conditions as may be necessary for the protection of the public interests.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082. The time required to complete this information collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

This permit is accepted subject to the conditions set out above.

HOLDER NAME: CALIFORNIA, STATE OF

U.S. DEPARTMENT OF AGRICULTURE  
Forest Service

By: Lisa Harvey  
for WALTER E. BIRD

By: J. Sharon Heywood  
J. SHARON HEYWOOD

Title: Supervising Right of Way Agent

Title: Forest Supervisor

Date: Jan 30, 2009

Date: 28 Jan 09

### **Supporting Documents Required in Special Use Permit**

Mitigations Plan – attached to and made a part of the permit

Site Development Schedule is Appendix C to be developed by the Holder before July 1, 2009 and approved by the Authorized Officer prior to clearing of Staging or Construction Areas.

Fire Control Plan is Exhibit D to be developed by the Holder and approved by the Authorized Officer prior to clearing of Staging or Construction Areas.

### **Other Supporting Documents**

Forest Service Timber Sale Contract with Erosion Control specifications

Storm Water Pollution Prevention Plan (SWPPP) (EPA)

Stream/Lakebed Alteration Agreement (1602) from California Department of Fish and Game  
Section 404 Permit from the Army Corps of Engineers

Water Quality Certification (Section 401) permit and De-watering permit from the Regional Water Quality Control Board, Central Valley Region.

Spill Prevention Control and Countermeasure Plan (EPA)

Bridge Removal Plan (Caltrans)

Soil Management Plan (Caltrans)

Re-vegetation and Restoration Plan (USFS)

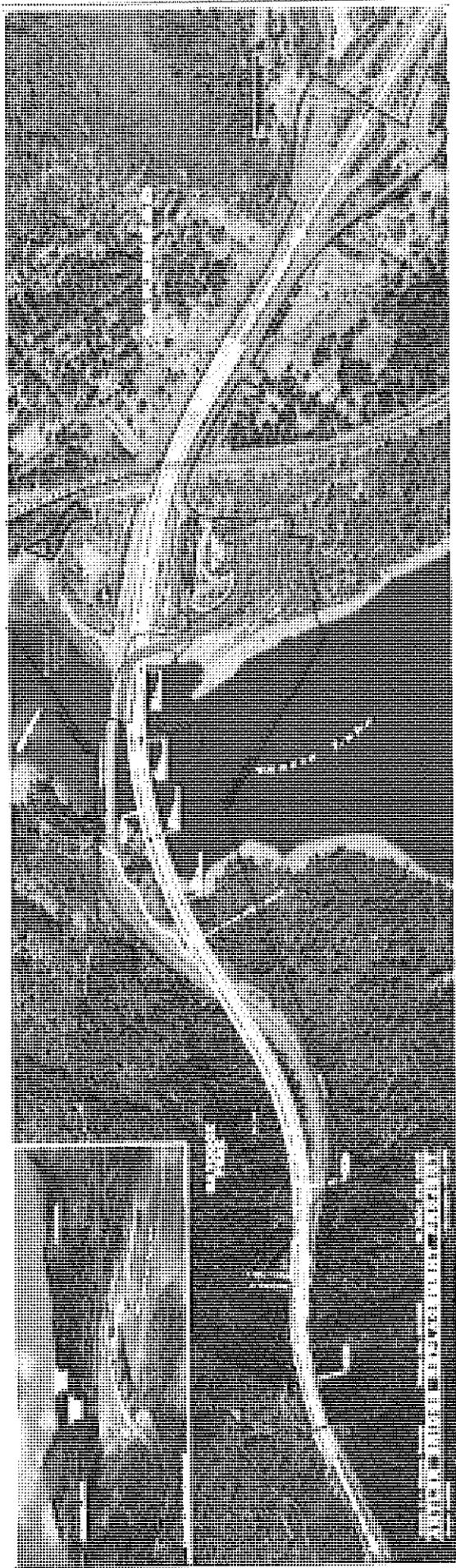
### **Other Supporting Documents**

**Caltrans 1999 Standard Specifications and Project Special Provisions**

**EXHIBIT A**

Maps Exhibits A1 – A4

EXHIBITS A1 - A4  
ANTLERS BRIDGE REPLACEMENT  
MONITORING AREA









**EXHIBIT B**

Mitigations and Requirements

## **EXHIBIT B**

### **Mitigations and Requirements**

These mitigations are in addition to the requirements of the following permits and Plans:

- Stream/Lakebed Alteration Agreement (1602) from California Department of Fish and Game
- Section 404 Permit from the Army Corps of Engineers
- Water Quality Certification (Section 401) permit and De-watering permit from the Regional Water Quality Control Board, Central Valley Region.
- Storm Water Pollution Prevention Plan (SWPPP) (EPA)
- Spill Prevention Control and Countermeasure Plan (EPA)
- Fire Control Plan (USFS)
- Site Development Schedule (USFS)
- Bridge Removal Plan (Caltrans)
- Soil Management Plan (Caltrans)
- Re-vegetation and Restoration Plan (USFS)

#### **Environmentally Sensitive Areas (ESA)**

An environmentally sensitive area (ESA) shall consist of an area within and near the limits of construction where access is prohibited or limited for the preservation of archeological site or existing vegetation, or protection of biological habitat as shown on the plans. Holder will determine the exact location of the boundaries of the ESA. No work shall be conducted within the ESA. Prior to beginning work, the boundaries of the ESA shall be clearly delineated by the placement of temporary fence (Type ESA).

Vehicle access, storage or transport of materials or equipment, or other project related activities are prohibited within the boundaries of ESA. Holder will ensure that any damage or impacts caused to the ESA are mitigated as determined by the Authorized Officer.

Prior to movement of equipment or materials onto the permit area, holder will conduct a pre-work meeting with the Forest Service and selected contractors representative to discuss all mitigations and permit requirements.

#### **Air Quality:**

Holder will require an operating permit from the California Air Resources Board (CARB). Holder is responsible for CEQA studies pertaining to air quality, noise levels, and other environmental factors related to the batch plant.

The Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) and the CARB rules require notification to the

CARB in writing prior to demolition or renovation of the existing bridge. Holder will implement mitigation measures required by the EPA and CARB. In addition, water will be used to suppress dust during construction activities and pavement will be swept and wet down as necessary to prevent tracking.

### **Cultural/Archaeological:**

To protect cultural resource CA-SHA-676, the limits of the resource will be designated as an ESA. An ESA action plan has been developed, which prescribes protection measures. No work will be permitted within the ESA. During high water, buoys will be placed at strategic locations to delineate the ESA. If the lake level recedes and the site becomes exposed, temporary ESA fencing will be installed around the site boundary. In addition, routine monitoring by the Holder's archaeological staff will be conducted and any damage or vandalism will be reported to the Authorized Officer.

### **Fire Prevention**

All operations shall be subject to inspection to ensure adequate fire prevention precautions are being met.

### **General Precautions:**

- When the Shasta-Trinity National Forest goes into Fire Restrictions, smoking shall be restricted to within vehicles or a 50'X 50' sized area that has been cleared of all flammable vegetation subject to inspection by fire personnel.
- All internal combustion engines shall have operational USFS-approved spark arrestors.
- A minimum of one 10-pound ABC rated fire extinguisher, one shovel, and one axe shall be readily available on all mechanical equipment.
- When portable power tools are used, a shovel and approved fire extinguisher shall be available on site.
- All debris (including slash) shall be removed from National Forest System lands.

### **Blasting**

The holder shall obtain a one-year permit from the Shasta-Trinity NRA for blasting operations. Additional permits will be issued as needed. Fire prevention precautions shall include but not be limited to:

- one round tipped shovel

- a minimum 25-foot radius from the blasting site cleared of vegetation (except for trees more than 10-feet tall.)

A fire watch shall be in place for a minimum of one-hour after detonation. Any temporary (less than 2 hours) storage of explosives will require a 100-ft clearance to provide for firefighter safety in the event of a wildfire. Longer term storage of explosives (greater than 2 hours) shall be off of National Forest System lands. All volatile materials are to be kept a distance of not less than 50 feet from explosives.

### Welding, Cutting, Grinding

- The Holder shall obtain a one-year permit from the Shasta-Trinity NRA Management Unit, for welding operations. Additional permits will be issued as needed. Terms and limitations will be included on the permit and are subject to change at any time as fire conditions dictate.
- All flammable vegetation and other fuels shall be removed for a minimum radius of 10-feet from the work area. Fire suppression equipment shall be available within 25-feet from the activity, and shall include a 10-pound ABC rated fire extinguisher and shovel.
- A fire watch shall be on hand during the operation and remain on site for at least one hour after the welding job has been completed.
- Spark arrester requirements are applicable to portable generators supplying power to arc welders and grinders.

### Additional Requirements

While operating on the Shasta-Trinity National Forest, the Holder shall refer to the daily PAL (Project Activity Level) which can be obtained on the Shasta-Trinity National Forest Website (<http://www.fs.fed.us/r5/shastatrinity/conditions/index>.) or by calling 226-2457. Once a PAL level of D, E, or EV is reached then a variance must be obtained from the NRA District Ranger.

For a PAL rating of B, C, D, E, or EV a 500-gallon water truck/trailer with pumping capacity of not less than 200 psi shall be within a 5-minute or less response time to any site in which grinding, blasting, cutting, welding, drilling, or mechanized work will be occurring. Included on the pumping apparatus shall be 500 feet of 1 ½" diameter hose with a minimum of one working 1 1/2" nozzle, one spanner wrench, and a minimum of 5 round-tipped shovels.

### Hazardous Waste:

Holder shall require the preparation of a project specific lead compliance plan in accordance with California Occupational Safety and Health Administration (Cal/OSHA) regulations.

Stockpiles of material containing lead from sand blast residue must be stockpiled separately and shall not be placed where affected by surface run-on or run-off. Stockpiles shall be covered with plastic sheeting 0.33 mm minimum thickness or 0.3 m of non-hazardous material. Stockpiles shall not be placed in environmentally sensitive areas. Stockpiled material shall not enter storm drains, inlets, or waters of the State.

Contaminated soil, concrete waste and/or liquid waste as defined in "Caltrans 1999 Standard Specifications and Project Special Provisions" are not to be discharged or remain on National Forest System lands at the conclusion of the permit.

Washing and drainage:

Holder shall have a current approved Storm Water Pollution Prevention Plan (SWPPP) specific to this project.

The Holder shall prevent erosion or the discharge of pollutants into storm drain systems or watercourses by managing the water used for construction operations. The Holder shall require approval prior to any washing operations on the construction site with water that could discharge into a storm drain system or watercourse. Holder shall require that discharges are reported immediately.

The Holder shall ensure water conservation practices when water is used on the construction site. Irrigation areas shall be inspected and watering schedules shall be adjusted to prevent erosion, excess watering, or runoff. The Holder shall ensure that water is shut off to broken lines, sprinklers, or valves and they shall be repaired as soon as possible. When possible, water from waterline flushing shall be reused for landscape irrigation. Paved areas shall be swept and vacuumed, not washed with water.

Clean construction water runoff, including water from water line repair, shall be directed to areas to infiltrate into the ground and shall not be allowed to enter storm drain systems or watercourses. Spilled water shall not be allowed to escape water truck filling areas. When possible, the Holder shall direct water from off-site sources around the construction site, or shall minimize contact with the construction site.

The Holder shall limit vehicle and equipment cleaning or washing on the construction site to that necessary to control vehicle tracking, noxious/invasive species or hazardous waste. Vehicles and equipment shall not be cleaned on the construction site with soap, solvents, or steam until Holder has been notified. The resulting waste shall be contained and recycled, or disposed of as provided in "Liquid Waste" or "Hazardous Waste" of the "Caltrans 1999 Standard Specifications and Project Special Provisions." The Holder shall not authorize diesel to clean vehicles or equipment, and shall minimize the use of solvents.

The Holder shall require that vehicles and equipment are cleaned or washed in a structure equipped with disposal facilities. If using a structure is not possible, vehicles and

equipment shall be cleaned or washed in an outside area with the following characteristics:

- A. Located at least 15 m from storm drainage systems or watercourses,
- B. Paved with AC, HMA or portland cement concrete,
- C. Surrounded by a containment berm, and
- D. Equipped with a sump to collect and dispose of wash water.

When washing vehicles or equipment with water, the Holder shall require minimum water use. Hoses shall be equipped with a positive shutoff valve. Wash racks shall discharge to a recycle system or to another system approved by Holder. Sumps shall be inspected regularly, and liquids and sediments shall be removed as needed.

The Holder shall not allow demolished material to enter storm water systems or watercourses. The Holder shall require covers and platforms approved by the Holder to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations.

#### Fueling:

The Holder shall ensure that fueling or maintenance on vehicles and equipment is off the construction site whenever practical. When fueling or maintenance must be done at the construction site, the Holder shall approve a site or sites before using. The fueling or maintenance site shall be protected from storm water, shall be on level ground, and shall be located at least 15 meters from drainage inlets or watercourses. Mobile fueling or maintenance shall be kept to a minimum.

The Holder shall require containment berms or dikes around the fueling and maintenance area. Adequate amounts of absorbent spill cleanup material and spill kits shall be kept in the fueling and maintenance area and on fueling trucks. Spill cleanup material and kits shall be disposed of immediately after use. Drip pans or absorbent pads shall be used during fueling or maintenance unless performed over an impermeable surface.

Fueling or maintenance operations shall not be left unattended. Fueling nozzles shall be equipped with an automatic shutoff control. Vapor recovery fueling nozzles shall be used where required by the Air Quality Management District. Nozzles shall be secured upright when not in use. Fuel tanks shall not be topped-off.

Drip pans and absorbent pads shall be placed under vehicles or equipment used over water, and an adequate supply of spill cleanup material shall be kept with the vehicle or equipment. Drip pans or plastic sheeting shall be placed under vehicles or equipment on docks, barges, or other surfaces over water when the vehicle or equipment will be idle for more than one hour.

The Holder shall require watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Material shall be secured to prevent spills or discharge into water due to wind.

## **Wildlife:**

Nesting or attempted nesting by migratory and non-game birds is anticipated to occur but is not limited to January 1<sup>st</sup> through August 15<sup>th</sup>.

Percussive driving of large diameter piles and demolition blasting methods will be confined to the period of August 15 to January 15 each year to avoid impacting nesting, rearing and foraging activities of raptors.

Continuous, routine construction activities at the proposed northwest construction staging area must begin between August 15<sup>th</sup> and December 31<sup>st</sup> of the first year of work in order to acclimate the birds to construction activities prior to nesting.

Removal of trees over 12-inches diameter at breast height (dbh) within the project limits will be implemented during the period of August 15<sup>th</sup> to December 31<sup>st</sup> of the first year of construction to avoid impacting bald eagles and migratory birds and to discourage occupancy within the project area during project implementation. No potential nest or perch trees will be removed for the highway alignment.

Funding will be provided to Shasta-Trinity National Forest wildlife staff to monitor the bald eagle nest at the Gregory Creek Campground during the three-year construction period. Funding will be provided to the Shasta-Trinity National Forest wildlife staff to perform forest stand improvement including fuel reduction around the nest tree within a five-acre radius. Funding will be provided to Shasta-Trinity National Forest wildlife staff to provide a fish cage at the Antlers Resort and Marina site in order to raise and release fish to improve bald eagle foraging opportunities away from the project site.

The Holder shall ensure that drainage holes on existing bridge piers are blocked with 10 min galvanized mesh epoxied to surrounding concrete to prevent bat entrance from November 1<sup>st</sup> to February 28<sup>th</sup> of the year prior to the demolition of the bridge. Holder will install 16 pre-cast concrete bat boxes on the new concrete bridge to provide permanent bat habitat. Monitoring surveys will be conducted for two seasons following construction to determine if bats are utilizing the new structure and if so, the number and species of bats.

If bridge demolition work cannot be scheduled to occur between August 15<sup>th</sup> and March 1<sup>st</sup> when swallows are not nesting, an exclusionary device such as netting will be installed to prevent nest construction on the bridge. Prior to the installation of an exclusionary device, existing, unoccupied nests will be knocked down to discourage the birds from trying to occupy them.

The biologist shall confirm that wildlife species protected by these special provisions have not gained access to the existing bridge prior to demolition.

To minimize animal crossing conflicts on Interstate-5, deer proof fencing will be installed on both sides of Interstate-5 from the south abutment of the new bridge to a point approximately ½ mile south. A bench will be constructed under the south abutment to provide a safe passage across the highway. One-way deer gates will be installed at strategic locations to provide an exit should the deer enter the fenced portion of the highway.

### **Recreation and Public Safety:**

#### **Antlers Ramp:**

The Antlers public boat ramp and campground will remain open during construction. During project work periods, Holder shall maintain water access to the Antlers public boat ramp from full pool down to a lake elevation of 991 feet. No use of these facilities will occur for construction of the proposed project.

The Antlers public boat ramp will not be affected by construction, but movement near the toe of the ramp may be restricted by the Holder due to the proximity of the construction area and to protect specific resources.

Drill tailings from the bridge pile installation may be placed on the lake bed with the following restrictions: 1) Tailings may be placed along the steep side slope uphill of the existing north bridge abutments and a minimum of 200 feet from the ESA surrounding the creek and rock cascade adjacent to Antlers public boat ramp. 2) Tailings may be placed along the steep side slope of the south shore of Shasta Lake outside the ESA for the small drainage under the proposed bridge alignment. 3) Tailings may be placed on the lake bed downstream of the existing bridge alignment in those areas where tailings debris will not create a topographic feature more than two feet above the surrounding lake bed while avoiding the actual river channel.

#### **Lake Surface:**

Boat traffic and recreational activities on the lake in the vicinity of the bridge will be restricted to designated areas and routes to ensure the safety of the public and construction workers. Traffic controls may include the use of speed restrictions, buoys, and signs in addition to the intermittent use of boats to direct and monitor lake traffic. Waterway channel marking shall be placed under all active work zones.

Holder shall ensure that a route will be maintained for boat traffic during construction. The route shall have a minimum horizontal clearance of not less than 36.6 meters measured normal to the direction of flow, and a minimum vertical clearance of not less than 15 meters measured from the normal water elevation. Route requirement applies to

all construction bridges, embankments, falsework, or other temporary work within the limits of the usable channel.

The route and the approach channels shall be marked in conformance with the requirements of the California Administrative Code, Title 14, Division 4, Department of Navigation and Ocean Development, Waterway Marking System, Sacramento, California, US Coast Guard regulations, State boating laws, and Shasta County ordinances.

A protective overhead covering shall be provided as necessary to insure protection from falling objects and drip from overhead structures. The exact location of openings will be determined by the Holder. The route may change as construction and demolition activities progress.

Between September 15<sup>th</sup> and May 15<sup>th</sup> of each year, intermittent, short-term closures of the access roads or lake area may be necessary for certain situations, such as blasting, moving large equipment or materials into place, etc. News releases will be provided immediately prior to and during construction to advise the public of construction activities and restrictions that may affect highway traffic or lake use.

#### Bridge Demolition:

The Holder shall require a complete bridge removal plan detailing procedures, sequences, and all features required to perform the removal in a safe and controlled manner. The Holder shall provide the following information to the Authorized Officer:

- The removal sequence, including staging of removal operations.
- Temporary support shoring or temporary bracing and means of protecting from water craft damage.
- Measures to assure that people, property, utilities, and improvements will not be endangered.
- Details and measures for preventing material, equipment, and debris from falling into water.

Bridge demolition blasting and related traffic control shall be restricted to Tuesday, Wednesday, and Thursday between 5:00 a.m. and 10:00 a.m. Bridge demolition blasting shall not take place during designated legal holidays.

Blasting guards, in sufficient numbers to assure that people, property and improvements will not be endangered, shall be stationed in the area where blasting operations are to be performed.

If a navigable water channel can be provided after the bridge demolition blasting operation, public boat traffic may be stopped and held for a period not to exceed 30 minutes. After each delay, all accumulated traffic for both directions shall pass through

the work before another stoppage is made. If a navigable water channel cannot be provided after the bridge demolition blasting operation, the navigable water channel may be completely closed for one 24-hour period.

**Noise:**

The Holder shall ensure that equipment and operations, with the exception of pile driving, shall not exceed ambient noise levels by more than 5 dBA Lmax along the Shasta-Trinity N.F. Antlers Campground campsites (Position IDs A, B, and C). Table 1 (below) identifies ambient sound levels. The sound level requirement shall apply to all the equipment on the job or related to the job. The Authorized Officer may require sound monitoring to ensure compliance with this requirement. If sound levels are out of compliance, the Holder shall implement measures, where feasible, to achieve compliance.

Restricted timeframes are from 9:00 p.m. to 8:00 a.m. from the Friday before Memorial Day weekend to the Tuesday after Labor Day weekend, and from 9:00 p.m. to 6:00 a.m. for the remainder of the year. The noise level requirement shall apply to equipment on the job or related to the job, including but not limited to trucks, transit mixers, or transient equipment that may or may not be owned by the Contractor.

If explosives are used to demolish bridge piers, a bubble curtain or other energy attenuation device as approved by the engineer shall be used below the water line. In addition, other measures, including but not limited to the following, must be implemented if feasible to further reduce underwater pressure levels: use of blast suppression blankets, borehole stemming, and charge delays.

The Holder shall notify the Authorized Officer and Shasta County Sheriff at least 5 days before blasting. If swallows are present, non-explosive demolition of the bridge superstructure is authorized from August 15<sup>th</sup> to January 15<sup>th</sup>. If bats are present, non-explosive demolition of the piers is authorized from October 30<sup>th</sup> to March 1<sup>st</sup>. Blasting demolition of the bridge superstructure, or of the bridge piers within a dewatered cofferdam shall only be performed from August 16<sup>th</sup> to December 31<sup>st</sup>. Earthwork blasting may be performed any time of year if noise is muffled, and vibration and fly rock are controlled.

**Table 1 Ambient Sound Level Limits**

<u>Dates Of Operation*</u>	<u>Position ID No.</u>	<u>dBA Lmax Ambient Sound Levels</u>	<u>Position Description</u>	<u>Time Period</u>
<u>9/8 to 5/20</u>	<u>A</u>	<u>67</u>	<u>Western Boundary Antlers Campground</u>	<u>6:00a.m. to 9:00 p.m.</u>
<u>5/21 to 9/7</u>	<u>A</u>	<u>67</u>	<u>Western Boundary Antlers Campground</u>	<u>8:00a.m. to 9:00 p.m.</u>
<u>9/8 to 5/20</u>	<u>A</u>	<u>55</u>	<u>Western Boundary Antlers Campground</u>	<u>9:00p.m. to 6:00 a.m.</u>
<u>5/21 to 9/7</u>	<u>A</u>	<u>55</u>	<u>Western Boundary Antlers Campground</u>	<u>9:00p.m. to 8:00 a.m.</u>
<u>9/8 to 5/20</u>	<u>B</u>	<u>65</u>		<u>6:00a.m. to 9:00 p.m.</u>
<u>5/21 to 9/7</u>	<u>B</u>	<u>65</u>		<u>8:00a.m. to 9:00 p.m.</u>
<u>9/8 to 5/20</u>	<u>B</u>	<u>53</u>		<u>9:00p.m. to 6:00 a.m.</u>
<u>5/21 to 9/7</u>	<u>B</u>	<u>53</u>		<u>9:00p.m. to 8:00 a.m.</u>
<u>9/8 to 5/20</u>	<u>C</u>	<u>69</u>		<u>6:00a.m. to 9:00 p.m.</u>
<u>5/21 to 9/7</u>	<u>C</u>	<u>69</u>		<u>8:00a.m. to 9:00 p.m.</u>
<u>9/8 to 5/20</u>	<u>C</u>	<u>57</u>		<u>9:00p.m. to 6:00 a.m.</u>
<u>5/21 to 9/7</u>	<u>C</u>	<u>57</u>		<u>9:00p.m. to 8:00 a.m.</u>

\* Dates in Table 1 are approximate to the actual Holidays noted above.

The Holder shall provide advance notice to the Authorized Officer for work between 9:00 p.m. and 6:00 a.m. or 8:00 a.m. that may exceed sound control levels or be considered excessively loud, including pile driving. The notice shall include potential control measures, noise monitoring procedures, and a contingency plan in case control measures are not effective.

All internal combustion engines used for any purpose on the job or related to the job shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without a muffler. The contractor shall also comply with all local sound control and noise level rules, regulations, and ordinances.

**Communications:**

Holder shall provide advance public information on blasting or percussive driving schedules, planned closures and required safety measures to the Authorized Officer, Forest Service Concessionaire operators, and other business owners under Special Use Permit in addition to local news organizations and the Lakehead community. Public

information about the project will be linked to the Shasta-Trinity website and websites of affected businesses if requested.

Holder will provide the name and contact information of their public affairs liaison to the Forest Service and will cooperatively develop public notices and announcements that affect Forest Service lands, waters or recreation facilities.

**Fisheries:**

A bubble curtain as described in "Caltrans 1999 Standard Specifications and Project Special Provisions" will be required to attenuate underwater energy generated by blasting and by percussive driving of 1.2 meter or larger diameter steel piling, permanent steel casings, piles used to anchor pile templates, and piles for a temporary access structure. Holder may choose to permit a dewatered cofferdam, or round shell, in lieu of a bubble curtain. A cofferdam or round shell, in the wet, could be used in combination with a bubble curtain system. Cofferdams shall be continuous, made of concrete or steel members, extend from above the water line to ½ meter below the ground level, and be dewatered prior to pile driving.

Holder shall require provisions to inspect the air bubble curtain system for proper operation before each deployment and as necessary during deployment. Proper operation during deployment will be determined by observation of the gauges in the monitoring station and by other methods determined by the Holder.

The pile driving energy attenuator is not required for pile or casing installation using a vibratory hammer. The approved attenuator system shall be operating prior to beginning pile driving at any given pile location. If the attenuator fails, pile driving shall immediately stop. Piling driving shall not resume until the attenuator system at that location is again operating.

Funding will be provided to the Shasta-Trinity National Forest wildlife staff to improve fisheries habitat within and adjacent to the project area. Work will include building and installing Manzanita brush structures within the drawdown zone of the project area; planting willows and button brush starts within suitable sites; and seeding, mulching and fertilizing an annual grain species at Gregory Beach.

**Noxious/Invasive Species:**

To limit the spread and establishment of invasive plant species into and out of the permit area, all equipment and vehicles shall be thoroughly cleaned with water to remove dirt, seeds, vegetative material, or other debris that could contain or hold seeds of noxious weeds before arriving or leaving the project site. A provision for equipment cleaning will be included in the service contracts.

Caltrans has entered into an agreement with Shasta-Trinity National Forest and the Shasta County Department of Agriculture (County) to expand efforts to eradicate Rush Skeleton weed on and adjacent to Interstate-5 in the project vicinity. Included in the treatment area is approximately 3.7 acres of National Forest System land adjacent to Interstate-5 near the southern bridge abutment. This area has a substantial population of Rush skeleton weed and therefore will be designated as an ESA to prohibit access and disturbance during construction. The County will hand pull weeds and apply herbicides prior to, during, and following construction. Monitoring and treatment will occur for a period of two years following construction to ensure containment and eradication of the weed.

Holder will take measures to prevent the spread of other identified invasive species located on the site (i.e. star thistle, Himalayan blackberry, etc.)

Holder and all contractors shall inspect and clean all boats, trailers and equipment that will enter Shasta Lake for Quagga and/or Zebra mussels. Inspections shall be performed as per the California Fish and Game guidelines (<http://www.dfg.ca.gov/invasives/quaggamussel/>).

### **Vegetation**

Abandoned segments of the highway and the temporary construction staging/access areas will be restored according to the Re-vegetation/Restoration Plan (Exhibit E) attached to and made a part of this permit.

Removal of vegetation will be minimized to the extent necessary to construct the project. Vegetative buffers as designated on the ground will be left in place where practicable. Selected mature upland trees located around the perimeter of the northern staging areas will be preserved to the extent practicable, i.e. to the extent trees do not interfere with construction operations.

The staging areas located on the west and east sides of the highway adjacent to the northern bridge abutment are both bisected by streams. The streams and the associated riparian corridors or upland buffers will be designated as ESAs and delineated with temporary fencing.

Following construction, all equipment and construction debris will be removed from the site. The staging and access areas will be treated according to the specifications in the Re-vegetation/Restoration Plan. Special provisions will be included in the project to salvage and stockpile large rocks during initial entry. Select material (i.e. large woody debris and chipped slash) will be retained or imported. This material will be used to dress areas that will be re-vegetated. Additional topsoil and soil amendments may be necessary as per the specifics of the plan.

Slash generated during site clearing may either be stockpiled for later use to dress the disturbed areas as described under the Re-vegetation / Restoration Plan, or shall be removed from the permit area.

### **Riparian/Water Resources:**

The project will include design features, special provisions, and temporary and permanent best management practices to avoid and minimize water quality impacts. The Holder shall require the installation and maintenance of soil stabilization and sediment control measures during the rainy season between October 15<sup>th</sup> and April 15<sup>th</sup> and may limit the size of the active disturbed soil area of the project site.

Holder will obtain a Stream/Lakebed Alteration Agreement (1602) from California Department of Fish and Game; a Section 404 Permit from the Army Corps of Engineers; a Water Quality Certification (Section 401) permit and De-watering permit from the Regional Water Quality Control Board, Central Valley Region.

The Holder shall obtain a Storm Water Pollution Prevention Plan (SWPPP) identifying potential sources of pollution, and temporary Best Management Practices (BMP's) to protect water quality. The project includes permanent BMP's which are identified during the planning and design phase of the project: hydro-seeding; placement of RSP on disturbed stream banks and/or lakebed where vegetation cannot be expected to become established; drainage and conveyance systems including asphalt dikes; over-side drains; flared culvert-end sections; outlet protection and velocity dissipation devices.

Holder shall ensure that demolished material does not enter storm water systems or watercourses. Holder shall ensure the use of covers and platforms approved by the Holder to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations. Debris catching devices shall be emptied regularly and debris shall be handled as described in the "Caltrans 1999 Standard Specifications and Project Special Provisions" for "Waste Management." Holder shall ensure that demolition sites are inspected within 15 meters of storm water or watercourses every day.

The Holder is required to comply with the terms and conditions of regulatory permits issued by the California Department of Fish and Game, the Regional Water Quality Control Board (RWQCB), and the U.S. Army Corps of Engineers. The Holder shall require the preparation of a spill containment plan for operations on the lake.

### **Visual/Aesthetics:**

Holder shall remove the steel shells around the concrete piers to reduce the visual impact of the bridge.

The abandoned section of highway south of the bridge will be obliterated and graded to conform to the natural pre-existing topography. Native shrubs and trees will be planted in disturbed areas beyond the clear recovery zone of the highway, which is typically 30-feet from the edge of pavement. If rock slope protection is required to stabilize embankments or drainages, native rock from highway excavations will be used, or rock staining will be performed, to match the color of the surrounding ground.

All concrete from demolition activities must be buried with a depth of soil that will support native trees and shrubs that will blend with the natural environment. After construction, re-shape and replant embankment slopes, access roads, cut and fill slopes, and staging areas as specified in the Re-vegetation /Restoration Plan.

Removal of large trees within access and staging areas will be avoided to the extent practicable, i.e. they will be left in place if they do not interfere with construction activities. An attempt will be made to preserve several of the larger pine and oak trees along the south and southeast boundary of the staging area as a visual screen. The vegetated segment of a small perennial drainage that bisects the proposed staging area and the ephemeral stream between the boat ramp and bridge will be protected with temporary ESA fence.

Following construction, temporary construction, access, and staging areas will be restored in a manner similar to the natural pre-existing topography. The rocks creating the cascade within the riparian ESA within the north eastern staging area will not be affected, nor will the rock outcrop at the public boat ramp.

Holder shall insure that any and all soil, rock and other material placed within the lake (below the high water mark) for purposes of constructing the temporary access ramps shall be removed at the conclusion of construction. Any material remaining below high water shall comply with the terms of the Holders permit from the Army Corps of Engineers restricting impacts to no more than ½ acre.

### **Re-vegetation and Restoration**

Holder shall comply with the terms and conditions of the Re-vegetation /Restoration Plan for the portions of the permit area used during construction but not included within the Department of Transportation (DOT) easement. The Re-vegetation/Restoration Plan may be amended by mutual agreement and signature if conditions change as a result of changes in construction.

Large rocks (>3' diameter) and non-commercial large woody debris within the permit areas but outside the designated ESA areas on the north abutment will be moved and may be stockpiled prior to construction for use in the Re-vegetation /Restoration Plan. Rocks and woody debris will be re-distributed as designated in the Re-Vegetation/Restoration Plan of the permit areas to provide microclimate for replanting work.

Permit areas outside of the designated ESA areas shall be shaped, amended and restored as per the approved Re-vegetation/Restoration Plan.

The Holder shall require and approve a soil management plan (SMP), identifying management, staging, handling, and placement of topsoil, mulch, compost, and incorporate materials. The Soil Management Plan shall be approved prior to beginning work on earthwork but no later than September 15<sup>th</sup> of the first construction season. The plan shall include:

1. A 279.4 mm x 431.8 mm or larger site map indicating areas where native soil or vegetation will be retained in place, and areas that will be stripped and the material stockpiled prior to application.
2. Calculations and plans for harvesting, handling, staging, storing, mixing, and placing.
3. A schedule of major soil and amendment compost, incorporate, and mixing operations.
4. Combustible material storage, handling, and suppression details.

**EXHIBIT C**

Site Development Schedule

The Site Development Schedule shall be prepared by the Holder before July 1, 2009 and approved by the Authorized Officer before the start of construction.

**EXHIBIT D**

Fire Control Plan

The Fire Control Plan shall be prepared by the Holder before July 1, 2009 and be approved by the Authorized Officer before the start of Construction

**EXHIBIT E**

Re-vegetation and Rehabilitation Plan

The Re-vegetation and Restoration Plan shall be prepared by the Holder by April 1, 2009 and shall be approved by the Authorized Officer before the start of construction.

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** GUDMUND SETBERG  
Senior Bridge Designer  
Division of Engineering Services  
Bridge Design Branch 2  
Office of Bridge Design North

**Date:** July 31, 2008  
**File:** 02-SHA-5-KP 64.63 (PM 40.16)  
Sacramento River (Antlers) Bridge  
(Replace)  
Bridge No. 06-0210  
EA 02-378901

Attention: Mr. Jason Lynch

**From:** DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES – MS 5

**Subject:** Foundation Recommendations  
***THIS MEMO SUPERSEDES AND REPLACES THE MEMO DATED March 7, 2008***

Per your request, the Office of Geotechnical Design North (OGD-N) has prepared this geologic and foundation information for the replacement of the Sacramento River at Antlers Bridge (Bridge No. 06-0089). This report includes review and evaluation of the existing bridge file and the General Plan dated March 5, 2008. In addition, twenty-one mud rotary borings (03-1 through 03-3 and B-1 through B-18) were drilled to determine the nature of foundation materials. Data are shown on the “Log of Test Borings” (LOTB), which will be forwarded when complete.

## **SCOPE OF WORK**

The scope of this report includes:

1. Review of “As-Built” information of the existing bridge and site reconnaissance.
2. Review of available published information about the site including site geology and seismicity.
3. Work with District 2 design project engineers and Drilling Services in pursuit of the necessary permits to perform the field investigation.
4. Conducting the field investigation including twenty-one test borings and PS logging.
5. Review of field findings.

6. Performing laboratory tests on the soil samples gathered from the field investigation.
7. Discussion of the project with Structure Design project engineer, and Structure Construction.
8. Performing engineering analysis, calculations, and developing recommendations.
9. Completing the report.

## **PROJECT DESCRIPTION**

The project site is located on Interstate 5 north of the city of Redding in Shasta County. Site vicinity map is presented in Plate 1. The proposed new bridge will cross over the Sacramento River and replaces the existing 7-span bridge. At the project location the freeway consists of three southbound lanes and two northbound lanes. The existing structure was originally built in 1941. It is a continuous 405 m, seven span deck truss on cellular concrete piers up to 50 m tall. The deck is 18.8 m wide. Spread footings were used at all support locations.

The project area lies within the Klamath Mountains. Within the project limits, the topography consists of rolling terrain with occasional areas of steep slopes due to natural drainage features. The elevation varies from about 335 meters to 490 meters over a length of 0.2 km. Refer to Plate 2 for topographic features. The drainage is generally in the southwest direction.

The elevations used in this report are based on the North America Vertical Datum of 1988 (NAVD 88).

## **SITE GEOLOGY AND SUBSURFACE CONDITIONS**

According to the Geologic Map of Redding Quadrangle, California (Jenkins 1962) the foundation material consists of Mississippian marine deposits (Bragdon Formation), which consist of metashale and metasandstone (Plate 3).

Twenty-one borings were drilled to characterize subsurface conditions. Two borings were drilled near the south abutment (Borings 03-1 and B-1). Seventeen borings were drilled in the channel (Borings 03-3, B-2 thru B-4 and B-6 thru B-18). Two borings were drilled near the north abutment (Borings 03-2 and B-5). Locations of test borings are presented in Plate 4. Below is a summary of the geology encountered at the three regions (south abutment, channel, and north abutment).

South Abutment: Material encountered consists of fill overlying deposits of intensely weathered to fresh metashale with lenses of metasandstone to elevation 354.2 m. Underlying this rock, material consists of fresh metasandstone to the maximum depth explored.

River Channel:

Material encountered at Pier 2 consists of decomposed metashale and metasandstone at the surface. This unit is underlain by intensely weathered to fresh metashale and intensely weathered to fresh metasandstone and metaconglomerate.

At Pier 3, the surface slopes approximately 33°. The top layer of clayey sand, gravel, cobbles and boulders ranges from approximately 2.4 to 7.6 meters in thickness. The top of rock surface slopes at 35° to 49° to the northeast and consists of intensely weathered to fresh metashale and metasandstone. The elevation of this material varies from each boring.

At Pier 4, the top surface slopes at 0° to 30°. The first layer consists of clay, silty sand, sand, gravel, cobbles, and boulders ranges from approximately 9 to 12 meters in thickness. The top of the rock surface slopes at 0° to 10° to the southwest and consists of intensely weathered to fresh metashale and metasandstone. The elevation of this material varies from each boring.

At Pier 5 the top surface slopes at 12° to 14° to the south. The top layer consists of lean clay with sand, lean clay, sandy clay, and clayey gravel and cobbles that is approximately 6 to 9 meters thick. The top of the rock slopes 8° to 12° to the southwest and consists of intensely weathered to fresh metashale, meta-sandstone, metaconglomerate and metabreccia. The elevation of this material varies from each boring.

North Abutment: Material encountered consists of silty sand with coarse gravel to elevation 329.6 m. Underlying this sediment, material consists of slightly weathered to fresh, intensely fractured basalt to elevation 322.3 m. This material is underlain by sandy gravel to clayey gravel with cobbles to an approximate elevation 320.0 m. Underlying this sediment, material consists of decomposed to fresh metashale and moderately weathered to fresh metasandstone.

Please refer to Log of Test Borings (LOTBs) for details.

## GROUNDWATER

For construction purposes, groundwater levels should be assumed to be at the elevation of the Sacramento River. However, groundwater elevations may fluctuate as seasonal precipitation, and river/lake water changes. Historic high groundwater is at an elevation of approximately 326.0 m.

## SCOUR EVALUATION

Based on the memorandum "Final Hydraulic Report," (FHR) dated August 5, 2005 from the Office of Hydrology and Hydraulics, the bridge was determined to be not scour critical. The "Bridge foundation determined to be stable for calculated scour within limits of footings or piles." According to the FHR the potential scour depth at the piers/abutments is 2.4 m. In addition, since the bridge spans over a lake/reservoir "no possibility of scour is expected to occur at this site." The FHR also states, "During drought years the bridge piles at OG will be exposed. However, during a drought condition flow rates from a  $Q_{100}$  will not inundate the locations where the piles are exposed. Thus scour is not a problem during drought or low water surface elevation events."

If the dam is raised, "Structure Hydraulics recommends that rock be placed in front of the abutment (Abutment 6) footing to prevent abutment cover soil from sloughing due to wave action."

## CORROSIVITY EVALUATION

Based on soil samples collected throughout the project site, native soil beneath the site is non-corrosive.

**Table 1. Soil Corrosion Test Summary**

Location	SIC Number	Minimum Resistivity (Ohm-Cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
Antlers Bridge	C726835	5096	5.57	n/a	n/a
Antlers Bridge	C726836	5878	7.53	n/a	n/a

Note: Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

## FOUNDATION RECOMMENDATIONS

Based on the available information, we are providing the following foundation recommendations for the proposed new bridge.

### 1. Spread Footing

Spread footing is recommended at Abutment 6. The spread footing will be founded on the basalt. Table 2 summarizes our calculation results for the spread footing.

**Table 2. Foundation Design Recommendations for Spread Footings at Abutment 6<sup>1,2</sup>**

Support Location	Footing Size (m)		Bottom of Footing Elevation (m)	Minimum Footing Embedment Depth (m)	Total Permissible Support Settlement (mm)	WSD (LRFD Service Limit State Load)		Load and Resistance Factor Design		
	B	L				Gross Permissible Contact Stress (kPa)	Gross Allowable Bearing Capacity (kPa)	Service	Strength	Extreme Event
								Net Permissible Contact Pressure, $q_{\text{permissible}}$ (kPa)	Factored Gross Nominal Bearing Resistance, $q_R$ (kPa), $\Phi=0.45$	Factored Gross Nominal Bearing Resistance, $q_R$ (kPa), $\Phi=1.00$
Abut 6	6.0	31.85	329.0	N/A	<25	N/A	N/A	375	650	1440

Notes: 1. Recommendations are based on the foundation geometry and load data provided by the Structure Designer on the Foundation Design Data Sheet. The footing contact area is taken as equal to the effective footing area, where applicable.

2. See MTD 4-1 for definitions and applications of the recommended design parameters.

The total settlement under the load transfer from the superstructure, in general, includes elastic, primary consolidation, and secondary consolidation settlement. Because the subsurface soils under Abutment 6 primarily consist of bedrock, the settlement estimation for the spread footings for this site is considered mainly “elastic.” The elastic settlement will be completed during construction.

### 2. Permanent Casing / Cast-in-drilled-hole (CIDH) piles at Pier 3, Pier 4, and Pier 5 and Rock Sockets at Pier 2, Pier 3, Pier 4, and Pier 5

Permanent steel casing will be required at Piers 3, 4 and 5. No geotechnical capacity was given for the permanent casings. Table 3 shows the specified pile tip for the permanent casing. The Office of Geotechnical Services Foundation Testing conducted a “Pile Driveability Analysis” dated October 2, 2006. The driveability analyses were performed for Pier 4 based on Boring B-3 soil and rock parameters. According to this report three hammers were used to simulate the stresses to the pile, and were “within acceptable blow

count limits and without overstressing the permanent steel casings.” The driveability analyses were performed for quantity estimation. More study should be taken before electing to drive permanent steel casing.

The material in the permanent steel casings will be drilled and cleaned out. Due to the sloping top of rock surface, and presence of hard rock, the permanent casing cannot be seated into rock by conventional driving alone.

These rock sockets were designed using resistance from both skin friction and end bearing. Thus a clean bottom is required during construction.

