

# **INFORMATION HANDOUT**

**For Contract No. 03-3F7604**

**At 03-But-191-6.8/8.6**

**Identified by**

**Project ID 0313000165**

## **PERMITS**

California Department of Fish and Wildlife

United States Army Corps of Engineers

Non-Reporting Nationwide 404

## **WATER QUALITY**

California Regional Water Quality Control Board

Central Valley Region

Board Order No. 2003-0017-DWQ

NPDES Permit No. CAS 5A04CR00257

## **MATERIALS INFORMATION**

Geotechnical Design Report



California Natural Resources Agency  
DEPARTMENT OF FISH AND WILDLIFE  
North Central Region  
1701 Nimbus Road, Suite A  
Rancho Cordova, CA 95670-4599  
916-358-2900  
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor  
CHARLTON H. BONHAM, Director



JUL 25 2016

Date

Matt Solano  
California Department of Transportation  
703 B Street  
Marysville, CA 95901

Subject: Final Lake or Streambed Alteration Agreement  
Notification No. 1600-2016-0073-R2

Dear Mr. Solano:

Enclosed is the final Streambed Alteration Agreement (Agreement) for the Paradise Road Realignment Project (Project). Before the California Department of Fish and Wildlife (Department) may issue an Agreement, it must comply with the California Environmental Quality Act (CEQA). In this case, the Department, acting as a responsible agency, filed a Notice of Determination (NOD) within five working days of signing the Agreement. The NOD was based on information contained in the Mitigated Negative Declaration prepared by the lead agency.

Under CEQA, the filing of an NOD triggers a 30-day statute of limitations period during which an interested party may challenge the filing agency's approval of the Project. You may begin the Project before the statute of limitations expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Juan Lopez Torres, Senior Environmental Scientist (Specialist) at (916) 358-2951 or [Juan.Torres@wildlife.ca.gov](mailto:Juan.Torres@wildlife.ca.gov).

Sincerely,

Tina Bartlett  
Regional Manager

ec: Juan Lopez Torres, Senior Environmental Scientist (Specialist)

**CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE**  
NORTH CENTRAL REGION  
1701 NIMBUS ROAD, SUITE A  
RANCHO CORDOVA, CA 95670



**STREAMBED ALTERATION AGREEMENT (REVISION 1)**  
NOTIFICATION NO. 1600-2016-0073-R2

CALIFORNIA DEPARTMENT OF TRANSPORTATION  
PARADISE ROAD REALIGNMENT PROJECT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (Department) and California Department of Transportation (Permittee) as represented by Bajwa Winder.

**RECITALS**

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified the Department on March 28, 2016, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, the Department has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

**PROJECT LOCATION**

The project is located within 14 unnamed streams tributary to Dry Creek, crossing State Route (SR) 191 between post mile (PM) 6.8 and PM 8.6, in the County of Butte, State of California. The project is located on the Cherokee California U.S. Geological Survey (USGS) 7.5-minute quadrangle, R3E, T21N, Section 2 and 11; Latitude 39°42'06.19", Longitude -121.36'40.60"W.

**PROJECT DESCRIPTION**

The proposed project will improve the roadway alignment by modifying horizontal curves and vertical profile on SR 191. The scope of work includes realigning the curves, widening the shoulders, and improving the clear recovery zone (CRZ) area. The new roadway dimensions will be two 12 foot lanes (paved), two 8 foot shoulders (paved), and two 3 foot hinge points (dirt) for a total width of 46 feet. Culverts will be removed and replaced in the same drainage pattern. The existing highway will be removed and restored in the areas where there are no private access needs.

As shown in Figure 2, there are a total of 23 culverts to be removed and replaced in the new roadway alignment; 14 of the culverts are under the California Department of Fish and Wildlife's jurisdiction and will be impacted by construction activities. These culverts are all on ephemeral drainages. The rest of the culverts are part of the storm water run-off system and are not under the Department jurisdiction.

The table below includes the information about the culvert work and its impact to the Department jurisdiction. Some culverts will be removed and restored to natural conditions when removing the existing roadway therefore reducing the total impacts to jurisdictional features.

<b>Drainage System (DS) Number</b>	<b>Description of Work</b>	<b>Rock Slope Protection (RSP) Type and Amount</b>	<b>Impact to Department Jurisdictional Features (acres)</b>
DS-01	Remove existing 18" x 45' culvert and replace with 18" x 43.4' culvert and place RSP	Install 10' x 19' Light, Method B <sup>1</sup> RSP at outlet (21.1 CY)	0.0009 ac perm impacts
DS-02	Remove existing 18" x 38' culvert and replace with 18" x 58.4' culvert and place RSP	Install 10' x 20' Light, Method B RSP at outlet (22.2 CY)	0.0016 ac. perm. impacts
DS-03	Install new culvert on new alignment measuring 18" x 62.1' and place RSP at inlet and outlet	Install 10' x 13' Light, Method B RSP at inlet (14.4 CY) and install 10' x 25' Light, Method B RSP at outlet (27.8 CY)	Non jurisdictional feature
DS-04	Remove existing 18" x 45' culvert and place RSP where culvert was located.	Install 16' x 60' (0.00005 acres) of 1/4 ton, Method B RSP where old culvert was located (142.2 CY)	0.006 ac. perm impacts to drainage from cut/fill; however, removing existing 18" x 45' culvert (0.001 ac.) from stream - stream channel now open. <b>Total perm impacts 0.005 ac.</b>

<sup>1</sup> Method B includes the placement of rocks by dumping them within jurisdictional areas and spreading them in layers by bulldozers or other suitable equipment.

Drainage System (DS) Number	Description of Work	Rock Slope Protection (RSP) Type and Amount	Impact to Department Jurisdictional Features (acres)
DS-05	Original 36" x 158' culvert remaining; new 48" x 313.6' culvert installed under new alignment and placement of RSP from existing culvert outlet to new culvert inlet/outlet	Install 20' x 325' 1/4 ton, Method B RSP from old culvert outlet to new culvert inlet (963 CY); Install 25' x 44' 1/4 ton, Method B RSP at new culvert outlet (163 CY)	0.017 ac. perm impacts from RSP at existing 36" culvert outlet, 0.009 ac. and 0.002 ac. perm impacts from cut and fill for new alignment; new culvert will be 48" diameter to allow for animal passage; <b>total perm impacts 0.028 ac.</b>
DS-06	New culvert 18" x 64.7' installed for private property driveway	Install 10' x 15' Light, Method B RSP at culvert inlet (16.7 CY) and 10' x 25' Light, Method B RSP at culvert outlet (27.8 CY)	Non jurisdictional feature
DS-07	Remove 18" x 54' culvert and existing roadway and replace with RSP; install new 18" x 69.8' culvert under new alignment with RSP at inlet/outlet	Removing culvert and replacing with RSP using 1/4 ton, Method B RSP measuring 16' x 53' (125.6 CY); RSP from slope to new culvert inlet will be 1/4 ton, Method B RSP measuring 4' x 40.7' (44.4 CY); culvert outlet 1/4 ton, Method B RSP measures 10' x 30' (24.1 CY)	0.005 ac. perm impacts from new culvert and RSP but removing existing culvert from the stream - stream now an open channel (18" x 54' culvert = 0.002 ac.); 0.005 acres perm impacts minus 0.002 ac. is <b>0.003 ac. total perm impacts</b>
DS-08	Remove 18" x 41' culvert and existing roadway and replace with RSP; install new 24" x 144' culvert under new alignment with RSP at inlet/outlet	Removing culvert and replacing with RSP using 1/4 ton, Method B RSP measuring 16' x 46' (109.0 CY); 1/4 ton, Method B RSP at new culvert inlet will be 8' x 112.2' (133.0 CY) and 1/4 ton, Method B RSP at the outlet will be 10' by 50' (74.1 CY)	0.009 ac. perm impacts from new culvert and RSP but removing existing culvert from stream - stream now an open channel (18" x 41' culvert = 0.001 ac.); 0.009 ac. perm impacts minus 0.001 acres is <b>0.008 ac. total perm impacts</b>

Drainage System (DS) Number	Description of Work	Rock Slope Protection (RSP) Type and Amount	Impact to Department Jurisdictional Features (acres)
DS-09	Remove 18" x 46' culvert and existing roadway and replace with RSP; install new 18" x 94.7' culvert under new alignment with RSP at inlet/outlet	Removing culvert and replacing with RSP using 1/4 ton, Method B RSP measuring 16' x 50' (118.5 CY); 1/4 ton, Method B RSP at new culvert inlet will be 4' x 55.9 (59.3 CY) and 1/4 ton, Method B RSP at the outlet will be 4' x 10' (33.1 CY)	0.005 ac. perm impacts but removing culvert from stream - stream now an open channel (18" x 46' culvert = 0.001 ac.); 0.005 ac. perm impacts minus 0.001 ac. is <b>0.004 ac. total perm impacts</b>
DS-10	Remove 18" x 37' culvert and existing roadway and replace with RSP; install new 18" x 93.6' culvert with RSP at inlet/outlet	Removing culvert and replacing with RSP using 1/4 ton, Method B RSP measuring 16' x 40' (59.3 CY); 1/4 ton, Method B RSP at new culvert inlet will be 4' x 32.4' (19.2 CY) and 1/4 ton, Method B RSP at the outlet will be 10' x 40' (59.3 CY)	0.005 ac. perm impacts but removing culvert from stream - stream now an open channel (18" x 37' culvert = 0.001 ac.); 0.005 acres perm impacts minus 0.001 ac. is <b>0.004 ac. perm impacts</b>
DS-11	Remove 18" x 40' culvert and replace with new 18" x 62' culvert in same drainage pattern	Install Light, Method B RSP at culvert outlet measuring 10' x 20' (22.2 CY)	<b>0.002 ac. perm impacts</b> from culvert extension
DS-12	Remove 18" x 37' culvert and replace with new 18" x 54' culvert in same drainage pattern	Install Light, Method B RSP at culvert outlet measuring 10' x 20' (22.2 CY)	Non jurisdictional feature
DS-13	Remove 18" x 46' culvert and replace with new 18" x 66.5' culvert with RSP at outlet	Install Light, Method B RSP at culvert outlet measuring 10' x 25' (27.8 CY)	Non jurisdictional feature
DS-14	Remove culvert and replace with new 12" x 47.7' culvert with RSP at inlet/outlet	Install Light, Method B RSP at culvert inlet and outlet measuring 4' x 10' (4.4 CY at inlet and outlet)	<b>0.003 ac. perm impacts</b> from culvert extension

Drainage System (DS) Number	Description of Work	Rock Slope Protection (RSP) Type and Amount	Impact to Department Jurisdictional Features (acres)
DS-15	Remove 18" x 121' culvert and replace with new 18" x 124.8' culvert with RSP at outlet	Install 1/4 ton, Method B RSP at outlet measuring 30' x 40' (177.8 CY)	<b>0.07 ac. perm impacts</b> from culvert extension and cut/fill
DS-16	Install new 18" x 155.5' culvert with RSP at outlet	Install 1/4 ton, Method B RSP at outlet measuring 10' x 20' (29.6 CY)	Non jurisdictional feature
DS-16A	Remove existing 18" x 76' culvert and roadway	None	Culvert removal will create <b>0.002 ac.</b> of non-culverted drainage
DS-17	Install new 18" x 58.8' culvert with RSP at outlet	Install 1/4 ton, Method B RSP at outlet measuring 10' x 40' (59.3 CY)	Non jurisdictional feature
DS-18	Remove existing 18" x 46' culvert and replace with RSP; install new 18" x 126.8' culvert with RSP at inlet/outlet	Removing culvert and old roadway and replacing with RSP using 1/4 ton, Method B RSP measuring 16' x 56' (132.7 CY); 1/4 ton, Method B RSP at new culvert inlet will be 8' x 26.7' (31.6 CY) and 1/4 ton, Method B RSP at the outlet will be 10' x 60' (88.9 CY)	0.009 ac. perm impacts but removing culvert from stream - stream now an open channel (18" x 46' culvert = 0.001 ac.); 0.009 acres perm impacts minus 0.001 ac. is <b>0.008 ac. perm impacts</b>
DS-19	Install new 18" x 53.2' culvert with RSP at outlet	Install Light, Method B RSP at outlet measuring 10' x 20' (22.2 CY)	Non jurisdictional feature
DS-20	Remove existing 18" x 45' culvert with RSP at outlet	Install Light, Method B RSP at outlet measuring 10' x 30' (33.3 CY)	<b>0.001 ac. perm impacts</b>
DS-21	Remove existing 18" x 36.1' culvert and replace with new 18" x 56.5' culvert with RSP at outlet	Install Light, Method B RSP at outlet measuring 10' x 30' (33.3 CY)	Non jurisdictional feature

Drainage System (DS) Number	Description of Work	Rock Slope Protection (RSP) Type and Amount	Impact to Department Jurisdictional Features (acres)
DS-22	Remove existing culvert and replace with 18" x 52.7' culvert with RSP at outlet	Install Light, Method B RSP at outlet measuring 10' x 15' (16.7 CY)	Non jurisdictional feature
DS-23	Remove existing 18" x 42" culvert and replace with 18" x 67.2' culvert with RSP at outlet	Install Light, Method B RSP at outlet measuring 10' x 30' (33.3 CY)	Non jurisdictional feature

The proposed project will permanently impact 0.13 acres of ephemeral streams within the Department jurisdiction. There is a net increase of 0.01 acres of ephemeral stream channels within the project limits from the removal of existing culverts and roadway at Drainage Systems 4, 7, 8, 9, 10, and 18 (Figure 2).

Exhibit A includes Figure 2 depicting the project impacts and Figure 3 includes the project plans.

### PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: nesting birds and aquatic and terrestrial plant and wildlife species.

The adverse effects the project could have on the fish or wildlife resources identified above include: disruption to nesting birds, disruption to aquatic or terrestrial plant and wildlife species, change in contour of channel or bank, soil compaction or other disturbance.

### MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

#### 1 Administrative Measures

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to the Department personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of

Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

- 1.3 **Notification of Conflicting Provisions.** Permittee shall notify the Department if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, the Department shall contact Permittee to resolve any conflict.
- 1.4 **Project Site Entry.** Permittee agrees that Department personnel may, with notification of the Resident Engineer, enter the project site at any time to verify compliance with the Agreement.
- 1.5 **Does Not Authorize "Take."** This Agreement does not authorize "take" of any listed species. Take is defined as hunt, pursue, catch, capture or kill or attempt to hunt, pursue, catch, capture, or kill. If there is potential for take of any listed species to occur, the Operator shall consult with the Department as outlined in FGC Section 2081 and shall obtain the required state and federal threatened and endangered species permits.