**Table 3. Rock Socket and Permanent Casing Design Recommendations**

Support Location	Pile Type	Cut-off Elevation (m)	Service Limit State Load/ Pile (kN)	Total Permissible Support Settlement (mm)	Required Factored Nominal Resistance (kN)/ pile				Design Tip Elevations <sup>1,2</sup> (m)	Rock Socket Specified Tip Elevation <sup>3</sup> (m)	Steel Casing Specified Tip Elevation (m)
					Strength Limit		Extreme Event				
					Comp. $\Phi=0.5$	Tension $\Phi=0.5$	Comp. $\Phi=1.0$	Tension $\Phi=1.0$			
Pier 2 West	3.500 m Rock Socket	327.0	50600	55	66100	0	59400	0	298.3 (a) 320.5 (b)	298.3	N/A
Pier 2 East		327.0	52500		68200	0	60400	0	298.3 (a) 3210.5 (b)	298.3	N/A
Pier 3 NW	3.800 m CIDH w/ PP 3.800 m Permanent Steel Casing 3.500 m Rock Socket	305.5	77500	55	101800	0	91800	0	282.2 (a) 289.4 (b)	282.2	294.0
Pier 3 NE		299.4	87900		113300	0	94900	0	267.7 (a) 282.8 (b)	267.7	286.0
Pier 3 SW		307.0	75100		99100	0	68400	0	279.6 (a) 292.6 (b)	279.6	292.7
Pier 3 SE		302.5	85200		113900	0	84200	0	270.9 (a) 282.3 (b)	270.9	284.0
Pier 4 NW	3.800 m CIDH w/ PP 3.800 m Permanent Steel Casing 3.500 m Rock Socket	296.0	79000	55	101900	0	75700	0	272.6 (a) 281.1 (b)	272.6	283.5
Pier 4 NE		296.0	86800		111600	0	79300	0	262.4 (a) 278.7 (b)	262.4	284.5
Pier 4 SW		296.0	80400		104700	0	88000	0	268.1 (a) 276.6 (b)	268.1	282.5
Pier 4 SE		296.5	93600		120600	0	95600	0	271.5 (a) 280.0 (b)	271.5	284.5
Pier 5 West	3.800 m CIDH w/ PP 3.800 m Permanent Steel Casing 3.500 m Rock Socket	308.0	53100	55	69700	0	60200	0	283.5 (a) 285.0 (b)	283.5	293.8
Pier 5 East		308.0	54700		71300	0	61100	0	283.7 (a) 285.0 (b)	283.7	292.8

Design tip elevations are controlled by the following demands:

1. "Design tip elevations" are controlled by (a) compression, (b) lateral load, respectively.
2. Both skin friction and end bearing were used to determine the compression control tip elevations.
3. The "Specified Tip Elevation" shall not be raised.

### 3. Cast-in-drilled-hole (CIDH) piles at Abutment 1

CIDH piles are recommended for Abutment 1. Table 4 shows CIDH piles data.

**Table 4. Foundation Design Recommendations for CIDH Piles at Abutment 1**

Support Location	Pile Type	Service Limit State Load/Pile (kN)	Total Permissible Support Settlement (mm)	Required Factored Nominal Resistance (kN)/ pile				Design Tip Elevations <sup>1,2</sup> (m)	CIDH Specified Tip Elevation <sup>3</sup> (m)
				Strength Limit		Extreme Event			
				Comp. $\Phi=0.7$	Tension $\Phi=0.7$	Comp. $\Phi=1.0$	Tension $\Phi=1.0$		
Abutment 1	600 mm CIDH	1316	55	1950	0	1580	0	346.0 (a) 347.0 (b)	346.0

Design tip elevations are controlled by the following demands:

1. "Design tip elevations" are controlled by (a) compression, (b) lateral load, respectively.
2. Skin friction was used to determine the compression control tip elevations.
3. The Specified Tip Elevation shall not be raised.

### 4. Retaining Walls

Retaining walls will be at both Abutment 1 and Abutment 6. They will be supported by H-piles and will be designed to be end-bearing piles.

**Table 5. Abutment 1 and Abutment 6 H-Piles for Type 1 Retaining Wall**

Support Location	Pile Type	Design Height of Wall (mm)	Cut-off Elevation (m)	LRFD Service Limit State I Load (kN)	Nominal Resistance (kN)	Design Tip Elevations <sup>1,2</sup> (m)	Specified Tip Elevation (m)	Nominal Driving Resistance Required <sup>3</sup>
				Total/pile				
Abut 1 Ret Wall	HP 250 x 62	4800	359.0	400	800	352	352	800
Abut 1 Ret Wall	HP 250 x 62	3600	360.5	400	800	352	352	800
Abut 1 Ret Wall	HP 250 x 62	1800	358.0	400	800	352	352	800
Abut 6 Ret Wall	HP 250 x 62	6100	332.0	400	800	329	329	800
Abut 6 Ret Wall	HP 250 x 62	4200	334.0	400	800	329	329	800
Abut 6 Ret Wall	HP 250 x 62	2400	335.5	400	800	329	329	800

Design tip elevations are controlled by the following demands:

1. "Design tip elevations" are controlled by compression.
2. Skin friction and end bearing were used to determine the compression control tip elevations.
3. The nominal driving resistance required to equal the nominal resistance needed to support the factored load plus driving resistance from the penetrated soil layers, if any, which do not contribute to the design resistance.

## **PILE LOAD TEST**

A pile load test is required for this project. Additional information regarding the load test will be included in a supplemental report.

## **GENERAL NOTES TO DESIGNER**

1. The structure engineer shall show on the plans, in the pile data table, the minimum pile tip elevation required to meet the lateral load demands.
2. Should the specified pile tip elevation required to meet lateral load demands exceed the specified pile tip elevation given within this report, the Office of Geotechnical Design North should be contacted for further recommendations.
3. Support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memos to Designers" 4-2. The plotting of the support locations should be made prior to the foundation review.

## **Construction Considerations**

### **1. Spread Footings**

1. Spread footings shall be placed neat against competent materials. All loose materials shall be removed prior to placement of concrete.
2. All footing excavations are to be inspected and approved by this Office or representative of the Office of Structure Construction when excavations are completed to the bottom of footing and prior to placement of concrete.

### **2. Permanent Casing Piles**

1. Prior to any driving of the permanent casings, the Contractor should perform a driveability study at the locations of all shafts at Pier 3, Pier 4, and Pier 5.
2. The permanent casing will be installed into hard bedrock. The Contractor should anticipate hard driving/drilling conditions. If the Contractor chooses to drive steel casings, caution should be taken to prevent damaging the tip of the casing.
3. The top of rock surface is sloping up to 49°. The pile installation method should prevent casing from drifting.

4. Due to the sloping top of rock surface, and presence of hard rock, the permanent casing cannot be seated into rock by conventional driving alone.
5. No geotechnical capacity was given to the permanent casing.
6. At some locations with weak soil conditions, steel casings may sink under their own weight.
7. If driving is the chosen method for casing installation, Pile Dynamic Analysis (PDA) testing is recommended to monitor pile driving. The PDA testing/monitoring should help to prevent piles from being overstressed during driving.
8. Pile tips for the permanent casing should be at the elevation presented in Table 3. If the Contractor elects to install the steel casing below the elevation shown on the Plans, the rock socket may be extended below specified tip. In this case this Office shall be contacted for pile tip evaluation.
9. If the methods of casing installation allow for a gap to form between permanent casing and rock, the gap must be grouted to preserve lateral capacity.
10. Prior to rock socket construction, steel casing shall be cleaned out. Equipment or methods used during casing cleanout shall not cause blow-ins, scouring, or caving around or below the tip of the steel casing. Cleanout shall be performed under a full head of slurry equal to the external water level.

### **3. CIDH Piles and Rock Sockets**

1. During installation of CIDH piles, hard rock coring into bedrock should be anticipated for Abutment 1 and Piers 2 through Pier 5.
2. Wet pile installation method shall be used for Piers 2 through Pier 5.
3. Uneven rock contact and loss of water circulation should be anticipated during the CIDH pile construction due to the presence of variably weathered and fractured rock, caving of rock, and steep top of rock surface. Temporary casing, slurry or other methods may be used to control caving.
4. If temporary casing is used, it shall be removed while the concrete is being placed in order to develop the assumed pile capacity.

5. End bearing will be utilized for these piles, any anomalies detected at the bottom of the pile by gamma-gamma, cross-hole sonic, or any other means of testing, shall be mitigated.
6. Care shall be taken during construction of the rock socket not to disturb this material surrounding the bottom of the steel casing. Equipment and methods used for constructing the socket shall not cause scouring or caving around or below the tip of the steel casing.
7. The Contractor shall perform desanding and cleaning of the slurry before placing concrete.
8. The drilling of the rock socket, the placement of the reinforcement, and concrete pour shall be completed in a continuous operation.
9. The Contractor shall submit the drilling log after completion of drilling. The drilling log should include: penetration rate, material descriptions, estimated volume of cuttings (e.g., poor, good, excessive), and other information pertaining to the drilling process (e.g., loss of circulation, zones of cave in, down pressure).
10. To clean out the bottom of hole the Contractor shall use some method to pump or vacuum the bottom to assure the base is debris free. The bottom of the drilled shaft shall be cleaned prior to concrete placement. The bottom shall be clear of sediment and debris. A minimum of 50 percent of the base of each shaft shall have less than 6 mm (1/4 inch) of sediment at the time of concrete placement. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 25 mm (1 in).
11. This Office requires the use of the Department's sonic caliper logging to prove shaft quality.
12. Due to end bearing requirements, it is critical for the bottom of the rock socket be clean. This Office requires the use of the Department's Shaft Inspection Device (SID) be used at Piers 2 through Pier 5 to verify that the bottom of the piles are clear of debris. The SID shall be used to inspect the bottom of the hole after completion of the drilling and clean out. The SID shall also be used to inspect the bottom of the hole after placement of the pile reinforcement. The pile must be approved by the Engineer prior to placing concrete.

13. Per section 49-4.03 paragraph 3 of the State of California Department of Transportation Standard Specifications (July 1999) "The bottom of drilled hole shall be cleaned just before placing reinforcement or concrete to remove any loose sand, gravel, dirt, and drill cuttings." To clean out the bottom of hole the Contractor shall use some method to pump or vacuum the bottom to assure the base is debris free.
14. Per section 49-4.03 paragraph 4 of the State of California Department of Transportation Standard Specifications (July 1999) "After placing reinforcement and prior to placing concrete in the drilled hole, if caving occurs or deteriorated foundation material accumulates on the bottom of the hole, as determined by the Engineer, the reinforcement shall be removed and the bottom of the drilled hole cleaned." To verify the cleanliness of the bottom of the hole, the Contractor shall allow the Caltrans Foundation Testing Branch use the SID before the hole is considered acceptable.
15. Gamma-gamma and cross-hole sonic testing should be performed.
16. If rock socket tip elevation is deepened or over drilled, inspection tubes must also be extended to three inches above the actual tip of pile.
17. The rock in the rock socket is not considered erodible. Water may be used as slurry for drilling the rock socket, only after the slurry from drilling the material above is removed.
18. No two adjacent shafts shall be excavated at the same time.
19. Due to the close spacing of the piles, after the concrete is poured, excavation of an adjacent pile shall not begin until the concrete has set. The concrete set time is dependent on the mix design, and the Engineer will determine the set time when mix design is approved.
20. Core boxes are available for inspection at the Caltrans Office. Bidders are encouraged to view the rock core samples at the Translab facility (5900 Folsom Blvd. Sacramento) before submitting bids.

#### **4. Retaining Walls**

1. Hard driving conditions should be anticipated during installation of the driven piles.
2. At the Engineer's option, any piles driven to within 1.0 meter of specified tip elevation may be considered adequate and cut off if three times the required pile acceptance criteria value is achieved.

#### **PROJECT INFORMATION**

Standard Special Provisions S5-280, "Project Information," discloses to bidders and Contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressees of this report via electronic mail.

*Data and information attached with the project plans are:*

- A. *Log of Test Borings for Sacramento River Bridge (Antlers), Bridge Number 06-0210.*

*Data and Information included in the Information Handout provided to the bidders and Contractors are:*

- A. *Addendum of Foundation Recommendations for Sacramento River Bridge (Antlers), Bridge Number 06-0210, dated July 31, 2008.*
- B. *Revised Lateral Resistance, py Curves, Bridge Number 06-0210, dated July 31, 2008.*

*Data and Information available for inspection at the District Office:*

- A. *N/A*

*Data and information available for inspection at the Transportation Laboratory:*

- A. *Core Samples*

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable. If there are any questions, please contact Joseph Kaump at (916)-227-1044 or Reid Buell at (916)-227-1012.



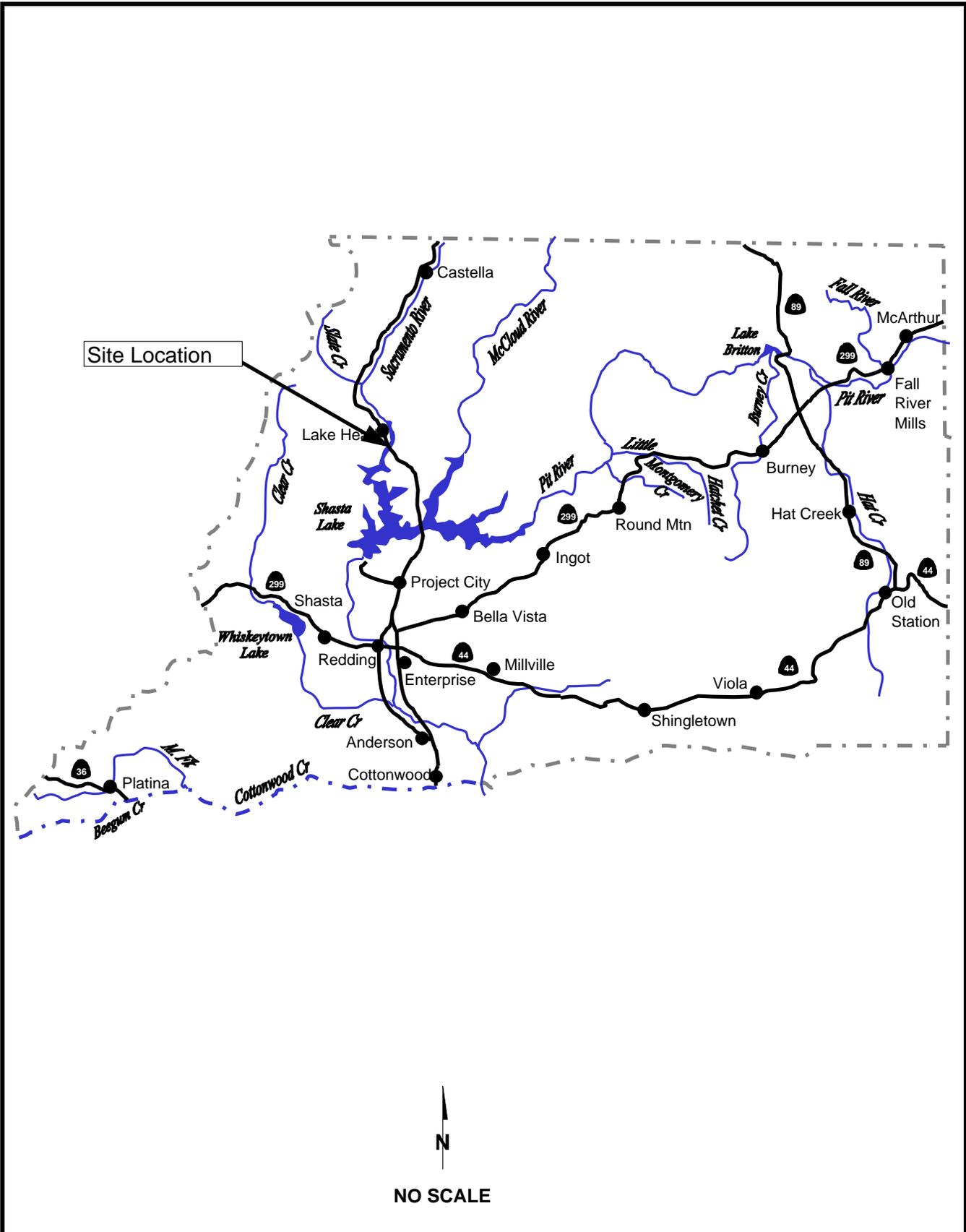
JOSEPH KAUMP, P.G. 7837  
Engineering Geologist  
Geotechnical Design – North



Attachments:  
Plates 1-4

c:

Reid Buell  
R.E. Pending  
Structure OE (E-copy)  
Eskinder Taddese-PCE (E-copy)  
Lerose Lane DME (E-copy)  
GDN File  
GS File



	CALTRANS Engineering Services Office of Geotechnical Services Geotechnical Design Branch - North	EA: 02-378901	<b>VICINITY MAP</b>
		Date: 07/31/08	
		<b>05-SHA-64.62 KP</b> <b>FOUNDATION REPORT</b>	



CALTRANS  
 Division of Engineering Services  
 Geotechnical Services  
 Geotechnical Design -North

EA: 02-378901

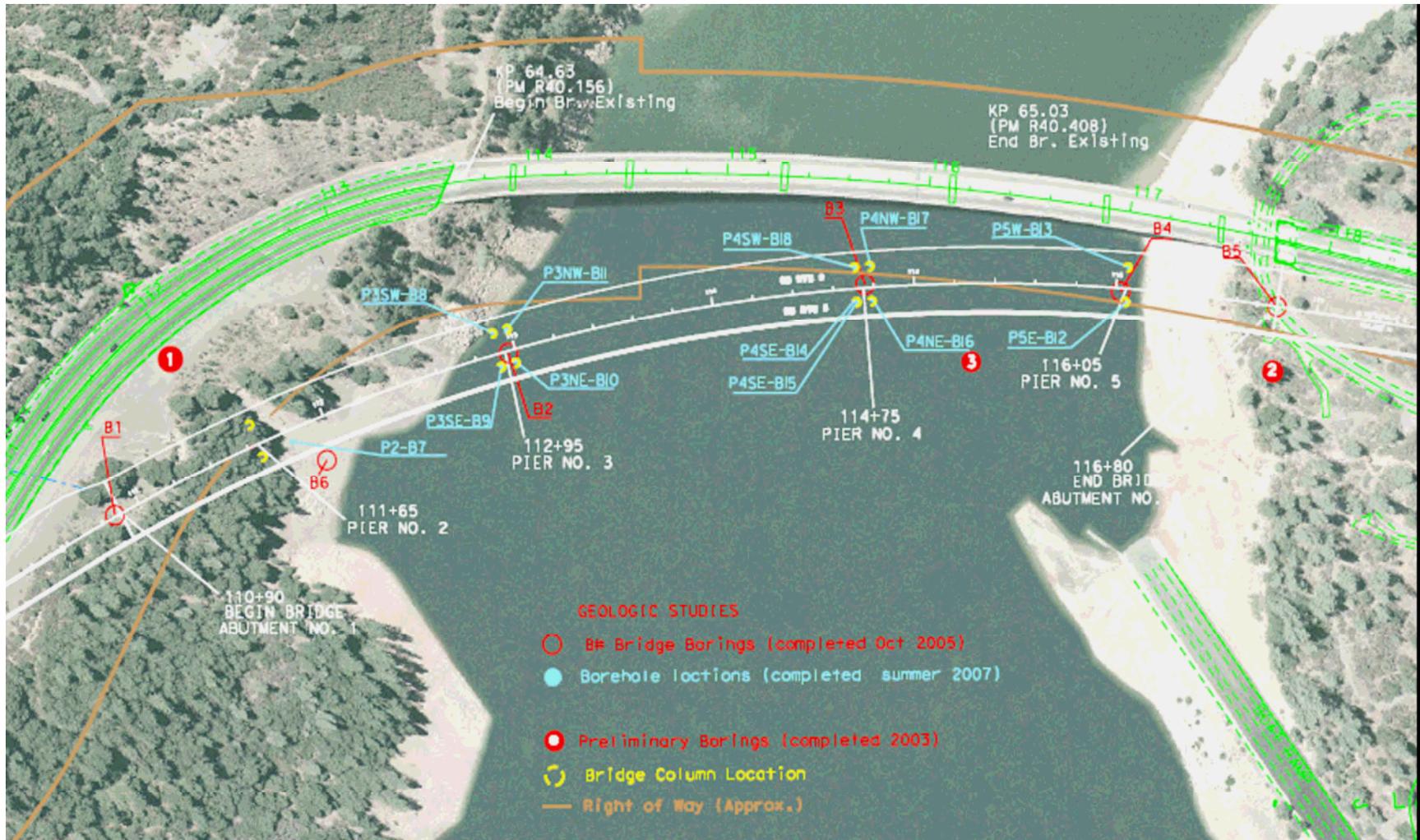
Date: July 2008

**Topographic Map of Site**

**02-SHA-5; KP 63.8/64.6  
 FOUNDATION REPORT**

Plate No.  
 2





CALTRANS  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design -North

EA: 02-378901

Date: July 2008

### Boring Location Map

**02-SHA-5; KP 63.8/64.6**  
**FOUNDATION REPORT**

Plate No.  
 4

## Memorandum

*Flex your power!  
Be energy efficient!*

To: MR. JIM ELDER  
Design Branch Chief  
Design S11



Date: July 31, 2008

File: 02-SHA-5 KP 63.8/64.6  
PM 39.6/40.1  
02-378901

Attention: Art Ceballos  
Project Engineer

From: **DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES – MS 5**

Subject: Geotechnical Design Report

### Introduction

Per your request, we are providing a Geotechnical Design Report (GDR) for Interstate 5 from KP 63.80 to KP 64.62 in Shasta County, California. The project involves the realignment of Interstate 5 in conjunction with the Sacramento River (Antler) Bridge Replacement (Br. 06-0089). This report addresses the roadway portion of the project only. A vicinity map is presented as Plate No. 1.

This report is based upon a literature study, a site reconnaissance and sampling program. Limited laboratory testing was performed to assess the soil and rock strength. Soil sampling and testing included grain-size distribution, moisture-density relationships, and unconfined compressive strengths. In addition a seismic refraction study, performed by the Office of Geotechnical Support Branch, was performed to assess the excavation characteristics of the rock cuts within the project limits.

Information presented herein is intended to assist Caltrans Project Development and Construction Management personnel, and should be made available to prospective bidders and contractors.

### Pertinent Reports and Investigations

The following is a list of documents that were reviewed in preparation of this report:

- Geologic Map of California, Redding Sheet dated 1962 by California Division of Mines and Geology.
- Dunsmuir Treatment Plant, CA, Period of Record Monthly Climate Summary provided by Western Regional Climate Center.
- Lakehead, California USGS 7.5 minute topographic map dated 1962.
- California Seismic Hazard Map prepared by Lalliana Mualchin, dated 1996.
- Seismic Refraction Survey Investigation, Rippability Evaluation at Antler Bridge, prepared by the Caltrans Division of Engineering Services for project EA: 02-378901, dated December 30, 2005.

### **Existing Facilities and Proposed Improvements**

Within the project limits, Interstate 5 travels in a general north/south direction and consists of three southbound lanes and two north bound lanes. In conjunction with the bridge replacement, it is proposed that Interstate 5 be realigned between KP 63.8 to 64.6. The purpose of the realignment is to straighten out the curvature of the freeway south of the existing bridge.

The proposed realignment will consist of several large cuts up to 30 meters in height through the rolling mountainous terrain and fills up to 4 meters thick.

### **Physical Setting**

The physical setting of the project site and the surrounding area was reviewed to aid in project design and construction planning. The physical setting includes climate, topography and drainage, man-made and natural features, geology and seismicity characteristics.

#### Climate

According to the Western Regional Climate Center, the average annual precipitation at Dunsmuir Treatment Plan (located approximately 38-km north of the project site) is 1600 mm (63.03 in). The majority of this precipitation (80%) occurs during the months of November to March. The average snowfall in this area is approximately 701 mm (27 in). The average maximum daily air temperature throughout the warmest month (July) is 32°C

(89.5°F) and the average minimum daily air temperature throughout the coldest month (January) is -1°C (30.2°F). Freezing temperature conditions are usually brief and freeze/thaw conditions do not occur.

### Topography and Drainage

The project area lies within the Klamath Mountains. Within the project limits, the alignment extends through rolling terrain with occasional areas of steep slopes due to natural drainage features. The elevation varies from about 335 meters to 490 meters over a length of 0.2 km. A topographic map is presented as Plate No. 2.

The drainage is generally in the northeast direction. There are several unnamed ephemeral creeks that carry water during the winter months, which cross the existing alignment in low-lying areas.

### Man-made and Natural Features of Engineering and Construction Significance

The land along the proposed alignment is owned by State of California and the United States Forest Department. Culverts and drains were installed where the creeks intersect the existing roadway.

Embankment fills slopes along the roadway were placed at 1:2 (V:H) and cut slopes are at 1:1 or flatter.

### Regional and Local Geology and Seismicity

The project area is located within the Klamath Mountain geomorphic province of California. This area is underlain by Mississippian marine deposits (Bragdon Formation), which consists of thinly bedded meta-shale, interstratified meta-siltstone, meta-sandstone and conglomerate. At station 116+80, these rocks are overlain by volcanic rocks and sedimentary rocks, including gravel and cobbles of Tertiary age. In general, the attitude of the Bragdon Formation within the proposed cuts is N50°W; 55° NE. A Geologic Map is presented as Plate No. 3.

The State of California, Department of Conservation Map of California Showing Principle Asbestos Deposits was reviewed. According to this map, the site is not near an area of naturally occurring asbestos.

Based on data compiled by Caltrans Chief Seismologist, Lalliana Mualchin, the United States Bureau of Reclamation has identified a fault near Shasta dam. The Fault is known as the Keswick Fault. The current Caltrans California Seismic Hazard Map (1996) did not consider local earthquake sources in the Shasta Dam area because there were no known late Quaternary faults and significant earthquakes in the region when the map was compiled. However, a number of earthquakes occurred in 1998, the largest being magnitude 5+. Based on tectonic analysis, US Bureau of Reclamation anticipated thrust faults in this region, trending approximately east-west.

There was no sufficient information on surface or sub-surface faults from which MCE magnitude can be estimated. Mr. Mualchin recommends a MCE moment magnitude 6-1/2 for this local thrust fault source. The fault is located approximately 12 kilometers south of the site. The Peak Bedrock Acceleration at this site is estimated to be 0.3g. The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting toward or passing directly through the project site.

## **Exploration**

### Drilling, Sampling and Testing

In November 2005, the Office of Geotechnical Design North conducted a subsurface investigation. This investigation involved the drilling of 2 mud rotary boreholes (R-1 and R-2 with depths of 21.34 m and 15.24 m, respectively. Drilling procedures involved advancing a 100-mm core barrel using mud rotary methods by means of a Acker AD2 drill rig. Using this method, continuous samples could be extracted from the holes. The recovered samples were logged and boxed. A boring location map is presented as Plate No. 4.

Based on our examination of the site, along with the above-mentioned studies, the soil present at the site consists (less than 4 meter thick) of silty sand to well graded gravel with cobbles. Bedrock underlies a majority of the project. Unconfined compressive

strengths collected throughout the project site range from 3,633 kPa to 9,082 kPa. Refer to Appendix A for the complete boring logs.

### Geophysical Studies

In order to evaluate the rippability of the rock for the cuts throughout the project seismic testing (shear wave velocity measurements) was performed. Eight seismic refraction lines were performed. The investigation was conducted by the Office of Geotechnical Support-Geophysics and Geology Branch, in October 2005. Due to site restrictions (i.e topography) and equipment limitation the extent of the seismic lines was limited to average depth of 15 m below grade. The investigation concluded that most of the cuts would require moderate to difficult ripping and blasting. Appendix B presents the findings of the seismic testing.

### **Geotechnical Conditions**

#### Natural Slope Stability

The project area consists of rolling terrain with rounded hills and moderately steep drainage channels with slopes as steep as 1:1. The natural slopes in the project area are vegetated with wild grasses and pine tress, with some medium sized brush. Rock outcrops are exposed on several slopes. Based on field observations, the slopes appear to be stable and erosion is minimal.

#### Subsurface Soil Conditions

The majority of the project area has less than 4 m of soil cover. The soil can be predominantly classified as poorly graded silty sand with gravel and cobbles. The soil near the surface is expected to be fairly dry and hard during the summer months but will remain soft and wet throughout the winter months.

#### Rock Conditions

As described previously, the area through which the project will be built passes through one geologic zone. The meta-shale and meta-sandstone is typically fractured and weathered near the surface but becomes more competent with depth. The effort required

for excavation work is discussed in the Rippability and Blasting section of this report, and in the Seismic Refraction Survey for Rippability Evaluation in Appendix B.

## **Water**

### Surface Water

Several unnamed ephemeral creeks carry water during the winter months that cross the alignment in low-lying areas. These creeks may provide for locally higher water tables with in their vicinity.

### Ground Water

Groundwater levels should be assumed to be at the elevation of the Sacramento River. However, groundwater elevations may fluctuate with seasonal precipitation. During the investigation, groundwater was measured at an elevation of 314.0 m in soil boring B-6. However, groundwater elevations may fluctuate as seasonal precipitation changes. Historic high groundwater is at an elevation of approximately 326 m.

### Erosion

As shown on the site topography map, there are many existing slopes within the project boundaries. The 1:1 cuts slopes are semi-vegetated with native vegetation and show no signs of distress. Erosion on the slopes is mild and similar performance can be expected for fill placed for the new alignment providing proper erosion control measures, such as hydroseeding, are utilized.

A soil erodibility factor ( $k$ ) is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. A soil erodibility factor of  $k \cong 0.25$  is recommended for the silty sand present at the site. However, since there are limited amounts of soil throughout the project area, most of the fill used will probably be crushed rock, gravel, and cobbles. For this case, a  $k \cong 0.10$  is recommended.

## Geotechnical Conclusions and Recommendations

### Fill Slopes

For embankment fills, the slope angle will depend upon the materials used for fill. A 1:2 (V:H) or flatter slope is the recommended slope for the crushed meta-shale and meta-sandstone removed from the cuts from Stations 110+70 to 110+90 and 116+80 to 119+60, when constructed in accordance with Caltrans Standard Specification Section 19-5 and 19-6. Due to space constraints, the fill section between approximate STA 103+00 and STA 104+00 may be constructed at 1:1.5 (V:H) or flatter. Erosion control measures should be used on this slope.

Additionally, temporary access roads to be used during construction may have side slopes of 1:1.5 (V:H) or flatter. However, these roads may require additional maintenance and placement of RSP if more than one construction season is required.

### Cut Slopes

Table 1 summarizes the cut locations, heights, and rock types that will likely be encountered.

Table 1: Proposed Cut Slopes

Approximate Cut Limits (Station)	Approx. Maximum Cut Height (m)	Subsurface Material Expected	Recommended Slope	Number of benches (5 m) and steps (3 m)	Method Recommended
Left 104+40 to Left 105+00	30	Soil underlain by Metashale and Metasandstone	1:1	1 bench, 2 steps	Moderate Difficult Ripping to Blasting
Left 105+50 to Left 106+10	18	Soil underlain by Metashale and Metasandstone	1:1	1 bench, 1 step	Easily Ripped to Moderate Ripping
Left 106+70 to Left 107+80	27	Soil underlain by Metashale and Metasandstone	1:1	1 bench, 3 steps	Difficult Ripping to Blasting

Left 107+80 to Left 109+30	30	Soil underlain by Metashale and Metasandstone	1:1	1 bench, 3 steps	Moderate Difficult Ripping to Blasting
Left 109+30 to Left 109+60	27	Metashale and Metasandstone	1:1	1 bench, no steps*	Moderate Difficult Ripping to Blasting
Right 110+00 to Right 110+80	12	Soil underlain by Metashale and Metasandstone	1:1.5 (V:H)	none	Moderate Difficult Ripping

\*no steps due to irregular shaped cut; refer to plan sheet L-4.

### Rockfall

Rockfall from the existing slopes is minimal. However, the new cuts may create some rockfall. The proposed cut slopes contain several 3 m landscape steps and a 5 m maintenance bench, each inclined 15% away from the roadway. In addition, there is 2 m from the toe of the slope to the edge of shoulder (also inclined 15% away from the roadway) and a 3 m shoulder width. These above-mentioned measures are considered adequate to prevent rocks from free falling or bouncing onto the traveled way.

### Settlement

Soils encountered during the field reconnaissance were very thin and did not contain significant amounts of plastic fines. The rock encountered on the site does not contain large, open fractures. As such, settlement due to applied embankment loads is expected to be negligible. We do not suggest earthwork quantities be adjusted to account for settlement.

### Rippability and Blasting

Based upon the rippability investigations, the moderate weathered to fresh meta-shale and meta-sandstone may require some blasting. The silty sand with gravel and cobbles layers, and intensely weathered meta-shale and meta-sandstone are 100% rippable using heavy equipment such as a Cat D9, D10, or D11 dozer equipped with rippers. Refer to Table 1 for the anticipated excavation methods for cut slopes. Rock blasting NSSP will be sent separately.

## Project Information

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

*Data and information attached with the project plans are:*

A. None

*Data and Information included in the Information Handout provided to the bidders and Contractors are:*

A. Geotechnical Design Report for EA 02-378901, dated 7/31/2008.

*Data and Information available for inspection at the District Office:*

A. None

*Data and Information available for inspection at the Transportation Laboratory are:*

A. None

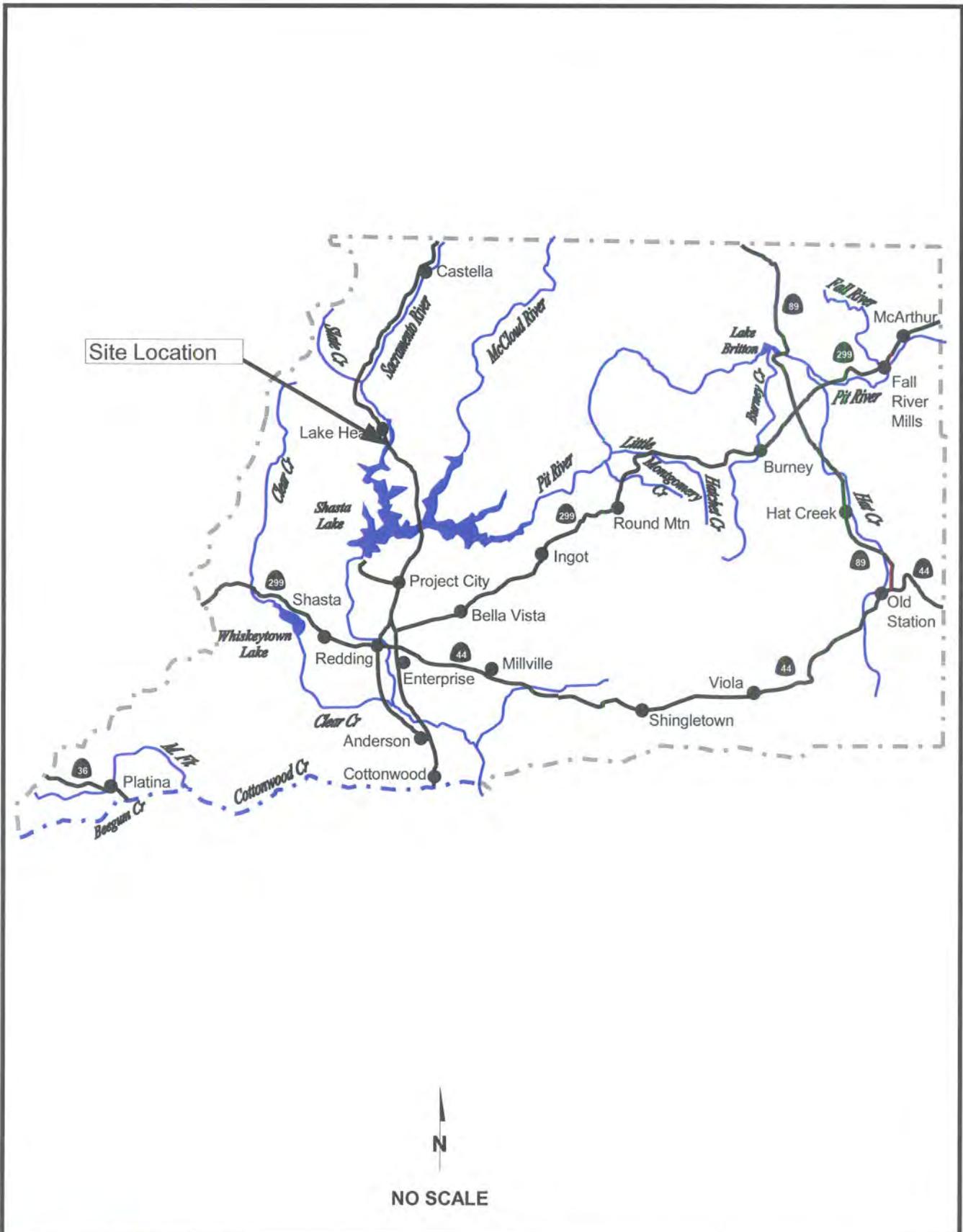
If you have any questions regarding this report, please contact Ben Barnes at 916-227-1039.



BENJAMIN BARNES, P.E.  
Transportation Engineer  
Geotechnical Design - North

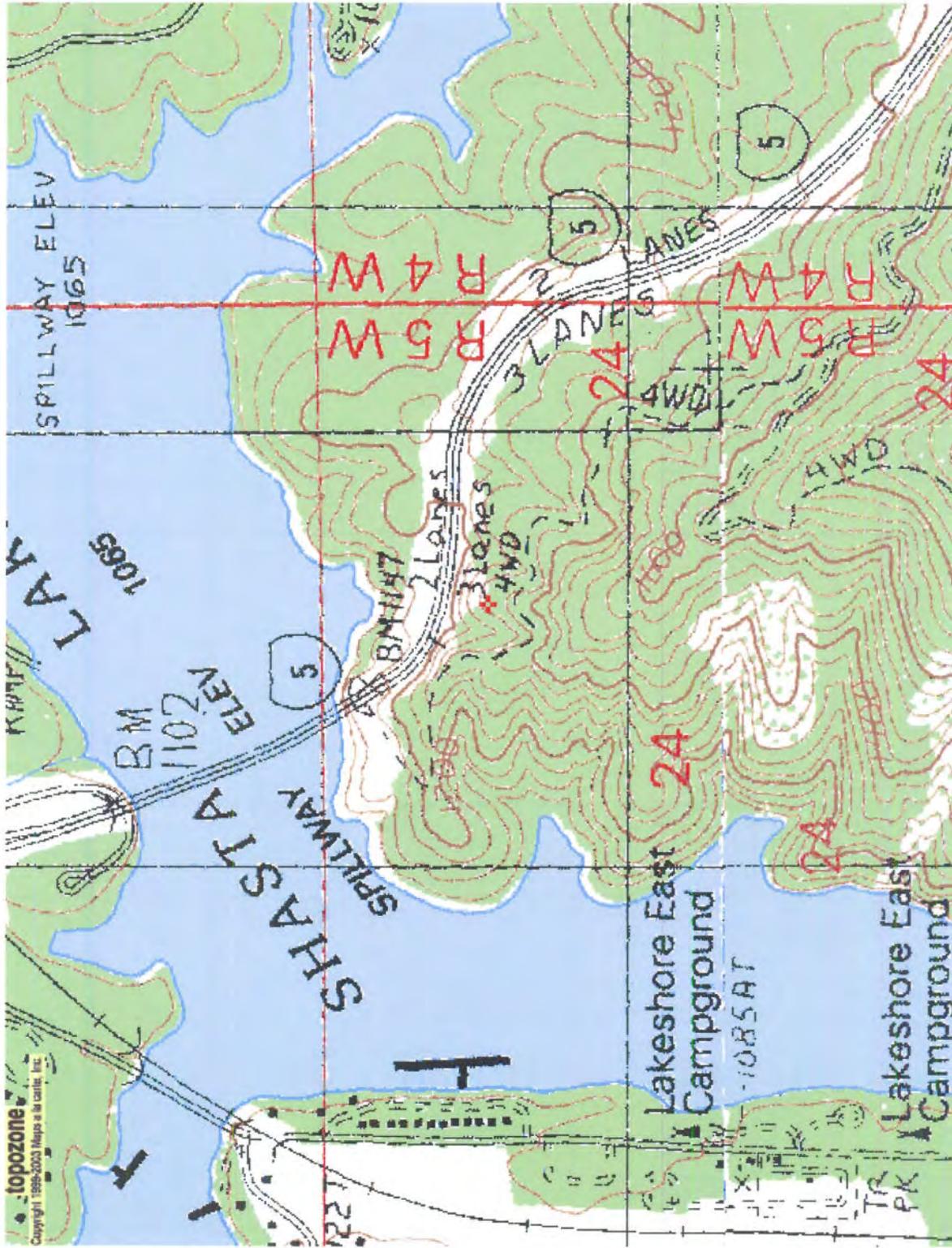


c: Qiang Huang  
GDN File

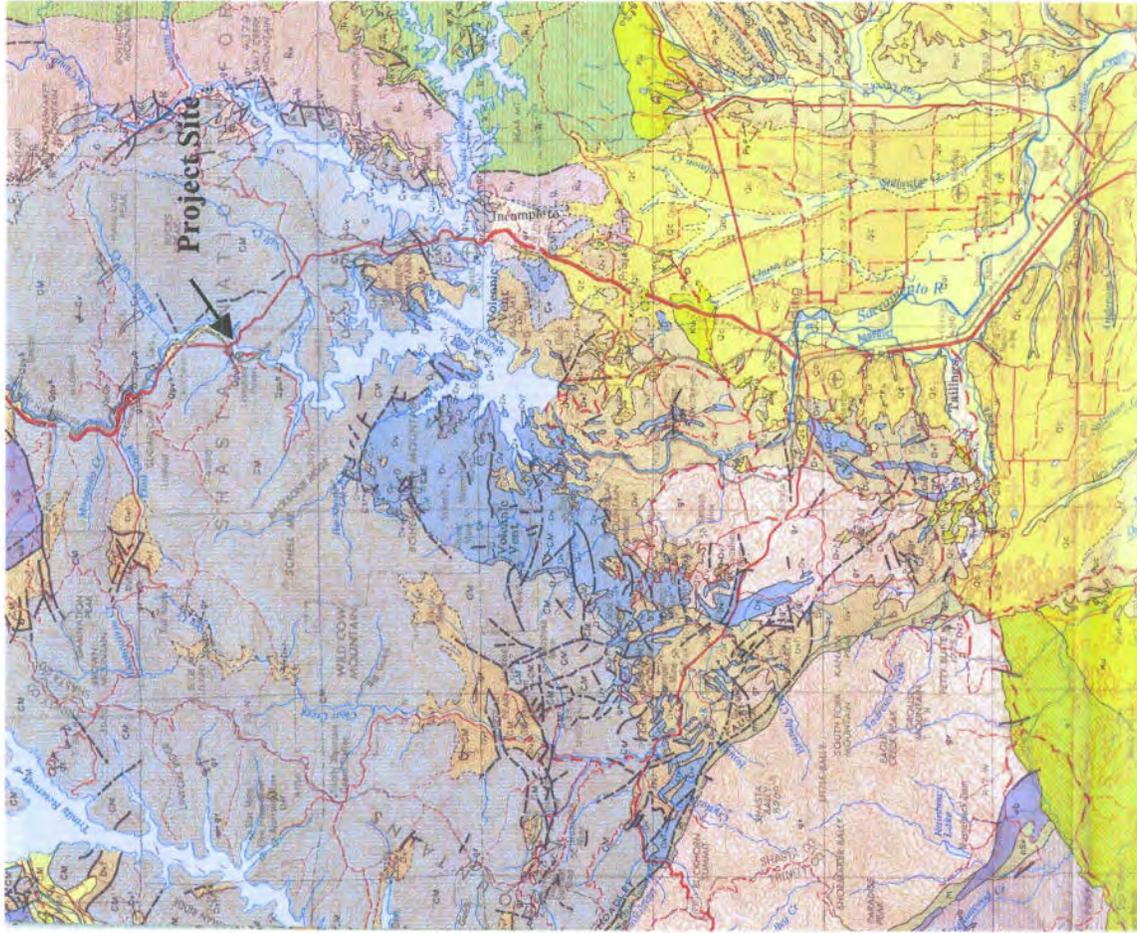


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EA: 02-378901	<b>VICINITY MAP</b>
Date: July 2008	
<b>02-SHA-5 KP 63.8/64.6</b>	
<b>Geotechnical Design Report</b>	PLATE NO. <b>1</b>