## **2 Avoidance and Minimization Measures**

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

- 2.1 **Work Period in Dry Weather Only.** Work within waters of the state shall be restricted to periods of low stream flow and dry weather. All necessary erosion control measures shall be implemented prior to the onset of precipitation. Construction activities halted due to precipitation may resume when precipitation ceases and the National Weather Service 72-hour weather forecast indicates a 20% or less chance of precipitation of greater than or equal to ¼-inch of accumulation for the subsequent 24-hour period. No work activity shall commence unless all equipment and materials that could be mobilized by stream water flow are removed from the channel at least 12 hours prior to the onset of precipitation; if the temporary trestles, falsework and gravel pad are anticipated to stay in place over the winter, these will be designed to withstand high flows and not allow construction materials to flow downstream (parts of the trestle will be removed if necessary).
- 2.2 **Nesting Birds.** It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by the FGC. No trees that contain active nests of birds shall be disturbed until all eggs have hatched and young birds have fledged without prior consultation and approval of a Department representative. If construction is scheduled during the breeding season (approximately February 15 to August 31) then Permittee shall conduct a breeding bird survey no more than 15 days prior to the start of construction by a Department approved biologist. The survey shall be conducted within the entire project footprint

and a 200 feet buffer. All active bird nests will be marked following the survey to avoid destruction by equipment. If nesting raptors or migratory birds are identified within the area, a non-disturbance buffer will be established around the nest site. The size of the non-disturbance buffer and any other restrictions will be determined, before project activities commence, through consultation with the Department following completion of the survey.

If a lapse in project-related work of fifteen (15) calendar days or longer occurs, another focused survey and consultation with the Department shall be required before project work can be reinitiated.

- 2.3 **Best Management Practices.** Permittee shall actively implement best management practices (BMPs) to prevent erosion and the discharge of sediment in to streams and lakes during project activities. BMPs shall be monitored daily and repaired if necessary to ensure maximum erosion and sediment control. Only certified weed-free materials shall be used in BMP applications. Fiber rolls or erosion control mesh shall be made of loose-weave mesh that is not fused at the intersections of the weave, such as jute, or coconut (coir) fiber, or other products without welded weaves. Non-welded weaves reduce entanglement risks to wildlife by allowing animals to push through the weave, which expands when spread. **Products with plastic monofilament or cross joints in the netting that are bound/stitched (such as found in straw wattles/fiber rolls and some erosion control blankets) which may cause entrapment of wildlife, shall not be allowed.**
- 2.4 **Environmentally Sensitive Areas (ESAs).** No more than five (5) calendar days prior to the start of project activities, the Permittee shall establish ESAs in the project area to prevent encroachment of construction personnel and equipment into areas of any known sensitive resources within or near the work area will be flagged to ensure that no activities are conducted in those areas. All potential sensitive habitats and native trees that can be reasonably avoided during construction activities shall be identified as ESAs. All construction personnel shall avoid ESAs. The Permittee shall avoid ESAs when siting all staging areas, spoils disposal areas, borrow pits, and construction equipment access routes. The ESAs will be identified on all engineering plans or construction specifications. The Permittee shall inspect the flagging before the start of each work day and the Permittee shall maintain the flagging until the completion of the project.
- 2.5 **Rock Slope Protection.** Un-grouted rock slope protection (RSP) and energy dissipater 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).

**2.6 Pollution and Litter.** Permittee 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 Permittee to ensure compliance.

**2.6.1** Permittee shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter a lake, streambed, or flowing stream or be placed in locations that may be subjected to high storm flows.

**2.6.2** Spoil sites shall not be located within a lake, streambed, or flowing stream or locations that may be subjected to high storm flows, where spoil shall be washed back into a lake, streambed, or flowing stream where it will impact streambed habitat and aquatic or riparian vegetation.

**2.6.3** Raw cement/concrete or washings thereof, asphalt, paint, or other coating material, oil or other petroleum products, or any other substances which could be hazardous to fish and wildlife resources resulting from project related activities shall be prevented from contaminating the soil and/or entering the waters of the state. These materials, placed within or where they may enter a lake, streambed, or flowing stream by Permittee or any party working under contract or with the permission of Permittee, shall be removed immediately.

**2.6.4** No broken concrete, cement, debris, soil, silt, sand, bark, slash, sawdust, rubbish, or washings thereof, 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 be 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 100 feet of the high water mark of any lake, streambed, or flowing stream.

**2.6.5** No equipment maintenance or fueling shall be done within or near any lake, streambed, or flowing stream where petroleum products or other pollutants from the equipment may enter these areas under any flow. If it is not feasible to move equipment for fueling or maintenance, permittee shall implement a plan and executed by the Resident Engineer. The plan shall include controls to be used to perform fueling and maintenance and shall be approved by the RE prior to implementation.

**2.7 Operating Equipment and Vehicle Leaks.** Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat.

- 2.8 **Stationary Equipment Leaks.** Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak.
- 2.9 **Staging and Storage Areas.** Equipment, materials, fuels, lubricants, and solvents on site shall be bermed to contain any spilled material and shall be protected from rain. Berms shall consist of plastic covered dirt or gravel-filled bags.
- 2.10 **Leave Wildlife Unharmmed.** If any wildlife is encountered during the course of construction, said wildlife shall be allowed to leave the construction area unharmed. If any listed wildlife is encountered, the Permittee shall contact the Department immediately or proceed as described in the Incidental Take Permit for the project.
- 2.11 **Stabilized Areas with Soil.** Soils exposed by project operations shall be treated to prevent sediment run-off and transport. Erosion control measures shall include the proper installation of BMPs and may include applications of seed, certified weed free straw, compost, fiber, commercial fertilizer, stabilizing emulsion mulch, or combinations thereof. Following construction all disturbed upland areas shall be stabilized and re-seeded with an erosion control mix consisting of regionally appropriate, native grass and forb species. Revegetation of such sites shall be completed as soon as possible after project activities in those areas cease.

### **3 Compensatory Measures**

- 3.1 **Habitat Preservation.** Permittee shall mitigate permanent impacts to 0.12 acres of Department jurisdictional areas either (a) by protecting no less than 0.26 acres of Department jurisdictional areas within Butte County; or (b) by providing sufficient funds to the Butte County Habitat Conservation Plan to preserve no less than 0.26 acres of blue oak woodland, with proof of purchase provided to the Department no later than 3 years after the execution of this Agreement.
- 3.2 **Conservation Easement.** If measure 3.1 option a is selected, within 3 years of the execution of this Agreement, Permittee shall place a conservation easement on no less than 0.26 acres of Department jurisdictional areas within Butte County, in favor of a Department approved local conservation entity. Permittee shall obtain Department approval of the site prior to placing the conservation easement. The Permittee shall be responsible for all costs in recording and funding the conservation easement. The Permittee shall provide sufficient funds to manage the area in perpetuity.

### **4 Reporting Measures**

Permittee shall meet each reporting requirement described below.

- 4.1 **Notification of Project Initiation.** The Permittee shall notify the Department two (2) working days prior to beginning work within any of the ephemeral streams. Notification shall be submitted as instructed in Contact Information section below. Email notification is preferred.
- 4.2 **Notification of Project Completion.** Upon completion of the project activities described in this Agreement, the project activities within the watercourse work area shall be digitally photographed. Photographs shall be submitted to the Department within fifteen (15) days of completion. Photographs and project commencement notification shall be submitted as instructed in Contact Information section below. Email submittal is preferred.

## **CONTACT INFORMATION**

Any communication that Permittee or the Department submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or the Department specifies by written notice to the other.

### **To Permittee:**

California Department of Transportation  
Bajwa Winder  
703 B Street  
Marysville, CA 95901  
Phone: 530-740-4805  
Email: arvinder.bajwa@dot.ca.gov

### **Contact person:**

Kelli Angell  
703 B Street  
Marysville, CA 95901  
Phone: 530-741-4486  
Email: kelli.angell@dot.ca.gov

### **To The Department:**

Department of Fish and Wildlife  
North Central Region  
1701 Nimbus Road, Suite A  
Rancho Cordova, CA 95670  
Attn: Lake and Streambed Alteration Program  
Notification #: 1600-2016-0073-R2  
Phone: 916-358-2885  
Email: R2LSA@wildlife.ca.gov

## **LIABILITY**

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute the Department's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

## **SUSPENSION AND REVOCATION**

The Department may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before the Department suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before the Department suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused the Department to issue the notice.

## **ENFORCEMENT**

Nothing in the Agreement precludes the Department from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects the Department's enforcement authority or that of its enforcement personnel.

## **OTHER LEGAL OBLIGATIONS**

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 *et seq.* (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse

disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

## **AMENDMENT**

The Department may amend the Agreement at any time during its term if the Department determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by the Department and Permittee. To request an amendment, Permittee shall submit to the Department a completed Department "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

## **TRANSFER AND ASSIGNMENT**

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter the Department approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to the Department a completed Department "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

## **EXTENSIONS**

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to the Department a completed Department "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). The Department shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (FGC § 1605, subd. (f)).

## **EFFECTIVE DATE**

The Agreement becomes effective on the date of the Department's signature, which shall be: 1) after Permittee's signature; 2) after the Department complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at [http://www.dfg.ca.gov/habcon/ceqa/ceqa\\_changes.html](http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html).

## **TERM**

This Agreement shall expire **November 30, 2020**, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

## **EXHIBITS**

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

- A. Figure 1 – Project Location
- Figure 2 – Project Footprint
- Figure 3 – Project Plans

**AUTHORITY**

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

**AUTHORIZATION**

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify the Department in accordance with FGC section 1602.

**CONCURRENCE**

The undersigned accepts and agrees to comply with all provisions contained herein.

**FOR PERMITTEE**

  
\_\_\_\_\_  
Bajwa-Winder *Subhinder S. Bajwa* Date 7/21/2016  
Project Manager

**FOR DEPARTMENT OF FISH AND WILDLIFE**

  
\_\_\_\_\_  
Tina Bartlett Date 7/25/16  
Regional Manager

Prepared by: Juan Lopez Torres  
Senior Environmental Scientist (Specialist)