 <p>CALTRANS Division of Engineering Services Geotechnical Services Geotechnical Design -North</p>	EA: 02-378901	<b>Topographic Map</b>	
	Date: July 2008		
<p><b>02-SHA-5; KP 63.8/64.6</b> <b>GEOTECHNICAL DESIGN REPORT</b></p>		Plate No. 2	



**EXPLANATION**  
SYMBOLS AND ABBREVIATIONS USED  
LEGENDS AND ABBREVIATIONS USED

QUATERNARY	PLEISTOCENE	PLIOCENE	MIOCENE	TERTIARY	CRETACEOUS	JURASSIC	TRIASSIC	PERMIAN	DEVONIAN	SILURIAN	CAMBRIAN	PRECAMBRIAN
Q1: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q2: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q3: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q4: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q5: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q6: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q7: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q8: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q9: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q10: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q11: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q12: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage	Q13: River terrace, 1st - 4th stage, 1st - 4th stage, 1st - 4th stage

TRIASSIC	PERMIAN	DEVONIAN	SILURIAN	CAMBRIAN	PRECAMBRIAN
T1: Triassic sandstone	P1: Permian sandstone	D1: Devonian sandstone	S1: Silurian sandstone	C1: Cambrian sandstone	P1: Precambrian sandstone



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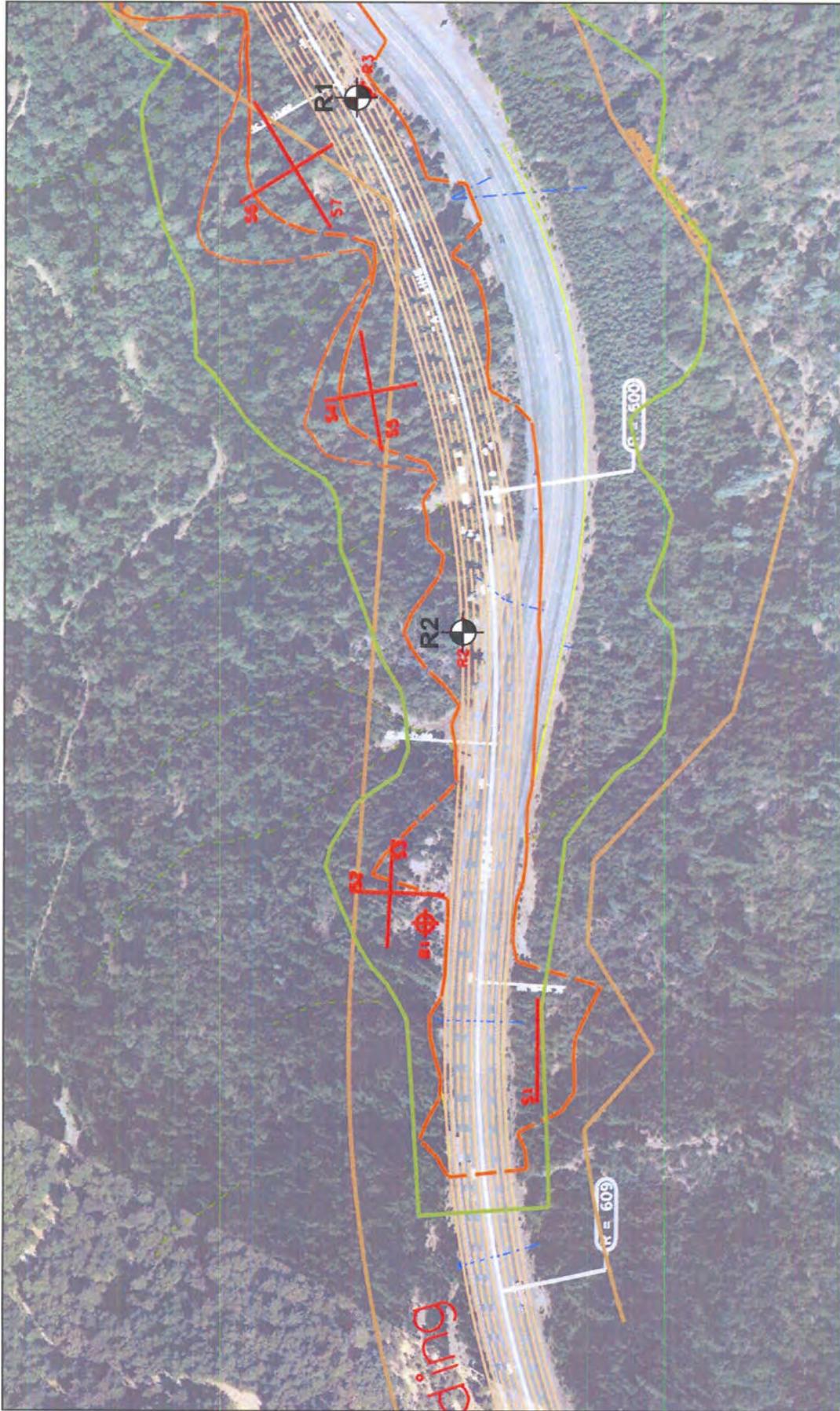
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**02-SHA-5; KP 63.8/64.6**  
**GEOTECHNICAL DESIGN REPORT**

Plate No. 3

**GEOLOGIC MAP**



⊕ Denotes boring location



 CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design -North	EA: 02-378901	<b>Boring Location Map</b>	Plate No. 4
	Date: July 2008		

# **APPENDIX A**

## Boring Logs

**GRAPHIC SYMBOLS**

	Bulk Sample		Auger
	Rock Core		Diamond Core
	Modified California Sampler		Jetting
	Standard Penetration Sampler		Rotary
	Shelby Tube		Water Level - 1st Reading
	Vane Shear		Water Level - 2nd Reading
			Water Level - 3rd Reading

**TESTING**

CONS	Consolidation (Cal Test 219)	RQD	Rock Quality Designation (ASTM D6032)
UU	Unconsolidated Undrained Triaxial (Cal Test 230)	CP	Compaction Test (Cal Test 216)
CU	Consolidated Undrained Triaxial (Cal Test 230)	PERM	Permeability (Cal Test 220)
DS	Direct Shear (ASTM D3080)	COR	Corrosivity Testing (Cal Test 532/643)
UC	Unconfined Compression (Cal Test 221)	GRAD	Gradation Analysis (Cal Tests 202/203)
LL	Liquid Limit-% (Cal Test 204)	EP	Expansion Pressure (Cal Test 354)
PI	Plasticity Index-% (Cal Test 204)	OC	Organic Content-% (ASTM D2974)
PP	Pocket Penetrometer	SE	Sand Equivalent (Cal Test 217)
TV	Pocket Torvane		

**SOIL GRAIN SIZE**

U.S. STANDARD SIEVE													
	12"		3"		3/4"		4		10	40	200		
BOULDERS	COBBLES		GRAVEL			SAND			SILT		CLAY		
			COARSE	FINE	COARSE	MEDIUM	FINE						
	300		75	19	4.75	2	0.425	0.075	0.005				
SOIL GRAIN SIZE (in mm)													

**GENERAL NOTES**

1. Logs represent general subsurface conditions observed at the point of exploration on the date indicated.
2. In general, USCS designations presented on logs were established by visual methods only; therefore, actual designations (based on laboratory tests) may vary.
3. No warranty is provided as to the continuity of soil conditions between individual sample locations.
4. Lines separating strata on the logs represent approximate boundaries only; actual transitions may be different or gradual.
5. Pocket penetrometer values reported on the logs under shear strength are actual values as recorded in the field. (To be used in analysis, the pocket penetrometer value should be divided by two)



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**BORING LOG LEGEND**

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MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS			
			GRAPH	LETTER				
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
		(LITTLE OR NO FINES)		<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
		GRAVELS WITH FINES		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES			
		(APPRECIABLE AMOUNT OF FINES)		<b>GC</b>	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES			
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
			(LITTLE OR NO FINES)		<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES		
		MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES			<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES	
				(APPRECIABLE AMOUNT OF FINES)		<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES	
			FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
							<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY						
SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50			<b>MH</b>	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS			
				<b>CH</b>	INORGANIC CLAYS OF HIGH PLASTICITY			
				<b>OH</b>	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS			
HIGHLY ORGANIC SOILS				<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS			



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### SOIL CLASSIFICATION SYSTEM

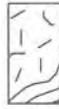
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## SYMBOLS



SEDIMENTARY



METAMORPHIC



IGNEOUS

### DEGREE OF WEATHERING

Descriptor	Criteria
Fresh	Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric.
Slightly weathered	Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. Decomposition extends up to 25.4 mm into rock.
Moderately Weathered	Rock mass is decomposed 50% or less. Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits.
Intensely weathered	Rock mass is more than 50% decomposed. Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water.
Decomposed	Rock mass is completely decomposed. Original rock "fabric" may be evident. May be reduced to soil with hand pressure.

### FRACTURING & FOLIATION (BEDDING)

Fracturing Descriptor*	Foliation (Bedding) Descriptor	Thickness/Spacing Criteria
Unfractured	Massive	None observed
Very slightly fractured		Very thickly foliated
	Between 1 m and 3 m	
Slightly fractured	Thickly foliated	Between 300 mm and 1 m
Moderately fractured	Moderately foliated	Between 100 mm and 300 mm
Intensely fractured	Thinly foliated	Between 30 mm and 100 mm
Very intensely fractured	Very thinly foliated	Between 10 mm and 30 mm
	Laminated (or intensely foliated)	Less than 10 mm (3/8")

\*Note: Spacing criteria for fracturing can refer to general or average recovery length of core measured along core axis; for other exposures, the criteria is distance measured between fracture (size)

### RELATIVE HARDNESS

Descriptor	Criteria
Extremely hard	Core, fragment, or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated hammer blows.
Very hard	Cannot be scratched with knife or sharp pick. Core or fragment breaks with repeated heavy hammer blows.
Hard	Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.
Moderately hard	Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.
Moderately soft	Can be grooved 2 mm (1/16") deep by knife or sharp pick with moderate or heavy pressure. Core or fragment breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved or gouged with fingernail, or carved with a knife. Breaks with light manual pressure.



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**ROCK CLASSIFICATION  
SYSTEM**

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3

Equipment: Acker AD2	Station/KP: 108+51.1	Boring ID.: R-1
Hammer: Safety semi-automatic drop (140#/ 30")	Offset Distance/Line: 7.4Rt./A1	Date Completed: 5-26-05
Drilling Method: Mud Rotary	North/East:	Hole Diameter: 94mm
Sampling Method: Rock Core	Ground Surface Elevation: 389.2m	Total Depth: 21.3m
Notes:	Depth to GW/date measured:	Logged By: C. Avila

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks
388.88	0.30	1		GRAVELLY SILT: dark brown, moist, nonplastic.					50	0					
388.57	0.61	2													
388.27	0.91	3													
387.96	1.22	4													
387.66	1.52	5			METASHALE: light brown, very intensely weathered to decomposed, soft to moderately hard, very intensely fractured. bedding plane at 60°.					50	0				
387.35	1.83	6													
387.05	2.13	7													
386.74	2.44	8													
386.44	2.74	9													
386.13	3.05	10													
385.83	3.35	11								86	0				
385.52	3.66	12													
385.22	3.96	13			METASANDSTONE: brown to medium gray (N5), intensely weathered, moderately hard, intensely fractured.										
384.91	4.27	14													
384.61	4.57	15													
384.30	4.88	16			METASANDSTONE: brown to medium gray (N5), intensely weathered, moderately hard, intensely fractured.					86	0				
384.00	5.18	17													
383.69	5.49	18													
383.39	5.79	19													
383.08	6.10	20													

(continued)



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1a

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks
382.78	6.40	21		vertical fractures.					86	20					
382.47	6.71	22													
382.17	7.01	23													
381.86	7.32	24													
381.56	7.62	25		qu=9063 kPa at elevation 381.71 m. qu = 9070 kPa @ 7.5 m					100	26					
381.26	7.92	26		METASANDSTONE: brown to medium gray (N5), intensely to moderately weathered, moderately hard to hard, moderately fractured, 90° jointed fracture.											
380.95	8.23	27		qu=2658 kPa at elevation 381.26 m. qu = 2660 kPa @ 7.9 m											
380.65	8.53	28													
380.34	8.84	29													
380.04	9.14	30													
379.73	9.45	31		moderately weathered to decomposed, soft to hard, 90° jointed fracture.					86	30					
379.43	9.75	32													
379.12	10.06	33													
378.82	10.36	34													
378.51	10.67	35													
378.21	10.97	36		METASANDSTONE: medium gray (N5), intensely to moderately weathered, moderately hard, intensely fractured, clay in fractures.					100	8					
377.90	11.28	37													
377.60	11.58	38													
377.29	11.89	39													
376.99	12.19	40		qu=3117 kPa at elevation 376.99 m. qu = 3120 kPa @ 12.2 m					86	8					
376.68	12.50	41													
376.38	12.80	42													
376.07	13.11	43													
375.77	13.41	44													

(continued)



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Geotechnical Design Report

1b

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks	
375.46	13.72	45		METASANDSTONE: medium gray to light brown, intensely to moderately weathered, moderately soft to moderately hard, intensely fractured, 90 jointed fracture, fracture open filled with SILTY SAND.					100	0						
375.16	14.02	46														
374.85	14.33	47														
374.55	14.63	48														
374.24	14.94	49														
373.94	15.24	50			METASANDSTONE: medium gray (N5), intensely to moderately weathered, moderately hard to hard, moderately fractured.					94	28					
373.64	15.54	51														
373.33	15.85	52			qu=5210 kPa at elevation 373.3 m. qu = 5210 kPa @ 15.8 m											
373.03	16.15	53														
372.72	16.46	54														
372.42	16.76	55			moderately weathered.					100	28					
372.11	17.07	56														
371.81	17.37	57														
371.50	17.68	58														
371.20	17.98	59														
370.89	18.29	60			METASANDSTONE: medium gray (N5), moderately weathered, moderately hard to hard, intensely to moderately fractured.					96	0					
370.59	18.59	61														
370.28	18.90	62														
369.98	19.20	63														
369.67	19.51	64														
369.37	19.81	65		Interbedded METASANDSTONE and METASHALE: dark gray (N3) to medium gray (N5), intensely to moderately weathered, moderately soft to moderately hard, intensely fractured.					90	0						
369.06	20.12	66														
368.76	20.42	67														
368.45	20.73	68														
368.15	21.03	69														

(continued)



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 Office of Geotechnical Design - North

EA: 02-378901

Date: 11-1-05

Drafted By: B. Barnes

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02-SHA-5

Geotechnical Design Report

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1c

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks
367.84	21.34	70		Intedbedded METASHALE and METASANDSTONE: medium gray to dark gray, decomposed to moderately weathered, soft to moderately hard, intensely fractured.					86	0					
367.54	21.64	71													
367.23	21.95	72													
366.93	22.25	73			METASHALE: dark gray (N3), moderately weathered, hard, intensely fractured.										
366.62	22.56	74													
366.32	22.86	75								74	0				
366.02	23.16	76													
365.71	23.47	77													
365.41	23.77	78													
365.10	24.08	79													
364.80	24.38	80			slightly weathered.					100	20				
364.49	24.69	81													
364.19	24.99	82													
363.88	25.30	83													
363.58	25.60	84													
363.27	25.91	85			Bottom of Hole at 21.34 m (70.0 ft) on 5-26-05										
362.97	26.21	86													
362.66	26.52	87													
362.36	26.82	88													
362.05	27.13	89													
361.75	27.43	90													
361.44	27.74	91													
361.14	28.04	92													
360.83	28.35	93													



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Equipment: <b>Acker AD2</b>	Station/KP: <b>106+69</b>	Boring ID.: <b>R-2</b>
Hammer: <b>Safety semi-automatic drop (140#/ 30")</b>	Offset Distance/Line: <b>.6Lt./A1</b>	Date Completed: <b>5-26-05</b>
Drilling Method: <b>Mud Rotary</b>	North/East:	Hole Diameter: <b>94mm</b>
Sampling Method: <b>Rock Core</b>	Ground Surface Elevation: <b>390.6m</b>	Total Depth: <b>15.2m</b>
Notes:	Depth to GW/date measured:	Logged By: <b>C.Avila</b>

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks
390.28	0.30	1		FILL SILTY SAND with coarse GRAVEL (SM): light brown, dry.											
389.97	0.61	2													
389.67	0.91	3													
389.36	1.22	4													
389.06	1.52	5		Well-graded GRAVEL with COBBLES (GW): dense, dark gray, moist.		1	29	35							
388.75	1.83	6					19								
388.45	2.13	7					16								
388.14	2.44	8													
387.84	2.74	9		SANDY lean CLAY with GRAVEL (CL): medium dense, light brown, moist, slightly plastic.		2	10	16							
387.53	3.05	10					9								
387.23	3.35	11					7								
386.92	3.66	12													
386.62	3.96	13													
386.31	4.27	14													
386.01	4.57	15													
385.70	4.88	16					7	26	50	0					
385.40	5.18	17		METASHALE: light brown, decomposed, very soft, intensely fractured.		9									
385.09	5.49	18				17									
384.79	5.79	19													
384.48	6.10	20													

(continued)



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 Geotechnical Services  
 Office of Geotechnical Design - North

EA: 02-378901

Date: 11-1-05

Drafted By: B. Barnes

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02-SHA-5

Geotechnical Design Report

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2a

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks
384.18	6.40	21		METASHALE: light brown, decomposed, very soft, intensely fractured. (continued)					60	0					
383.87	6.71	22													
383.57	7.01	23													
383.26	7.32	24													
382.96	7.62	25		METASHALE: light brown, intensely weathered to decomposed, very soft to moderately soft, very intensely fractured.					64	0					
382.66	7.92	26													
382.35	8.23	27													
382.05	8.53	28													
381.74	8.84	29		intensely weathered, moderately hard.					34	0					
381.44	9.14	30													
381.13	9.45	31													
380.83	9.75	32													
380.52	10.06	33		METASHALE: light brown, intensely weathered, moderately soft, very intensely fractured.					86	0					
380.22	10.36	34													
379.91	10.67	35													
379.61	10.97	36													
379.30	11.28	37		METASHALE: light brown to dark gray, intensely weathered, moderately soft to moderately hard, intensely fractured.					30	0					
379.00	11.58	38													
378.69	11.89	39													
378.39	12.19	40													
378.08	12.50	41													
377.78	12.80	42													
377.47	13.11	43													
377.17	13.41	44													

(continued)



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EA: 02-378901

Date: 11-1-05

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Geotechnical Design Report

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2b

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (kN/m <sup>3</sup> )	Shear Strength (kPa)	Drilling Method/Casing	Remarks	
376.86	13.72	45		METASHALE: dark gray, moderately weathered, moderately hard to hard, intensely fractured.					100	0						
376.56	14.02	46														
376.25	14.33	47														
375.95	14.63	48														
375.64	14.94	49														
375.34	15.24	50														
				Bottom of Hole at 15.24 m (50.0 ft) on 5-26-05												
375.04	15.54	51														
374.73	15.85	52														
374.43	16.15	53														
374.12	16.46	54														
373.82	16.76	55														
373.51	17.07	56														
373.21	17.37	57														
372.90	17.68	58														
372.60	17.98	59														
372.29	18.29	60														
371.99	18.59	61														
371.68	18.90	62														
371.38	19.20	63														
371.07	19.51	64														
370.77	19.81	65														
370.46	20.12	66														
370.16	20.42	67														
369.85	20.73	68														
369.55	21.03	69														



Department of Transportation  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North

EA: 02-378901

Date: 11-1-05

Drafted By: B. Barnes

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02-SHA-5

Geotechnical Design Report

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2c

# **APPENDIX B**

## Seismic Refraction Investigation and Rippability Evaluation

## Memorandum

*Flex your power!  
Be energy efficient!*

**To:** REID BUELL  
Senior, Transportation Engineer, Branch A  
Geotechnical Design North  
Division of Engineering Services

**Date:** December 30, 2005

**File:** 02-SHA-5-64.6KP  
02-325601

Attn: Claudio Avila

**From:** DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES-MS#5

**Subject:** Seismic Refraction Investigation, Rippability Evaluation at Antler Bridge.

### Introduction

This report documents results of a seismic refraction investigation to determine rippability values within the highly variable Bragdon Formation in the vicinity of the Antler Bridge Replacement Project. Roadway realignment associated with this project (south of the bridge) requires new roadway cuts on the western side (southbound direction). The rippability of the material within the proposed cuts is presented in Table 1 of this report. The seismic lines could not be imaged as laid out on the original plans due to site geometry restrictions, and were re-numbered for clarification

### Results and Conclusions

Table 1 below summarizes the results of the investigation. Models of each seismic line are also presented at the end of this report. Four sites were evaluated for rippability. Two of the four sites required three seismic lines each, and the other two sites required one seismic line. Approximate line locations are shown in Figure 1. Seismic Line S3 indicates unrippable material within 4 meters of the surface. Seismic Lines S5A, S5, and S4 indicate unrippable material within 9 to 15 meters of the surface. Seismic Lines S6, S7A, and S7 did not sample any material that indicates difficult ripping or blasting would be required for its removal. Unrippable material should be expected during construction. Flatter cuts will require removal of larger volumes of unrippable material.

Seismic Line 8 is located over station 111+82.60. Standard seismic refraction methods could not provide the requested data at the depth of interest. Surface exposures of rock prohibited the safe use of explosives as an energy source. Therefore, alternative methods were employed to estimate shear-wave velocities over the entire line length. In order to image as deep as was requested (60

feet), a 120-meter long seismic line was used. A seismic line of this length can provide average S-wave velocities as deep as 100.00 feet. The method uses acquisition of random Rayleigh-wave noise to determine one-dimensional shear wave (S-wave) velocities at a general location. At the site, 20 records were taken for processing. The data were analyzed using SeisOpt software developed by Optim LLC. That software uses the refraction microtremor (ReMi) technique to estimate the averaged one-dimensional S-wave velocity along the recording array. It is important to note that the measured average velocity for Line S8 is a shear wave velocity, whereas all the other velocities listed in Table 1 are P-wave velocities.

**TABLE 1**

Seismic Line	Layer	Average Thickness (m)	Average Velocity (m/s)	Rippability <sup>1</sup>
Line S3	1	.75	462	ER
	2	3.0	1050	MD
	3	N/A	2100	BL
Line S4	1	2.2	384	ER
	2	13.0	989	ER
	3	N/A	1868	DR/LB
Line S5	1	3.0	467	ER
	2	9.5	1098	MD
	3	NA	2100	BL
Line S5A	1	3.0	467	ER
	2	8.0	1208	MD
	3	N/A	1800	MD/LB
Line S6	1	3.0	400	ER
	2	N/A	800	ER
Line S7	1	4.0	400	ER
	2	N/A	1075	MD
Line S7A	1	3.0	380	ER
	2	N/A	1075	MD
Line 8	1	10.5	410	N/A <sup>2</sup>
		8	980	N/A <sup>2</sup>
		N/A	1235	N/A <sup>2</sup>

<sup>1</sup>ER= Easily Ripped,. MD= Moderately Difficult DR/LB=Difficult Ripping/ Light Blasting

BL= Blasting Required NA=Not Applicable. <sup>2</sup> Shear Wave velocities averaged across the profile.

## Rippability

Ripping ability is based on unpublished Caltrans data for a Caterpillar D9 series bulldozer with a single-tooth ripper. These values are as follows:

<b>Velocity (m/s)</b>	<b>Rippability</b>
<1050	Easily Ripped
1050-1500	Moderately Difficult
1500-2000	Difficult Ripping/Light Blasting
>2000	Blasting Required

Different excavation equipment may experience different results. Penetrating efficacy of the ripping tooth is often more important in predicting ripping success than seismic velocity. Undetected blocks or lenses of high-velocity material may also require blasting for excavation.

## Data Acquisition and Processing

Seismic refraction data were recorded using an EG&G Smartseis 24 channel seismograph with 14 MHz geophones. The profiles varied in length from 39 to 48 meters depending on site geometry. Geophone spacing varied from 2 to 5 meters.

Either a Betsy downhole seismic gun or a striker plate was used as the energy source for the survey. The seismic gun was fired in a shallow borehole. The striker plate was placed on the ground surface and struck with a sledgehammer until sufficient energy was recorded. During data acquisition, the profile geometry (shot and geophone locations) was recorded and stored in seismograph memory. Refraction data from each shot were also stored in the seismograph's memory. Five to seven shots were recorded for each profile. Both profile geometry and refraction data were backed-up to paper and floppy disk upon completion of the survey. The attached aerial photo shows the general locations and orientations of the profiles. The seismic lines are staked in the field if exact locations are desired. Elevations used in this report were furnished by District surveyors or were taken from plans.

Except for Line S8 as described above, interpretation of the survey results used the Generalized Reciprocal Method of refraction interpretation (GRM; Palmer, 1980). The method can accommodate variation in refractor velocity and depth along the seismic line, is relatively insensitive to refractor dip (up to 20 degrees), and can accommodate hidden layer conditions (where supporting borehole data exist).

Viewseis was used to analyze and interpret the refraction data. This is a commercially developed program that uses the GRM method for interpretation and presentation of refraction data. This method calculates refractor depths for each geophone location, using overlapping refraction arrival times from both forward and reverse shots. Accuracy of the GRM method relies on data from both forward and reverse shots, and on the selection of an optimum XY value. XY is

defined as the distance of separation, measured at the surface, where forward and reverse seismic waves originate from the same point on the refractor. Where incomplete refractor coverage exists, the refractor can be modeled using the standard intercept-time method of interpretation (ITM), but with comparatively reduced accuracy. ITM models typically are less robust and tend to overestimate seismic velocity.

In addition to the intercept-time method of interpretation, two methods of GRM interpretation can be used: the approximate velocity (AP) and the average velocity (AV) method. The approximate velocity method is relatively insensitive to selection of the optimum XY. However, this method requires that every refractor above the target be defined. The average velocity method is very sensitive to optimum XY selection and is, therefore, normally used only where supporting borehole information exists. However, the average velocity method does not require that every refractor above the target be known. The type of line drawn for the refractor represents the method used for interpretation. ITM interpretations are shown as a solid line, GRM interpretations are drawn as a series of arcs—the envelope formed by the locus of interconnecting points at the base of these arcs represents the “best fit” model for the refractor.

The refraction data were transferred from the seismograph to the Viewseis program via floppy disks. Utilizing the Viewseis program, initial P-wave arrivals were picked for the seismic line and refractor layers assigned. GRM analyses were then performed. Resulting travel-time curves, velocity models, and depth sections are presented in this report. Layer velocities, thicknesses, and rippabilities are summarized in Table 1. Average velocities and thicknesses are approximate and were estimated from velocity models and depth sections.

Profiles in this report are presented in terms of velocity units. A velocity unit is a three-dimensional unit, which due to its elastic properties and density, propagates seismic waves at a characteristic velocity or within a characteristic velocity range. Velocities denoted in this report and in the seismic refraction sections are expressed in meters per second. At least one velocity is present within a geological rock unit. In addition, each zone of weathering, or fracturing within that geological unit can constitute its own velocity unit. Conversely, when two rock units such as water saturated gravel and moderately weathered rock propagate seismic waves at the same velocity and are adjacent to each other, both units would be part of the same velocity unit. Lastly, discontinuous velocities might result from variation in the degree of alteration in the form of physical and chemical weathering and should be considered in the interpretation of the data.

Thank you for the opportunity to work on this project. If you have any questions or need additional assistance, please contact me at (916) 227-1307 or Bill Owen at (916) 227-0227.

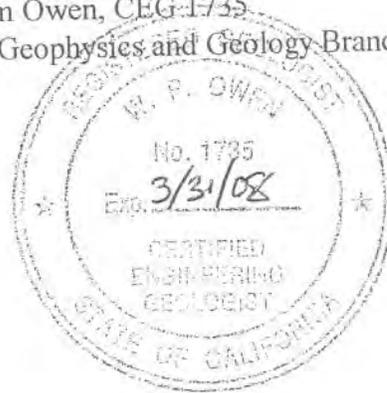
Report by:

Dennison Leeds  
Engineering Geologist  
Geophysics and Geology Branch

Reviewed By:



William Owen, CEG-1735  
Chief, Geophysics and Geology Branch



### References

Stephens, E., 1978, Calculating earthwork factors using seismic velocities, California Department of Transportation, Report No. FHWA-CA-TL-78-23

c: Project File.  
dl/WO/AntlerBridge SRReport.doc

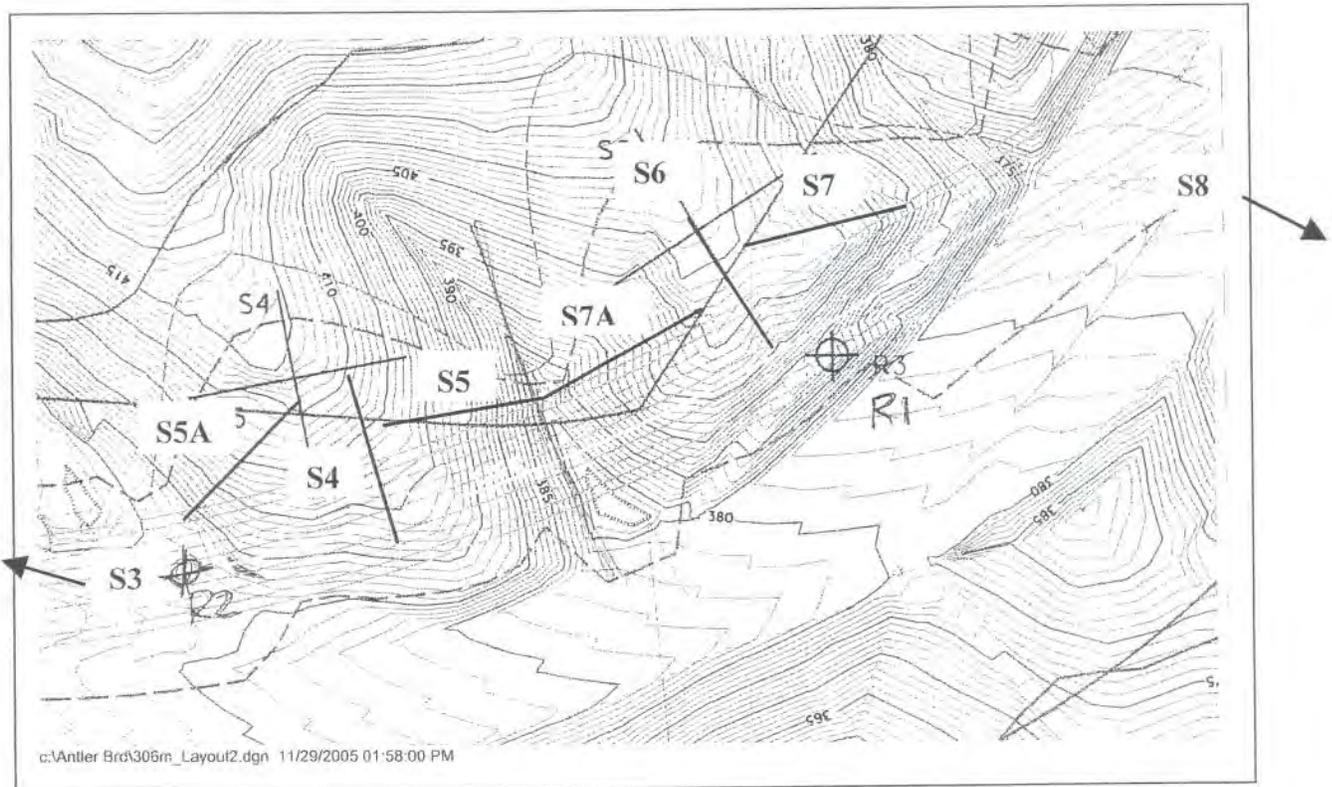


Figure 1. Location map showing actual line locations and their assigned line numbers.

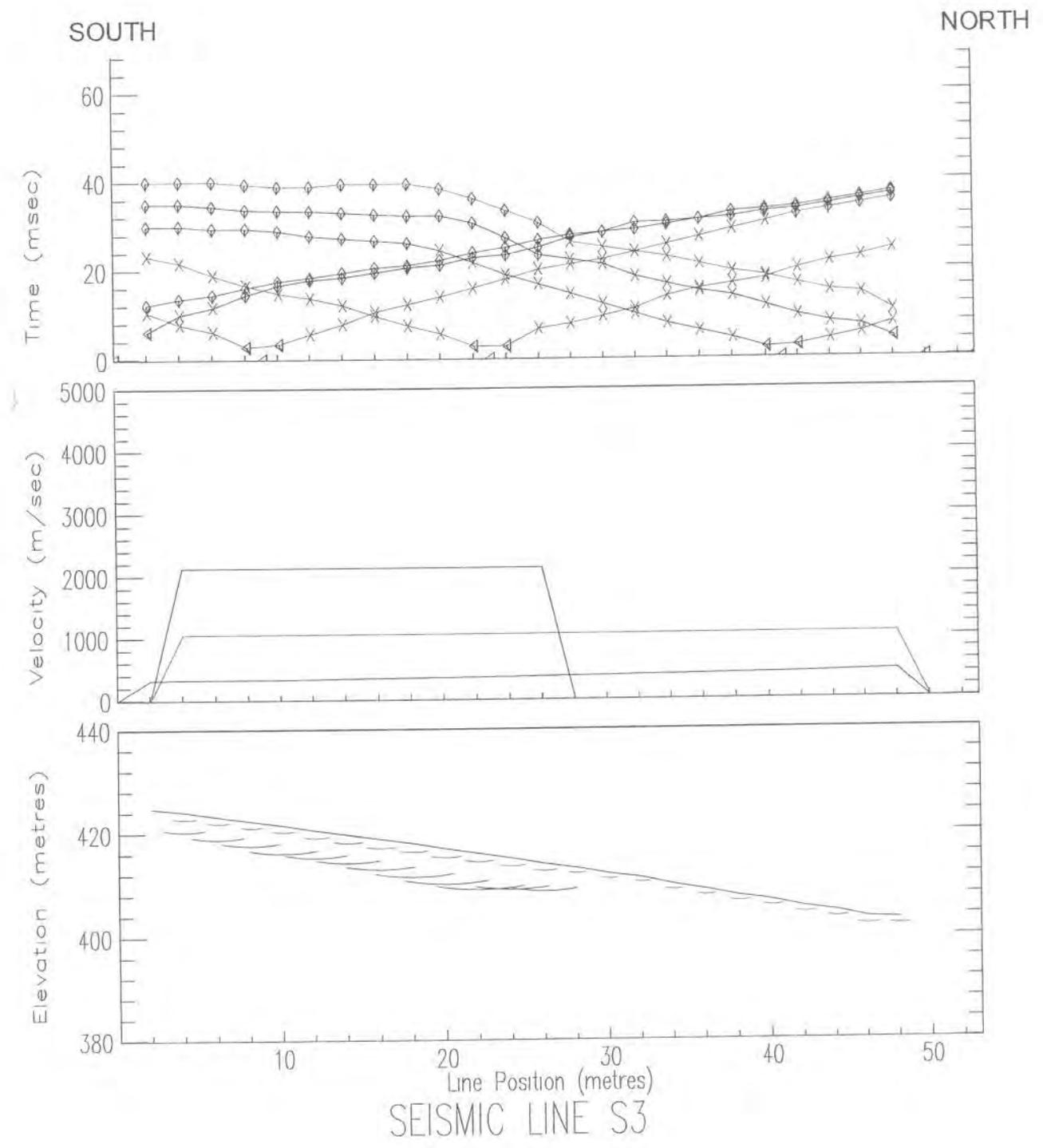
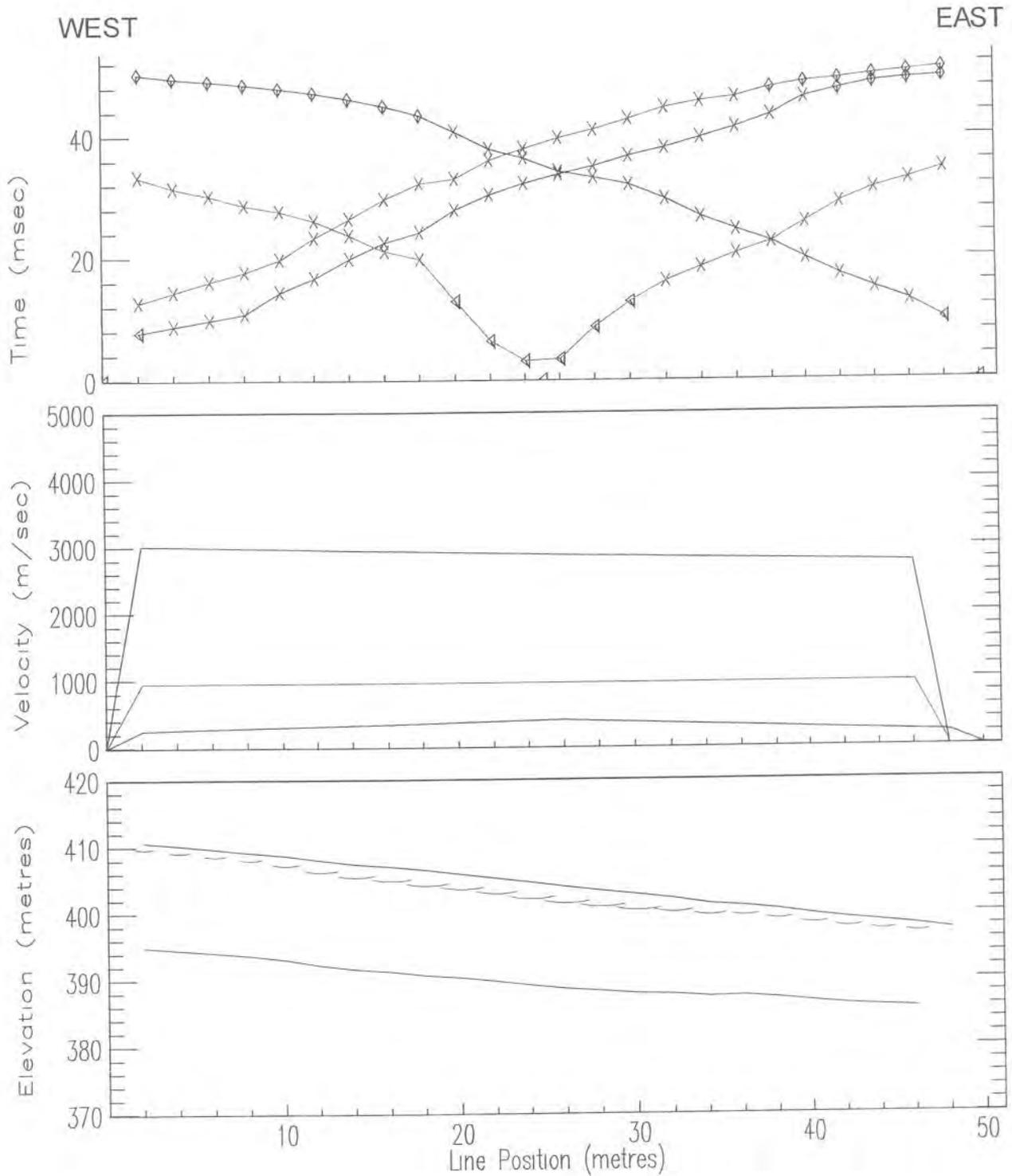


Figure 2. Travel-time curve, velocity model and depth section for Seismic Line S3



### Seismic Line S-4

Figure 3. Travel-time curve, velocity model, and depth section for Seismic Line S-4.