**Exhibit A**  
**Figure 1 – Project Location**

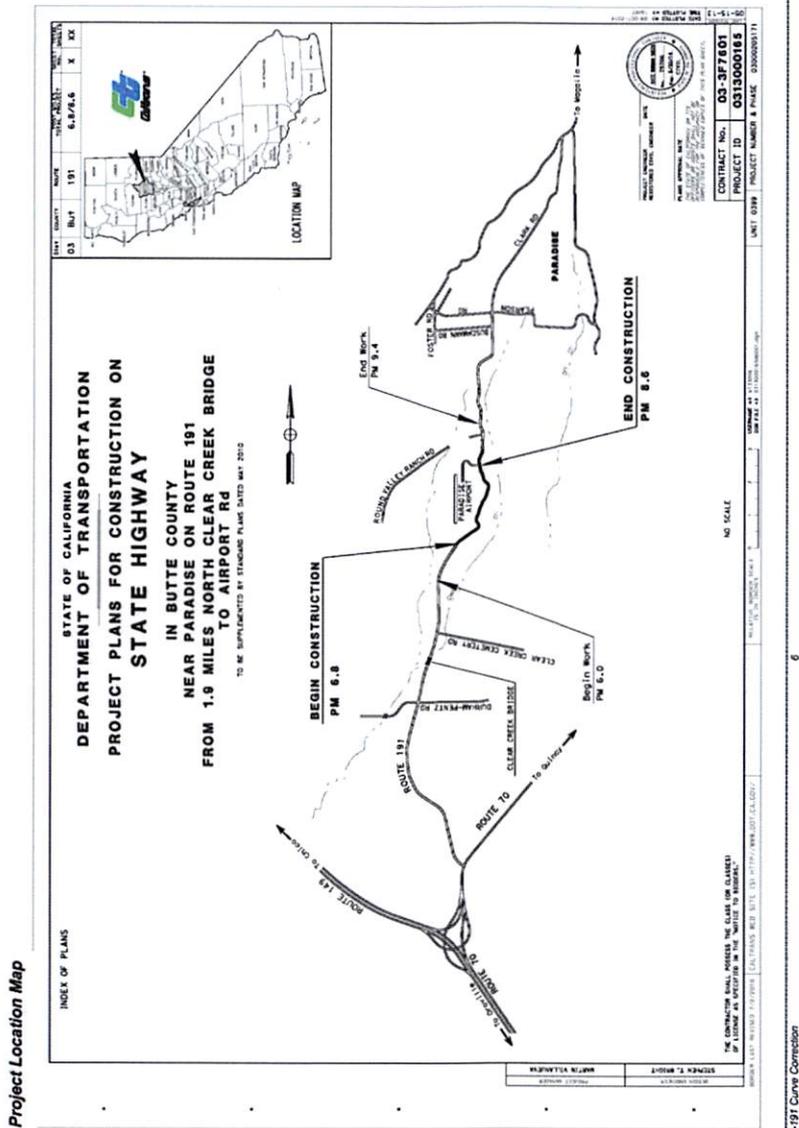
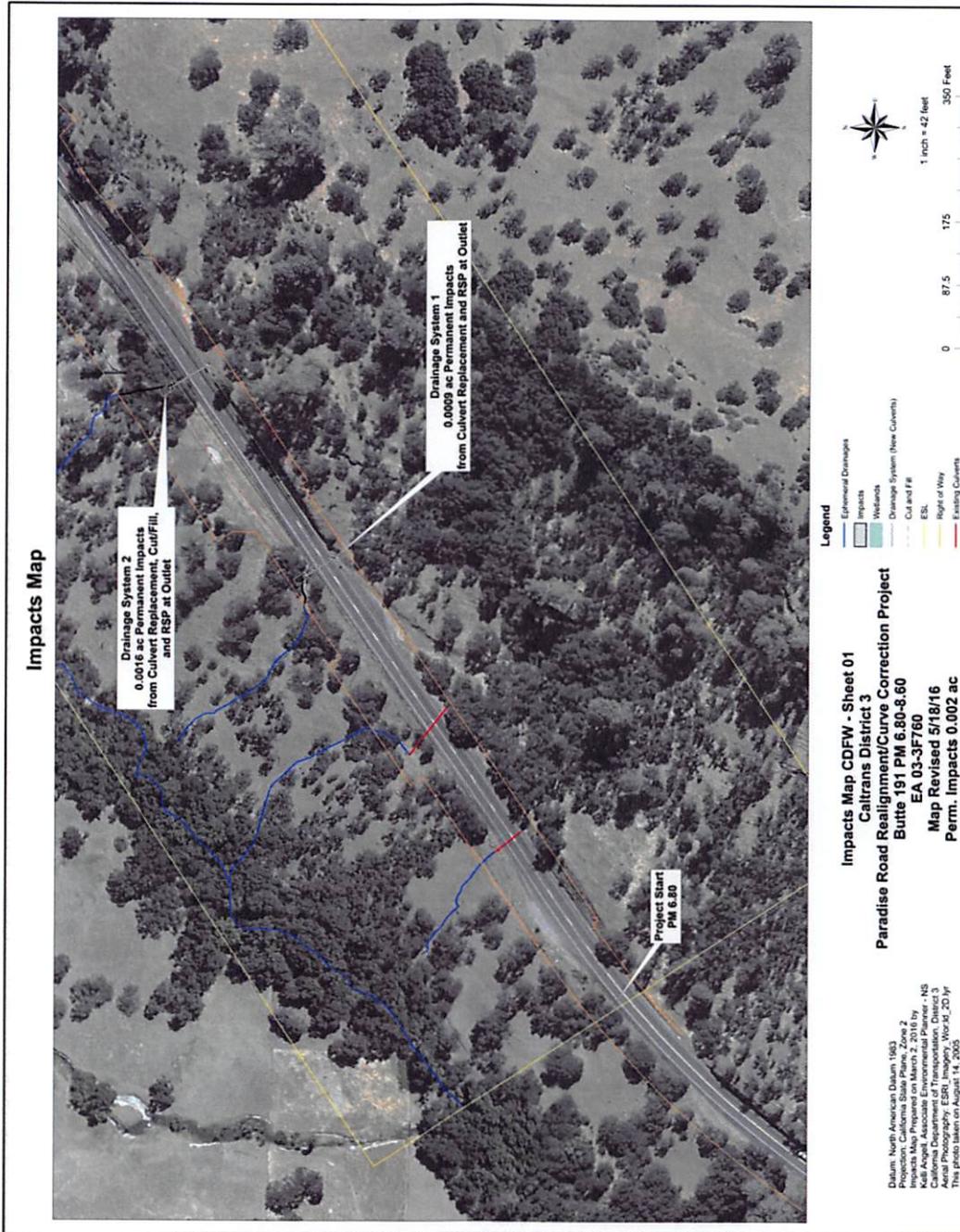
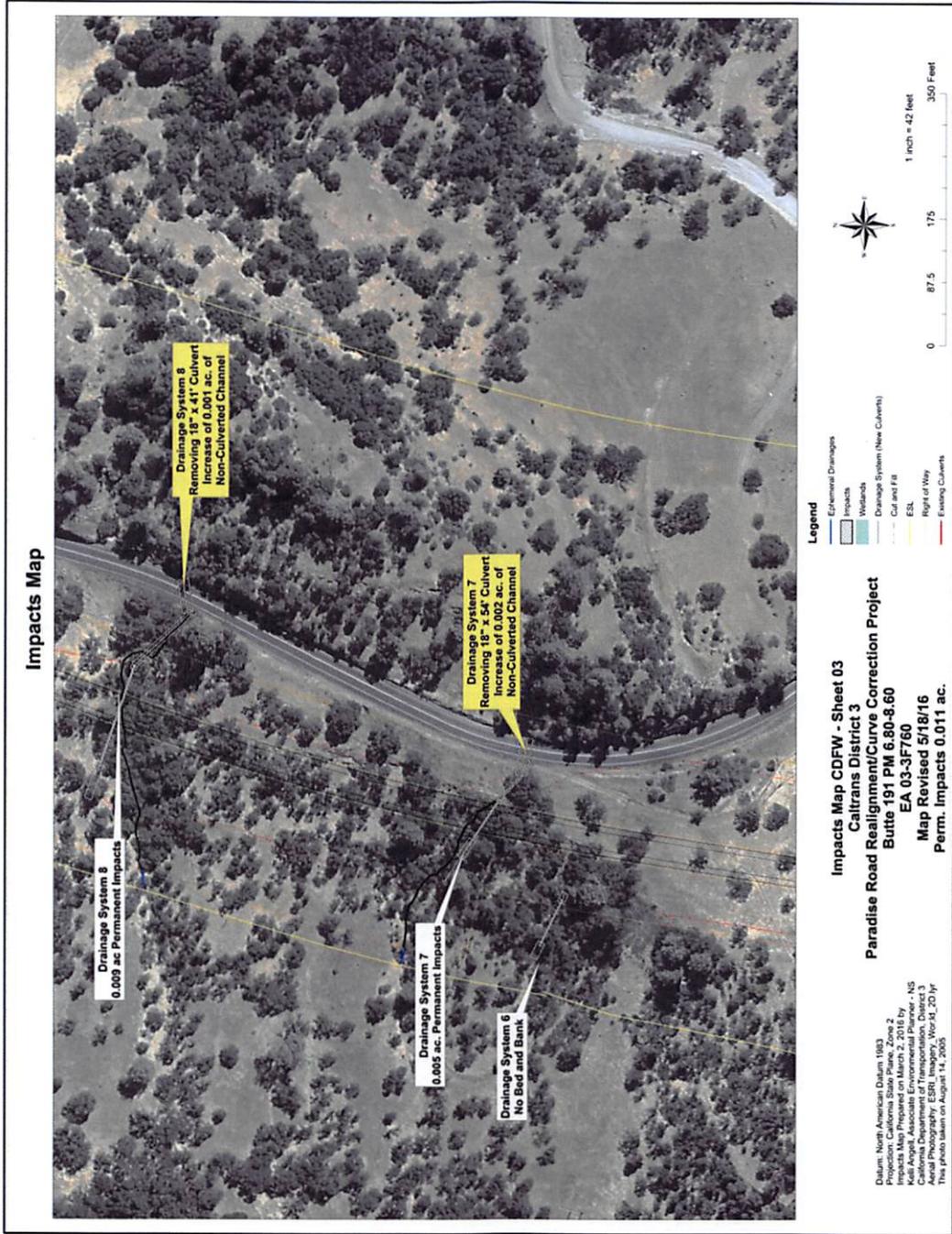
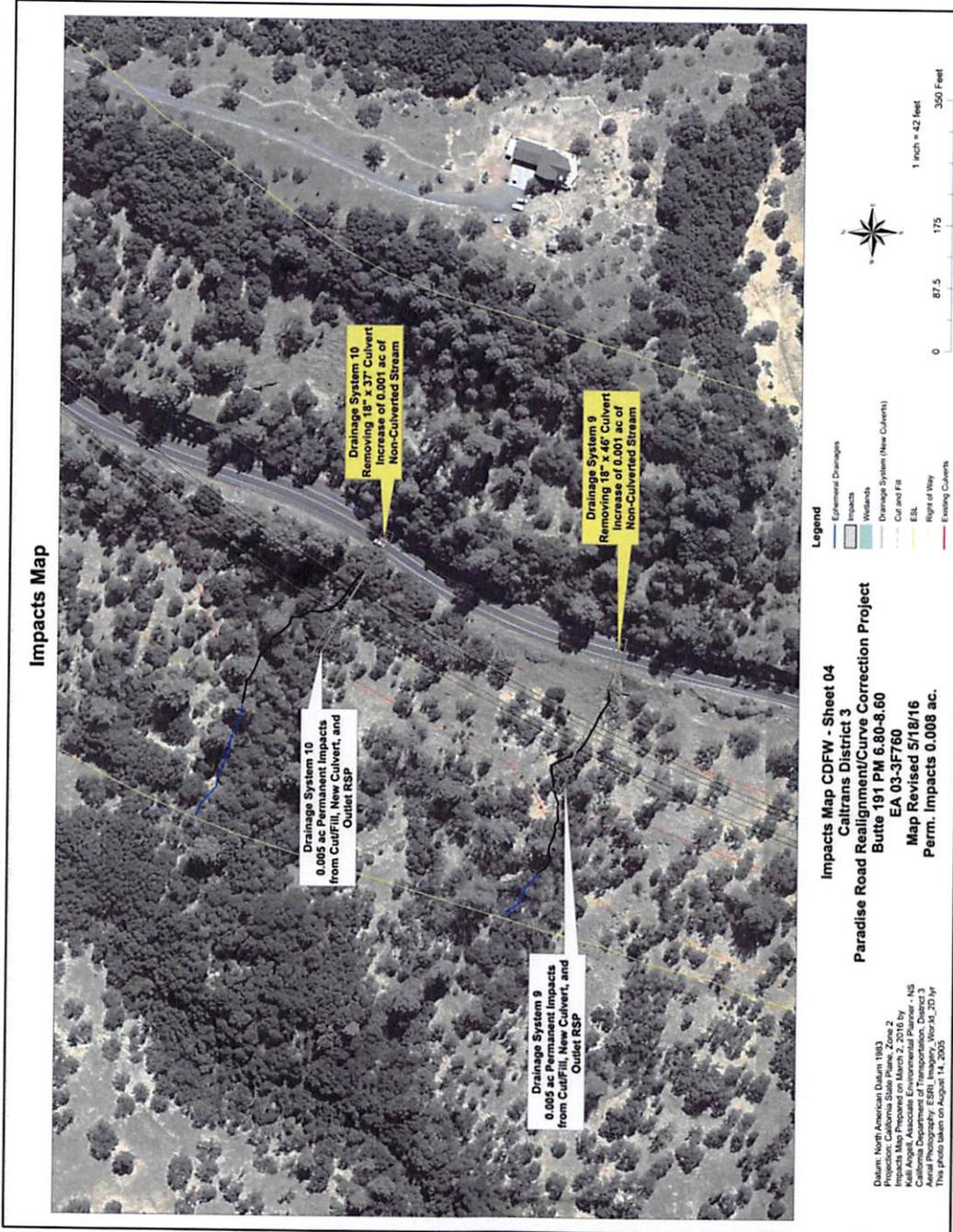