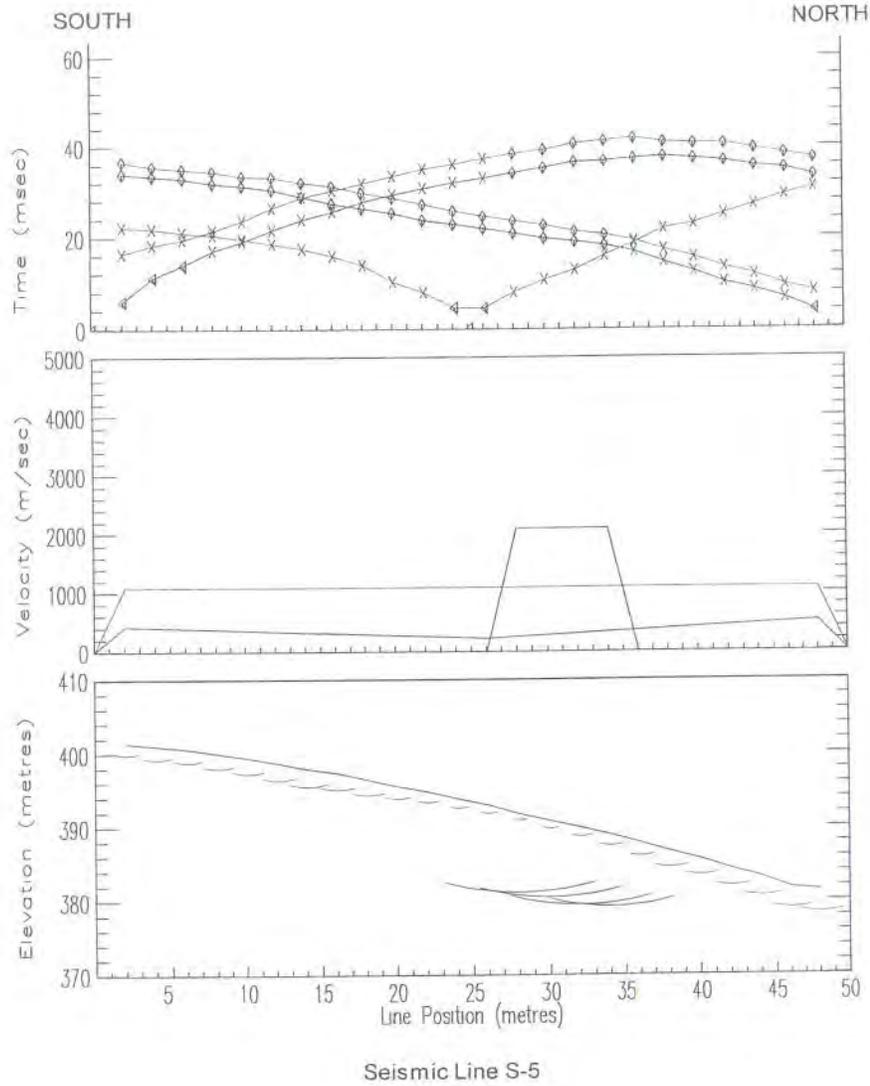


Figure 4 Travel-time curve, velocity model and depth section for Seismic Line S5

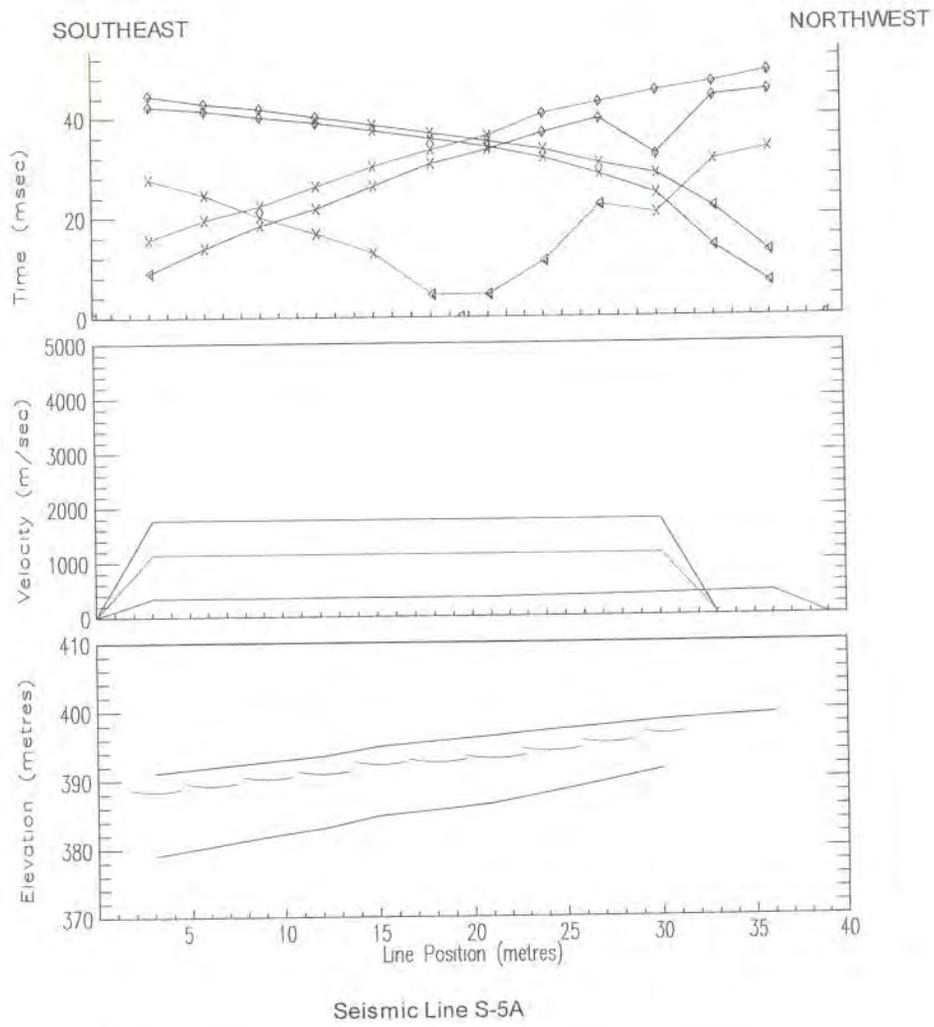
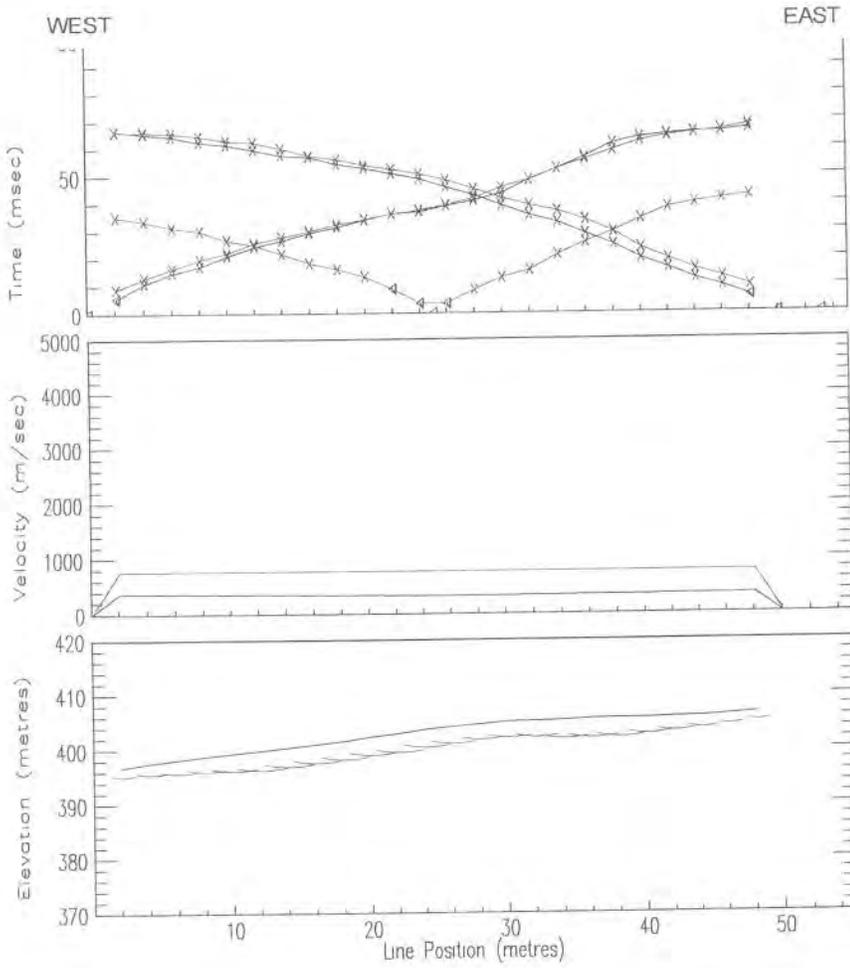
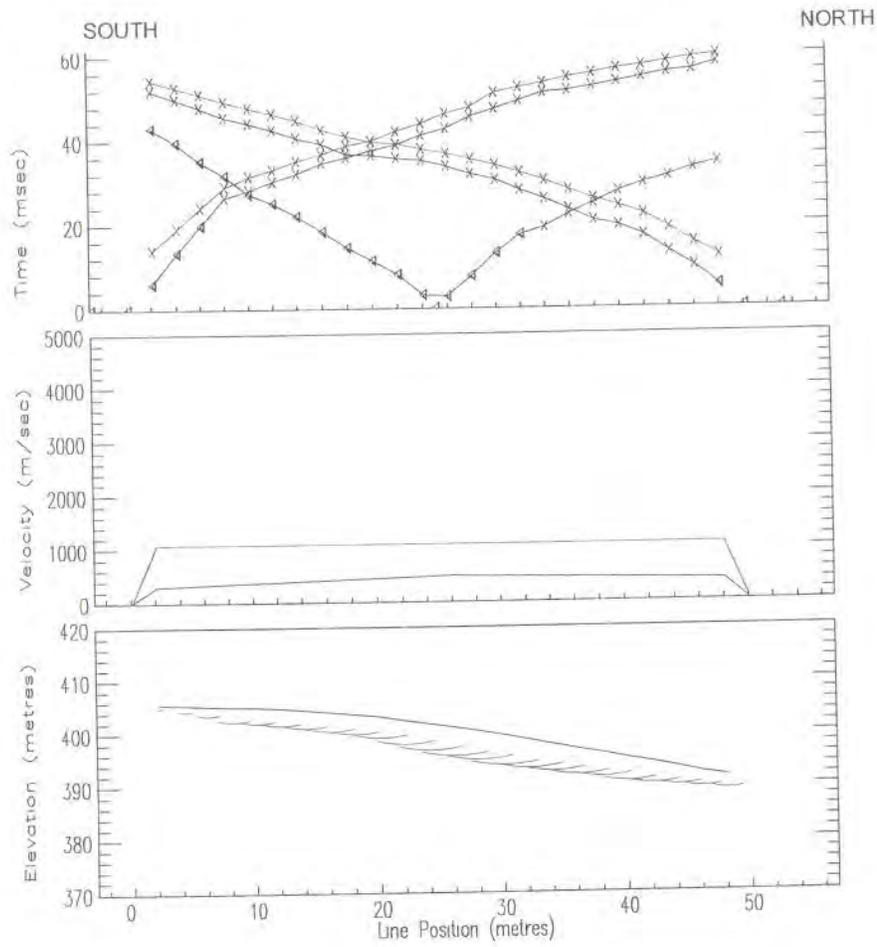


Figure 5. Travel-time curve, velocity model, and depth section for Seismic Line 5A



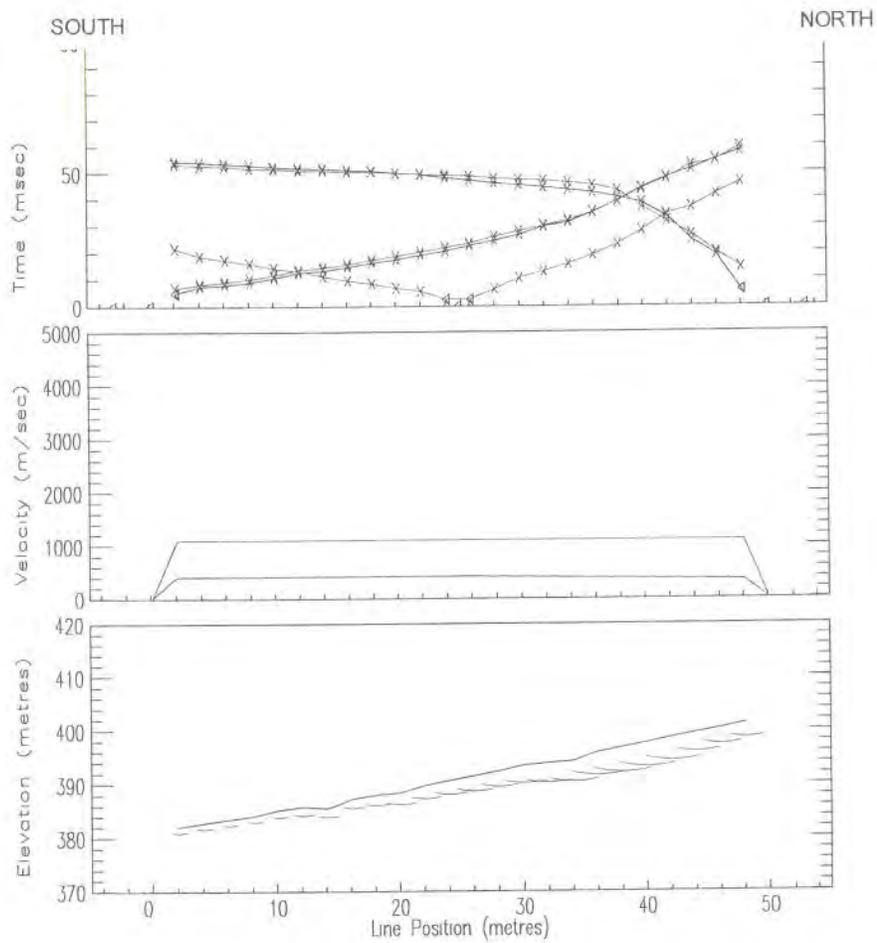
Seismic Line S-6

Figure 6. Travel-time curve, velocity model, and depth section for Seismic Line S6.



Seismic Line S-7

Figure 7. Travel-time curve, velocity model and depth section for Seismic Line S7.



Seismic Line S-7A

Figure 8. Travel-time curve, velocity model and depth section for Seismic Line 7A

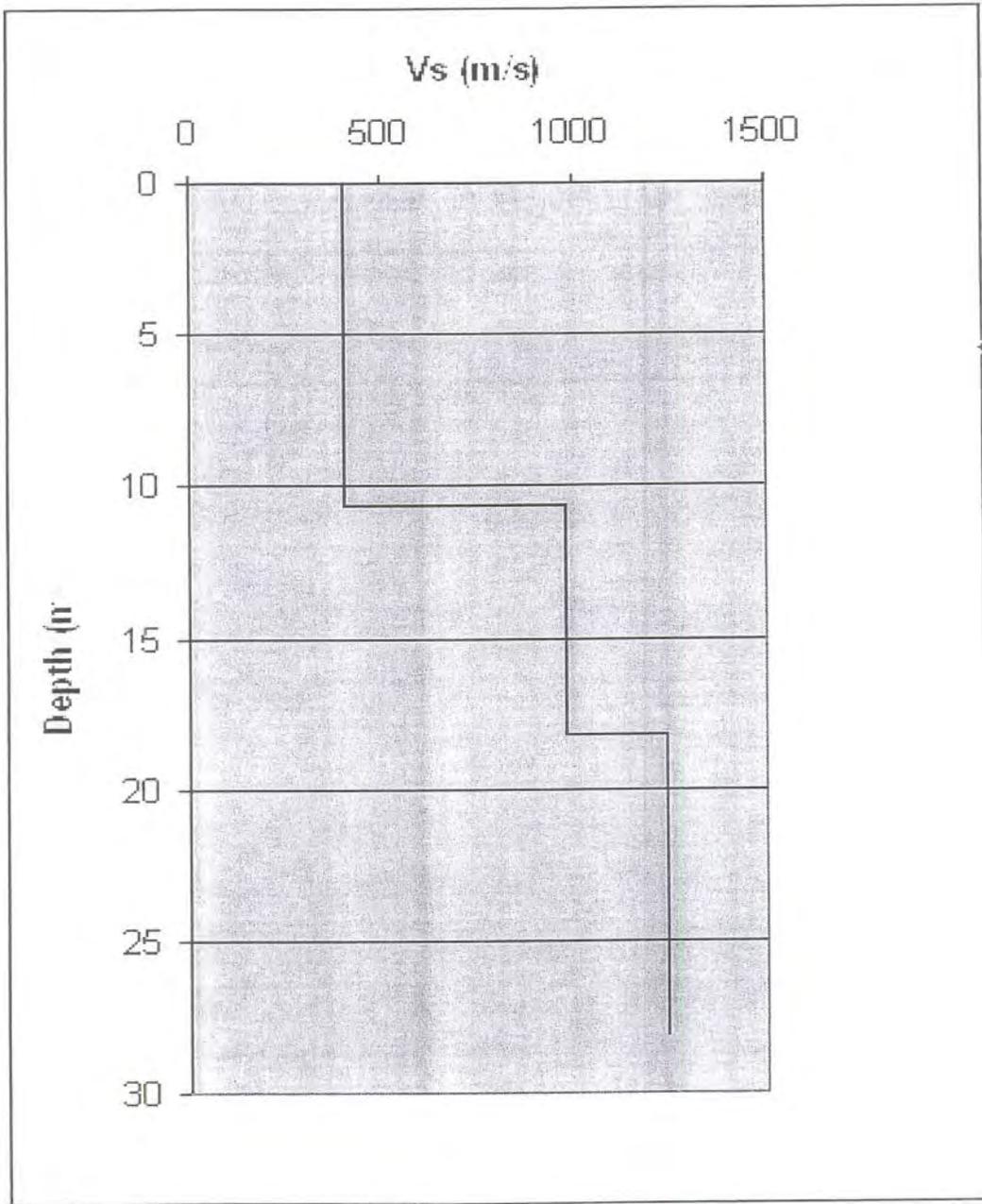


Figure 9. profile of the average shear wave velocity across Seismic Line 8.



**National Marine Fisheries Service  
Southwest Region**

**JUVENILE FISH SCREEN CRITERIA  
FOR PUMP INTAKES**

**Developed by  
National Marine Fisheries Service  
Environmental & Technical Services Division  
Portland, Oregon  
May 9, 1996**

**ADDENDUM  
JUVENILE FISH SCREEN CRITERIA FOR PUMP INTAKES**

Developed by  
National Marine Fisheries Service  
Environmental & Technical Services Division  
Portland, Oregon  
May 9, 1996

The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

**Definitions used in pump intake screen criteria**

**Pump intake screens** are defined as screening devices attached directly to a pressurized diversion intake pipe.

**Effective screen area** is calculated by subtracting screen area occluded by structural members from the total screen area.

**Screen mesh opening** is the narrowest opening in screen mesh.

**Approach velocity** is the calculated velocity component perpendicular to the screen face.

**Sweeping velocity** is the flow velocity component parallel to the screen face with the pump turned off.

**Active pump intake screens** are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean.

**Passive pump intake screens** have no cleaning system and should only be used when the debris load is expected to be low, and

- 1) if a small screen (less than 1 CFS pump) is over-sized to eliminate debris impingement, and
- 2) where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and
- 3) if the maximum diverted flow is less than .01% of the total minimum streamflow, or
- 4) the intake is deep in a reservoir, away from the shoreline.

### **Pump Intake Screen Flow Criteria**

The **minimum effective screen area** in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (CFS) by an approach velocity of **0.4 feet per second (FPS)**. The **minimum effective screen area** in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in CFS by an approach velocity of **0.2 FPS**. Certain site conditions may allow for a waiver of the 0.2 FPS approach velocity criteria and allow a passive screen to be installed using 0.4 FPS as design criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 FPS for active pump intake screens, or 0.4 FPS for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

### **Pump Intake Screen Mesh Material**

Screen mesh openings shall not exceed **3/32 inch (2.38 mm)** for woven wire or perforated plate screens, or **0.0689 inch (1.75 mm)** for profile wire screens, with a **minimum 27% open area**. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed **1/4 inch (6.35 mm)** for woven wire, perforated plate screens, or profile wire screens, with a **minimum of 40% open area**.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

### **Pump Intake Screen Location**

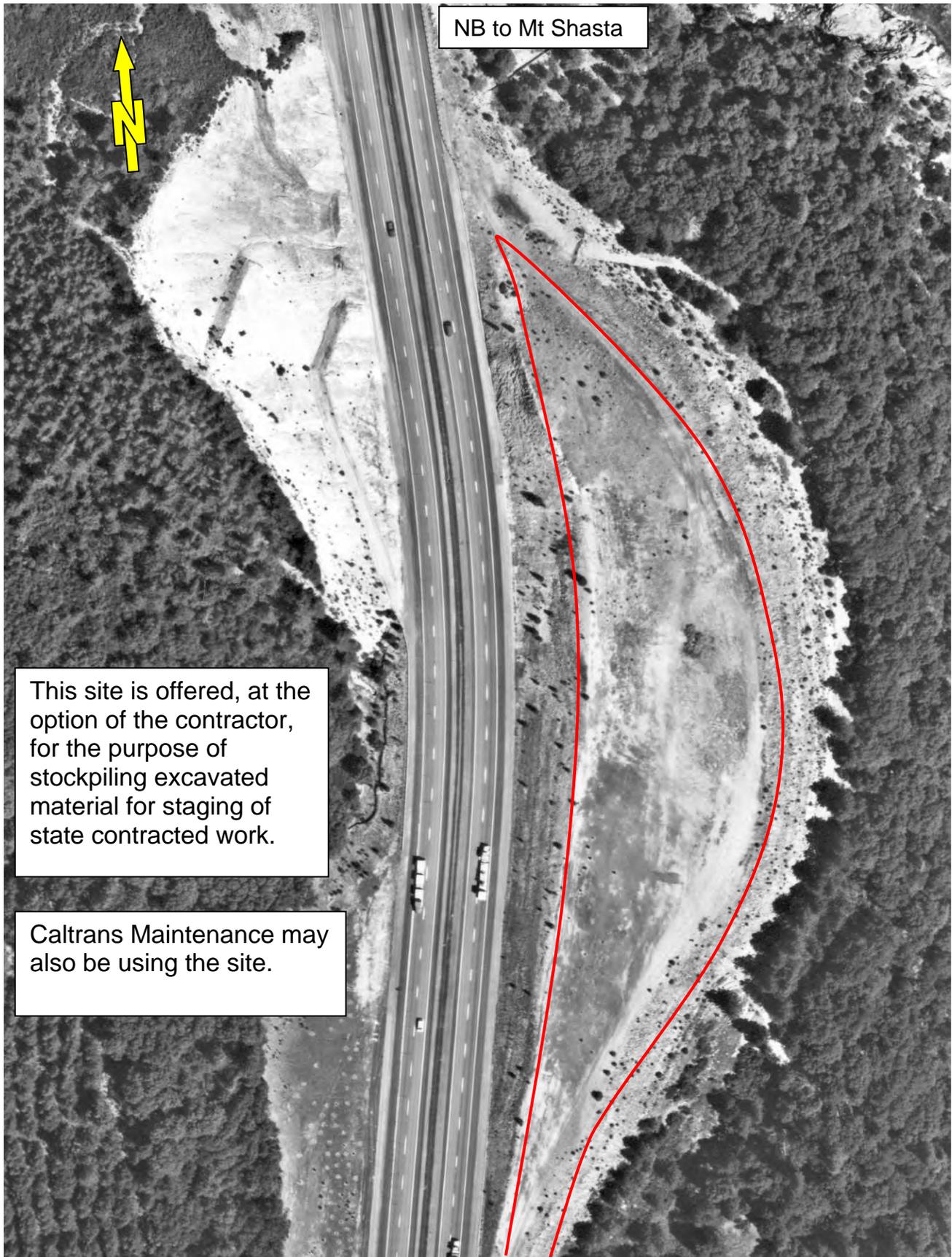
When possible, pump intake screens shall be placed in locations with **sufficient sweeping velocity** to sweep away debris removed from the screen face. Pump intake screens **shall be submerged** to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A **clear escape route** should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

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**Pump Intake Screen Protection**

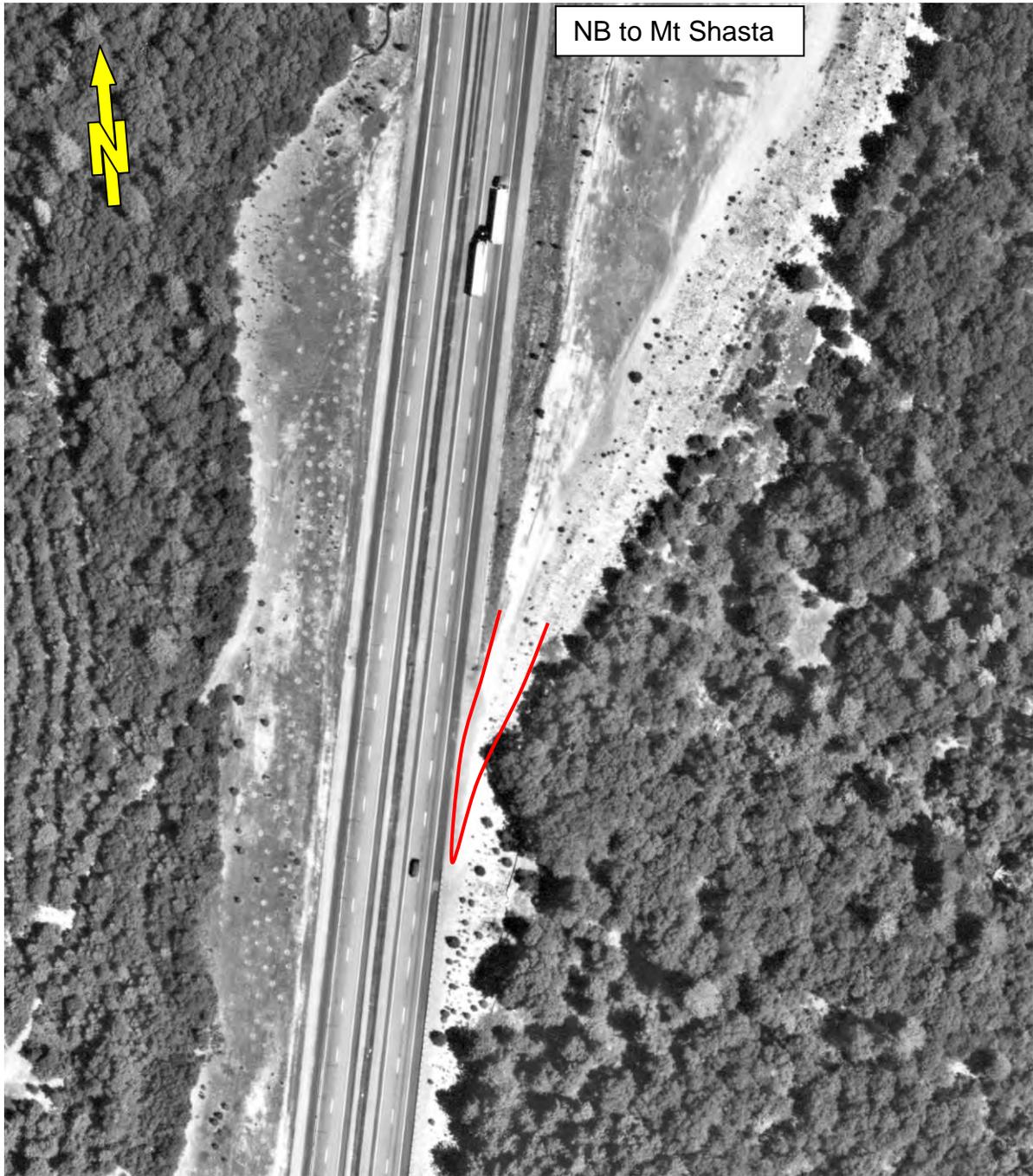
Pump intake screens **shall be protected** from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An **inspection and maintenance plan** for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.

# Stockpile Site Sha-I-5 PM 44.1/ KP 71.0

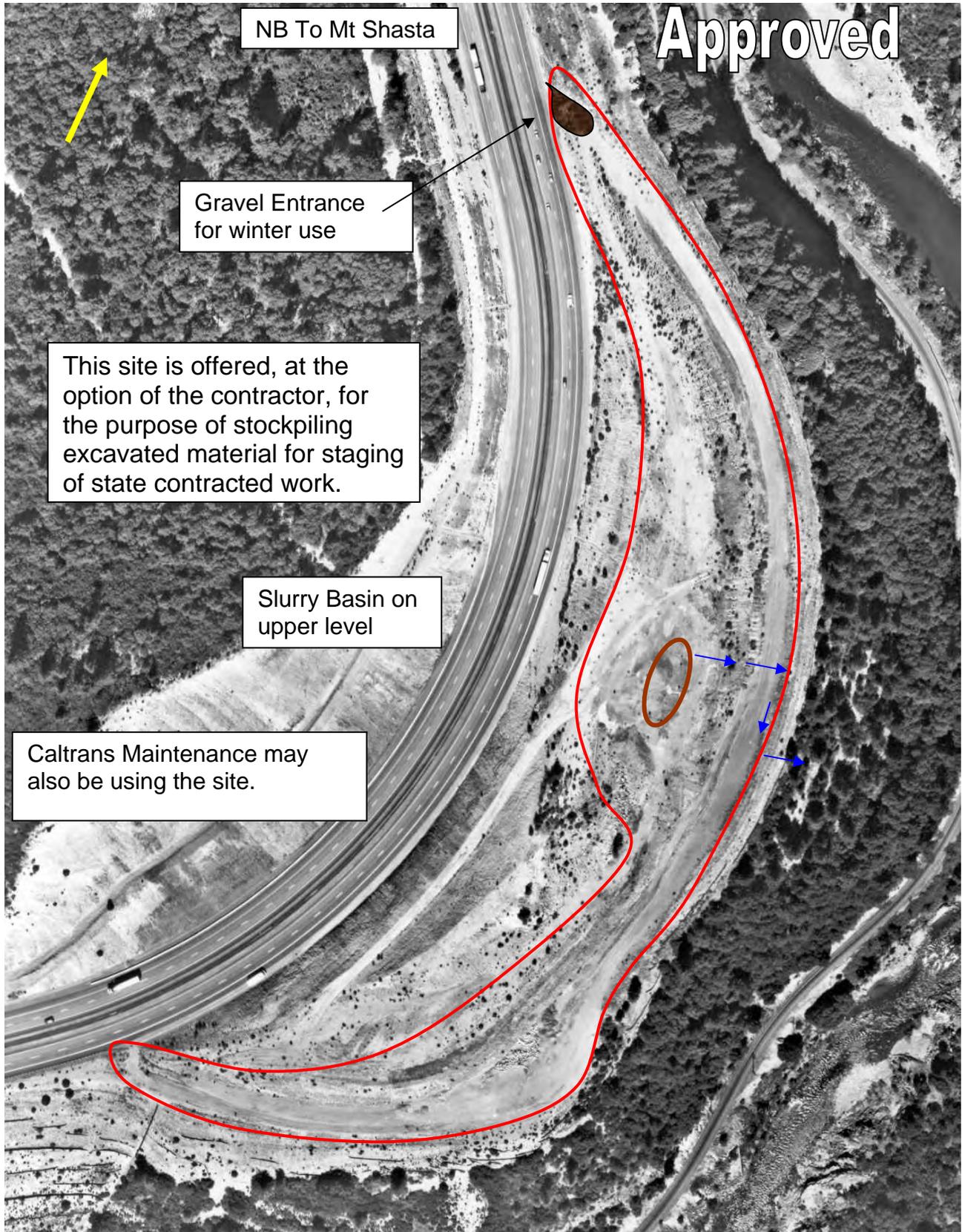


This site is offered, at the option of the contractor, for the purpose of stockpiling excavated material for staging of state contracted work.

Caltrans Maintenance may also be using the site.



# Stockpile Site Sha I-5 PM 45.0 / KP 72.4





## Antlers Bridge Design Criteria

Version 2.0, July 31 2008

Br. No. 06-0210

EA: 02-378901



(Note: Numbered sections of this Criteria generally conform to the numbering of the LRFD code. Sections marked "unchanged" have not been modified.)

### 1. INTRODUCTION

- 1.1. This *Antlers Bridge Design Criteria* applies to the cast-in-place prestressed segmental concrete box girder bridge constructed by the balanced cantilever method.
- 1.2. The bridge shall be designed in accordance to the *AASHTO LRFD Bridge Design Specifications*, Third Edition, with Interims and Caltrans Amendments up to 2006 (*LRFD*).
- 1.3. In addition to the *LRFD*, pertinent sections of the following codes and criteria are to be used unless otherwise noted or revised in this Design Criteria:
  - *AASHTO Guide Specifications For Design and Construction of Segmental Concrete Bridges*, Second Edition 1999 with 2003 Interims (*AASHTO Seg*), *Caltrans Seismic Design Criteria*, Version 1.4, June 2006 (*SDC*)
  - *Caltrans Bridge Memo to Designers (MTD)*
- 1.4. Platforms, ladders, and accessories inside the box girder shall be designed to the 2007 California Building Code (CBC).
- 1.5. Some details included in the *Standard Plans* and Standard Drawing Sheets were created using Load Factor Design or Working Stress Design. These details remain acceptable under the *Antlers Bridge Design Criteria*.
- 1.6. Attention is directed to the following project-specific reports prepared by Caltrans:
  - Final Foundation Recommendations, dated July 31, 2008
  - Supplement (Pile Load Test) to the Final Foundation Recommendations, dated July 31, 2008
  - Final Seismic Design Recommendations and Soil Springs, dated October 6, 2006
  - Revised Lateral Resistance and PY Curves, Report dated July 31, 2008
  - Final Hydraulic Report, dated August 5, 2005

### 2. GENERAL DESIGN & LOCATION FEATURES

#### 2.1. Unchanged

#### 2.2. Unchanged

#### 2.3. Location Features

##### 2.3.1. Operational Importance

2.3.1.1. The Antlers Bridge is categorized as an Important Bridge (*MTD* 20-1) and a Critical Bridge (*LRFD* 3.10.3)

2.3.1.2. For all limit states, the Operational Importance Factor (*LRFD* 1.3.5),  $\eta_I = 1.0$ .

##### 2.3.2. Bridge Site Arrangement

###### 2.3.2.1. Future Dam Raising

The bridge shall be designed to accommodate the raising of Shasta Lake to a future full pool elevation 332.2 m (NAVD88)

###### 2.3.2.2. Traffic Safety

Bicycle traffic shall be carried on the roadway shoulders.

No provisions are required for the safe passage of boats under the bridge.

##### 2.3.3. Clearances

The bridge shall meet the following navigational clearances:

Horizontal: 83 m minimum span length over Shasta Lake

Vertical: greater than 9.1 m average vertical clearance above the future full pool elevation (Article 2.3.2.1).

#### 2.4. Unchanged

#### 2.5. Design Objectives

##### 2.5.1. Seismic Performance

- 2.5.1.1. The Seismic Performance Criteria for Important Bridges shall apply. (*MTD* 20-1)
- 2.5.1.2. Safety-Evaluation Ground Motion (*SEE*)
- 2.5.1.2.1. The ground motion shall be assessed deterministically using the attenuation confidence specified in Article 3.10.
- 2.5.1.2.2. "Repairable Damage" should not require closure of the bridge and should be sufficiently limited that the structure can be restored essentially to its pre-earthquake condition without replacement of main structural members or their reinforcement. Damage should be limited to:
- Failed abutment backwall and shear keys.
  - Failed expansion joints.
  - Inelastic response resulting in minor concrete cracking, reinforcement yield, and minor spalling of cover concrete in columns. The column reinforcement will not buckle or rupture.
  - Small permanent deformations, not interfering with serviceability of the bridge.
- 2.5.1.3. Functional-Evaluation Ground Motion (*FEE*)
- 2.5.1.3.1. The ground motion shall be assessed probabilistically as specified in Article 3.10.
- 2.5.1.3.2. "Minimal Damage" shall not disrupt traffic on the bridge. Although minor inelastic response may occur, the bridge shall remain essentially elastic (*MTD* 20-1) and permanent deformations are not apparent. Postearthquake damage should be limited to narrow cracking in concrete.
- 2.5.1.4. Earthquake During Construction
- 2.5.1.4.1. The ground motion shall be assessed probabilistically as specified in Article 3.10.
- 2.5.1.4.2. "No Collapse" performance: significant damage shall be allowed, with a minimum risk of collapse.

## 2.5.2. Serviceability

### 2.5.2.1. General

- 2.5.2.1.1. As an important bridge with little opportunity for deck replacement, the service life shall be in excess of 100 years.
- 2.5.2.1.2. During its service life, the Antlers Bridge will be subjected to temperature extremes, freeze thaw cycles, chain wear, road salts, high ADTT, and increasing traffic volumes.
- 2.5.2.1.3. The Bridge is located in the severe California State Highway Environmental Area III (*MTD* 8-2).

### 2.5.2.2. Durability

The design shall include the following measures to improve durability and minimize the whole-life costs of the bridge:

- High performance concrete with low permeability
- High performance concrete curing methods
- Transverse post tensioning in the deck\*
- No tension stress in the deck at the service limit state\* (Article 5.2)
- 60 mm cover over top reinforcing in the deck
- Epoxy-coated reinforcement (purple) in the deck, stirrups, and barrier
- 20 mm polyester concrete overlay
- Deck corrosion detection instrumentation
- Structural continuity: Deck access openings and intermediate expansion joints are not permitted.

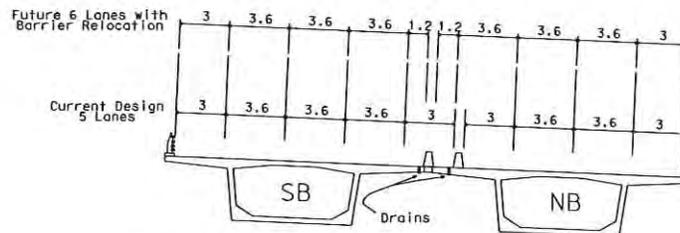
\*Transverse post tensioning and the no-tension requirement do not apply to the longitudinal closure strip.

### 2.5.2.3. Instrumentation

The bridge shall include the following instrumentation systems to quantitatively assist long-term life-cycle and bridge management decisions:

- ~~Health Monitoring instrumentation~~ (Deleted 8/2/07.)

- ~~Deck Corrosion Detection instrumentation (Deleted 8/2/07.)~~
  - Seismic Strong Motion instrumentation
- 2.5.2.4. Unchanged (Rideability)
- 2.5.2.5. Utilities
- 2.5.2.5.1. Systems to be carried
- AT&T Fiber Optic
  - Bridge Interior Lighting
  - ~~Navigation Lighting (Deleted 6/21/07.)~~
  - Instrumentation (Article 2.5.2.3)
  - Hoist Trolley
  - Future Utilities
- 2.5.2.5.2. Structural Details for Utilities
- 2.5.2.5.2.1. Utilities shall remain serviceable after the Safety Evaluation seismic event.
- 2.5.2.5.2.2. Anchors for utility hangers shall be cast-in threaded anchors; drilled anchors are not permitted in prestressed elements unless their penetration is less than or equal to 50 mm..
- 2.5.2.6. Unchanged (Deformations)
- 2.5.2.7. Consideration of Future Widening
- 2.5.2.7.1. No provisions are required for the future addition of a bridge widening.
- 2.5.2.7.2. Traffic projections anticipate future restriping to a 6 lane configuration with 1.2 m inside shoulders as shown in Figure 2.5.2.7.2-1.



**Figure 2.5.2.7.2-1 Future Lane Configuration**

**2.5.3. Constructibility**

Water Levels in Shasta Lake will vary due to manmade and natural causes. The bridge design should be constructible under all possible variations in water level (Article 2.6).

**2.6. Hydrology & Hydraulics**

**2.6.1. General**

The Hydraulic design requirements are based on the use of large diameter CIDH shaft extensions. With this foundation type in Shasta Lake, the Final Hydrology & Hydraulics Report finds that the bridge is not Scour Critical for the Design Flood.

**2.6.2. Site Data**

2.6.2.1. The design water levels vary annually and seasonally between elevations NAVD88 Elevation 256.0 (drought year) and elevation 326.0 (full pool).

2.6.2.2. The design shall accommodate the anticipated upgrade of Shasta Dam, raising the future design water level to Elevation 332.3 (future full pool).

**2.6.3. Unchanged**



**2.6.4. Unchanged**

**2.6.5. Unchanged**

**2.6.6. Roadway Drainage**

**2.6.6.1. General**

Roadway drainage shall discharge through the deck directly into Shasta Lake. No provisions are required for carrying stormwater within the bridge.

**2.6.6.2. Design Storm**

Drainage systems shall be designed for a peak rainfall intensity of 180 mm/hr.

**2.6.6.3. The drainage design shall accommodate the future relocation of the median barrier (Figure 2.5.2.7.2-1).**

**2.6.6.4. Surface water shall not be allowed to flow through the median barrier.**

**2.7. Bridge Security**

**2.7.1. The bridge shall include the following Bridge Security measures:**

- Locked gates on service roads beneath the bridge
- Tamper-resistant locks on soffit access openings on the main girder
- Screened soffit vents (also used for bat exclusion)

**2.7.2. The bridge design shall not consider bomb blast loading.**

**2.7.3. Additional threat mitigation will be included in a future Security Retrofit project.**

**3. LOADS AND LOAD FACTORS**

**3.1. Unchanged**

**3.2. Unchanged**

**3.3. Unchanged**

**3.4. Load Factors and Load Combinations**

**3.4.1. Unchanged**

**3.4.2. Load Factors for Construction Loads**

**3.4.2.1. Construction load combinations in *LRFD* Table 5.14.2.3.3-1 shall apply to the superstructure at the service limit state**

**3.4.2.2. Construction load factors in *LRFD* Article 3.4.2.1 shall apply to the superstructure and substructure at the strength limit state. The construction loads in *LRFD* Article 5.14.2.3.2 shall be included.**

**3.5. Permanent Loads**

**3.5.1. Dead Loads**

**3.5.1.1. DC**

DC shall be based on a unit weight of concrete (including rebar) of 24.3 kN/m<sup>3</sup> (155 lb/ft<sup>3</sup>).  
(*AASHTO* Seg 7.4.1)

**3.5.1.2. DW**

DW loads applied to the structure after completion of the segmental construction shall include the following:

- Polyester Concrete Overlay
- Utilities and Services 1.50 kN/m per box girder
- Future wearing surface 1.00 kPa

**3.6. Live Loads**

**3.6.1.1. Unchanged**

**3.6.1.2. Design Vehicular Live Load**

- 3.6.1.2.1. The high percentage of truck traffic (31-35% of ADT) does not require an increase in the design lane load.
- 3.6.1.2.2. The design lane load shall not be decreased for span lengths up to 200 m.

3.6.1.3. Application of Design Vehicular Live Loads

- 3.6.1.3.1. The wheel load for transverse deck design shall be increased by 25%, to 90 kN (HS-25 loading)
- 3.6.1.3.2. The Strength II load combination shall not include any HL-93 live load.
- 3.6.1.3.3. The load factor for live load combined with seismic loading (Extreme Event I) shall be  $\gamma_{EQ}=0.0$ .
- 3.6.1.3.4. It is not necessary to show live load distribution coefficients on the contract plans.

**3.7. Water Loads**

- 3.7.1. The design water level for all limit states varies. See Article 2.6.2.
- 3.7.2. Scour in Shasta Lake should not be considered for all limit states. See Article 2.6.1.
- 3.7.3. Seismic seiche effects in Shasta Lake are inconsequential and should not be considered in the design.

**3.8. Wind Load**

- 3.8.1. Horizontal Wind Pressure
  - 3.8.1.1. The base wind velocity shall be  $V_B = 130$  kph.

**3.9. Unchanged (Ice Loads)**

**3.10. Earthquake Effects**

**3.10.1. General**

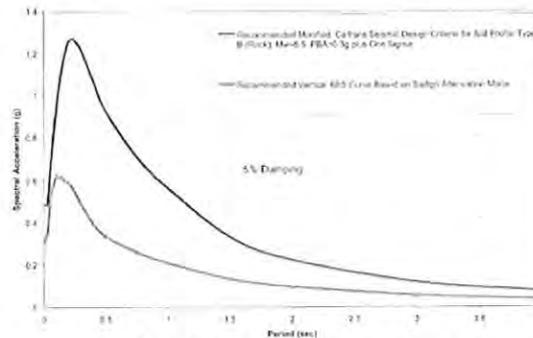
- 3.10.1.1. Two levels of seismic ground motion shall be considered, the Safety-Evaluation Ground Motion and the Functional-Evaluation Ground Motion. (MTD 20-1)
- 3.10.1.2. Attention is directed to Article 2.5.1, Seismic Performance.

**3.10.2. Ground Motions**

**3.10.2.1. Keswick Fault description**

**3.10.2.2. Safety-Evaluation Ground Motion (SEE)**

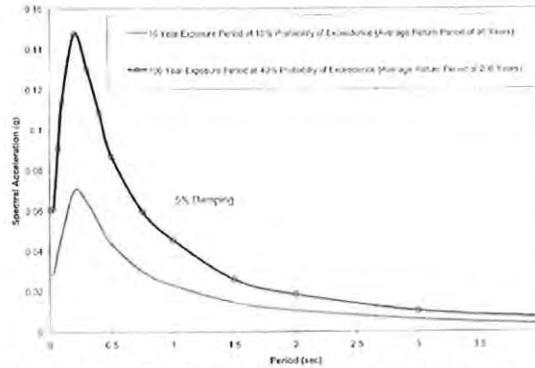
The horizontal and vertical design loadings on the completed structure shall be based on a site-specific determination of the Maximum Credible Earthquake. The associated Acceleration Response Spectrum (ARS) shall be the elastic, 5% damped curve with mean plus one sigma (84%) attenuation confidence.



**Figure 3.10.2.2-1 Safety-Evaluation ARS Curve**

**3.10.2.3. Functional-Evaluation Ground Motion (FEE)**

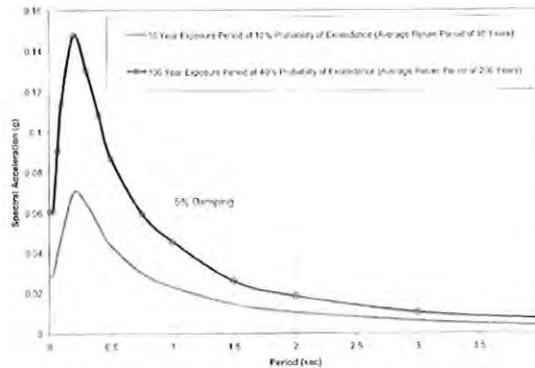
The horizontal and vertical design loadings on the completed structure shall be based on a probabilistic ground motion with a 40% probability of exceedence during its service life (Article 2.2.5.1.1). The associated Acceleration Response Spectrum (ARS) shall be the elastic, 5% damped curve.



**Figure 3.10.2.3-1 Functional-Evaluation ARS Curve**

**3.10.2.4. Construction Earthquake**

During segmental construction, the horizontal and vertical design loadings on the partially completed structure shall be based on a probabilistic ground motion with a 10% probability of exceedence in 10 years (*MTD* 20-12). The associated Acceleration Response Spectrum (ARS) shall be the elastic, 5% damped curve.



**Figure 3.10.2.4-1 Construction ARS Curve**

**3.10.3. Importance Categories**

See Article 2.3.1.