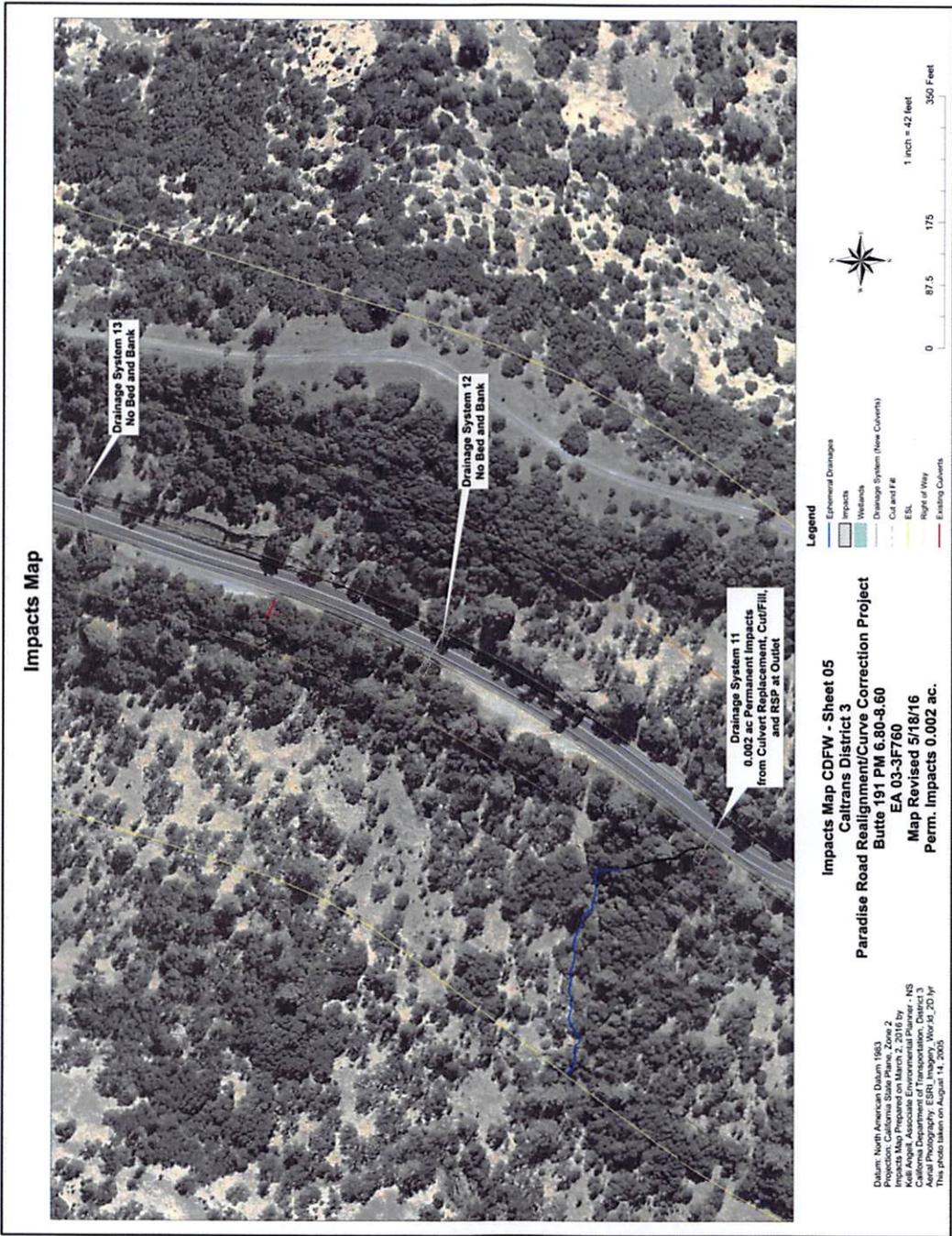
Figure 2 – Project Impacts

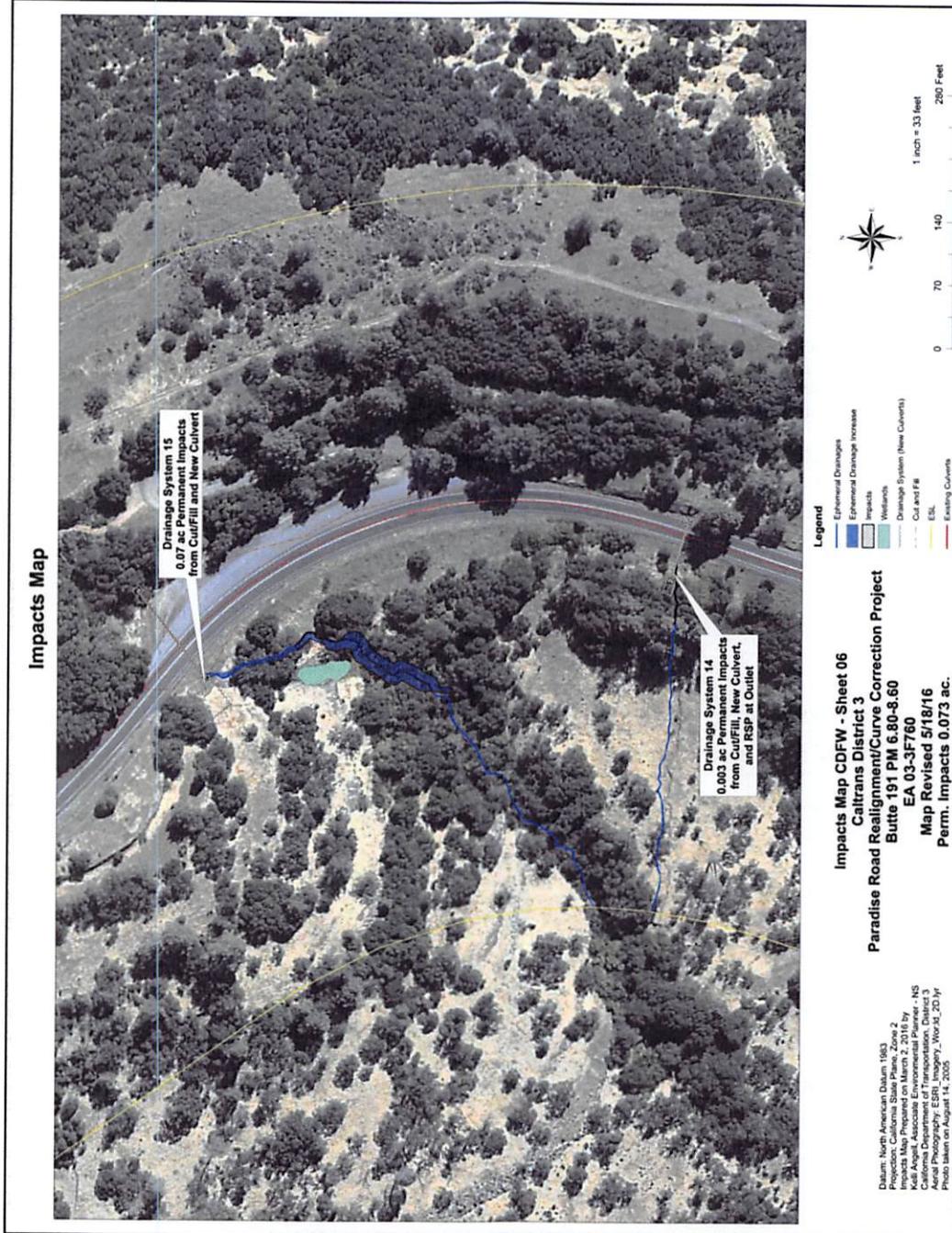