**3.10.4. Unchanged**

**3.10.5. Unchanged**

**3.10.6. Unchanged**

**3.10.7. Response Modification Factors**

The R-factor shall be taken as 1.0 for all components under the FEE.

**3.10.8. Unchanged**

**3.10.9. Unchanged**

**3.10.10. Requirements for Temporary Bridges and Stage Construction**

See Article 2.5.1.4.

**3.11. Unchanged (Earth Pressure)**



**3.12. Force Effects Due to Superimposed Deformations**

**3.12.1. Unchanged**

**3.12.2. Uniform Temperature**

The design temperature range for calculating forces in the structure (TU) shall be 22.2°C rise or fall from the assumed construction temperature. The design temperature range accounts for the lag between the air temperature and the interior of massive concrete members or structures.

**3.12.3. Unchanged (Temperature Gradient)**

**3.12.4. Unchanged**

**3.12.5. Creep**

Creep and Shrinkage effects (CR&SH) shall be evaluated for all load combinations on both a young and an old structure. The "young structure" shall be at the time when all closures have been made. The "old structure" shall be a minimum of 30 years old.

**3.12.6. Unchanged (Settlement)**

**3.13. Unchanged (Friction Forces)**

**3.14. Vessel Collision**

3.14.1. Shasta Lake does not meet the interstate or foreign commercial requirements of USACE 33 *CFR Part 329*, which defines navigability of a waterway. *LRFD* 3.14 shall not apply.

3.14.2. Pier protection systems for pleasure boats are not required (*LRFD* C3.14.2)

**3.15. Special Construction Loads**

**3.15.1. Construction Equipment**

The assumed form traveler loading (CE) for the contract plans analysis shall be as follows:

Traveler weight	533 kN (120 kips)
Formwork	175 kN (39 kips)
Center of gravity	<u>Traveler only</u> : 1.35 m in front of the leading edge of supporting segment. <u>Forms only</u> : ½ formed segment in front of the leading edge of supporting segment.

The Contractor shall base the structural analysis on the actual form traveler equipment to be used on the job.

**3.15.2. Interior Transport Load**

The typical section shall be designed to support a prestress tensioning jack transported inside the box girder by floor dolly or by a ceiling-mounted crane rail. The design load (including IM=33%) shall be assumed to be a 25 kN concentrated load. As an element of future construction, this load shall be applied as "DC" in combination with the Service I and Strength I limit states.

**3.15.3. Closure Forces**

The structure shall accommodate erection tolerances of L/1000 (where L is the cantilever length from center of pier to the cantilever tip.) Structure stresses assuming uncracked sections shall be included as a component of "EL" in *LRFD* Equation 3.4.1-2.

**4. STRUCTURAL ANALYSIS & EVALUATION**

All construction, live, and permanent load cases shall be analyzed using three-dimensional structural analysis software.

The bridge shall be designed to meet the SEE displacement ductility requirements of the Caltrans Seismic Design Criteria using three-dimensional elastic dynamic analysis and inelastic static analysis.

Seismic demands associated with the FEE shall be calculated using three-dimensional elastic dynamic analysis.

## 5. CONCRETE STRUCTURES

### 5.1. Unchanged

### 5.2. Unchanged

### 5.3. Unchanged

### 5.4. Material Properties

#### 5.4.1. Unchanged

#### 5.4.2. Normal Weight Concrete

##### 5.4.2.1. Compressive Strength

The specified 28-day concrete strength shall not exceed  $f'_{c28} = 48$  Mpa unless verified through physical tests on the Contractor's concrete mix design.

##### 5.4.2.2. Shrinkage and Creep

###### 5.4.2.2.1. General

The effects of shrinkage and creep shall be estimated using the provisions of the 1990 CEB-FIP Model Code, using:

- average relative humidity = 65%
- average ambient temperature = 20°C
- Type II Modified Portland Cement
- Medium water/cement ratio

###### 5.4.2.2.2. Creep

###### 5.4.2.2.3. Shrinkage

Shrinkage reducing admixtures may be used to enable the concrete performance predicted by the CEB-FIP Model Code.

##### 5.4.2.3. Modulus of Elasticity

The 28-day modulus of elasticity shall be calculated by *LRFD* Eq. 5.4.2.4-1 with  $K_1 = 1.0$ , or as verified by mix-specific physical tests.

#### 5.4.3. Unchanged (Reinforcing Steel)

#### 5.4.4. Unchanged (Prestressing Steel)

### 5.5. Limit States

#### 5.5.1. Unchanged (General)

#### 5.5.2. Unchanged (Service Limit State)

#### 5.5.3. Unchanged (Fatigue Limit State)

#### 5.5.4. Unchanged (Strength Limit State)

#### 5.5.5. Extreme Event Limit State

##### 5.5.5.1. Functional-Evaluation Event

The resistance factors for the FEE shall be those specified for the strength limit state in *LRFD* 5.5.4.2.

##### 5.5.5.2. Safety-Evaluation Event

The resistance factors for the SEE shall be 1.0.

### 5.6. Design Considerations

### 5.7. Design for Flexural and Axial Force Effects

At the strength and extreme limit states for permanently cased portions of pile shafts, the maximum usable concrete strain may be taken as  $\epsilon_c = 0.005$ . The casing shall not be considered as part of the reinforcement, and composite action between the steel casing and the concrete core shall not be used to develop flexural strength.

**5.8. Shear and Torsion****5.8.1. Superstructure Girders**

The shear design shall be based on LRFD 5.8.3, using the Modified Compression Field Theory. The AASHTO Guide Specifications for shear (LRFD 5.8.6) shall not apply.

**5.8.2. Shear in CIDH shafts and rock sockets**

See section 10.5.4 (Extreme Limit State)

**5.8.3. Girder Stirrups**

Stirrups in girder webs shall be designed for the longitudinal shear and torsion ( $A_v$ ) and the out of plane bending from the transverse box girder analysis ( $A_f$ ). The minimum area of steel should not be less than the larger of the following combinations of the two effects:

- a)  $A_v + 0.5A_f$
- or b)  $0.5A_v + A_f$
- or c)  $0.7(A_v + A_f)$

(*Construction and Design of Prestressed Concrete Segmental Bridges*, Podolny & Muller, page 203)

**5.9. Prestressing and Partial Prestressing****5.9.1. Unchanged (General Design Considerations)****5.9.2. Unchanged (Stresses Due to Imposed Deformation)****5.9.3. Unchanged (Stress Limitations for Prestressing Tendons)****5.9.4. Stress Limits for Concrete****5.9.4.1. (Unchanged) For Temporary Stresses Before Losses****5.9.4.2. For Stresses at Service Limit State After Losses**

## 5.9.4.2.1. Unchanged (Compression Stresses)

## 5.9.4.2.2. Tension Stresses in Prestressed Concrete at Service Limit State After Losses

## 5.9.4.2.2.1. Tension in the prestressed box girder

Tension at top surface of prestressed deck: No tension

Tension in other areas:  $0.25\sqrt{f'_c}$  MPa

## 5.9.4.2.2.2. Tension in the longitudinal closure strip

Tension at top surface:  $0.25\sqrt{f'_c}$  MPa

Tension at bottom surface:  $0.50\sqrt{f'_c}$  MPa

**5.10. Unchanged****5.11. Unchanged****5.12. Durability**

5.12.1. All reinforcement in the concrete deck shall be protected against chloride-induced corrosion with epoxy-coating (purple).

5.12.2. The minimum concrete cover shall meet the "non-corrosive" provisions in LRFD Table 5.12.3-1 (amended by Caltrans) except that the top surface of the concrete deck shall have 60 mm cover to resist chain wear and corrosive attack by deicing salts and snow runoff.

**5.13. Unchanged****5.14. Unchanged****5.15. Seismic Design and Detailing****5.15.1. General**

5.15.1.1. The Caltrans *Seismic Design Criteria* shall govern design for the Safety-Evaluation Ground Motion.

5.15.1.2. The LRFD shall govern design for the Functional-Evaluation Ground Motion.

5.15.1.3. Attention is directed to Article 2.5.1, Seismic Performance.

**5.15.2. Superstructure Flexural Strength (MTD 20-6)**

5.15.2.1. The superstructure shall be designed to resist the internal forces generated when the structure has reached its Collapse Limit State in the longitudinal direction. Any prestressing steel used to satisfy MTD 20-6 shall be stressed to at least  $0.3f_{su}$  to prevent wedge slip.

5.15.2.2. The MTD 20-6 recommended minimum mild steel reinforcement (#25 @ 300 mm top and bottom) shall not apply.

5.15.2.3. The "service splice" requirements for mild steel may be satisfied with a double length lap splice.

**5.15.3. Column and Pile Shaft Design**

**5.15.3.1. Safety-Evaluation Event**

5.15.3.1.1. Concrete strains shall be limited to  $\epsilon_c = 0.67\epsilon_{cu}$  where  $\epsilon_{cu}$  is the ultimate concrete strain according to the Mander model.

5.15.3.1.2. Reinforcement strains shall satisfy the reduced ultimate values of SDC 3.2.3.

5.15.3.1.3. Minimum Local Displacement Ductility Capacity (SDC 3.1.4.1)

For this long-period structure on large diameter CIDH extensions, the minimum displacement ductility capacity shall be  $\mu_C = 2.5$ .

**5.15.3.2. Functional-Evaluation Event**

5.15.3.2.1. Concrete strains shall be limited to  $\epsilon_c = 0.004$ . For cased portions of CIDH shafts, see Article 5.7.

5.15.3.2.2. Reinforcement strains shall be limited to  $\epsilon_s = 0.015$ .

**5.15.4. Joint Shear Design**

**5.15.4.1. Safety-Evaluation Event**

5.15.4.1.1. Principal tension stress shall be limited to  $0.50\sqrt{f'_c}$ .

5.15.4.1.2. Principal compression stress shall be limited to  $0.3f'_c$ .

**5.15.4.2. Functional-Evaluation Event**

5.15.4.2.1. Principal tension stress shall be limited to  $0.30\sqrt{f'_c}$ .

5.15.4.2.2. Principal compression stress shall be limited to  $0.3f'_c$ .

- 6. Unchanged (STEEL STRUCTURES)
- 7. Unchanged (ALUMINUM STRUCTURES)
- 8. Unchanged (WOOD STRUCTURES)
- 9. Unchanged (DECK & DECK SYSTEMS)

**10. FOUNDATIONS**

10.1. Unchanged

10.2. Unchanged

10.3. Unchanged

10.4. Unchanged

**10.5. Limit States and Resistance Factors**

**10.5.1. General**

All foundations shall be designed using the LRFD method. Caltrans' amendments to LRFD 10.5.1 shall not apply.

**10.5.2. Service Limit States**

**10.5.2.1. Unchanged**

**10.5.2.2. Tolerable Movements and Movement Criteria**

10.5.2.2.1. Differential settlement between piers shall be limited to 50 mm.

10.5.2.2.2. Differential settlement between individual piles within a pier shall be limited to 5 mm.

**10.5.3. Strength Limit State**

**10.5.4. Extreme Event Limit State**

10.5.4.1. To ensure the structural integrity and serviceability of the bridge after the FEE, permanent vertical settlements shall not exceed 50 mm. After the SEE, permanent vertical settlements shall not exceed 100 mm.

10.5.4.2. The design shear force in CIDH shafts and rock sockets need not be taken as more than two times the seismic overstrength shear force:  $V_u \leq 2V_o$ .

**10.5.5. Resistance Factors**

10.5.5.1. Unchanged

10.5.5.2. Unchanged

**10.5.5.3. Extreme Limit States**

Design of foundations at extreme limit states shall be consistent with the performance criteria for important bridges in Article 2.5.1.

**10.6. Unchanged (Spread Footings)****10.7. Unchanged (Driven Piles)****10.8. Drilled Shafts**

10.8.1. Unchanged

10.8.2. Unchanged

10.8.3. Unchanged

10.8.4. Unchanged

**10.8.5. Pile Penetration For Lateral Loads****10.8.5.1. General**

The minimum pile penetration for lateral loads shall ensure stable load-deflection characteristics at the strength limit state and the extreme event limit state. Attention is directed to the pile shaft design procedure in Caltrans *Bridge Design Aids* Chapter 12.

**10.8.5.2. Strength Limit State**

10.8.5.2.1. The minimum pile penetration shall be increased 20% beyond that required by the load-deflection analysis.

10.8.5.2.2. Attention is directed to the balanced cantilever overturning requirements of *LRFD* 5.14.2.4.4.

**10.8.5.3. Extreme Event Limit State**

10.8.5.3.1. The minimum pile penetration shall ensure stable load-deflection characteristics at the collapse limit state (*MTD* 20-1), using expected material properties to calculate  $M_p$  and  $V_p$  (*SDC* 3.2).

10.8.5.3.2. The factor of safety against overturning shall be greater than 1.0.

**11. ABUTMENTS, PIERS & WALLS**

Abutments and retaining walls shall be designed by the LRFD method.

**12. Unchanged (BURIED STRUCTURES & TUNNEL LINERS)****13. RAILINGS**

Reinforcing shall be epoxy-coated (purple).

**14. JOINTS & BEARINGS****14.1. Bearings**

The bearings at the abutments shall be designed according to Caltrans *MTD* 7.1 with the following modifications:

- The "Prestress Shortening" shall be the shortening due to creep and shrinkage effects (CR+SH) for both the young and old structures as defined in Article 3.12.5.



## Antlers Bridge Design Criteria

Version 2.0, July 31 2008

Br. No. 06-0210

EA: 02-378901



- Thermal effects (movement and reactions) on the bearings shall include both uniform temperature changes and the temperature gradient (Articles 3.12.2, 3.12.3).

### 14.2. Expansion Joint Assemblies

The expansion joint assemblies shall be designed according to Caltrans *MTD* 7.10 with the following modifications:

- The “Anticipated Shortening” shall be the shortening due to creep and shrinkage that is anticipated to occur between the casting of the abutment diaphragm and 30 years in the future (Article 3.12.5). Due to the uncertainty of the material model for concrete, creep and shrinkage displacements at the joints shall be increased by 50%.
- Bridge expansion joints shall accommodate structure displacements during the Functional-Evaluation Event.

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** GUDMUND SETBERG  
Senior Bridge Designer  
Division of Engineering Services  
Bridge Design Branch 2  
Office of Bridge Design North

**Date:** July 31, 2008  
**File:** 02-SHA-5-KP 64.63  
Sacramento River (Antler)  
Bridge No. 06-0210  
EA 02-378901

Attention: Mr. Jason Lynch

**From:** DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES – MS 5

**Subject:** Revised Lateral Resistance, py Curves  
**THIS MEMO SUPERSEDES AND REPLACES THE PREVIOUS MEMO DATED MARCH 7, 2008**

This report presents the revised lateral resistance, py curves for the above reference projects located on Interstate 5 in Shasta County. The revisions are due to new casing elevations for the proposed pile foundation at Piers 3-SE, 3-SW, and Pier 5E and 5-W. The other revision is due to recent clarification of ground elevations. In developing the soil springs, the elevations of the center of the piles were based on the Foundation Plan dated March 6, 2008 with the exception of Pier 3 where the ground elevations were based on the leveling procedure that was performed by the District 02 surveyor.

Based on the twenty-one log of test borings, the subsurface materials generally consist of granular soils underlain by weathered to fresh meta-shale with lenses of meta-sandstone with different degrees of weathering and hardness. The measured Rock Quality Designations ranged anywhere from 0 to about 90 percent. Also, core samples were obtained to measure the unconfined compressive strength of the rock that was used to model the physical properties of rock in estimating the lateral resistance.

The lateral resistance, py curves, for the proposed pile foundations were generated using soil and rock models included in the documentation for the computer program LPILE (Ensoft Inc., May 1997). The plots and tabulated data of lateral soil resistances are attached in Appendix A.

Please note the group reduction factors (GRF) have been computed for each pile

configuration as provided to our office by Mr. Lynch in an e-mail communication on January 1, 2007. Table 1 as shown below provides the recommended GRFs as they should be used in the design of the pile foundation. Please note that the same data were emailed to Mr. Lynch on January 18, 2007.

Support Locations	Pile Configurations	Spacing (meters)		Average GRF
		Transverse	Longitudinal	
Abut. 1	N/A			
2	1x2	16.4	N/A	1
3	2x2	16.4	7.5	0.72
4	2x2	16.5	7.5	0.72
5	1x2	16.4	N/A	1
Abut. 6	N/A			

Table 1- Group Reduction Factors

If you have any questions regarding the above lateral resistance recommendations, please call me at (916) 227-1033.



Reza Mahallati  
Senior Materials and Research Engineer  
Geotechnical Design – North

Attachment:

1- Appendix A – p-y Curves

c: Joe Kaump- OGDN  
GDN File



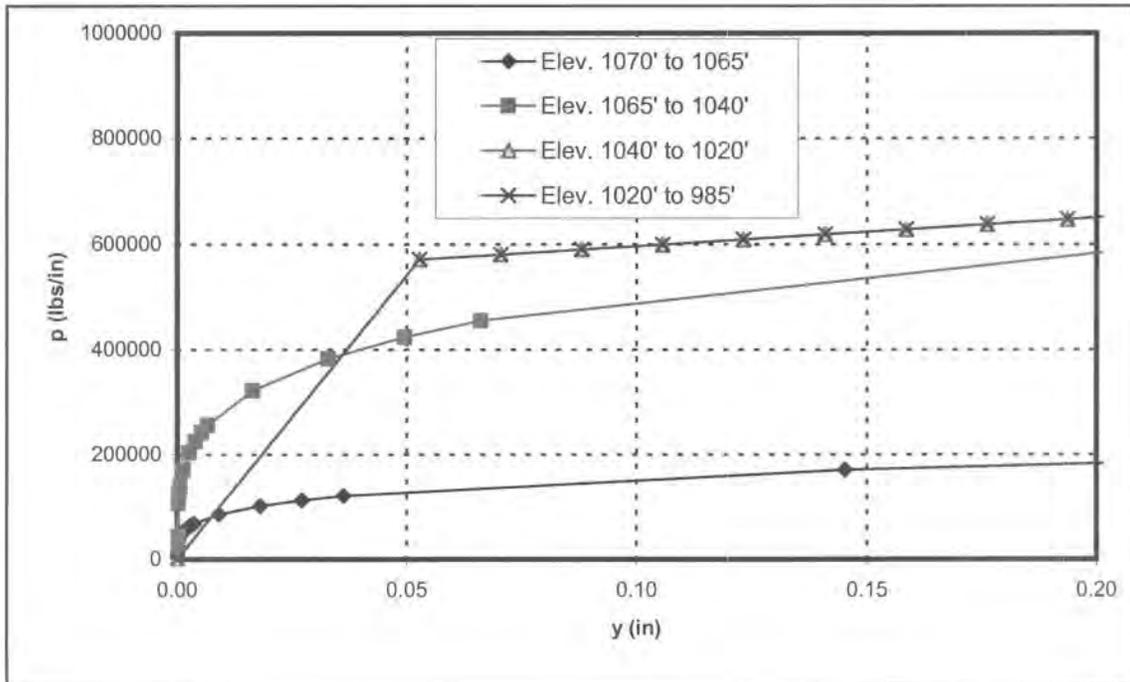
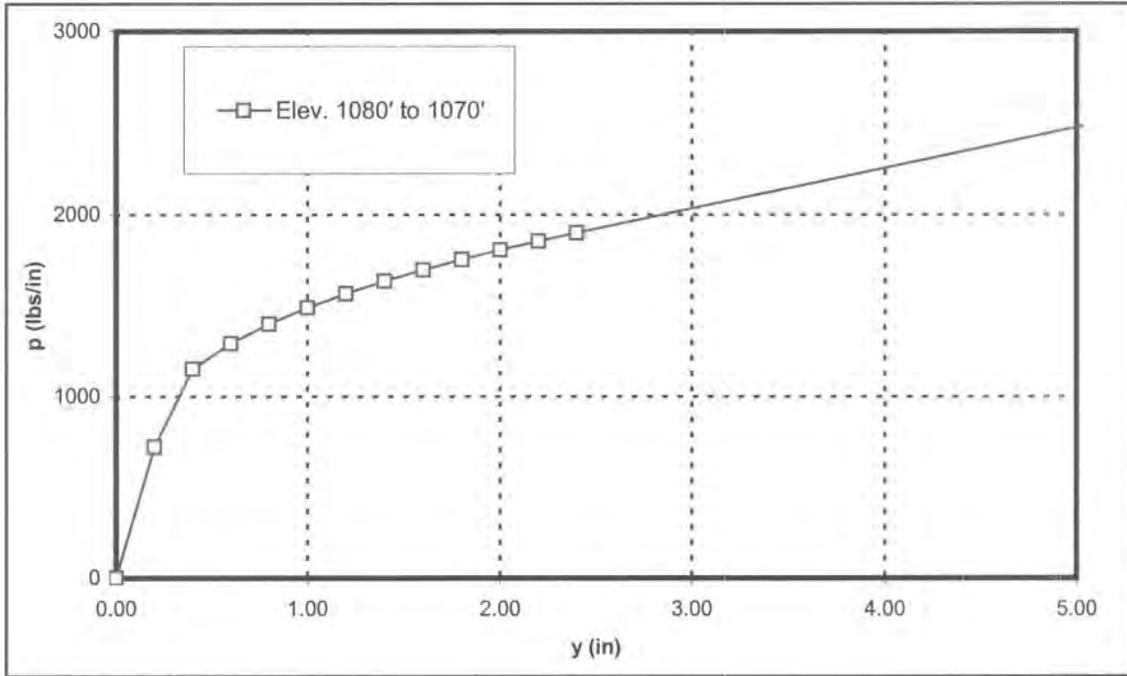
# Appendix A

## Lateral Resistance, p-y Curves

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 2**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 1080 ft**  
**G.W.S. = Elev. 1046 ft**

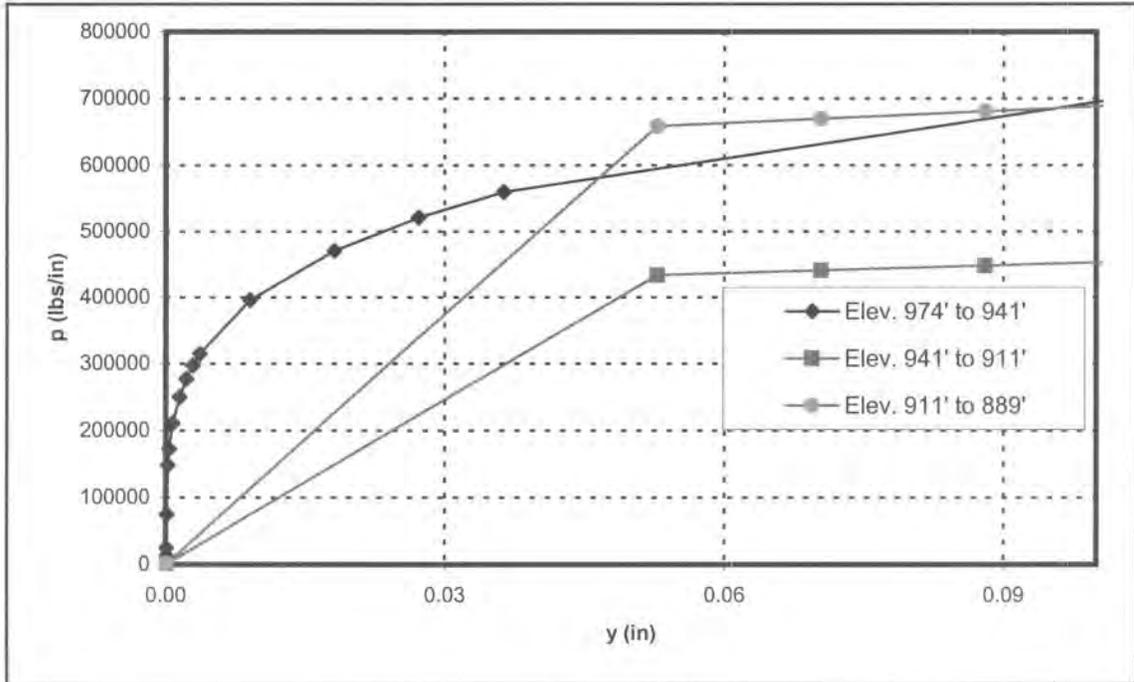
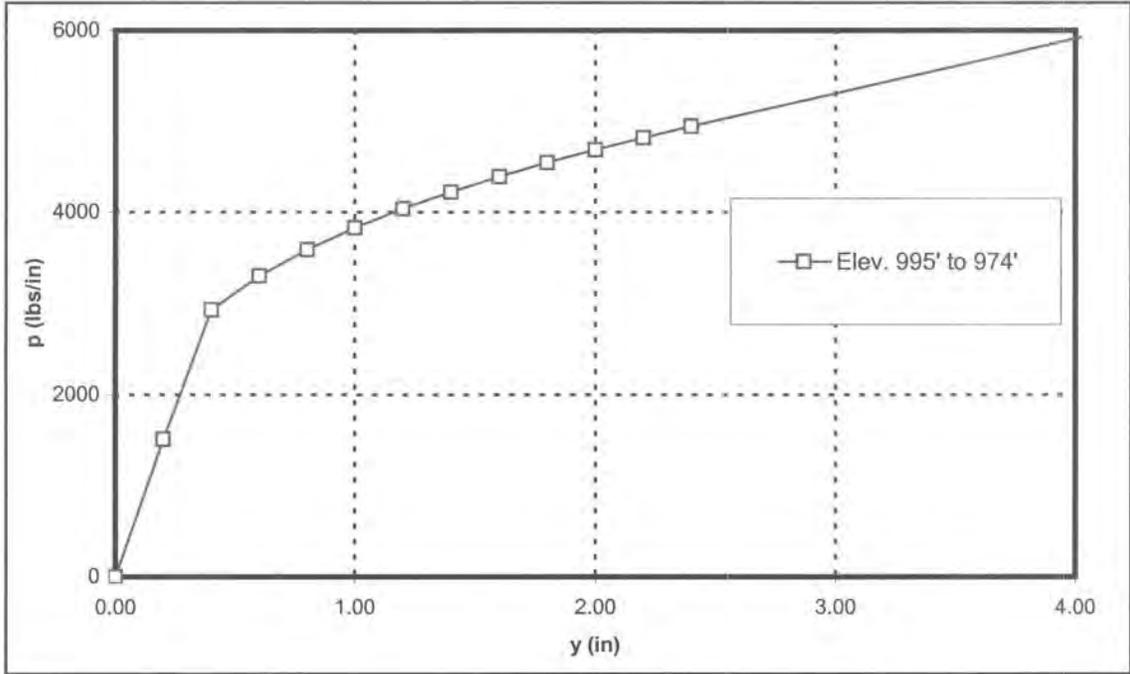


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 3 - North West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 995 ft  
 G.W.S. = Elev. 1046 ft

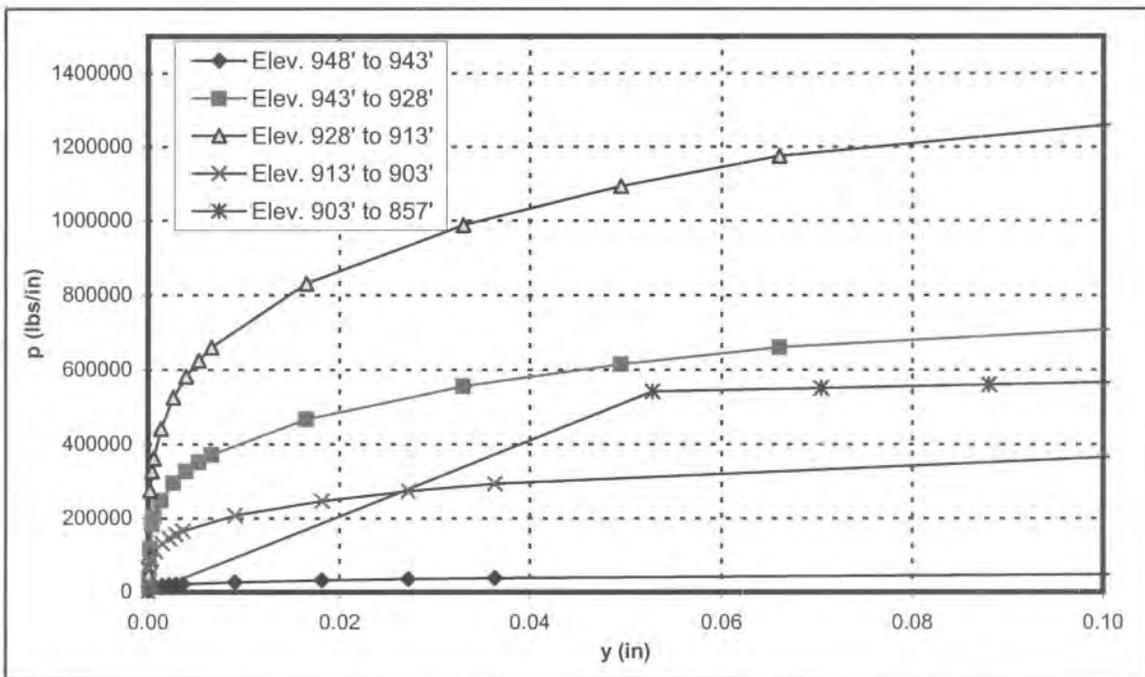
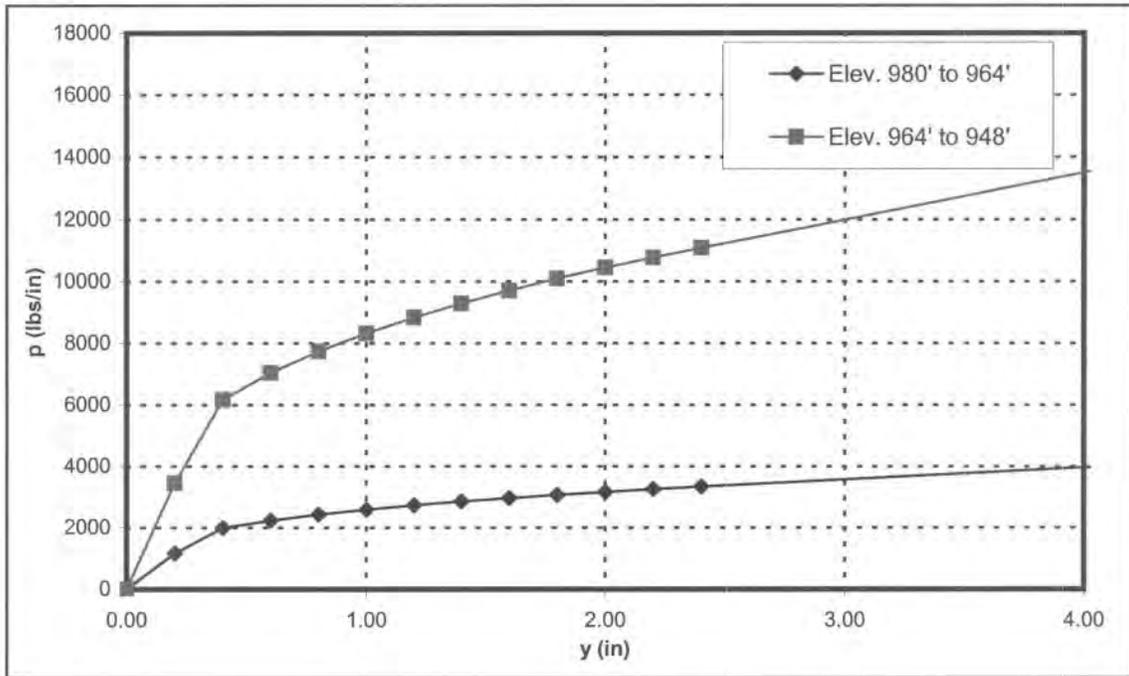


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 3 - North East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 980 ft  
 G.W.S. = Elev. 1046 ft

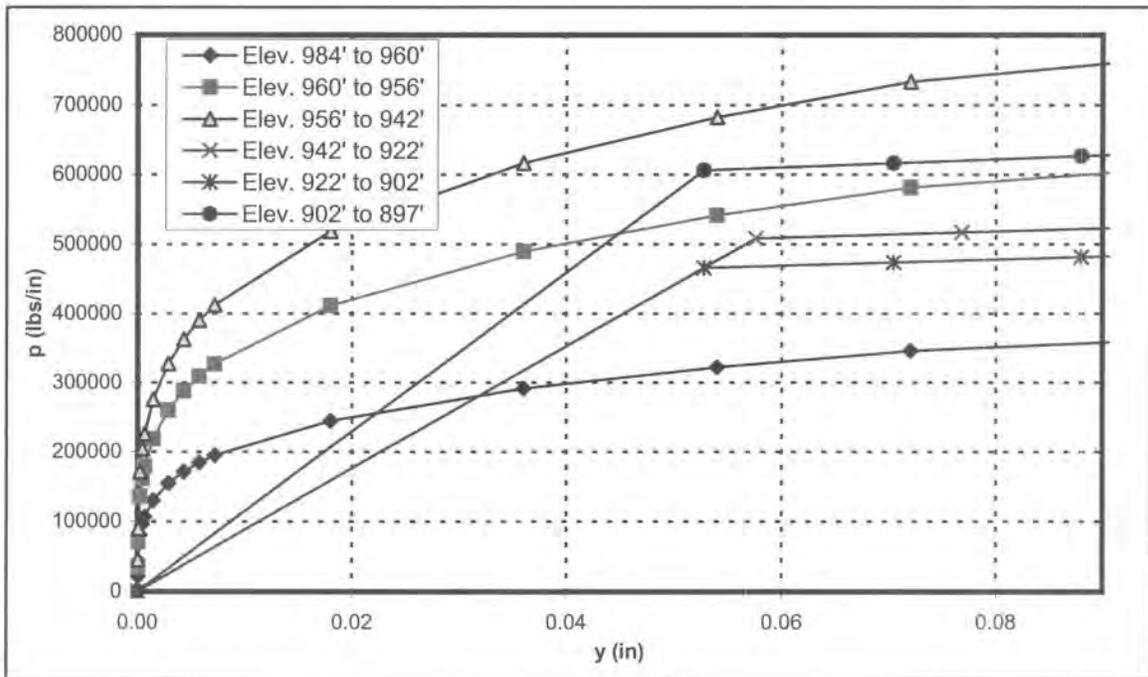
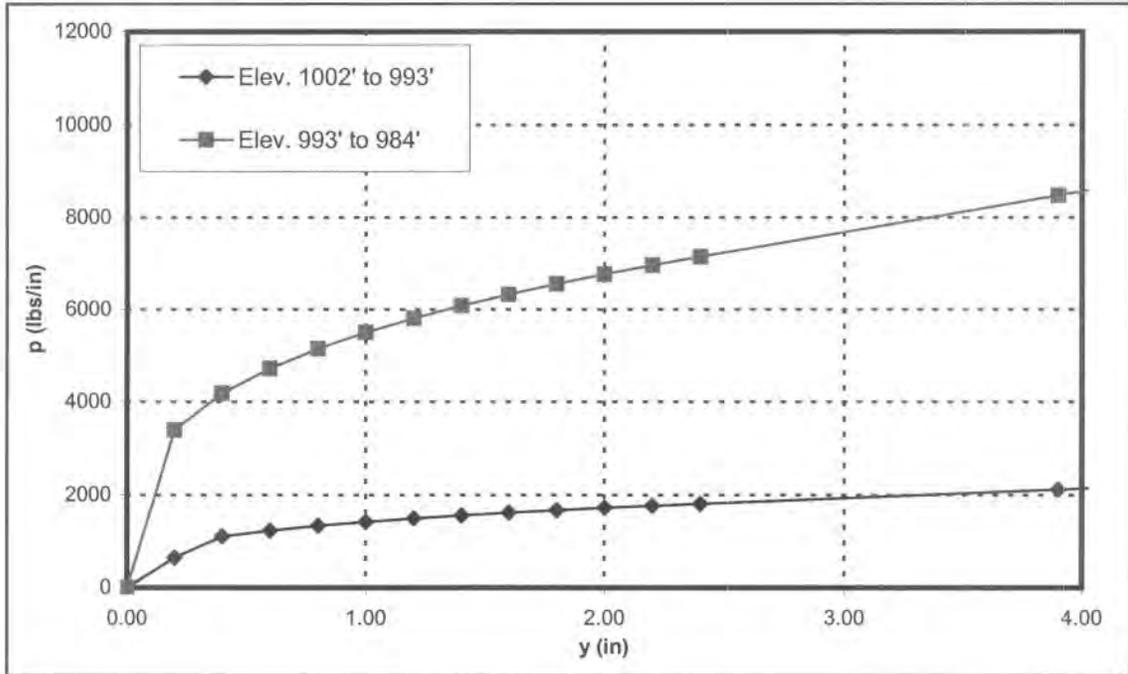


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 3 - South West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 1002 ft  
 G.W.S. = Elev. 1046 ft

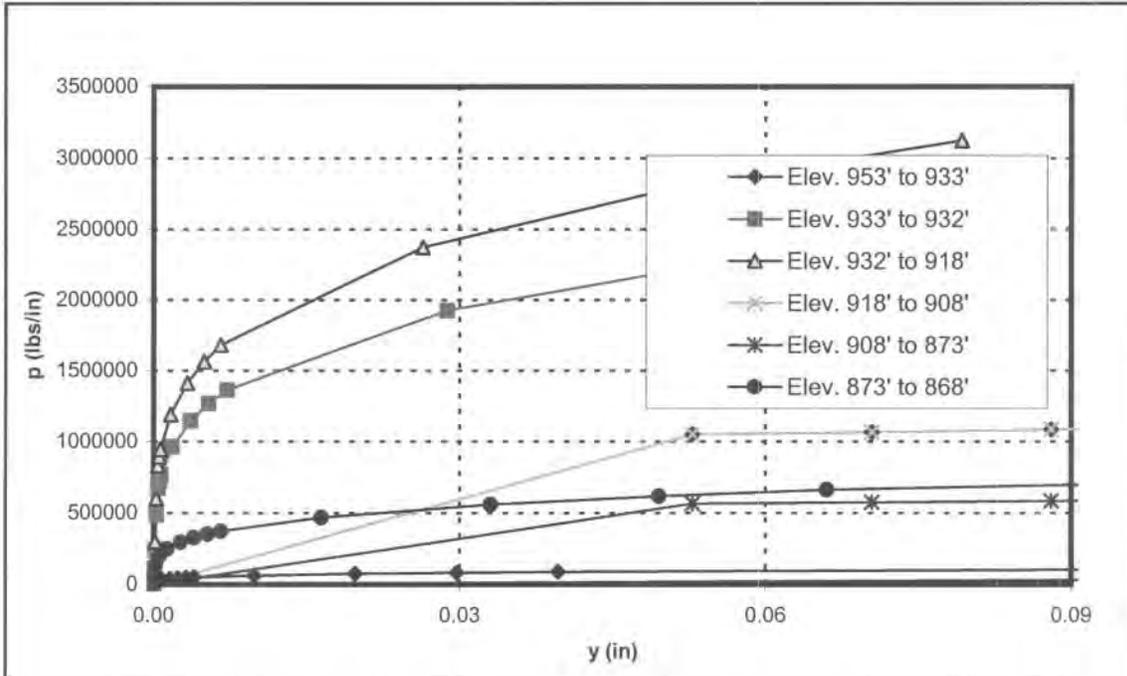
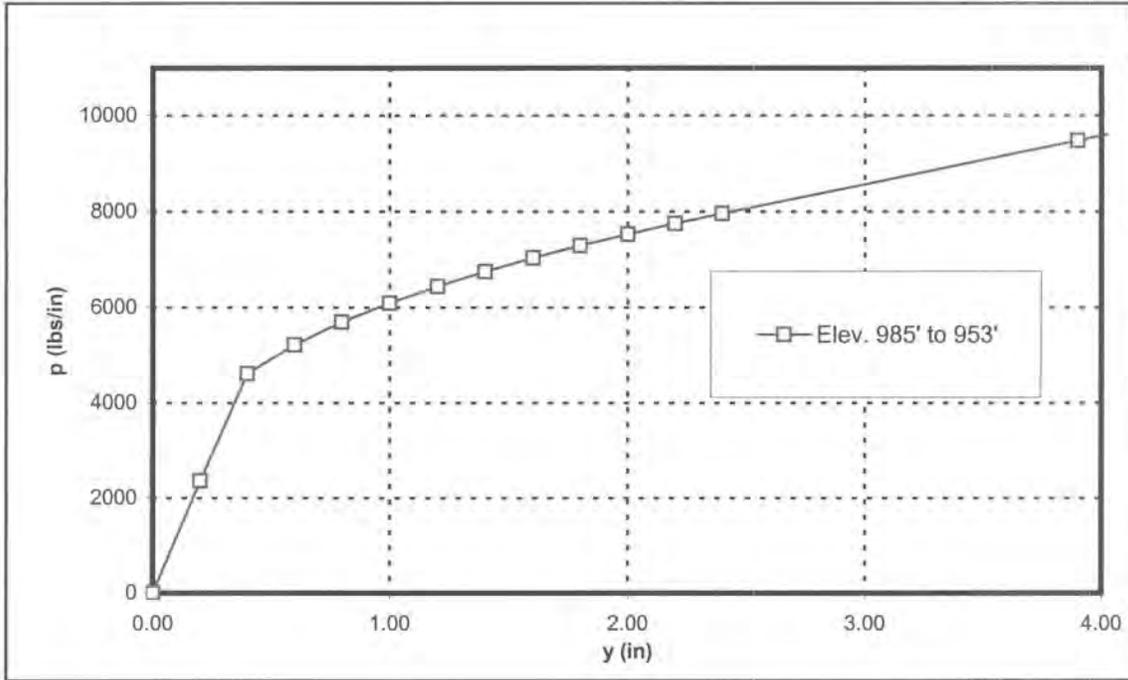


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 3 - South East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 985 ft  
 G.W.S. = Elev. 1046 ft

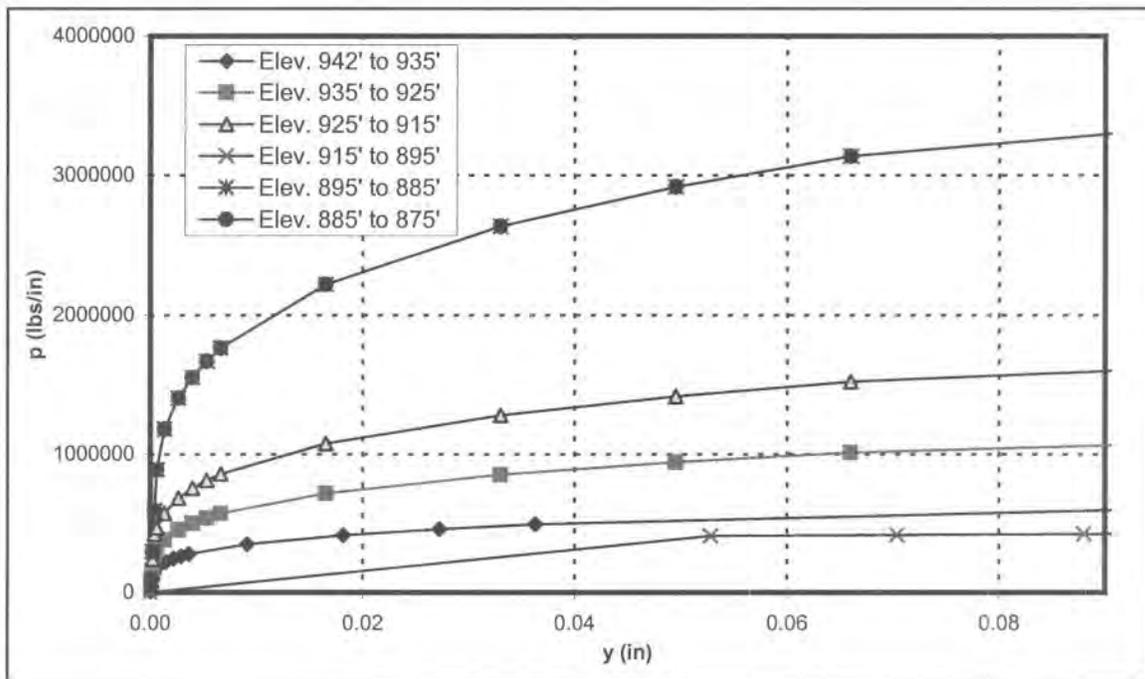
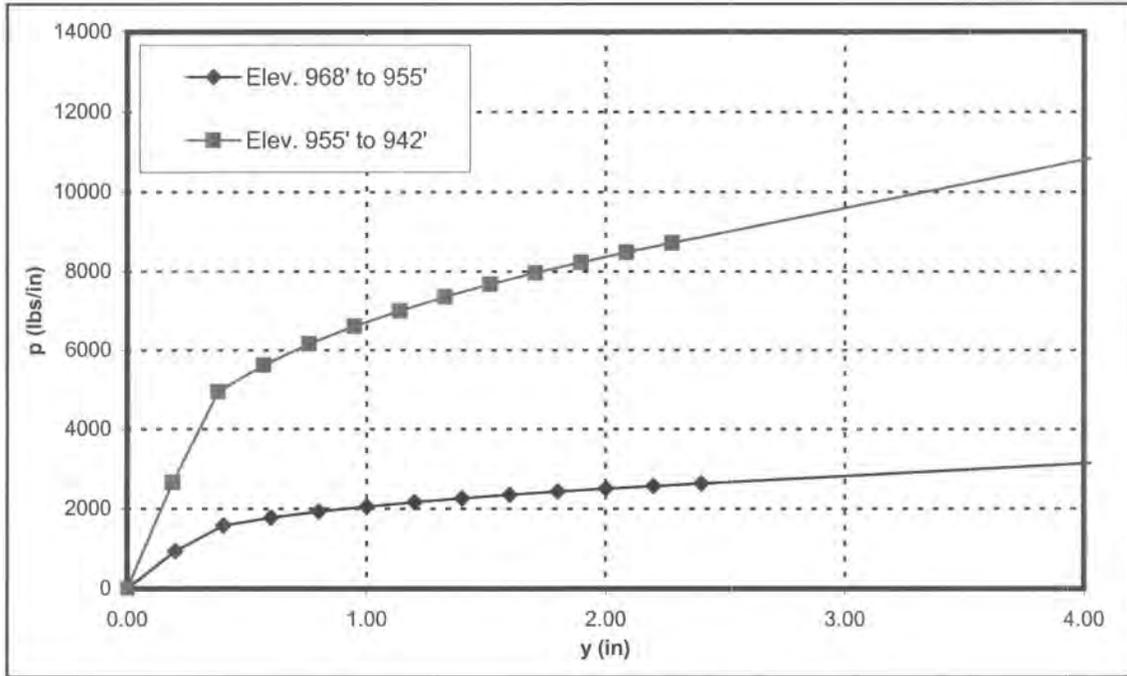


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 4 - North West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 968 ft  
 G.W.S. = Elev. 1046 ft

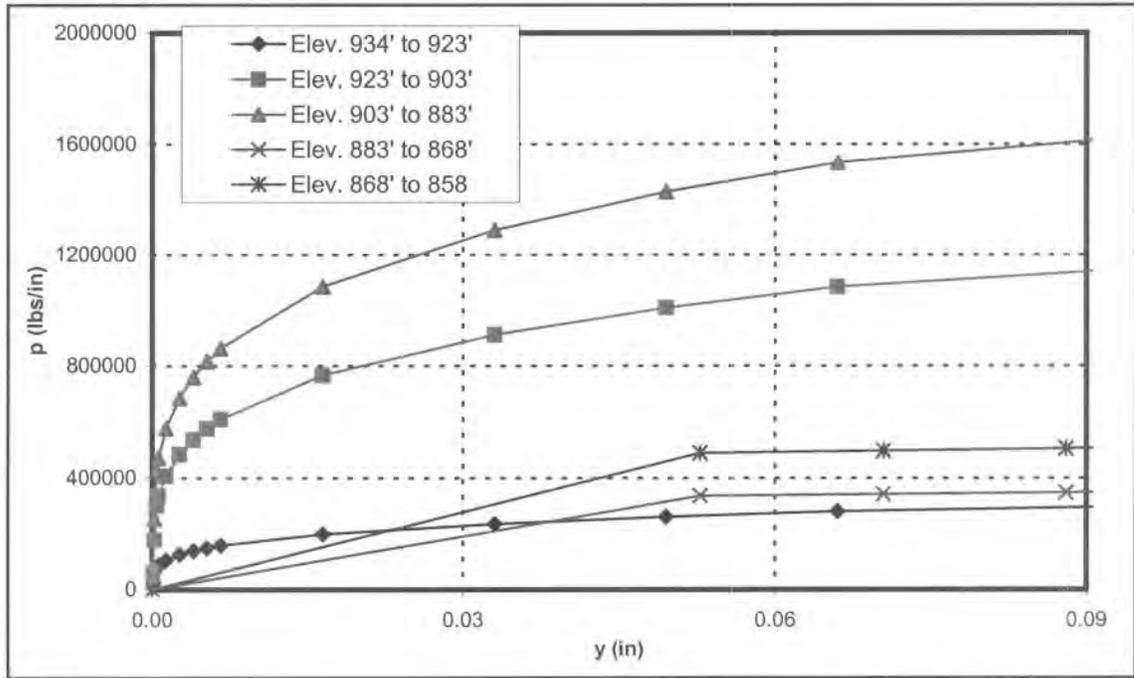
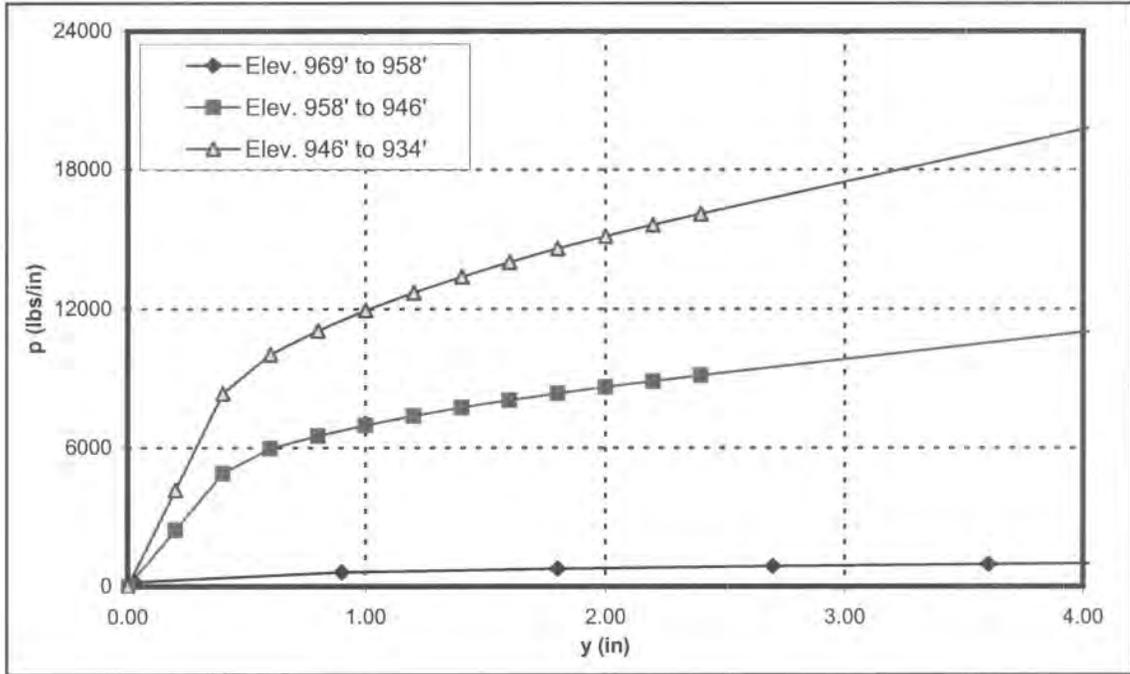


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 4 - North East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 969 ft  
 G.W.S. = Elev. 1046 ft

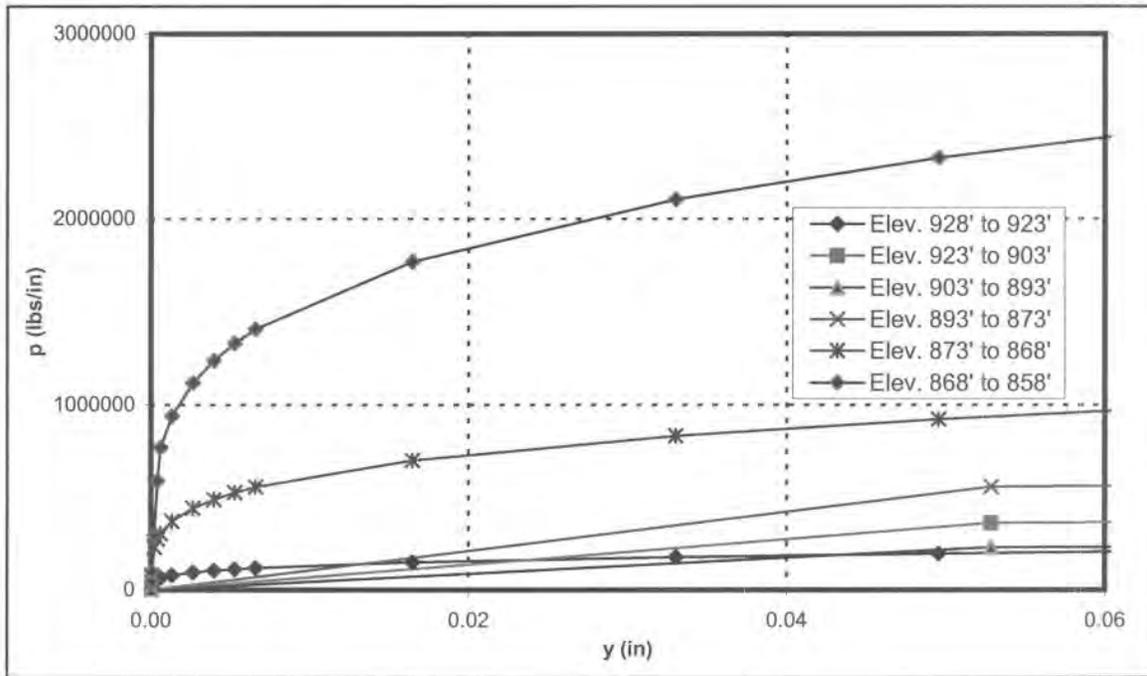
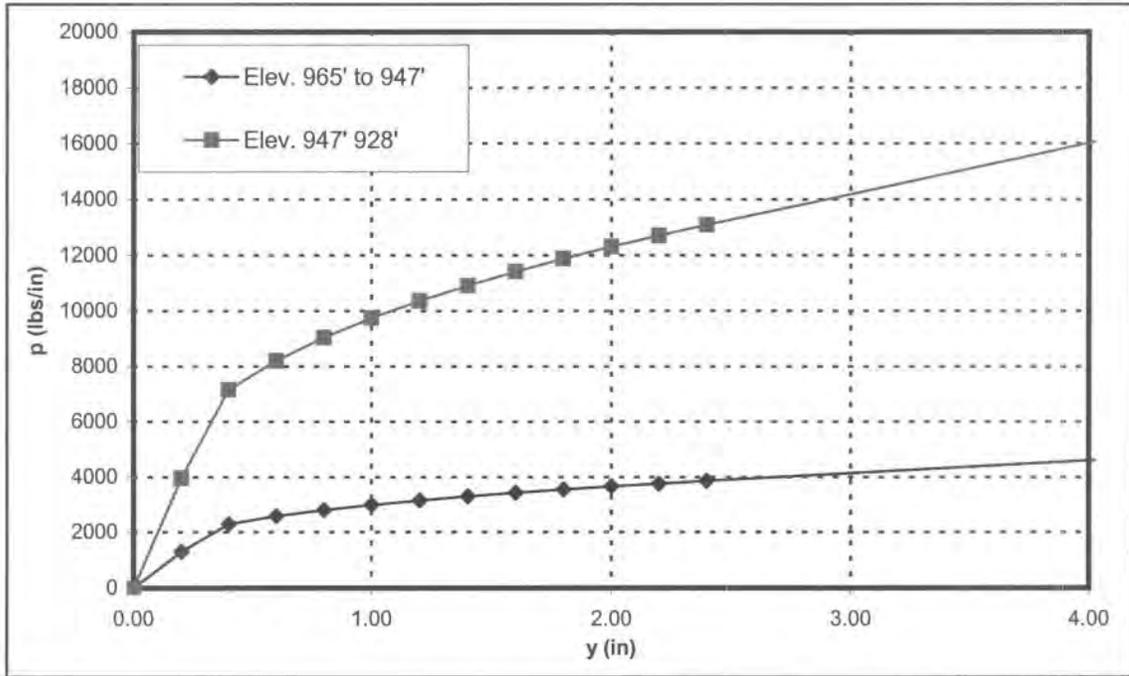


py Chart

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 4 - South West Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

O.G. = Elev. 965 ft  
 G.W.S. = Elev. 1046 ft

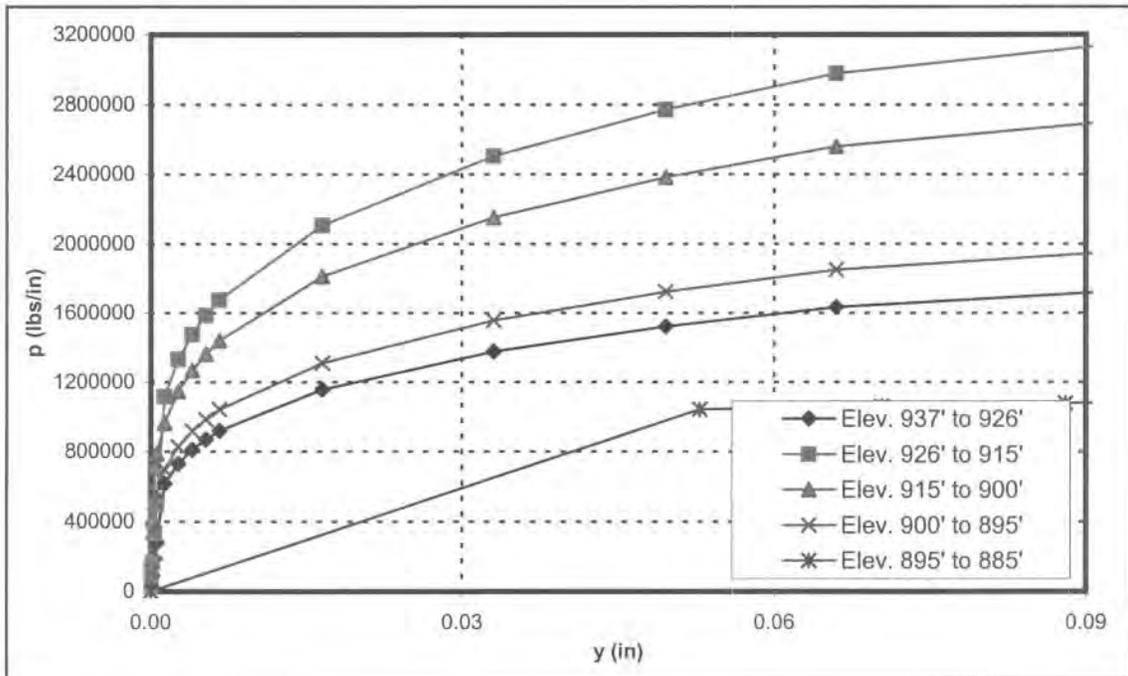
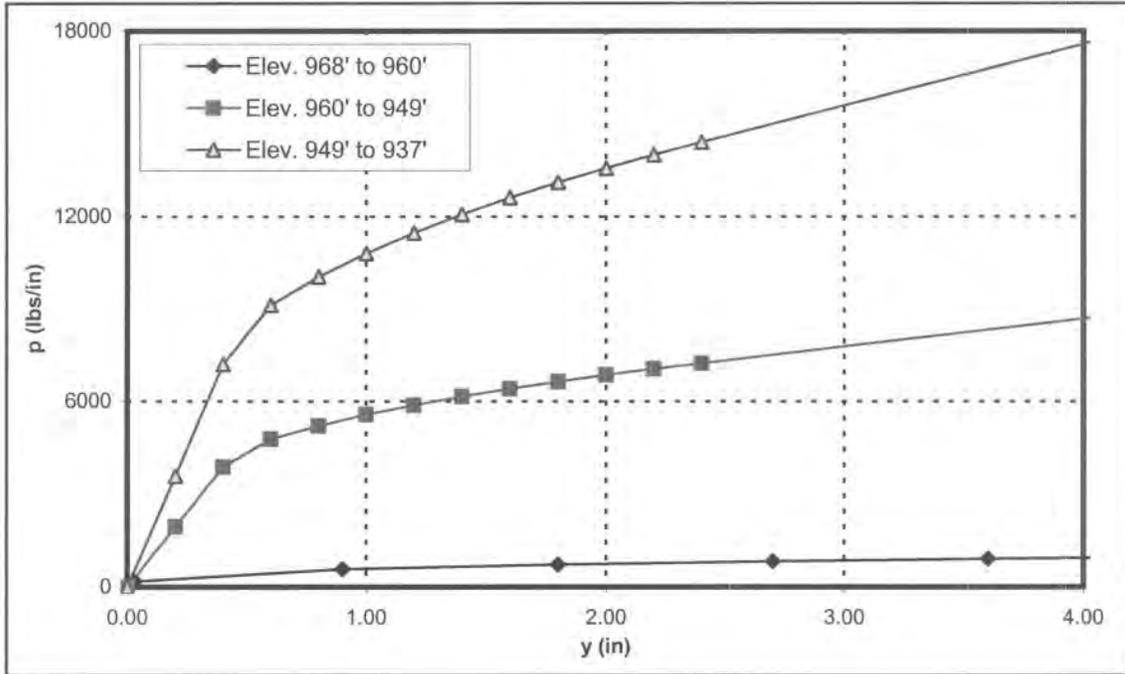


py Chart

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 4 - South East Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 968 ft**  
**G.W.S. = Elev. 1046 ft**

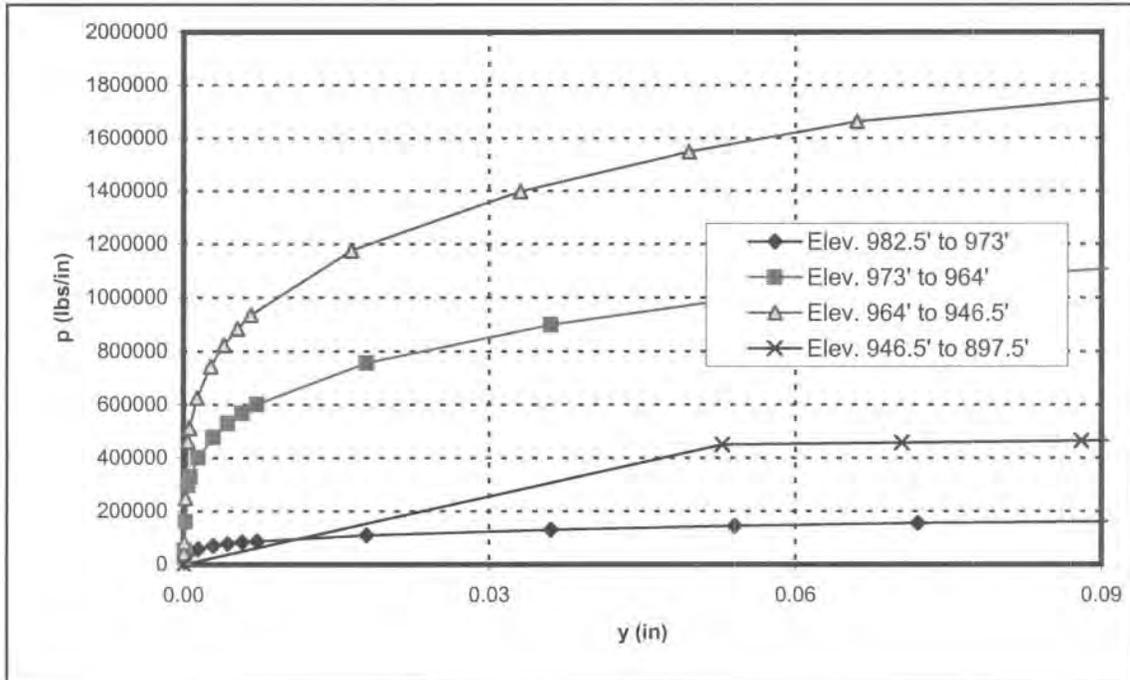
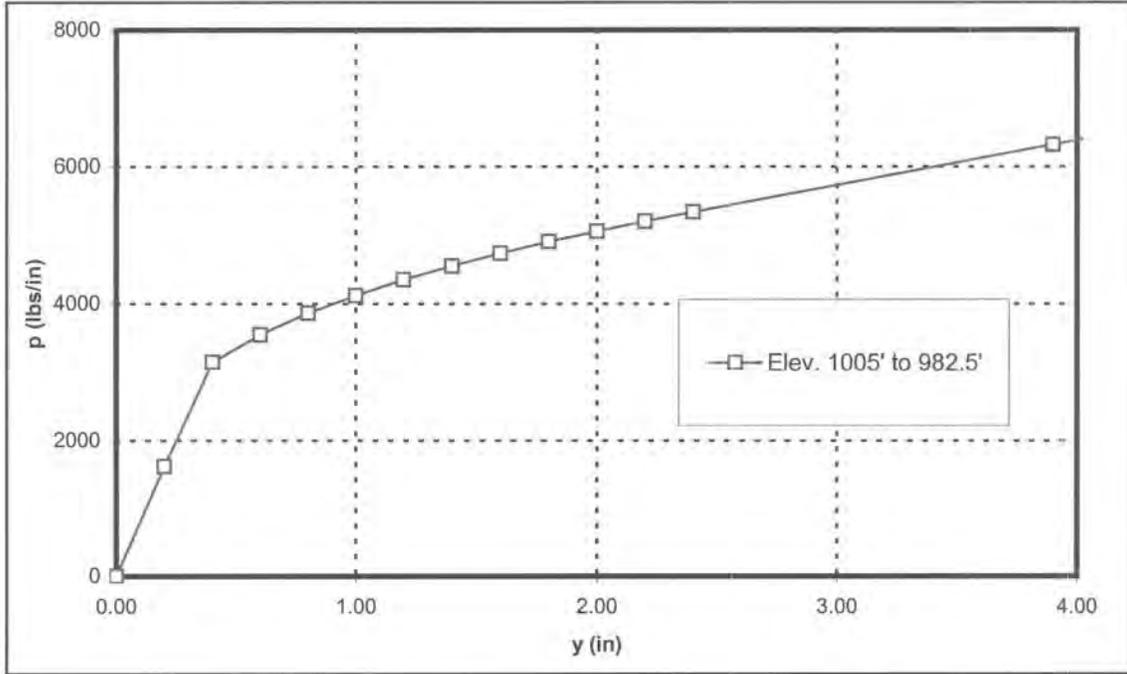


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 5 - West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 1005 ft  
 G.W.S. = Elev. 1046 ft

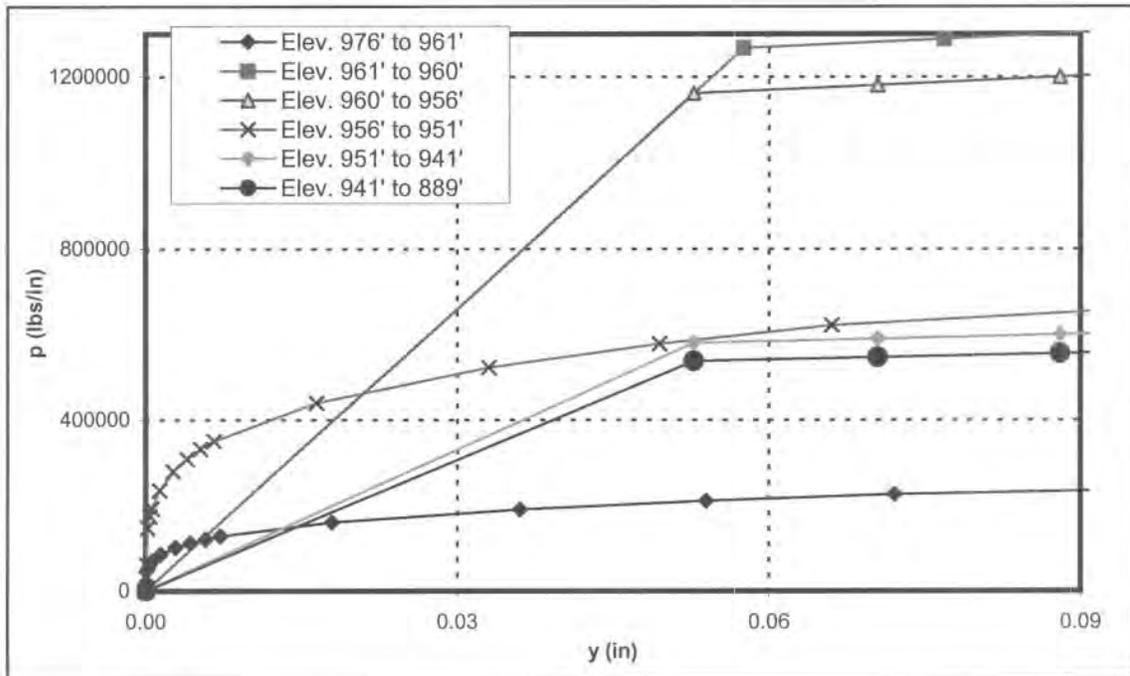
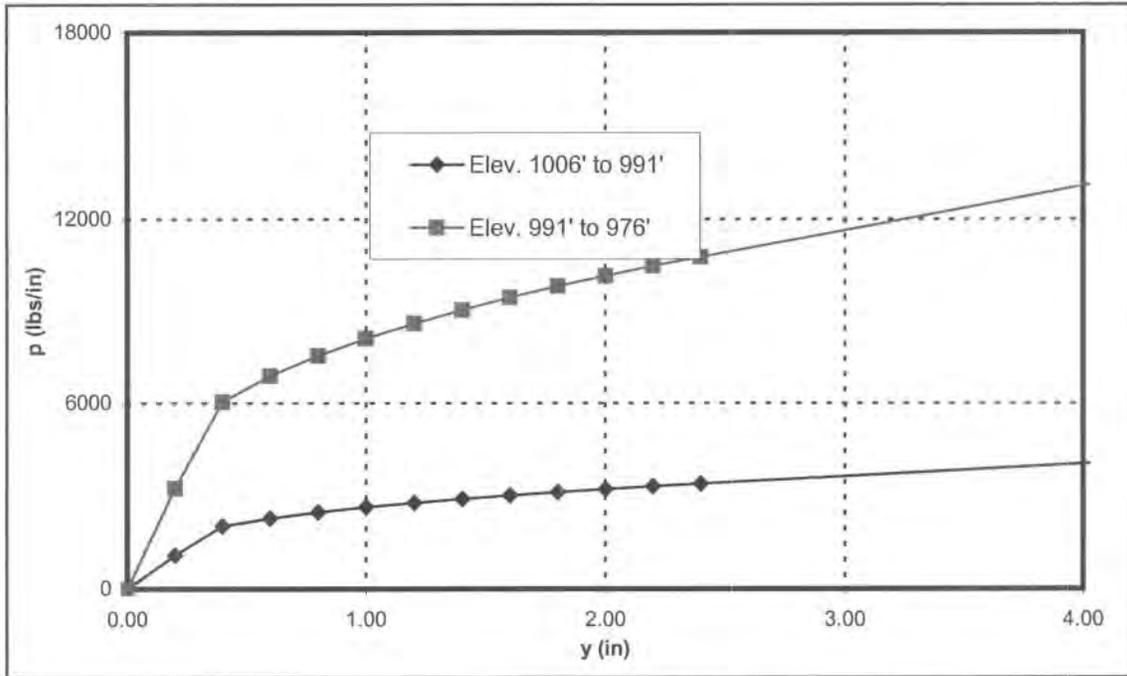


py Chart

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 5 - East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 1006 ft  
 G.W.S. = Elev. 1046 ft



py Chart

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

Pier 2  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 1080 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
Elevation	Elev. 1080' to 1070'		Elev. 1070' to 1065'		Elev. 1065' to 1040'		Elev. 1040' to 1020'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.0000	4205	0.0000	22115	0.0000	0
2	0.20	720	0.0000	8410	0.0001	44229	0.0528	570821
3	0.40	1153	0.0001	25229	0.0002	106586	0.0704	580334
4	0.60	1291	0.0002	33608	0.0004	126753	0.0880	589848
5	0.80	1399	0.0003	37194	0.0006	140275	0.1056	599362
6	1.00	1489	0.0007	45412	0.0013	171268	0.1232	608876
7	1.20	1567	0.0015	54004	0.0026	203674	0.1408	618389
8	1.40	1636	0.0022	59765	0.0040	225402	0.1584	627903
9	1.60	1698	0.0029	64222	0.0053	242210	0.1760	637417
10	1.80	1754	0.0036	67906	0.0066	256106	0.1936	646930
11	2.00	1807	0.0091	85387	0.0165	322036	0.2112	656444
12	2.20	1855	0.0182	101543	0.0330	382968	0.2288	665958
13	2.40	1901	0.0272	112376	0.0495	423824	0.2464	675471
14	5.40	2565	0.0363	120756	0.0660	455428	0.2640	684985
15	149.40	2565	0.1452	170775	0.2640	644073	0.2816	694499
16	293.40	2565	0.2904	203087	0.5280	765936	0.2992	704012
17	437.40	2565	0.4356	224752	0.7920	847647		

p-y Curve	5	
Elevation	Elev. 1020' to 985'	
Point	y(in)	p(lb/in)
1	0.0000	0
2	0.0528	570821
3	0.0704	580334
4	0.0880	589848
5	0.1056	599362
6	0.1232	608876
7	0.1408	618389
8	0.1584	627903
9	0.1760	637417
10	0.1936	646930
11	0.2112	656444
12	0.2288	665958
13	0.2464	675471
14	0.2640	684985
15	0.2816	694499
16	0.2992	704012

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 3 - North West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 995 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
	Elev. 995' to 974'		Elev. 974' to 941'		Elev. 941' to 911'		Elev. 911' to 889'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.0000	12347	0.0000	0	0.0000	0
2	0.20	1512	0.0000	24695	0.0528	433382	0.0528	658733
3	0.40	2927	0.0001	74084	0.0704	440605	0.0704	669712
4	0.60	3296	0.0002	148167	0.0880	447828	0.0880	680691
5	0.80	3586	0.0003	172258	0.1056	455052	0.1056	691669
6	1.00	3828	0.0007	210318	0.1232	462275	0.1232	702648
7	1.20	4038	0.0015	250112	0.1408	469498	0.1408	713627
8	1.40	4224	0.0022	276794	0.1584	476721	0.1584	724606
9	1.60	4392	0.0029	297435	0.1760	483944	0.1760	735585
10	1.80	4546	0.0036	314499	0.1936	491167	0.1936	746564
11	2.00	4689	0.0091	395462	0.2112	498390	0.2112	757543
12	2.20	4821	0.0182	470286	0.2288	505613	0.2288	768522
13	2.40	4946	0.0272	520457	0.2464	512836	0.2464	779500
14	5.40	6755	0.0363	559267	0.2640	520059	0.2640	790479
15	149.40	6755	0.1452	790923	0.2816	527282	0.2816	801458
16	293.40	6755	0.2904	940572	0.2992	534505	0.2992	812437
17	437.40	6755	0.4356	1040914				

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 3 - North East Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 980 ft**  
**G.W.S. = Elev. 1046 ft**

p-y Curve	1		2		3		4	
	Elev. 980' to 964'		Elev. 964' to 948'		Elev. 948' to 943'		Elev. 943' to 928'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.0000	2509	0.0000	19831
2	0.20	1152	0.20	3456	0.0000	5017	0.0001	39662
3	0.40	1988	0.40	6164	0.0001	9000	0.0002	118986
4	0.60	2234	0.60	7040	0.0002	10703	0.0004	183854
5	0.80	2426	0.80	7735	0.0003	11845	0.0006	203468
6	1.00	2587	1.00	8322	0.0007	14462	0.0013	248423
7	1.20	2727	1.20	8834	0.0015	17199	0.0026	295427
8	1.40	2850	1.40	9292	0.0022	19033	0.0040	326944
9	1.60	2962	1.60	9707	0.0029	20453	0.0053	351324
10	1.80	3064	1.80	10089	0.0036	21626	0.0066	371480
11	2.00	3158	2.00	10444	0.0091	27194	0.0165	467111
12	2.20	3246	2.20	10775	0.0182	32339	0.0330	555492
13	2.40	3328	2.40	11086	0.0272	35789	0.0495	614753
14	5.40	4525	5.40	15627	0.0363	38457	0.0660	660595
15	149.40	4525	149.40	15627	0.1452	54387	0.2640	934222
16	293.40	4525	293.40	15627	0.2904	64678	0.5280	1110983
17	437.40	4525	437.40	15627	0.44	71577	0.79	1229505

p-y Curve	5		6		7	
	Elev. 928' to 913'		Elev. 913' to 903'		Elev. 903' to 857'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	47880	0.0000	13818	0.0000	0
2	0.0001	95759	0.0000	27637	0.0528	541728
3	0.0002	274953	0.0001	68710	0.0704	550757
4	0.0004	326976	0.0002	81710	0.0880	559786
5	0.0006	361858	0.0003	90427	0.1056	568814
6	0.0013	441810	0.0007	110406	0.1232	577843
7	0.0026	525403	0.0015	131296	0.1408	586872
8	0.0040	581454	0.0022	145303	0.1584	595901
9	0.0053	624813	0.0029	156138	0.1760	604930
10	0.0066	660659	0.0036	165096	0.1936	613958
11	0.0165	830735	0.0091	207597	0.2112	622987
12	0.0330	987916	0.0182	246876	0.2288	632016
13	0.0495	1093309	0.0272	273213	0.2464	641045
14	0.0660	1174837	0.0363	293587	0.2640	650074
15	0.2640	1661470	0.1452	415195	0.2816	659102
16	0.5280	1975832	0.2904	493753	0.2992	668131
17	0.79	2186618	0.4356	546427		

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 3 - South West Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 1002 ft**  
**G.W.S. = Elev. 1046 ft**

p-y Curve	1		2		3		4	
	Elev. 1002' to 993'		Elev. 993' to 984'		Elev. 984' to 960'		Elev. 960' to 956'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.0000	21534	0.0000	35889
2	0.20	648	0.20	3399	0.0001	43067	0.0001	71779
3	0.40	1102	0.40	4181	0.0002	81005	0.0002	136134
4	0.60	1232	0.60	4719	0.0004	96332	0.0004	161891
5	0.80	1335	0.80	5143	0.0006	106609	0.0006	179162
6	1.00	1420	1.00	5498	0.0014	130164	0.0014	218748
7	1.20	1493	1.20	5805	0.0029	154792	0.0029	260136
8	1.40	1558	1.40	6079	0.0043	171305	0.0043	287888
9	1.60	1617	1.60	6327	0.0058	184080	0.0058	309356
10	1.80	1670	1.80	6553	0.0072	194641	0.0072	327104
11	2.00	1720	2.00	6763	0.0180	244748	0.0180	411312
12	2.20	1766	2.20	6958	0.0360	291056	0.0360	489135
13	2.40	1809	2.40	7141	0.0540	322106	0.0540	541317
14	3.90	2122	3.90	8475	0.0720	346125	0.0720	581683
15	5.40	2435	5.40	9809	0.2880	489495	0.2880	822624
16	149.40	2435	149.40	9809	0.5760	582111	0.5760	978270
17	293.40	2435	293.40	9809	0.86	644212	0.86	1082634

p-y Curve	5		6		7		8	
	Elev. 956' to 942'		Elev. 942' to 922'		Elev. 922' to 902'		Elev. 902' to 897'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	45118	0.0000	0	0.0000	0	0.0000	0
2	0.0001	90236	0.0576	508320	0.0528	465960	0.0528	606250
3	0.0002	171574	0.0768	516792	0.0704	473726	0.0704	616354
4	0.0004	204037	0.0960	525264	0.0880	481492	0.0880	626458
5	0.0006	225804	0.1152	533736	0.1056	489258	0.1056	636562
6	0.0014	275695	0.1344	542208	0.1232	497024	0.1232	646666
7	0.0029	327858	0.1536	550680	0.1408	504790	0.1408	656770
8	0.0043	362834	0.1728	559152	0.1584	512556	0.1584	666875
9	0.0058	389891	0.1920	567624	0.1760	520322	0.1760	676979
10	0.0072	412260	0.2112	576096	0.1936	528088	0.1936	687083
11	0.0180	518389	0.2304	584568	0.2112	535854	0.2112	697187
12	0.0360	616472	0.2496	593040	0.2288	543620	0.2288	707291
13	0.0540	682238	0.2688	601512	0.2464	551386	0.2464	717395
14	0.0720	733113	0.2880	609984	0.2640	559152	0.2640	727500
15	0.2880	1036778	0.3072	618456	0.2816	566918	0.2816	737604
16	0.5760	1232944	0.3264	626928	0.2992	574684	0.2992	747708
17	0.86	1364476	0.3456	635400	0.3168	3088	0.3168	3619

Sacramento River (Antler) Bridge (Replace)  
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 02-378901

Pier 3 - South East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 985 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
	Elev. 985' to 953'		Elev. 953' to 933'		Elev. 933' to 932'		Elev. 932' to 918'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.0000	4023	0.0000	6118	0.0000	7518
2	0.20	2364	0.0000	8046	0.0000	12237	0.0000	15037
3	0.40	4612	0.0001	20461	0.0000	36710	0.0000	45110
4	0.60	5218	0.0002	24332	0.0000	73420	0.0000	90220
5	0.80	5697	0.0004	26928	0.0001	110131	0.0001	135330
6	1.00	6098	0.0008	32878	0.0001	244735	0.0001	300734
7	1.20	6446	0.0016	39098	0.0003	489470	0.0003	601467
8	1.40	6756	0.0024	43269	0.0004	673772	0.0004	831040
9	1.60	7037	0.0032	46496	0.0006	724015	0.0005	893011
10	1.80	7294	0.0040	49164	0.0007	765552	0.0007	944244
11	2.00	7532	0.0099	61820	0.0018	962631	0.0017	1187324
12	2.20	7754	0.0198	73517	0.0036	1144768	0.0033	1411974
13	2.40	7963	0.0297	81360	0.0054	1266894	0.0050	1562606
14	3.90	9480	0.0396	87427	0.0072	1361366	0.0066	1679130
15	5.40	10997	0.1584	123640	0.0288	1925262	0.0264	2374648
16	149.40	10997	0.3168	147033	0.0576	2289536	0.0528	2823948
17	293.40	10997	0.4752	162719	0.09	2533788	0.08	3125213

p-y Curve	5		6		7	
	Elev. 918' to 908'		Elev. 908' to 873'		Elev. 873' to 868'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	0	0.0000	0	0.0000	22763
2	0.0528	1048502	0.0528	564854	0.0001	45526
3	0.0704	1065977	0.0704	574269	0.0002	136579
4	0.0880	1083452	0.0880	583683	0.0004	184534
5	0.1056	1100928	0.1056	593097	0.0006	204221
6	0.1232	1118403	0.1232	602511	0.0013	249343
7	0.1408	1135878	0.1408	611926	0.0026	296520
8	0.1584	1153353	0.1584	621340	0.0040	328153
9	0.1760	1170828	0.1760	630754	0.0053	352624
10	0.1936	1188303	0.1936	640168	0.0066	372854
11	0.2112	1205778	0.2112	649583	0.0165	468840
12	0.2288	1223253	0.2288	658997	0.0330	557547
13	0.2464	1240728	0.2464	668411	0.0495	617028
14	0.2640	1258203	0.2640	677825	0.0660	663039
15	0.2816	1275678	0.2816	687240	0.2640	937679
16	0.2992	1293153	0.2992	696654	0.5280	1115095
17	0.32	2146	0.3168	3463	0.7920	1234055

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 4 - North West Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 968 ft**  
**G.W.S. = Elev. 1046 ft**

p-y Curve	1		2		3		4	
	Elev. 968' to 955'		Elev. 955' to 942'		Elev. 942' to 935'		Elev. 935' to 925'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.0000	7718	0.0000	26791
2	0.20	936	0.19	2663	0.0000	15435	0.0001	53582
3	0.40	1581	0.38	4950	0.0001	46305	0.0002	160746
4	0.60	1775	0.57	5627	0.0002	92610	0.0004	281633
5	0.80	1927	0.76	6162	0.0003	138915	0.0006	311678
6	1.00	2053	0.95	6612	0.0007	185073	0.0013	380543
7	1.20	2163	1.14	7004	0.0015	220090	0.0026	452544
8	1.40	2260	1.33	7353	0.0022	243570	0.0040	500823
9	1.60	2348	1.52	7670	0.0029	261733	0.0053	538169
10	1.80	2428	1.71	7961	0.0036	276749	0.0066	569044
11	2.00	2502	1.90	8230	0.0091	347993	0.0165	715535
12	2.20	2571	2.09	8482	0.0182	413836	0.0330	850920
13	2.40	2635	2.28	8718	0.0272	457985	0.0495	941698
14	5.40	3574	5.12	12161	0.0363	492137	0.0660	1011920
15	149.40	3574	141.71	12161	0.1452	695987	0.2640	1431071
16	293.40	3574	278.30	12161	0.2904	827672	0.5280	1701840
17	437.40	3574	414.89	12161	0.44	915970	0.79	1883395

p-y Curve	5		6		7		8	
	Elev. 925' to 915'		Elev. 915' to 895'		Elev. 895' to 885'		Elev. 885' to 875'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	40021	0.0000	0	0.0000	49258	0.0000	49258
2	0.0001	80042	0.0528	409200	0.0001	98517	0.0001	98517
3	0.0002	240127	0.0704	416020	0.0002	295550	0.0002	295550
4	0.0004	423463	0.0880	422840	0.0004	591100	0.0004	591100
5	0.0006	468639	0.1056	429660	0.0006	886650	0.0006	886650
6	0.0013	572183	0.1232	436480	0.0013	1179248	0.0013	1179248
7	0.0026	680444	0.1408	443300	0.0026	1402370	0.0026	1402370
8	0.0040	753036	0.1584	450120	0.0040	1551978	0.0040	1551978
9	0.0053	809189	0.1760	456940	0.0053	1667709	0.0053	1667709
10	0.0066	855614	0.1936	463760	0.0066	1763387	0.0066	1763387
11	0.0165	1075877	0.2112	470580	0.0165	2217342	0.0165	2217342
12	0.0330	1279441	0.2288	477400	0.0330	2636879	0.0330	2636879
13	0.0495	1415934	0.2464	484220	0.0495	2918186	0.0495	2918186
14	0.0660	1521520	0.2640	491040	0.0660	3135795	0.0660	3135795
15	0.2640	2151754	0.2816	497860	0.2640	4434684	0.2640	4434684
16	0.5280	2558881	0.2992	504680	0.5280	5273758	0.5280	5273758
17	0.79	2831868			0.7920	5836373	0.7920	5836373

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 4 - North East Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 969 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
	Elev. 969' to 958'		Elev. 958' to 946'		Elev. 946' to 934'		Elev. 934' to 923'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.00	0	0.0000	14099
2	0.03	193	0.20	2448	0.20	4176	0.0001	28199
3	0.90	608	0.40	4896	0.40	8352	0.0002	65647
4	1.80	766	0.60	5970	0.60	10030	0.0004	78068
5	2.70	877	0.80	6520	0.80	11064	0.0006	86396
6	3.60	965	1.00	6981	1.00	11938	0.0013	105485
7	4.50	1039	1.20	7382	1.20	12704	0.0026	125443
8	5.40	1104	1.40	7738	1.40	13389	0.0040	138826
9	6.30	1163	1.60	8061	1.60	14013	0.0053	149178
10	7.20	1216	1.80	8357	1.80	14587	0.0066	157737
11	8.10	1264	2.00	8631	2.00	15121	0.0165	198343
12	9.00	1309	2.20	8887	2.20	15620	0.0330	235871
13	9.90	1352	2.40	9127	2.40	16090	0.0495	261035
14	10.80	1391	5.40	12620	5.40	22947	0.0660	280500
15	28.80	1930	149.40	12620	149.40	22947	0.2640	396687
16	54.00	1930	293.40	12620	293.40	22947	0.5280	471743
17	72.00	1930	437.40	12620	437.40	22947	0.79	522069

p-y Curve	5		6		7		8	
	Elev. 923' to 903'		Elev. 903' to 883'		Elev. 883' to 868'		Elev. 868' to 858	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	29993	0.0000	42298	0.0000	0	0.0000	0
2	0.0001	59986	0.0001	84596	0.0528	336547	0.0528	489456
3	0.0002	179959	0.0002	253788	0.0704	342156	0.0704	497614
4	0.0004	301644	0.0004	427080	0.0880	347765	0.0880	505771
5	0.0006	333824	0.0006	472642	0.1056	353375	0.1056	513929
6	0.0013	407581	0.0013	577070	0.1232	358984	0.1232	522086
7	0.0026	484699	0.0026	686256	0.1408	364593	0.1408	530244
8	0.0040	536407	0.0040	759467	0.1584	370202	0.1584	538402
9	0.0053	576407	0.0053	816101	0.1760	375811	0.1760	546559
10	0.0066	609476	0.0066	862922	0.1936	381420	0.1936	554717
11	0.0165	766376	0.0165	1085067	0.2112	387029	0.2112	562874
12	0.0330	911379	0.0330	1290369	0.2288	392638	0.2288	571032
13	0.0495	1008607	0.0495	1428028	0.2464	398248	0.2464	579190
14	0.0660	1083819	0.0660	1534516	0.2640	403857	0.2640	587347
15	0.2640	1532751	0.2640	2170133	0.2816	409466	0.2816	595505
16	0.5280	1822759	0.5280	2580738	0.2992	415075	0.2992	603662
17	0.79	2017214	0.7920	2856056				

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

Pier 4 - South West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 965 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
Elevation	Elev. 965' to 947'		Elev. 947' 928'		Elev. 928' to 923'		Elev. 923' to 903'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.0000	11919	0.0000	0
2	0.20	1296	0.20	3960	0.0001	23839	0.0528	364320
3	0.40	2293	0.40	7160	0.0002	49722	0.0704	370392
4	0.60	2579	0.60	8207	0.0004	59129	0.0880	376464
5	0.80	2803	0.80	9041	0.0006	65437	0.1056	382536
6	1.00	2990	1.00	9746	0.0013	79896	0.1232	388608
7	1.20	3152	1.20	10362	0.0026	95012	0.1408	394680
8	1.40	3296	1.40	10914	0.0040	105148	0.1584	400752
9	1.60	3426	1.60	11416	0.0053	112989	0.1760	406824
10	1.80	3545	1.80	11877	0.0066	119472	0.1936	412896
11	2.00	3654	2.00	12306	0.0165	150228	0.2112	418968
12	2.20	3757	2.20	12707	0.0330	178652	0.2288	425040
13	2.40	3853	2.40	13084	0.0495	197711	0.2464	431112
14	5.40	5247	5.40	18587	0.0660	212454	0.2640	437184
15	149.40	5247	149.40	18587	0.2640	300455	0.2816	443256
16	293.40	5247	293.40	18587	0.5280	357304	0.2992	449328
17	437.40	5247	437.40	18587	0.79	395421		

p-y Curve	5		6		7		8	
Elevation	Elev. 903' to 893'		Elev. 893' to 873'		Elev. 873' to 868'		Elev. 868' to 858'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	0	0.0000	0	0.0000	40131	0.0000	49258
2	0.0528	232320	0.0528	559680	0.0001	80263	0.0001	98517
3	0.0704	236192	0.0704	569008	0.0002	231966	0.0002	295550
4	0.0880	240064	0.0880	578336	0.0004	275856	0.0004	591100
5	0.1056	243936	0.1056	587664	0.0006	305285	0.0006	770541
6	0.1232	247808	0.1232	596992	0.0013	372737	0.0013	940790
7	0.1408	251680	0.1408	606320	0.0026	443261	0.0026	1118794
8	0.1584	255552	0.1584	615648	0.0040	490549	0.0040	1238149
9	0.1760	259424	0.1760	624976	0.0053	527129	0.0053	1330478
10	0.1936	263296	0.1936	634304	0.0066	557371	0.0066	1406809
11	0.2112	267168	0.2112	643632	0.0165	700857	0.0165	1768968
12	0.2288	271040	0.2288	652960	0.0330	833464	0.0330	2103670
13	0.2464	274912	0.2464	662288	0.0495	922380	0.0495	2328093
14	0.2640	278784	0.2640	671616	0.0660	991162	0.0660	2501699
15	0.2816	282656	0.2816	680944	0.2640	1401714	0.2640	3537937
16	0.2992	286528	0.2992	690272	0.5280	1666928	0.5280	4207340
17					0.7920	1844760	0.7920	4656187

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 4 - South East Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 968 ft**  
**G.W.S. = Elev. 1046 ft**

p-y Curve	1		2		3		4	
	Elev. 968' to 960'		Elev. 960' to 949'		Elev. 949' to 937'		Elev. 937' to 926'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.00	0	0.0000	15496
2	0.03	181	0.20	1944	0.20	3600	0.0001	30992
3	0.90	571	0.40	3888	0.40	7200	0.0002	92977
4	1.80	719	0.60	4782	0.60	9124	0.0004	185953
5	2.70	823	0.80	5212	0.80	10032	0.0006	278930
6	3.60	906	1.00	5571	1.00	10799	0.0013	614344
7	4.50	976	1.20	5883	1.20	11468	0.0026	730582
8	5.40	1037	1.40	6160	1.40	12067	0.0040	808522
9	6.30	1092	1.60	6411	1.60	12610	0.0053	868814
10	7.20	1142	1.80	6641	1.80	13110	0.0066	918659
11	8.10	1187	2.00	6853	2.00	13574	0.0165	1155152
12	9.00	1230	2.20	7051	2.20	14007	0.0330	1373715
13	9.90	1269	2.40	7237	2.40	14415	0.0495	1520266
14	10.80	1307	5.40	9940	5.40	20361	0.0660	1633632
15	28.80	1812	149.40	9940	149.40	20361	0.2640	2310305
16	54.00	1812	293.40	9940	293.40	20361	0.5280	2747431
17	72.00	1812	437.40	9940	437.40	20361	0.79	3040532

p-y Curve	5		6		7		8	
	Elev. 926' to 915'		Elev. 915' to 900'		Elev. 900' to 895'		Elev. 895' to 885'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	27893	0.0000	70266	0.0000	56966	0.0000	0
2	0.0001	55786	0.0001	140532	0.0001	113933	0.0528	1040160
3	0.0002	167358	0.0002	421596	0.0002	341798	0.0704	1057496
4	0.0004	334716	0.0004	712658	0.0004	514842	0.0880	1074832
5	0.0006	502074	0.0006	788685	0.0006	569766	0.1056	1092168
6	0.0013	1115720	0.0013	962943	0.0013	695654	0.1232	1109504
7	0.0026	1332239	0.0026	1145139	0.0026	827277	0.1408	1126840
8	0.0040	1474364	0.0040	1267304	0.0040	915533	0.1584	1144176
9	0.0053	1584308	0.0053	1361807	0.0053	983804	0.1760	1161512
10	0.0066	1675201	0.0066	1439936	0.0066	1040246	0.1936	1178848
11	0.0165	2106454	0.0165	1810623	0.0165	1308040	0.2112	1196184
12	0.0330	2505010	0.0330	2153206	0.0330	1555530	0.2288	1213520
13	0.0495	2772250	0.0495	2382914	0.0495	1721477	0.2464	1230856
14	0.0660	2978976	0.0660	2560608	0.0660	1849848	0.2640	1248192
15	0.2640	4212908	0.2640	3621246	0.2640	2616080	0.2816	1265528
16	0.5280	5010020	0.5280	4306412	0.5280	3111061	0.2992	1282864
17	0.79	5544499	0.7920	4765828	0.7920	3442955		

Sacramento River (Antler) Bridge (Replace)  
 Bridge No. 6-0210  
 02-378901

Pier 5 - West Pile  
 11' CIDH Pile with a 12' Permanent Casing

O.G. = Elev. 1005 ft  
 G.W.S. = Elev. 1046 ft

p-y Curve	1		2		3		4	
	Elev. 1005' to 982.5'		Elev. 982.5' to 973'		Elev. 973' to 964'		Elev. 964' to 946.5'	
Elevation	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.0000	9779	0.0000	26950	0.0000	41597
2	0.20	1620	0.0001	19558	0.0001	53900	0.0001	83194
3	0.40	3149	0.0002	36376	0.0002	161701	0.0002	249582
4	0.60	3548	0.0004	43258	0.0004	297526	0.0004	462766
5	0.80	3862	0.0006	47873	0.0006	329267	0.0006	512135
6	1.00	4124	0.0014	58451	0.0014	402018	0.0013	625290
7	1.20	4351	0.0029	69510	0.0029	478082	0.0026	743599
8	1.40	4553	0.0043	76925	0.0043	529085	0.0040	822928
9	1.60	4736	0.0058	82662	0.0058	568539	0.0053	884294
10	1.80	4903	0.0072	87404	0.0072	601156	0.0066	935027
11	2.00	5057	0.0180	109905	0.0180	755914	0.0165	1175734
12	2.20	5201	0.0360	130700	0.0360	898939	0.0330	1398191
13	2.40	5336	0.0540	144643	0.0540	994839	0.0495	1547353
14	3.90	6318	0.0720	155429	0.0720	1069024	0.0660	1662739
15	5.40	7300	0.2880	219810	0.2880	1511829	0.2640	2351467
16	149.40	7300	0.5760	261400	0.5760	1797877	0.5280	2796382
17	293.40	7300	0.8640	289286	0.86	1989678	0.79	3094705

p-y Curve	5	
	Elev. 946.5' to 897.5'	
Elevation	y(in)	p(lb/in)
1	0.00	0
2	0.05	449856
3	0.07	457354
4	0.09	464851
5	0.11	472349
6	0.12	479846
7	0.14	487344
8	0.16	494842
9	0.18	502339
10	0.19	509837
11	0.21	517334
12	0.23	524832
13	0.25	532330
14	0.26	539827
15	0.28	547325
16	0.30	554822
17	0.32	3311

**Sacramento River (Antler) Bridge (Replace)**  
**Bridge No. 6-0210**  
**02-378901**

**Pier 5 - East Pile**  
**11' CIDH Pile with a 12' Permanent Casing**

**O.G. = Elev. 1006 ft**  
**G.W.S. = Elev. 1046 ft**

p-y Curve	1		2		3		4	
	Elev. 1006' to 991'		Elev. 991' to 976'		Elev. 976' to 961'		Elev. 961' to 960'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.00	0	0.00	0	0.0000	10521	0.0000	0
2	0.20	1080	0.20	3240	0.0001	21042	0.0576	1267200
3	0.40	2025	0.40	6046	0.0002	52637	0.0768	1288320
4	0.60	2275	0.60	6890	0.0004	62596	0.0960	1309440
5	0.80	2471	0.80	7559	0.0006	69274	0.1152	1330560
6	1.00	2634	1.00	8122	0.0014	84580	0.1344	1351680
7	1.20	2775	1.20	8613	0.0029	100583	0.1536	1372800
8	1.40	2901	1.40	9052	0.0043	111313	0.1728	1393920
9	1.60	3014	1.60	9450	0.0058	119614	0.1920	1415040
10	1.80	3117	1.80	9815	0.0072	126476	0.2112	1436160
11	2.00	3213	2.00	10154	0.0180	159035	0.2304	1457280
12	2.20	3302	2.20	10471	0.0360	189126	0.2496	1478400
13	2.40	3386	2.40	10769	0.0540	209302	0.2688	1499520
14	5.40	4599	5.40	15105	0.0720	224910	0.2880	1520640
15	149.40	4599	149.40	15105	0.2880	318071	0.3072	1541760
16	293.40	4599	293.40	15105	0.5760	378252	0.3264	1562880
17	437.40	4599	437.40	15105	0.8640	418605	0.35	1584000

p-y Curve	5		6		7		8	
	Elev. 960' to 956'		Elev. 956' to 951'		Elev. 951' to 941'		Elev. 941' to 889'	
Point	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)	y(in)	p(lb/in)
1	0.0000	0	0.0000	30285	0.0000	0	0.0000	0
2	0.0528	1161600	0.0001	60571	0.0528	580800	0.0528	537680
3	0.0704	1180960	0.0002	145493	0.0704	590480	0.0704	546641
4	0.0880	1200320	0.0004	173021	0.0880	600160	0.0880	555603
5	0.1056	1219680	0.0006	191480	0.1056	609840	0.1056	564564
6	0.1232	1239040	0.0013	233787	0.1232	619520	0.1232	573525
7	0.1408	1258400	0.0026	278021	0.1408	629200	0.1408	582487
8	0.1584	1277760	0.0040	307680	0.1584	638880	0.1584	591448
9	0.1760	1297120	0.0053	330624	0.1760	648560	0.1760	600409
10	0.1936	1316480	0.0066	349592	0.1936	658240	0.1936	609371
11	0.2112	1335840	0.0165	439589	0.2112	667920	0.2112	618332
12	0.2288	1355200	0.0330	522763	0.2288	677600	0.2288	627293
13	0.2464	1374560	0.0495	578532	0.2464	687280	0.2464	636255
14	0.2640	1393920	0.0660	621673	0.2640	696960	0.2640	645216
15	0.2816	1413280	0.2640	879178	0.2816	706640	0.2816	654177
16	0.2992	1432640	0.5280	1045525	0.2992	716320	0.2992	663139
17	0.32	1313	0.7920	1157064	0.3168	1805	0.3168	3105

Project No. S8875-06-89  
May 24, 2006

Mr. Jeff Pizzi  
California Department of Transportation - District 2  
Environmental Engineering Office  
P.O. Box 496073  
Redding, California 96049-6073

Subject: ANTLERS BRIDGE REPLACEMENT  
INTERSTATE 5, POST MILE 40.2  
SHASTA COUNTY, CALIFORNIA  
CONTRACT NO. 03A0937  
TASK ORDER NO. 89, EA 02-378900  
SAND-BLAST WASTE SITE INVESTIGATION REPORT

Dear Mr. Pizzi:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A0937 and Task Order No. 89, Geocon Consultants, Inc. has performed environmental engineering services at the Antlers Bridge Replacement project in Shasta County, California. The accompanying report summarizes the services performed including the excavation of twelve hand-auger soil borings, homogenized soil sampling, and laboratory testing.

*The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.*

Please contact us if you have any questions concerning the contents of this report or if we may be of further service.

Sincerely,

**GEOCON CONSULTANTS, INC.**

John E. Juhrend, PE, CEG  
Project Manager

West J. Bourgault  
Project Geologist

WJB:JEJ:jaj

(5 + 3CD) Addressee

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1. Vicinity Map
2. Site Plan

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1. Summary of Boring Coordinates, Lead and Soil pH Analytical Results

### APPENDICES

- A. Laboratory Reports and Chain-of-Custody Documentation
- B. Lead Statistics and Regression Analysis Results

# **SAND-BLAST WASTE SITE INVESTIGATION REPORT**

## **1.0 INTRODUCTION**

This Sand-Blast Waste Site Investigation Report for the Antlers Bridge Replacement project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 03A0937 and Task Order (TO) No. 89.

### **1.1 Project Description and Proposed Improvements**

The project site consists of the area beneath the existing Antlers Bridge (Bridge No. 06-0089) (the Bridge) on Interstate 5 (I5), Post Mile (PM) 40.2, located near Lakehead, Shasta County, California (the Site). The existing Bridge is of painted steel truss construction, and is approximately 1,330 feet (ft) long, 62 ft wide. Caltrans intends to construct a replacement bridge prior to demolishing the existing Bridge. Construction activities for the replacement bridge will require soil excavation. The area beneath the Bridge is steep, loose and rocky. The approximate project location is depicted on the attached Vicinity Map, Figure 1. The layout of the existing Bridge is depicted on the Site Plan, Figure 2.

### **1.2 General Objectives**

The purpose of the scope of services outlined in TO No. 89 was to evaluate whether impacts due to sand-blast waste from bridge maintenance activities exist in the surface and near surface soils within the project boundaries. Additionally, we performed a lead-containing paint (LCP) and asbestos-containing material (ACM) bridge survey. The results of the LCP and ACM survey are presented in a separate report. The investigative results will be used by Caltrans to inform the construction contractor if lead-impacted soil is present within the project boundaries for health, safety and soil management/disposal purposes.

## 2.0 BACKGROUND

### 2.1 Potential Lead Soil Impacts

Elevated lead levels in soil may exist beneath and adjacent to the existing Bridge due to historical bridge maintenance activities including sand-blasting of LCP and repainting operations. Samples of the existing bridge paint contained lead levels of 96,000 and 100,000 milligrams per kilogram (mg/kg).

### 2.2 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as “California hazardous” for handling and disposal purposes are contained in the *California Code of Regulations (CCR)*, Title 22, Division 4.5, Chapter 11, Article 3, § 66261.24. Criteria to classify a waste as “Resource, Conservation, and Recovery Act (RCRA) hazardous” are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For a waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste has the potential of exceeding the STLC when the waste’s total metal content is greater than or equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

Per Section 25157.8 of the California Health and Safety Code (HSC), waste that contains total lead in excess of 350 mg/kg must be disposed of at a Class I hazardous waste landfill facility.

### **3.0 SCOPE OF SERVICES**

The following scope of services was performed as requested by Caltrans in TO No. 89.

#### **3.1 Pre-field Activities**

- Contacted the local public utilities via Underground Service Alert (Ticket No. 0123125) on April 13, 2006, to attempt to delineate subsurface public utilities and conduits in proximity to the proposed boring locations.
- Prepared a Health and Safety Plan dated April 2006 to provide guidelines on the use of personal protective equipment during the field activities.
- Retained the services of Advanced Technology Laboratories (ATL) (ELAP No. 1838), a Caltrans-approved and California-certified analytical laboratory, to perform the chemical analyses of soil samples.

#### **3.2 Field Activities**

The field activities consisted of collecting soil samples beneath the bridge on April 26, 2006. Thirty-five soil samples were collected from twelve hand-auger soil borings (HA1 through HA12). The soil borings were excavated to an approximate maximum depth of 24 inches below ground surface (bgs). Soil samples were collected at general depths from surface to approximately 8 inches, 8 to 16 inches and from 16 to 24 inches bgs. The approximate boring locations are depicted on Figure 2.

## **4.0 INVESTIGATIVE METHODS**

### **4.1 Boring Location Rationale**

The borings were performed in accessible areas beneath the abutment approach of each end of the bridge. Hand-auger borings HA1 through HA8 were performed on the north side of the Bridge, and borings HA9 through HA12 were performed on the south side of the Bridge.

### **4.2 Soil Sampling Procedures**

A total of 35 soil samples were obtained directly from the hand-auger and transferred to Ziploc® re-sealable plastic bags. The soil samples were field-homogenized within the sample bags and subsequently labeled, placed in an ice chest, and delivered to ATL under standard chain-of-custody documentation.

The sampling equipment was cleansed prior to each soil boring by washing the equipment with an Alconox™ solution followed by a double rinse with deionized water. The borings were backfilled with the soil cuttings. The field sampling activities were performed under the direct supervision of Geocon's project manager.

### **4.3 Laboratory Analyses**

The laboratory was instructed to homogenize the soil samples prior to analysis in accordance with Contract 03A0937 requirements. Total lead, pH and WET analyses were performed under standard turn-around-time. The soil samples collected within the project boundaries were submitted to ATL for the following analyses:

- Thirty-five soil samples were tested for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B.
- Fifteen soil samples were further analyzed for WET soluble lead following EPA Test Method 7420.
- One soil sample was further analyzed for TCLP soluble lead following EPA Test Methods 1311 and 7420.
- Four soil samples chosen at random were analyzed for soil pH following EPA Test Method 9045C.

Quality assurance/quality control (QA/QC) procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix, whichever was more frequent, with the spike made at ten times the detection limit or at the analyte level.

Prior to submitting the soil samples to the laboratory, the chain-of-custody documentation was reviewed for accuracy and completeness. We also reviewed the analytical laboratory QA/QC provided with the laboratory report. These data show acceptable non-detect results for the method blanks, matrix spikes and appropriate recoveries for the laboratory control samples. Two of the duplicate results had relative percent differences (RPDs) of 62.1% and 191%, both greater than the accepted RPD limit of 20%. The high RPDs were addressed by the laboratory, stating “RPD for duplicate (DUP) is outside criteria for samples 084075-020ADUP and 084075-030ADUP; however, the laboratory control sample (LCS) validated the analytical batch.” These results may be due to lack of matrix homogeneity. Based on the other laboratory QA/QC, no qualification of the data presented herein is necessary, and the data are of sufficient quality for the purposes of this report. Reproductions of the laboratory reports and chain-of-custody documentation are presented in Appendix A.

## 5.0 FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

### 5.1 Soil Conditions

Soil encountered during the excavation of borings was generally comprised of miscellaneous colluvium consisting of loose, dry, sand and silt with angular gravels. Evidence of sand-blast material/waste was not observed beneath the existing Bridge.

### 5.2 Soil Analytical Results

Soil analytical results for the Site are summarized hereinafter. The analytical results of the soil samples are summarized on Table 1. Laboratory reports and chain-of-custody documentation are presented in Appendix A.

Total lead was detected in all 35 soil samples analyzed at concentrations ranging from 7.5 to 1,700 mg/kg. Fifteen of the 35 soil samples had reported total lead concentrations greater than 50 mg/kg (ten times the STLC value for lead of 5.0 milligrams per liter [mg/l]). One soil sample (HA11-0) had a total lead concentration greater than the TTLC value for lead of 1,000 mg/kg.

WET soluble lead was detected in each of the 15 soil samples analyzed at concentrations ranging from 0.38 to 67 mg/l. Seven of the 15 soil samples had reported WET soluble lead concentrations exceeding the STLC value for lead of 5.0 mg/l. TCLP soluble lead was not detected above the laboratory method detection limit of 1.2 mg/l for the only soil sample analyzed (HA11-0).

Soil pH values ranged from 6.4 to 8.6.

### 5.3 Statistical Evaluation for Lead Detected in Soil Samples

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the true means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and soluble lead concentrations exists that would allow the prediction of soluble lead concentrations based on calculated UCLs. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring*, by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications*, by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap*, by Bradley Efron and Robert J. Tibshirani.

#### **5.3.1 Total Lead Distribution**

The presence of non-detects and/or low concentrations in total lead data sets can strongly skew sample data towards low values. In these cases, the data are often lognormally distributed or non-parametric and classical statistical methods do not work properly since they assume that the data exhibit an

underlying normal distribution. Consequently, it is necessary to apply the appropriate method when determining the UCLs on the true total lead means.

### **5.3.2 Calculating the UCLs for the True Mean**

The upper one-sided 90% and 95% UCLs of the true mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the true mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from the site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap*. The bootstrap results are included in Appendix B. The calculated UCLs and statistical results are summarized in the table below:

SAMPLE INTERVAL (inches)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0 to 8	471.1	513.2	296.1	7.5	1,700
8 to 16	149.5	166.8	95	14	550
16 to 24	66.3	71.8	45.1	9.0	190

### **5.3.3 Correlation of Total and Soluble Lead**

Total and corresponding soluble (WET) lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of soluble lead (WET) concentrations based on the UCLs calculated above in Section 5.3.2.

To estimate the degree of interrelation between total and corresponding soluble (WET) lead values ( $x$  and  $y$ , respectively), the *correlation coefficient* [ $r$ ] is used. The correlation coefficient is a ratio that ranges from +1 to -1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of -1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all. The *correlation coefficient* was calculated for the 14 ( $x$ ,  $y$ ) data points (i.e., soil samples analyzed for both total lead [ $x$ ] and soluble [WET] lead [ $y$ ]) and equaled 0.939. A *correlation coefficient* greater than or equal to 0.8 is an acceptable indicator that a correlation exists. To achieve an acceptable correlation, the total and soluble

(WET) lead data for soil sample HA11-0 (1,700, 3.4) were omitted from the regression analysis. For the purpose of this report, an acceptable correlation was obtained.

For the *correlation coefficient* that indicates a linear relationship between total and soluble (WET) lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be  $y = 0.0805(x)$ , where  $x$  represents total lead concentrations and  $y$  represents predicted soluble lead (WET) concentrations.

This equation was used to estimate the expected WET soluble lead concentrations for the UCLs calculated in Section 5.3.2. Regression analysis results and a scatter plot depicting the 14 ( $x$ ,  $y$ ) data points along with the regression line are included in Appendix B. The predicted WET soluble lead concentrations are summarized in the table below.

SAMPLE DEPTH (inches)	90% TOTAL LEAD UCL (mg/kg)	PREDICTED SOLUBLE LEAD (mg/l)	95% TOTAL LEAD UCL (mg/kg)	PREDICTED SOLUBLE LEAD (mg/l)
0 to 8	471.1	37.9	513.2	41.3
8 to 16	149.5	12.0	166.8	13.4
16 to 24	66.3	5.3	71.8	5.8

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Soil Waste Disposal/Reuse Classification

Elevated total and soluble lead levels above California hazardous waste thresholds were encountered to the maximum depth explored of 24 inches beneath the existing Bridge. Additional soil sampling and analytical testing would be necessary to characterize the vertical and lateral extent of elevated lead levels.

Based on the elevated total and soluble lead concentrations, excavated soil extending to a depth of at least 24 inches should be either (1) managed and disposed of as a California hazardous waste or (2) stockpiled separately and resampled to confirm total and soluble lead concentrations for disposal and/or reuse evaluation.

Based on the reported TCLP soluble lead concentration less than the federal regulatory TCLP value of 5.0 mg/l, excess soil material generated at the Bridge project should not require disposal as a RCRA hazardous waste.

Per Caltrans requirements, the contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to prevent or minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

## **7.0 REPORT LIMITATIONS**

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.



# California Regional Water Quality Control Board Central Valley Region



Karl E. Longley, ScD, P.E., Chair

Linda S. Adams  
Secretary for  
Environmental Protection

Redding Office  
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Arnold Schwarzenegger  
Governor

8 July 2008

Mr. Christopher Quiney  
c/o Eric Akana,  
California Department of Transportation, District 2  
1657 Riverside Drive  
Redding, CA 96001

## **ACTION ON REQUEST FOR CLEAN WATER ACT §401 WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE ANTLERS BRIDGE REPLACEMENT PROJECT, W DID NO. 5A45CR00300, REDDING, SHASTA COUNTY**

### **ACTION:**

1.  Order for Standard Certification
2.  Order for Technically conditioned Certification
3.  Order for Denial of Certification

### **WATER QUALITY CERTIFICATION STANDARD CONDITIONS:**

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and §3867 of Title 23 of the California Code of Regulations (23 CCR).
2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.
3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR §3833, unless otherwise stated in writing by the certifying agency.
4. Certification is valid for the duration of the described project. The Discharger shall notify the Regional Water Board in writing within 7 days of project completion.



**ADDITIONAL CONDITIONS (for Certification Action 2):**

In addition to the four standard conditions, the applicant shall satisfy the following:

1. Discharger shall notify the Central Valley Regional Water Quality Control Board (Regional Water Board) within 7 days of the start of any in-water activities.
2. Except for activities permitted by the U.S. Army Corps of Engineers (Corps) under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.
3. The discharge of petroleum products or other excavated materials to surface waters is prohibited, unless otherwise specified. Discharger shall notify the Regional Water Board immediately of any spill of petroleum products or other organic or earthen materials.
4. All equipment or vehicles operated adjacent to, or within, the lake/river channel shall be checked and maintained daily to prevent leaks of petroleum products that if introduced to water, could impact the beneficial uses of the lake.
5. Spill response kits, including absorbent materials designated for spill containment and cleanup, shall be on-site in case of accidental spills. If a spill occurs, the responsible party shall notify Office of Emergency Services (OES) at 1-800-852-7550, and the Regional Water Board, immediately.
6. Activities shall not cause turbidity increases in surface waters to exceed:
  - (a) where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
  - (b) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
  - (c) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
  - (d) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

Except that these limits will be eased during in-water working periods to allow a turbidity increase of **15 NTU** over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

7. Activities shall not cause settleable matter to exceed 0.1 mL/l in surface waters as measured in surface waters 300 feet downstream from the project.
8. Activities shall not cause visible oil, grease, or foam in the work area or downstream.
9. All areas disturbed by project activities shall be protected from washout or erosion.



10. In the event that project activities result in the deposition of soil materials or creation of a visible plume in surface waters, the following monitoring shall be conducted immediately upstream and 300 feet downstream of the work site, samples sent to the laboratory, and the results reported to this office within two weeks:

<b>Parameter</b>	<b>Unit</b>	<b>Type of Sample</b>	<b>Frequency of Sample</b>
<b>Turbidity</b>	<b>NTU</b>	<b>Grab</b>	Every 4 hours during in water work
<b>Settleable Material</b>	<b>mL/l</b>	<b>Grab</b>	Same as above.

11. Discharger shall notify the Regional Water Board immediately if the above criteria for turbidity, settleable matter, oil/grease, or foam are exceeded. In addition, the Discharger shall prepare a Notice of Discharge, to be submitted to the Regional Water Board, as a follow-up. Discharger shall outline mitigation measures implemented to comply with this certification.
12. All collected water quality data, lab sample results, notices of discharge, storm water inspection reports and associated photos, as well as any other relevant information, shall be compiled in a report, and submitted monthly to the Regional Water Board for review.
13. Discharger shall implement all compensatory and non-compensatory mitigation measures as outlined in the application submittal to the Regional Water Board.
14. Discharger shall provide the Regional Water Board with pre- and post-project photos of the work areas, taken from established photo points, upon completion of the project.
15. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under state law. For purposes §401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification.
16. In response to a suspected violation of any condition of this certification, the Regional Water Board may require the holder of any permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the Regional Water Board deems appropriate, provided that the burden, including costs, of the reports shall be a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.
17. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.



18. Discharger shall comply with all Department of Fish and Game 1600 requirements for the project as required in Lake & Streambed Alteration Agreement No. R1-08-0093. Discharger shall comply with all requirements of Army Corps of Engineers Clean Water Act §404 permit.
19. Prior to the impacts to the 0.06 acre of stream, the Discharger shall provide the Regional Water Board with proof of payment to the in-lieu fee agreement with the Army Corps of Engineers and the National Fish and Wildlife Foundation, for an equivalent of 0.06-acre of stream habitat.
20. The Discharger shall comply with their General NPDES Permit No. 99-06-DWQ (NPDES No. CAS 000003) issued by the State Water Resources Control Board.

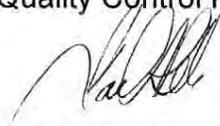
**REGIONAL WATER BOARD CONTACT PERSON:**

Andrew J. Jensen, M.S., Redding Branch Office, 415 Knollcrest Drive, Suite 100, Redding, California 96002, (530) 224-4783, ajensen@waterboards.ca.gov

**WATER QUALITY CERTIFICATION:**

I hereby issue an order certifying that any discharge from the Antlers Bridge Replacement Project (WDID No. 5A45CR00300) will comply with the applicable provisions of §301 ("Effluent Limitations"), §302 ("Water Quality Related Effluent Limitations"), §303 ("Water Quality Standards and Implementation Plans"), §306 ("National Standards of Performance"), and §307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges that have received State Water Quality Certification (General WDRs)".

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the applicant's project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Regional Water Board's Water Quality Control Plan (Basin Plan).



(for) PAMELA C. CREEDON  
Executive Officer

AJJ: knr

Enclosure: Project Information

cc: see attached list



cc: Mr. Matt Kelley, U.S. Army Corp of Engineers  
U.S. Fish and Wildlife Service, Sacramento  
Donna Cobb Department of Fish and Game, Region 1  
Mr. Bill Orme, State Water Resources Control Board, Certification Unit, Sacramento  
Bill Jennings, CALSPA, Stockton

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## PROJECT INFORMATION

**Application Date:** 24 March 2008

**Applicant:** Christopher Quiney, Eric Akana, Caltrans 1657 Riverside Drive Redding, CA 96001

**Applicant Representatives:** Not Applicable

**Project Name:** Antlers Bridge Replacement Project

**Regional Board:** Central Valley Regional Water Quality Control Board-Redding Branch Office

**Regional Board Application Number:** WDID No.5A45CR00300

**U.S. Corps Application Number:** Pending (individual permit)

**Type of Project:** Replacement of Antlers Bridge on I-5 in Lakehead. Realign of I-5 in the area.

**Project Location:** Interstate 5, Antler Bridge, near Lakehead in Shasta County, Section 13, Township 35N, Range 5W, M.D.B.&M., Latitude: 40°52'54. 49"N and Longitude: 122°22'51. 68"W

**County:** Shasta County

**Receiving Water (hydrologic unit):** Shasta Lake, which are a tributary to the Sacramento River. Shasta Dam Hydrologic Unit-Shasta Lake Hydrologic Area No. 506.10

**Water Body Type:** Lake

**Designated Beneficial Uses:** The Basin Plan for the Central Valley Regional Water Quality Control Board has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Hydropower Generation (POW); Water Contact Recreation (REC-1); Non-contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Spawning, Reproduction, and /or Early Development (SPWN); and Wildlife Habitat (WILD).

**Project Description (purpose/goal):** The project entails replacement of the Antlers Bridge (Bridge No. 06-0089) at Interstate 5 in Shasta Lake between Postmile 39.0 and 41.2 in Shasta County. The new bridge, a 5-span, concrete structure, will be built immediately east of the existing bridge. The project proposes to realign a 0.42-mile section of highway south of the bridge to improve safety. Traffic will remain on the existing bridge during construction. The existing bridge will be removed once the new bridge is placed in service. New right-of-way will be required due to the change in highway alignment.



**Preliminary Water Quality Concerns:** Turbidity, suspended matter, settleable matter, discharges of sediment, and various pollutants associated with construction activities.

**Non-Compensatory Mitigation:** The Discharger has permit coverage under the State Water Resources Control Board Construction Storm Water Program, and must prepare and implement a Storm Water Pollution Prevention Plan. Discharger will implement Best Management Practices (BMPs) to control sedimentation and erosion. All disturbed areas must have an effective combination of erosion and sediment control BMP's in place during the rainy season.

Discharger proposes to mitigate water quality concerns by incorporating Best Management Practices in the project area.

**Compensatory Mitigation:** The Discharger had been working with the Western Shasta Resource Conservation Service (WSRCD) to identify a mitigation project to offset project impacts of 0.06-acre of stream habitat. Unfortunately, the WSRCD did not have any projects currently, that meet the mitigation requirements. Therefore, in the interest of time, the Discharger will purchase the equivalent of 0.06-acre of credit through the in-lieu fee agreement with the Army Corps of Engineers and the National Fish and Wildlife Foundation.

In addition, the Discharger will provide \$30,000 and \$50,000 to California Department of Fish and Game, and Shasta-Trinity National Forest, respectively, for angling improvements and warm water fishery improvements within Shasta Lake.

Temporary impacts will be mitigated by restoring all impacted areas to their original topography and condition.

**Fill/Excavation Area:** Project implementation will permanently impact 0.06 acres, (2,231 linear feet) of unvegetated streambed and 1.2 acres of lake/reservoir and temporarily impact include 0.03 acres (268 linear feet) of unvegetated streambed and 6.7 acres (138 linear feet) of lake/reservoir.

**Dredge Volume:** Not applicable

**U.S. Army Corps of Engineers Permit Number:** The applicant proposes to utilize an individual permit for this project (Pending).

**Regional Water Board Public Notice:** Information regarding this project was noticed on the Central Valley Water Board's website from 28 March 2008 to 18 April 2008. No comments were received.

**Department of Fish & Game Streambed Alteration Agreement:** Discharger applied for a Streambed Alteration Agreement with the Department of Fish and Game on 21 March 2008. The applicant must comply with all conditions in Lake and Streambed Alteration Agreement No. R1-08-0093.

**Possible Listed Species:** Based on the habitat suitability assessment conducted by



Geomatrix Consultants the following Federal Threatened or Endangered species have potential to occur in the project area: bald eagle

**Status of CEQA Compliance:** Caltrans prepared an Initial Study and Mitigated Negative Declaration in January 2007, which was approved on 29 September 2006 (SCH# 2006102048).

**Application Fee Provided:** A certification fee of \$11,655.00 was submitted on 24 March 2008 as required by 23 CCR §3833b(2)(A) and by 23 CCR § 2200(e).



**Permanent Erosion Control - Soil Restoration  
&  
Revegetation Report**

**INTERSTATE 5 REALIGNMENT  
SACRAMENTO RIVER (ANTLER) BRIDGE**



**02-378901  
05-SHA-4-KP 63.8/64.6**

**Prepared by**

**Division of Engineering Services**

**Landscape Architectural Services – MS#80**

**Office of Landscape Architectural Design  
North North Region (Redding)**

**August 7, 2008**

Timothy Ellison Landscape Architect

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## **Introduction**

This report serves to address the erosion control, soil restoration and re-vegetation aspects that influence the construction of the realignment for Interstate 5 in Shasta County, California. Specifically the realignment segment of Interstate 5 will be constructed in conjunction with the Sacramento River (Antler) Bridge Replacement (Br. 06-0089) from KP 63.80 to KP 64.62.

The Office of Landscape Architecture – North North Region (Redding) has prepared this Erosion and Revegetation Report based upon a literature study, Caltrans Geotechnical Design Report, site reconnaissance and a “Cut Slope Profile Vegetation Density Study”(CSPVDS). Information presented herein is intended to assist Caltrans Project Development and Construction Management personnel. The report should be made available to prospective bidders and contractors.

## **Pertinent Reports and Investigations**

The following is a list of documents that were reviewed in preparation of this report:

- 1) Geotechnical Design Report (Antler Bridge 06-0089) and its reference materials.
- 2) Statewide General Construction Storm Water Pollution Control Permit.
- 3) Existing Cut Slope Profile Vegetation Density Study
- 4) Caltrans Highway Design Manual
- 5) Caltrans Storm Water Quality Handbook Project Planning and Design Guide
- 6) Caltrans Standard Specifications and Plans.
- 7) SOIL STRATEGIES - For Stormwater Management, Erosion Control. (See Appendix)

## **GENERAL INFORMATION**

### **Existing Facilities and Proposed Improvements**

The proposed realignment will consist of several large cuts up to 22 meters (72 Feet) in height and fills up to 4 meters (13 Feet) thick through the rolling and steep mountainous terrain.

### **Physical Setting**

The physical setting of the project site and the surroundings area was reviewed to aid in project design and construction planning. The physical setting includes climate, topography, drainage, man-made and natural features, geology, soils characteristics and their re-vegetation probability.

#### **Climate**

According to the Western Regional Climate Center, the average annual precipitation at Dunsmuir Treatment Plant (located approximately 38-km (24 miles) north of the project site) is 1600 mm (63 inches). The majority of this precipitation (80%) occurs during the months of November to March. The average snowfall in this area is approximately 701 mm (27 inches). Additional information can be found within the Geotechnical Report.

### **Man-made and Natural Features of Engineering and Construction Significance.**

The land along the proposed alignment is owned by State of California and the United States Forest Department. Culverts and drains were installed where the creeks intersect the existing roadway. Downstream fragmentation is apparent from increased velocities and quantities of water resulting from the addition of impermeable surfaces.

Embankment fills slopes along the roadway were placed at 2:1 (H:V) and cut slopes are at 1:1 (H:V) or flatter. Existing fill areas and slopes are stabilized by prolific and substantially natural re-vegetation cover. Cut slopes have experienced varying degrees of revegetation and are heavily dependent on the supporting surfaces and subsurface characteristics and location on the particular cut slope.

## Regional and Local Geology

The project area is located within the Klamath Mountain geomorphic province of California. This area is underlain by Mississippian marine deposits (Bragdon Formation), which consists of thinly bedded meta-shale, interstratified meta-siltstone, meta-sandstone and conglomerate. In general, the attitude of the Bragdon Formation within the proposed cuts is *North 50 degrees west; 55 degrees northeast*.

Generally, observations made along this portion of the route indicate that locations having an attitude (strike plane between shale/sandstone layers) parallel to and dipping towards the travelway at 3:1 (33%) or greater do not stabilize (or revegetate). A more substantial stabilization strategy will be required where these and similar conditions exist. Similar conditions were noted to exist south of station R-108+50.



## Soil Survey, Exploration and Geophysical Studies

Currently, the NRCS has no soil survey information for this area. Based on Geotechnical examination of the site, the soil present at the site consists (less than 4 meters [13 feet] thick) of silty sand to well graded gravel with cobbles. Bedrock underlies a majority of the project. Cuts would require moderate to difficult ripping. A small limited area will require blasting. The majority of the larger cut slopes lie south of Station 111+00. Existing slopes in this area appears to be dominated by weathered, continuously raveling, and eroding consolidated to semi-consolidated, coarse to finer shale and sand stone deposits. The geotechnical report identifies this as meta-shale and meta sandstone typically fractured and weathered near the surface but becoming more compact with depth. Observations of this material within deeper existing cuts near the project indicate that when the material becomes exposed to weathering, natural stabilization for erosion control purposes on slopes greater than 4:1 (H:V) is unlikely. Most similar slopes along this portion of the route, thought stabilized when cut in the 1960s, continue to ravel, erode the cuts have not adequately revegetated to meet current policy.



## Geotechnical Conditions

### Natural Slope Stability

The project area consists of rolling terrain with rounded hills and moderately to steep drainage channels with slopes as steep as 1:1 (H:V). The natural slopes in the project area are covered with modest depths of vegetation litter, vegetated with native trees and shrubs throughout and grasses in some isolated and open spots. Rock outcrops are not typically exposed on slopes adjacent to the project, except where there is lake hydraulic action on exposed rock, and where seen on the distant mountainsides. Based on field observations, the existing natural slopes appear to be stable and the erosion is limited to existing drainage channels, where the flow is concentrated.

## Erosion

As shown on the Geotechnical Report, there are many existing slopes within the project boundaries and in adjacent areas. As compared to existing natural slopes, the 1:1 (H:V) cuts slopes are all missing a great deal of vegetation or very lightly revegetated. More consolidated and monolithic foundation materials exhibit almost no vegetation cover at steeper inclines, while other less consolidated base material and flatter areas have varying degrees of vegetation dependent on soil striations/layering and position on the slope. Striation of parent material that weather at different speed in some cases support growth on the stable striations above the more stable layers especially when the lower layer is denser and resistant to moisture percolation. Most vegetation is prolific at the toes of existing cut slopes where natural debris, slope erosive ravel, snow and moisture accumulate. Continuous ravel and erosion on unstabilized slopes is substantially greater than the little to no erosion on the stabilized native background natural slopes. Erosion on existing stabilized fill slopes, is mild to non-existent and similar performance can be expected on fill placed for the new alignment providing proper erosion control measures, such as soil enhancements, surface enhancement including terracing, roughing, hydroseeding and incorporation of indigenous vegetation.



Existing fill areas are substantially made up of crushed rock, gravel, and cobbles, and they do not exhibit good revegetation potential. Fill having these characteristics will need to be covered over with gravel, cobble and a layer of suitable select material for modification and re-vegetation introduced. Increased revegetation success could be anticipated with the incorporation of a moisture resistant barrier layer between the upper select top material and the gravel cobble under layers.



## STORM WATER REVIEW AND COMPLIANCE

In our attempt to comply with California Water Quality Order 99-08-DWQ for Construction Activity and watershed restoration requirements by Army Corp/ EPA all disturbed surfaces occurring as a result of construction will be permanently stabilized prior to project completion.

The objective (as defined by our storm water program) is to prevent all construction resulting pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters. Increased volumes and velocity's are identified as products that may cause off site erosion and result in off site receiving water pollution contributing impacts.

The focus (Landscape Architecture) on permanent BMPs (usually post-construction) shall include BMPs which primarily address source control by stabilization through integration of permanent erosion control measures. However, and in addition, maintenance, safety, environmental and aesthetic considerations are also taken into consideration when complying with permit requirements. Areas extending beyond the clear recovery area, are of special concern when attempting to fulfill our full responsibility.

To comply with the general permit (water quality) requirements, recommendations for permanent stabilization will use most practicable currently available applications (items currently identified in our standards) to minimize to the maximum extent all impacts that may reduce physical and biological integrity to adjacent wetlands or watercourses of concern identified by Caltrans Environmental Unit.

In keeping with Caltrans policies:

Caltrans Storm Water Quality Handbook, Project Planning and Design Guide (CPPDG) "For all Caltrans projects, Caltrans will maximize vegetation-cover" and employ slope/surface protection and conveyance systems as our primary action.

In keeping with the requirements of the state wide construction permit final stabilization for the purposes of submitting a Notice of Completion of Construction (NCC) (similar to Notice of Termination NOT) are satisfied when two conditions are met:

All soil disturbing activities are completed AND EITHER OF THE TWO FOLLOWING CRITERIA ARE MET:

- (1) A uniform vegetative cover with 70 percent coverage has been established OR: equivalent stabilization measures have been employed. These measures include most other erosion resistant soil covering or treatments.
- (2) Where background native vegetation covers less than 100 percent of the surface, such as in arid areas, the 70 percent criteria is adjusted as follows: If the native vegetation covers 50 percent of the ground surface, 70 percent of 50 percent (.70 X .50= .35) would require 35 percent total uniform surface coverage.

The CPPDG, state wide construction permit, Caltrans Highway Design & Roadside Maintenance Manuals general policies and the projects environmental document visual impact study all work together to support the above stabilization strategies. SEE APPENDIX CALTRANS AESTHETICS POLICIES

In keeping with the CPPDG and other environmental and Caltrans policies, permanent perennial vegetative cover shall only be considered for areas that can support the selected vegetation long-term. Surfaces shall be designed to minimize overland and concentrated flow depths and velocities, and maximize contact time between water and vegetation surfaces. This will enhance infiltration and pollutant removal opportunities. As required by the CPPDG Landscape Architecture evaluated the site to select the appropriate surface, vegetation and planting strategy. Soil type & condition, site topography, climate and season, types of appropriate native vegetation suited to the site, and maintenance factors were considered to assist in selecting BMPs.

To identify areas that can support vegetation long-term, existing cut, fill & native slopes in the project area were studied.

### Fill Areas

General studies have shown that fill slopes (and other flatter disturbed areas) should be provided with:

- (1) Thirty inches of suitable select soil distributed over native poorly graded silty sand with gravel or cobbles, and
- (2) stabilized by the incorporation of 32% by volume compost amendment into the top twelve to eighteen inches, and
- (3) horizontally compacted to 75 to 85% show the strongest re-vegetation potential.

To enhance revegetation, flatter fill areas should have a water resistant barrier layer between the select top material and the gravelly cobble base material. SEE

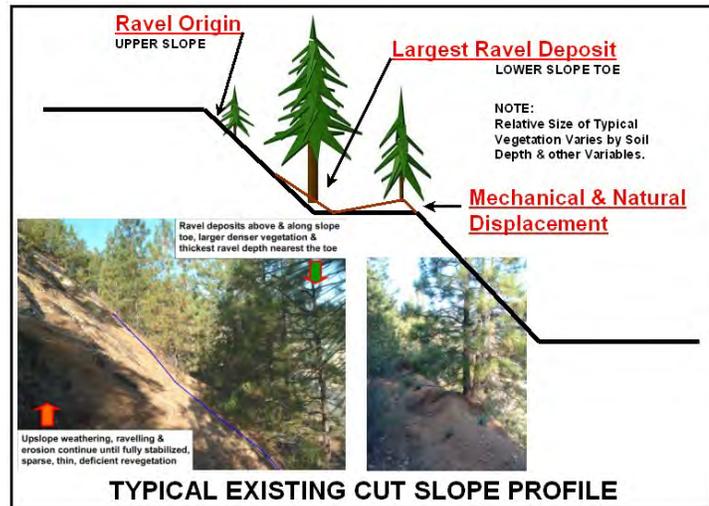
APPENDIX SOIL STRATEGIES.



### Cut Areas

To evaluate cut slope re-vegetation potential a “Cut Slope Profile Vegetation Density Study”(CSPVDS) was conducted on existing cut slopes in and adjacent to the project area. The findings of the CSPVDS study were directly related to the foundation material, fracturing density, relative slope angle and the parent materials natural stability.

Solid consolidated, monolithic and unfractured bedrock was not dominant in the area but where present had little vegetation or re-vegetation cover. Exceptions were noted anywhere rock fracturing occurred and at the toe of *all* existing slopes. Each of these locations (fractures and slope toes) supported increased densities of native specie independently developing. The localized microenvironments in the many surface fractures and along the length of slope toes provide increased protection and a more suitable germination environment (deeper ravel mixed with accumulated organic mater and moisture), to allow for native plant



proliferation. The predominant rock in the area is not solid and the existing rocks natural fracturing and sheeting characteristics together with reoccurring freeze/thaw cycles further compound continued ravel, erosion and natural native specie re-vegetation at the slope toes over time.

Generally, observations made along this portion of the route indicate that locations having an attitude (strike plane between shale/sandstone layers) parallel to and dipping towards the travelway at 3:1 (33%) or greater do not stabilize (or revegetate). A more substantial stabilization strategy will be required where these and similar conditions exist. Similar conditions were noted to exist south of station R-108+50. Slopes should be substantially and permanently stabilized to reduce continued ravel, erosion, water volume and velocities to decrease the potential for increased down stream or off site impacts, prior to completion of the project.

For erosion control purposes on cut slopes, the dominant characteristic evident throughout the local area defining the subsurface geologic formation is unconsolidated, moderately to heavily fractured, shale, siltstone, sandstone including gravel and cobbles. All slopes in excess of 4:1 (H:V) surfaces, not initially and permanently stabilized at construction and continuously exposed to natural weathering, thereafter continue to breakdown and experience surface erosion and raveling on upper slopes until permanent stabilization of the slope is undertaken and successful. This continuing surface erosion, on upper slopes, further exacerbates the establishment of native species and permanent slope stabilization. Dust, blowing humus, native seeds, snow, moisture etc. can not accumulate adequately, to begin germination and initial and effective long-term colonization. Exceptions to re-establishment were noted anywhere surface fracturing was frequent and especially at the toe of all slopes where ravel accumulated.

At these locations, especially along the toes of slopes, a supportive environment enhanced by accumulated appropriate native materials accelerated natural and independent vegetation re-establishment.



Permanent stabilization to minimize pollutant load to the maximum extent is required by our state wide construction permit using standard and recognized construction practices. Project areas studies indicate that reasonable re-vegetation can occur using typical and practical standard practices recognized by Caltrans. In addition these standard and practical practices also support Caltrans roadside maintenance and visual quality (aesthetic scenic) policies.

## **EROSION AND REVEGETATION CONCLUSIONS AND RECOMMENDATIONS.**

To achieve full compliance with the statewide construction permit and visual scenic quality policies the following practical practices should be used on this project:

### **GENERAL**

- 1) Develop a soil management plan including practical strategies for accumulation, protection, redistribution, protected placement, and rehabilitation and stabilization.
- 2) Strip and stockpile select material (topsoil, duff or other suitable growing medium) and incorporate removed vegetation during construction and use the stockpiled materials for permanent stabilization in the surface preparation prior to the permanent seeding and revegetation operations.

### **DISTURBED FILL AREAS (ALL)**

- 3) All fill areas should receive twenty four to thirty inches of suitable select soil distributed over native poorly graded silty sand with gravel or cobbles.
- 4) Stabilized select material by the incorporation of compost amendments bringing total amendment content to 32% by volume compost amendment in the top twelve to eighteen inches.
- 5) Fill areas should be horizontally compacted not to exceed 75 to 85% relative density and left with a terraced and roughened finished surface.
- 6) Incorporate nutrients at a rate identified by appropriate laboratory testing.
- 7) To support and expedite revegetation establishment, incorporate a moisture penetration resistant layer between the upper select material (24-30 inches deep) and the lower gravelly material.
- 8) All fill areas should receive a one-inch mulch cover over hand dry applied broadcast native species seed or typical erosion control type "D" with the addition of appropriate background native species.
- 9) Areas adjacent to, and visible from the highway (and visible from lake areas) will receive increased densities of supportive materials including vegetation. Areas with less visibility may have costly additives reduced by up to 40%.
- 10) As an alternative to number one (#2) above "retaining existing vegetation", imported composted material could be incorporated into the surface of areas to be revegetated (32% by volume) and at a larger depth and diameter within individual and larger planting holes. It is generally accepted, and a typical planting practice, that when planting larger plant material the receiving hole should receive improved soil to about twice the diameter of the root ball.

### **FILL SLOPES**

- 11) Improved revegetation strategies will include flattening all fill slopes to 3:1 (H:V) or flatter where practical.
- 12) Adjacent to the travelway only, at the tops and toes of slopes exceeding 4:1 (H:V) incorporate indigenous colored RSP (or stained RSP to background indigenous color) to add stability, decrease the proliferation of vegetation and support fire retardation along the travelway. RSP longitudinal edge furthest from the travelway should be varied and undulating to provide a natural looking transition into the background vegetation.
- 13) Beyond the RSP treatment transition to native grasses and small shrubs with larger material being placed beyond the clear recovery zone where the incorporation of a full complement of practical and typical background native species should be encouraged.

### **ALL CUT SLOPES (SEE TABLE *Cut Slope Guidelines*)**

- 14) Adjacent to the road, the slope should be sloped at the designated angle and longitudinally chiseled or scraped leaving the surface as smooth as reasonably achievable using typically available excavation techniques. The smooth surface should be carried to the backside or upper edge of the clear recovery zone where a benched, roughened and natural surface should begin.

### **CUT SLOPES (LESS CONSOLIDATED) See Table Below: "Cut Slope Guidelines"**

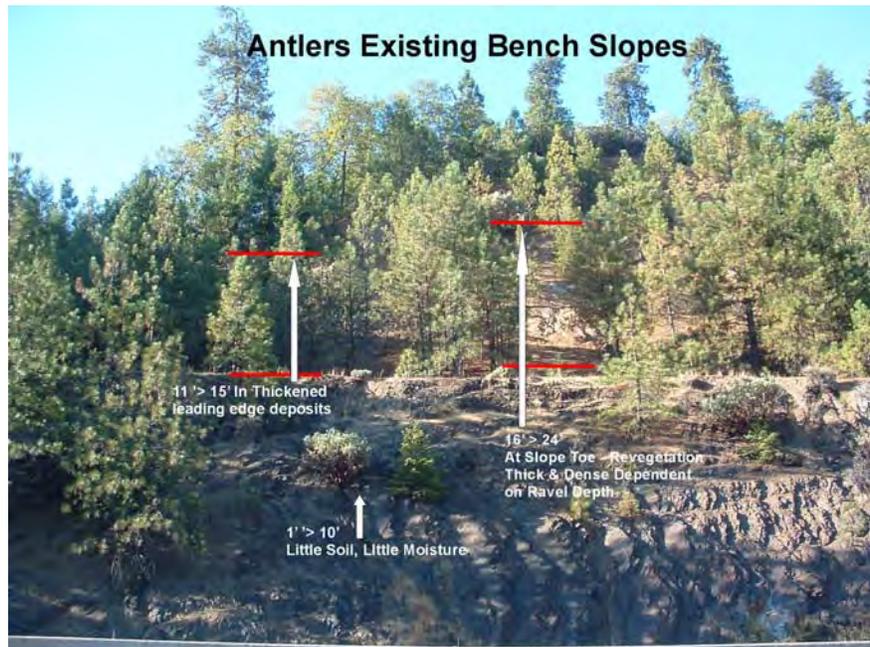
- 15) Leave the longitudinal slopes within the clear recovery as smooth as practical using typically available excavation techniques. See # 13 above.
- 16) To the maximum extent, increase the number of slope toes by the incorporation of steps on all materials that have the potential for continued ravel or are of a strongly fractured or layered basic nature or character. This especially includes all areas where cutting can be accomplished by ripping and also in all areas where

mechanical or expansion wedging or fracturing can be accomplished. Expedient revegetation is usually enhanced by incorporating steps or benches.

- 16) If improved fill material is used on steps or benches the space between benches can be increased by forty percent.
- 17) If improved fill material is used on steps every other step can be left un-planted.
- 18) Unconsolidated and heavily fractured step top material areas Should also receive typical erosion control type “D” with the addition of a smaller quantity of appropriate background native species. Areas adjacent to, and visible from the highway (and lake areas) will receive increased densities of supportive materials including vegetation.
- 19) Where attitude (strike plane between shale/sandstone layers) parallel to and dipping towards the travelway at 3:1 (33%) or greater a more substantial stabilization strategy should be utilized. Similar conditions were noted to exist south of station R-108+50. In this location a retaining structure should be considered. Using stabilized stepped slopes 3:1 or flatter on any portion of the cut slope remaining above the wall.

**CUT SLOPES (MONOLITHIC/ CONSOLIDATED) See Table Below: “Cut Slope Guidelines”**

- 20) On slopes, establish longitudinal vertical and horizontal benching. Benches should be at intervals consistent with typically existing cut slope re-vegetation height now along the route. Benches at a max of 15 feet should encouraging opportunities for natural vegetation and re-establishment at vertical intervals to allow the cover of the slope face and support a resemblance to the background vegetation density and reach an appearance of 70% of background in an extended time frame, (15 to 30 years).



- 21) If fill material will be used on benches the space between benches can be increased by forty percent (40%) and the appearance of 70% of background will likely occur in a much shorter time frame, (7 to 15 years).
- 22) Benches with fill should also receive typical erosion control type “D” with the addition of a smaller quantity of appropriate background native species. Areas adjacent to, and visible from the highway (and lake areas) will receive increased densities of supportive materials including vegetation.
- 23) Surfaces should be left in a roughened and fractured state with no flat chiseled planes on the majority of the upper slopes.

These recognized standard Caltrans practices will use typically available technology and provide the best opportunity to minimize to the maximum extent practical the prevention of all construction resulting pollutants from contacting storm water and maintain the spirit of the intent to keep all products of erosion from moving off site into receiving waters. In addition to meeting storm water requirements, these standardized applications support required existing visual and scenic quality standards within this viewshed and along this portion of the route.

**Table: Cut Slope Guidelines**

Water Pollution/ Permanent Erosion Control Revegetation - Aesthetics Integration					
ID	BASE MATERIAL	Procedure	SLOPE		
			BOTTOM	MIDDLE	TOP
			1/3	1/3	1/3
			&/or CRV		
			0-15' MAX		
			H:V	H:V	H:V
<b>A)</b>	<b>CONSOLIDATED MONOLITHIC</b>		<b>1 1/2:1</b>	<b>1:1</b>	<b>1 1/2:1</b>
		<i>BLAST ONLY MATERIAL</i>			
		Steps/ Catchment (15% Min. H:V Tilt Back)	NO	NO	NO
		No Maintenance Bench (Vertical Distance)	NO	16' MAX	16' MAX
		Bench Width	0	8' MIN	8' MIN
		Surface to Remain Smooth	YES	NO	NO
		Surface to Remain Rough	NO	YES	YES
		Moisture Resistant Step Base Layer	NO	NO	NO
		Select Material Step Top	NO	YES	YES
		Gabion W/fill (indigenous colored rock)	NO	YES	YES
		Slope Rounding/ Setback	NO	NO	NO
<b>B)</b>	<b>CONSOLIDATED SHALE OR SANDSTONE</b>		<b>1:1</b>	<b>1 1/2:1</b>	<b>2:1</b>
		<i>DIFFICULT RIP OR MINI BLAST</i>			
		Steps/ Catchment (15% Min. H:V Tilt Back)	NO	3' H&V	3' H&V
		No Maintenance Bench (Vertical Distance)	NO	NO	NO
		Bench Width	0	0	0
		Surface to Remain Smooth	YES	NO	NO
		Surface to Remain Rough	NO	YES	YES
		Moisture Resistant Step Base Layer	NO	YES	YES
		Select Material Step Top	NO	YES	YES
		Gabion W/fill (indigenous colored rock)	NO	NO	NO
		Slope Rounding/ Setback	NO	NO	YES
<b>C)</b>	<b>OTHER MATERIAL</b>		<b>1 1/2:1</b>	<b>2:1</b>	<b>2 1/2:1</b>
		<i>MODERATE TO EASY RIPPING</i>			
		Steps/ Catchment (15% Min. H:V Tilt Back)	NO	2' H&V	2' H&V
		No Maintenance Bench (Vertical Distance)	NO	NO	NO
		Bench Width	0	0	0
		Surface to Remain Smooth	YES	NO	NO
		Surface to Remain Rough	NO	YES	YES
		Moisture Resistant Step Base Layer	NO	YES	YES
		Select Material Step Top	NO	NO	NO
		Gabion W/fill (indigenous colored rock)	NO	NO	NO
		Slope Rounding/ Setback	YES	YES	YES

## Appendix Alternatives

Alternative #1:  
Kuranda Road Option



Kuranda Rd Queensland March 2005

Caltrans Hwy Design Manual 304.5

**BEST MANAGEMENT PRACTICES**

**Alternative 2, Steps**

NOTES:  
1) VERTICAL CUT DISTANCE SHALL BE LESS THAN HORIZONTAL DISTANCE.  
2) VERTICAL CUT SHALL NOT EXCEED 24" (600 mm) IN SOFT MATERIAL & 3' (1 m) IN ROCKY MATERIAL

**Alternative 2a, Add Percolation Resistant Layer with Stabilized & Ammended Fill to Over.**

**STEPPED SLOPE**

**Alternative 3, Terraces**

**Alternative 3a, Add Percolation Resistant Layer with Stabilized & Ammended Fill to Over.**

**TERRACED SLOPE**

Stepped and Terraced Slope Construction

Appendix A, Project Planning & Design Guide 09/2002  
Approved & Modified Design Pollution Prevention BMPs

**Alternative #3**

Unmodified Typical Cut Slopes (no steps or benches)

**APPENDIX EXISTING STEPS/BENCHES**

Project Area Revegetation

**ORIGINAL 1:1 ROADWAY CUTS  
HAVE NOT ADEQUATELY  
RE-VEGETATED**

**EXISTING BENCHED SLOPE  
SHOW CONDITION THAT  
SUPPORTS RE-VEGETATION  
TAKING PLACE**



**SOUTH  
STAGING AREA  
VEGETATION LOSS**

**RESTORATION  
PLANTING**

**SOUTH LAUNCH**

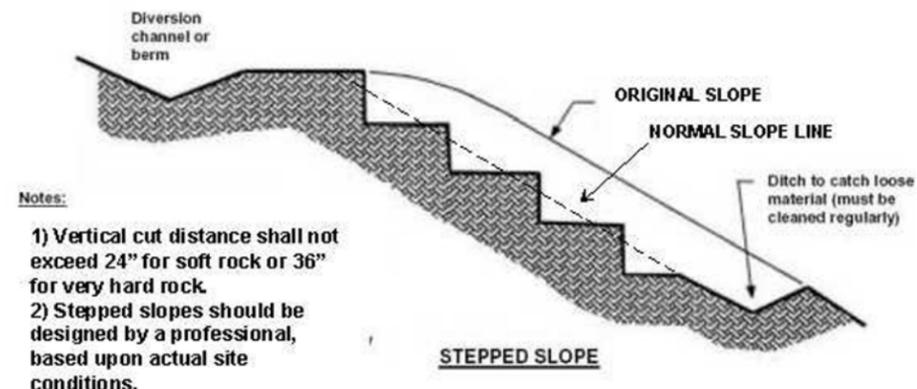
**PROPOSED ANTLER BRIDGE  
NORTH LAUNCH**

**TYPICAL TREATMENT ADJACENT  
TO BRIDGE ABUTMENTS (RSP)**



**PROPOSED STEPPED SLOPES ENHANCE LONG  
TERM INDIGENOUS RE-VEGETATION**

CALTRANS HWY DESIGN MANUAL 304.5 STEPPED SLOPE



**02-37890**

**ANTLER BRIDGE REPLACEMENT**

# LOWER CANYON

INTERSTATE 5  
SHASTA LAKE AREA  
ANTLERS PROJECT AREA  
02-37890



**FLAT AREAS ON BENCHES/STEPS SUPPORT  
INDIGENOUS RE-VEGETATION**

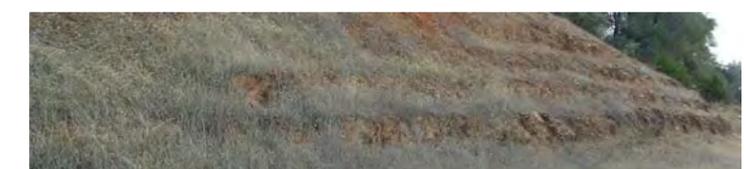
**Caltrans District #2 Redding California  
STEP BENEFITS INCLUDE:**

- **REDUCE SOIL MIGRATION/EROSION**
- **COST EFFECTIVE**
- **SUPPORT LONG TERM RE-VEGETATION**
- **CORRIDOR CHARACTER CONSISTENCY**



# GRASSLANDS

REDDING AREA  
LOWER ELEVATION  
LOWER RAIN FALL



# SLOPES WITHIN THE PROJECT AREA

**SMOOTH &  
STEEP  
SURFACES  
DELAY  
THE  
RESTORATION  
PROCESS  
FOR  
CENTURIES**



**BENCHES DO  
RE-VEGETATE**

**FLAT AREAS ACCUMULATE  
FINES, ORGANIC MATTER & MOISTURE**

**ANTLER**

## Appendix: Caltrans Aesthetics

### Caltrans Highway Design Manual

#### Topic 901.1 - Landscape Architecture Program

The Landscape Architecture Program is responsible for the development of policies, programs, procedures, and standards for all aspects of the Roadside Program ... including; revegetation, restoration, Roadside Management, Beautification, Modernization and Scenic Highways.

### Topic 109 - Scenic Values in Planning and Design

#### 109.1 Basic Precepts

On any highway, pleasing appearance is an important consideration. Scenic values must be considered along with safety, utility, economy, and all the other factors considered in planning and design. This is particularly true of the many portions of the State Highway System situated in areas of natural beauty. The location of the highway, its alignment and profile, the cross section design, and other features should be in harmony with the setting. Economy consistent with traffic needs is of paramount importance, although a reasonable additional expenditure can be justified to enhance the beauty of the highway.

#### Topic 109.3 Aesthetic Factors

Throughout planning and design consider the following:

- (a) The location of the highway should be such that the new construction will preserve the natural environment and will lead to and unfold scenic positions. In some cases, additional minor grading not required for roadbed alignment may expose an attractive view or hide an unsightly one.
- (b) The general alignment and profile of the highway should fit the character of the area traversed so that unsightly scars of excavation and embankment will be held to a minimum. Curvilinear horizontal alignment should be coordinated with vertical curvature to achieve a pleasing appearance.
- (c) Existing vegetation (e.g., trees, specimen plants, diminishing native species or historical plantings) should be preserved and protected to the maximum extent feasible during the planning, design, and construction of transportation projects. Whenever specimen or mature trees are present, especially in forested areas, a tree survey should be made to provide accurate data on the variety, condition, location, size, and ground elevations of trees affected.
- (d) Appropriate replacement planting should be provided when existing planting is removed. When native or specimen trees are removed, replacement planting should reflect the visual importance of the plantings lost. Where the visual impact of tree removal is substantial, replacement with large transplants or specimen size trees may be appropriate. If not, an appropriate quantity of smaller replacements may be required to ensure eventual survival of an adequate number of plants. Provisions for watering and establishment of replacement planting should also be considered. The District Landscape Architect should be consulted early

- in the planning and design process so that appropriate conservation and revegetation measures are incorporated.
- (e) Existing vegetation such as trees or large brush may be selectively thinned or removed to open up scenic vistas or HIGHWAY DESIGN MANUAL 100-15 September 1, 2006 and provide a natural looking boundary between forest and cleared areas. Vegetation removal for aesthetic purposes should be undertaken only with the concurrence of the District Landscape Architect.
  - (f) Vista points should be provided when views and scenery of outstanding merit occur and feasible sites can be found. (See Topic 904 for site selection criteria.)
  - (g) Whenever feasible, wide medians and independent roadways should be provided on multilane facilities as these features add scenic interest and relieve the monotony of parallel roadways.
  - (h) Bridges, tunnels, and walls merit consideration in lieu of prominent excavation and embankment slopes when costs of such alternates are not excessive.
  - (i) Slopes should be flattened and rounded whenever practical and vegetation provided so that lines of construction are softened.
  - (j) Structures should be located and designed to give the most pleasing appearance.
  - (k) Scars from material sites should be avoided. Planting compatible with the surroundings should be undertaken to revegetate such scars when they are unavoidable.
  - (l) Drainage appurtenances should be so located that erosion, sumps, and debris collection areas are hidden from view or eliminated when site conditions permit.
  - (m) Interchange areas should be graded as flat as reasonable with slope rounding and contouring to provide graceful, natural looking appearance. The appearance can be further enhanced by planting a vegetative cover appropriate to the locality, being careful to maintain driver visibility.
  - (n) In locations where graffiti has been excessive, concepts such as limiting accessibility, planting, and surface treatments should be considered to deter graffiti.
  - (o) Roadsides should be designed to deter weed growth along the traveled way, and to provide for mechanical litter collection.

### Topic 707 - Slope Treatment Under Structures

#### 707.1 Policy

Structure end slope should be treated to:

- (a) Protect slopes.
- (b) Improve aesthetics.
- (c) Reduce long term maintenance costs.

Other areas in the manual where Aesthetics is discussed.

#### AESTHETIC FACTORS

Contour Grading and Slope Rounding -----	304.4
In Design-----	109.3
Materials and Color Selection -----	705
Noise Barrier -----	1102.6
Planting -----	902.1

**The HDM is supported by the SER;  
California Standard Environmental  
Reference:**

**Visual Impact Assessments & Preparer Qualifications:** Scenic Resource Evaluations and Visual Impact Assessments are performed under the direction of licensed Landscape Architects. Landscape Architects receive formal training in the area of visual resource management with a curriculum that emphasizes environmental design and context sensitive solutions. Landscape Architects also understand the constructability and maintenance issues when recommending specific mitigation measures

**Processing and Approval** For projects requiring both state and federal environmental approval the Landscape Architect submits the completed Scenic Resource Evaluation /Visual Impact Assessment (SRE/VIA) to the Environmental Coordinator (or for local projects the preparer of the environmental document). The document writer incorporates the findings and recommended mitigation measures identified in the SRE/VIA and provides a copy to the Landscape Architect for review. Mitigation measures can involve avoiding, minimizing, or compensating for proposed project impacts. The completed SRE/VIA serves as a supporting technical study and is referenced in the environmental document. Upon receipt of this information the environmental staff in coordination with the Project Development Team will determine which level of environmental document is appropriate for the project.

For local assistance projects (federal aid projects off the State Highway System), the Preliminary Environmental Studies (PES) form is used to indicate whether a detailed technical report will be required for visual and aesthetic resources. Additional information on local assistance procedures is contained in the Local Assistance Procedures Manual.

**CUMULATIVE IMPACTS** A cumulative effect is defined in the NEPA Regulations 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 yet collectively significant actions taking place over a period of time. CEQA has similar language and requirements.

While removing trees or excavating slopes may not be considered major impacts on an individual project, similar impacts on past, or future projects within a highway corridor can result in a cumulative impact when considering the combined result.

Because different agencies have differing approaches to cumulative impacts, it is recommended that interagency coordination begin early in project development. Also refer to the Department's Guidance for Preparers of Cumulative Impact Analysis.

Director Policy Support:

DP-22 Context Sensitive Solutions:

The Department uses "Context Sensitive Solutions" as an approach to plan, design, construct, maintain, and operate its transportation system. These solutions use innovative and inclusive approaches that integrate and balance community, aesthetic, historic, and environmental values with transportation safety, maintenance, and performance goals. Context sensitive solutions are reached through a collaborative, interdisciplinary approach involving all stakeholders.

DP-25 Best Practices

The California Department of Transportation (Department) investigates and implements best practices in all its endeavors to improve delivery of products, projects, and services.

The Department shares and implements best practices throughout the Department, as appropriate, so that maximum benefits are realized.

The Department shares its best practices within the Department, and with transportation agencies globally, as well as locally.

The Department searches for best practices from transportation agencies around the world – as well as nationally, locally, and internally.

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** GUDMUND SETBERG  
Senior Bridge Designer  
Division of Engineering Services  
Bridge Design Branch 2  
Office of Bridge Design North

**Date:** July 31, 2008  
**File:** 02-SHA-5-KP 64.63 (PM 40.16)  
Sacramento River (Antlers) Bridge  
(Replace)  
Bridge No. 06-0210  
EA 02-378901

Attention: Mr. Jason Lynch

**From:** DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
GEOTECHNICAL SERVICES – MS 5

**Subject:** Supplemental To Foundation Report Dated July 31, 2008.

## Load Test

This memo adds recommendations for a load test to be performed at the Antlers Bridge on Interstate 5 in Shasta County. The load test shall be performed utilizing the Osterberg cell method. This testing will be performed by the Contractor and LOADTEST, Inc.

The load test will be performed in the middle of Pier 4 at the approximate location of Boring B-3, as shown on the Plans. The test pile will be constructed with a 2.2-meter (m) (7.2 feet (ft)) diameter steel casing and a 2 m (6.5ft) diameter rock socket. The steel casing specified tip elevation is 284.1 m, which is approximately 1 m into rock. The rock socket will extend 10.7 m (35 ft) below the casing tip to an elevation of 273.4 m. The cut-off elevation for the rock socket is 284.1 m.

The load test will utilize three Osterberg load cells (O-cells). There will be three 34-inch diameter O-cells just off the bottom arranged in a triangular pattern. The O-cells will be attached to a carrying frame. Twelve strain gauges will be attached to the carrying frame at three elevations to measure the movement of the pile. At each of these three locations there will be four strain gauges arranged at equal distances around the pile. The strain gauges will be attached to 1.5 m long, #13 rebar sister bars. The sister bars will be attached to the carrying frame at three locations along the rock socket. The three 34-inch diameter O-cells have the capacity to test a total of 160135 kN (36000 kips).

To measure movement from the pile, LOADTEST, Inc. requires a ridged reference frame above the pile. The reference frame must not be subject to movement by regular construction activities or wave action from the lake. An isolation casing should be placed at the support locations for the reference frame. 12-inch diameter pipe piles or 12-inch H-piles should then be driven inside the isolation piles to the top of rock for sufficient support. The reference beam support piles must be at least 6.6 m (21.6 ft) horizontal distance from the center of the test pile.

Cleaning of the bottom and inspection methods for the test pile should be the same as those used for the production piles. It is essential to have a clean pile bottom to enable successful analysis of the available end bearing.

PVC casings will be attached to the full length of the carrying frame along the perimeter so that nondestructive testing maybe performed after concrete is placed. Hoops should be attached to the carrying frame to support the PVC casings. Notches will also need to be cut out of the steel plates to make room for the inspection tubes.

The testing of the test pile shall consist of engaging the three 34-inch diameter O-cells at the tip of the pile. This should provide the Engineer with an estimate of the end bearing and skin friction values for the material tested.

Coordination between the Contractor and LOADTEST, Inc. is necessary for the load test to be performed successfully.

Table 1 contains the specified tip elevations for the steel casing and rock socket, and elevations for the O-cells and strain gauges.

**Table 1. Test Pile Recommendations.**

Item	Steel Casing Specified Tip Elevation (m)	Rock Socket Specified Tip Elevation (m)	Specified bottom of O-cell Elevation (m)	Strain Gauge Specified Elevation (m)	Cut Off Elevations (m)
2.2 m Casing	284.1	N/A	N/A	N/A	N/A
2.0 m Rock Socket	N/A	273.4	N/A	N/A	284.1
O-cell 96080 (3x16014) kN	N/A	N/A	273.7	N/A	N/A
Strain Gauge #1	N/A	N/A	N/A	283.0	N/A
Strain Gauge #2	N/A	N/A	N/A	281.5	N/A
Strain Gauge #3	N/A	N/A	N/A	278.2	N/A

## Construction Considerations

### 1. Steel Casing Piles

1. Prior to any driving of the steel casings, the Contractor should perform a driveability study at the test pile location.
2. The steel casing will be installed into hard bedrock. The Contractor should anticipate hard driving/drilling conditions. If the Contractor chooses to drive the steel casing, caution shall be taken to prevent damaging the tip of the casing.
3. The top of rock surface is sloping up to 10°. The pile installation method shall prevent casing from drifting.
4. Due to the sloping top of rock surface, and presence of hard rock, the steel casing cannot be seated into rock by conventional driving alone.
5. No geotechnical capacity was given to the steel casing.
6. Weak soil conditions may cause the steel casings to sink under their own weight.

7. If driving is the chosen method for casing installation, Pile Dynamic Analysis (PDA) testing is recommended to monitor pile driving. The PDA testing/monitoring should help to prevent the steel casing from being overstressed during driving.
8. The installed pile tip for the steel casing should be at the elevation presented in Table 1. If the Contractor elects to install the steel casing below the elevation shown on the Plans, the rock socket shall be extended a corresponding distance below specified tip. In this case this Office shall be contacted for pile tip evaluation.
9. If rock is encountered at an elevation higher than 285.1 m, the steel casing tip elevation may be raised. In this case this Office shall be contacted for pile tip evaluation.
10. Prior to rock socket construction, steel casing shall be cleaned out. Equipment or methods used during casing cleanout shall not cause blow-ins, scouring, or caving around or below the tip of the steel casing. Cleanout shall be performed under a full head of slurry equal to the external water level.

## **2. CIDH Piles and Rock Sockets**

1. During installation of CIDH piles, hard rock coring into bedrock should be anticipated.
2. Wet CIDH pile installation method shall be used for the test pile.
3. Uneven rock contact and loss of water circulation should be anticipated during the CIDH pile construction due to the presence of variably weathered and fractured rock, caving of rock, and sloping top of rock surface. Temporary casing, slurry or other approved methods may be used to control caving.
4. The installed pile tip for the rock socket should be at the elevation presented in Table 1. If the Contractor elects to install the steel casing below the elevation shown in Table 1, the rock socket shall be extended a corresponding distance below specified tip. In this case this Office shall be contacted for pile tip evaluation.

5. If rock is encountered at an elevation higher than 285.1 m, the rock socket tip elevation may be raised. The rock socket length should be 10.7 m (35 ft). In this case this Office shall be contacted for pile tip evaluation.
6. If temporary casing is utilized, it shall be removed while the concrete is being placed.
7. Care shall be taken during construction of the rock socket not to disturb the material surrounding the bottom of the steel casing. Equipment and methods used for constructing the socket shall not cause scouring or caving around or below the tip of the steel casing.
8. The Contractor shall perform desanding and cleaning of the slurry before placing concrete.
9. The drilling of the rock socket, the placement of the carrying frame with O-cells, and concrete pour shall be completed in a continuous operation.
10. The Contractor shall submit the drilling log after completion of drilling. The drilling log shall include: penetration rate, material descriptions, estimated volume of cuttings (e.g., poor, good, excessive), and other information pertaining to the drilling process (e.g., loss of circulation, zones of cave in, down pressure).
11. Due to end bearing requirements, it is critical for the bottom of the rock socket be clean. This Office requires the use of the Department's Shaft Inspection Device (SID) be used at the test pile to verify that the bottom of the pile is clear of debris. The SID shall be used to inspect the bottom of the hole after completion of the drilling and clean out. The pile must be approved by the Engineer prior to placing concrete.
12. To clean out the bottom of hole the Contractor shall use some method to pump or vacuum the bottom to assure the base is debris free. The bottom of the drilled shaft shall be cleaned prior to concrete placement. The bottom shall be clear of sediment and debris. A minimum of 50 percent of the base of each shaft shall have less than 6 mm (1/4 inch) of sediment at the time of concrete placement. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 25 mm (1 in).
13. This Office requires the use of the Department's sonic caliper logging to prove shaft quality.

14. Per section 49-4.03 paragraph 3 of the State of California Department of Transportation Standard Specifications (July 1999), "The bottom of drilled hole shall be cleaned just before placing reinforcement or concrete to remove any loose sand, gravel, dirt, and drill cuttings." To clean out the bottom of the hole the Contractor shall use some method to pump or vacuum the bottom to assure the base is debris free.
15. Caltrans will perform non-destructive gamma-gamma testing.
16. If rock socket tip elevation is deepened or over drilled, inspection tubes must also be extended to three inches above the actual tip of pile/drilled hole. The O-cells must also be lowered and carrying cage be extended to the bottom of the pile.
17. The rock in the rock socket is not considered erodible. Water may be used as slurry for drilling the rock socket, only after the slurry from drilling the material above is removed.
18. The load test will not occur until the concrete reaches maximum strength. Caltrans will notify the Contractor when the pile is ready for the load test to begin.
19. Core boxes are available for inspection at the Caltrans Office. Bidders are encouraged to view the rock core samples at the Translab facility (5900 Folsom Blvd. Sacramento) before submitting bids.

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable. If there are any questions, please contact Joseph Kaump at (916)-227-1044 or Reid Buell at (916)-227-1012.

  
JOSEPH KAUMP, P.G. 7837  
Engineering Geologist  
Geotechnical Design – North

c:

Reid Buell  
R.E. Pending  
Structure OE (E-copy)  
Eskinder Taddese-PCE (E-copy)  
Lerose Lane DME (E-copy)  
GDN File  
GS File



DEPARTMENT OF INDUSTRIAL RELATIONS  
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH  
MINING AND TUNNELING UNIT

2211 Park Towne Circle, Suite 2  
Sacramento, California 95825



Telephone (916) 574-2540  
FAX (916) 574-2542

September 5, 2008

Department of Transportation  
District 3  
2800 Gateway Oaks Drive  
Sacramento, California 95833

Attention: Jim Elder, Branch Chief

Subject: Underground Classification No. C057-089-09T  
Antler Bridge – Interstate 5 – Shasta County

Mr. Elder:

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, an Underground Classification of "Potentially Gassy with Special Conditions" has been assigned to the tunnel identified on your submittal. Please retain the original Classification for your records and deliver a true and correct copy of the Classification to the tunnel contractor for posting at the job site.

When the contractor who will be performing the work is selected, please advise them to notify this office to schedule the mandated Prejob Conference with the Division prior to commencing any activity associated with construction or rehabilitation of the tunnel.

Please be informed that whenever an employee enters any bore or shaft being constructed under 30 inches in diameter, the Mining and Tunneling Unit then has immediate jurisdiction over that job. Please contact the Mining and Tunneling Unit prior to entering such spaces.

If you have any questions on this subject, please contact this office at your earliest convenience.

Sincerely,

A handwritten signature in blue ink that reads 'John R. Leahy'. The signature is fluid and cursive, with the first letters of each word being capitalized and prominent.

John R. Leahy  
Senior Engineer

cc: Jerel Snapp  
File



State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH  
MINING AND TUNNELING UNIT

# Underground Classification

C057-089-09T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Sacramento, California 95833  
(MAILING ADDRESS)

at ANTLER BRIDGE – INTERSTATE 5 – SHASTA COUNTY  
(LOCATION)

has been classified as \*\*\* POTENTIALLY GASSY with Special Conditions\*\*\*  
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

### \*\*\*SPECIAL CONDITIONS\*\*\*

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The twelve 11.5-foot diameter by 74 to 107 feet deep drilled shafts located at the Sacramento River arm of Lake Shasta approximately 1.3 miles south of the intersection of Interstate 5 and Antlers Road under crossing, Redding, Shasta County.

This classification shall be conspicuously posted at the place of employment.

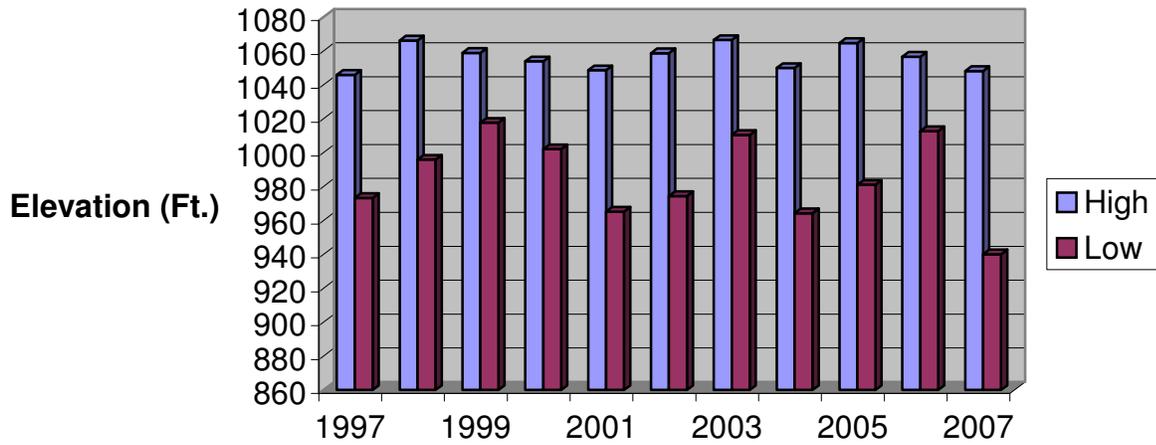
Date September 5, 2008

John R. Leahy  
(SENIOR ENGINEER)

John R. Leahy

	<u>High</u>	<u>Low</u>
<b>1997</b>	1045.9	973.34
<b>1998</b>	1066.18	995.88
<b>1999</b>	1058.89	1017.66
<b>2000</b>	1053.93	1002.09
<b>2001</b>	1048.63	965.16
<b>2002</b>	1058.69	974.36
<b>2003</b>	1066.48	1010.49
<b>2004</b>	1049.98	964.24
<b>2005</b>	1064.73	981.09
<b>2006</b>	1056.61	1012.73
<b>2007</b>	1048.12	940.02

**High/Low Shasta Lake Elevations 1-97 to 12-07**





# United States Department of the Interior

## BUREAU OF RECLAMATION

Northern California Area Office  
16349 Shasta Dam Boulevard  
Shasta Lake, California 96019-8400

IN REPLY REFER TO:

NC-600  
SAF-1.10

SEP 11 2008

Mr. Jim Elder  
Department of Transportation  
District 3  
2800 Gateway Oaks  
Sacramento, CA 95833

Subject: Shasta Lake Elevations Request

Dear Mr. Elder:

Enclosed are averages monthly elevations, for each year, for the past ten years. We hope this data is useful for your efforts to build the new Antler Bridge and wish you a successful project.

If you have any questions or need additional information, please contact Bob Gee at 530-276-2013.

Sincerely,

Don Bader  
Deputy Area Manager

Enclosure