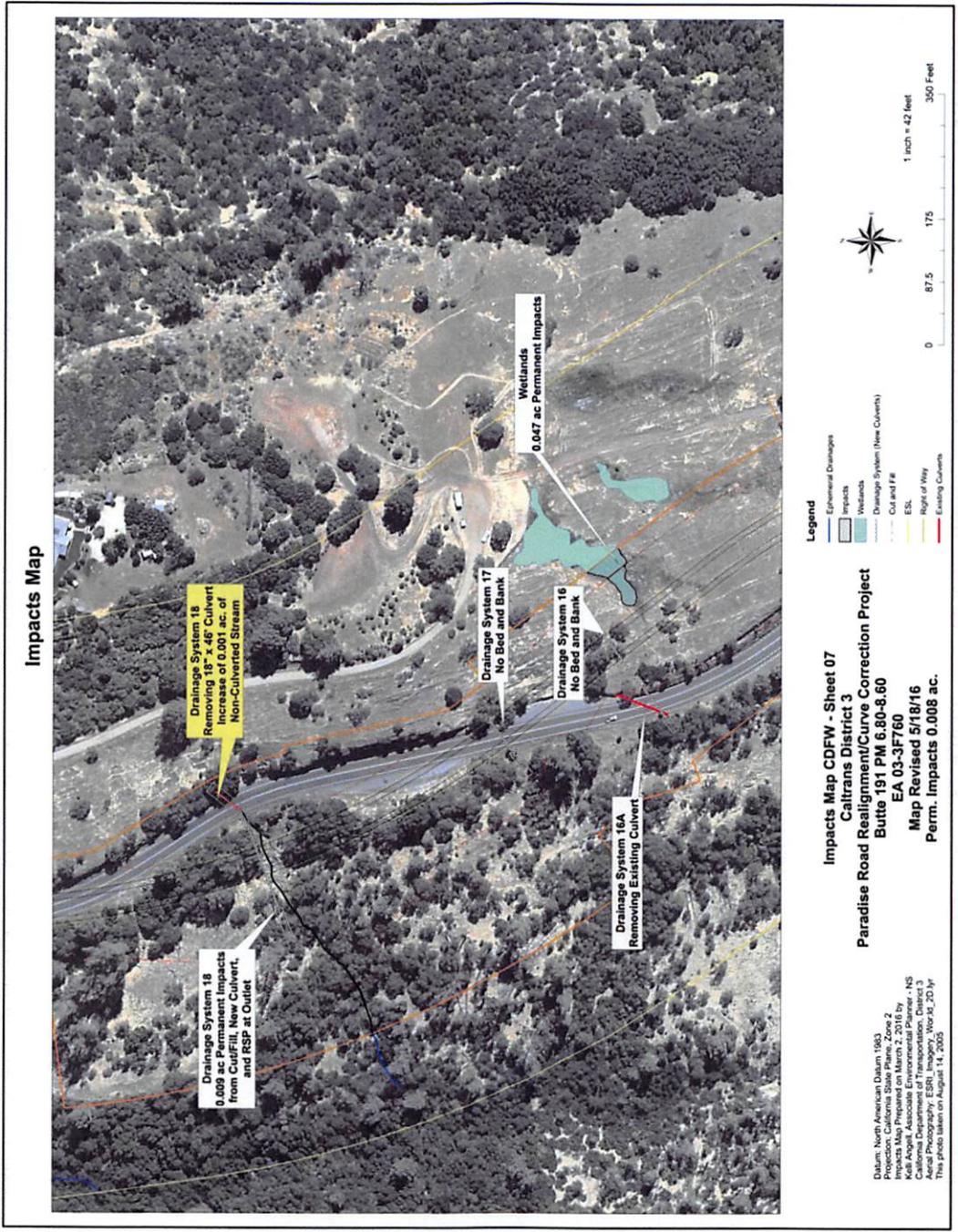


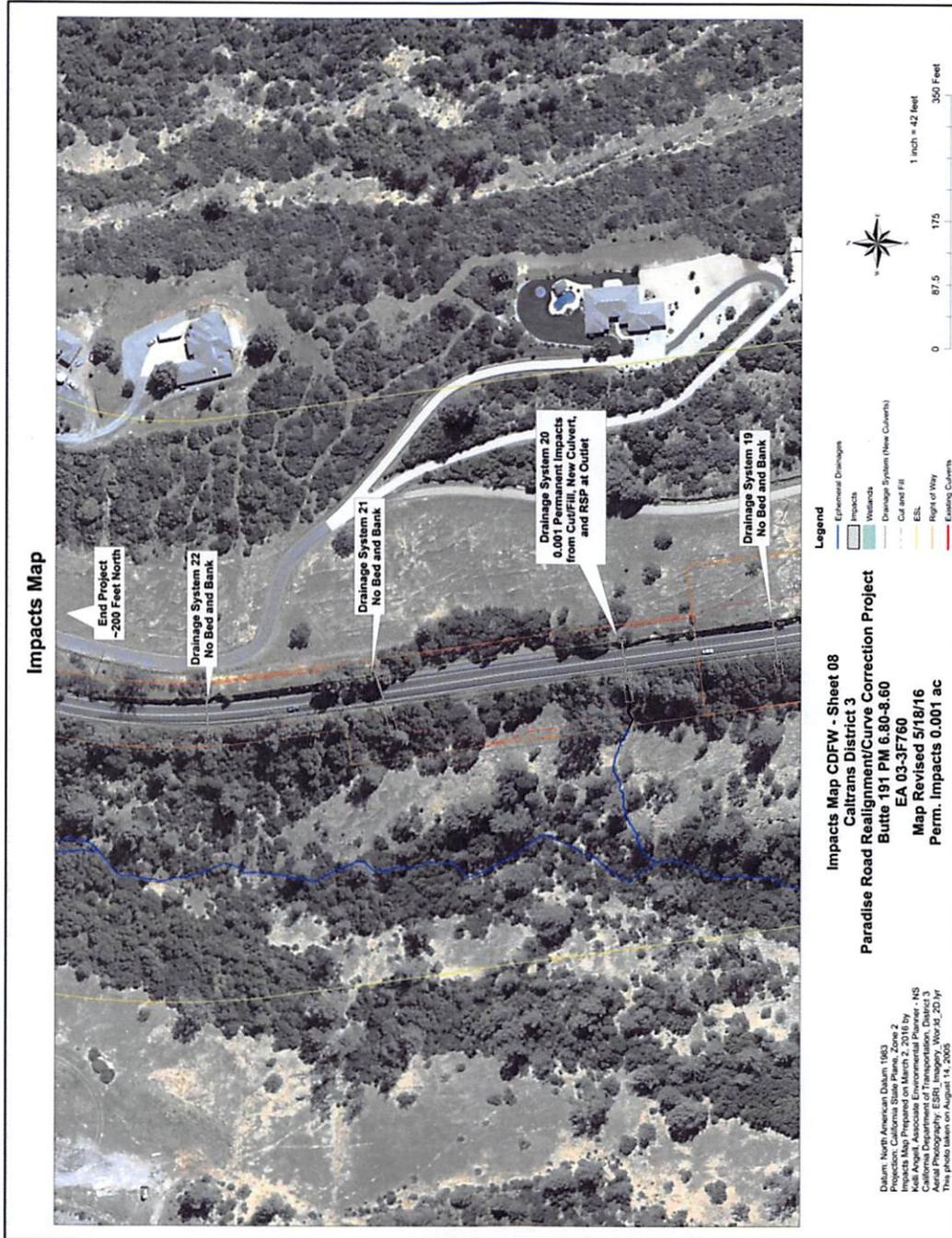








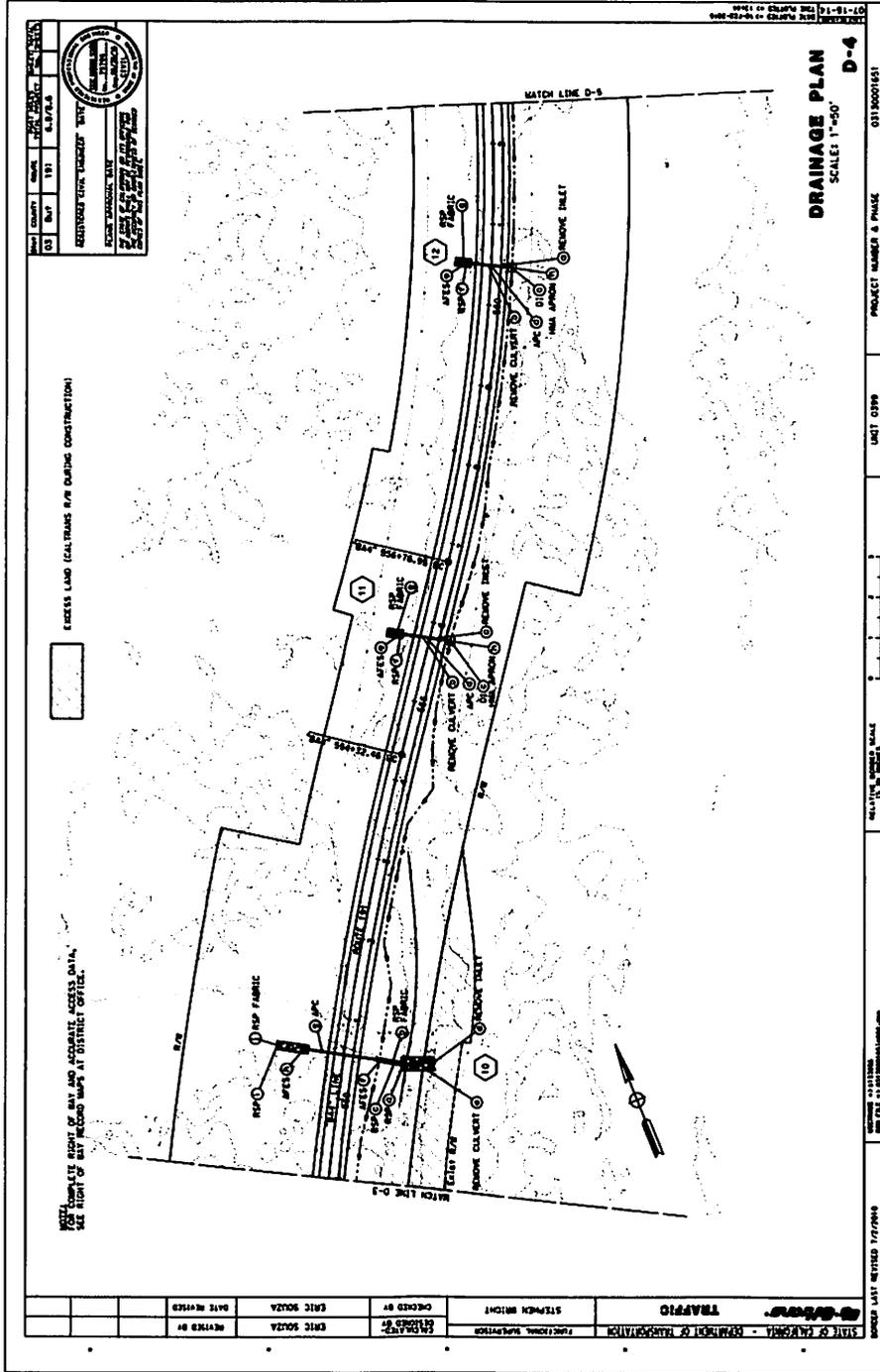


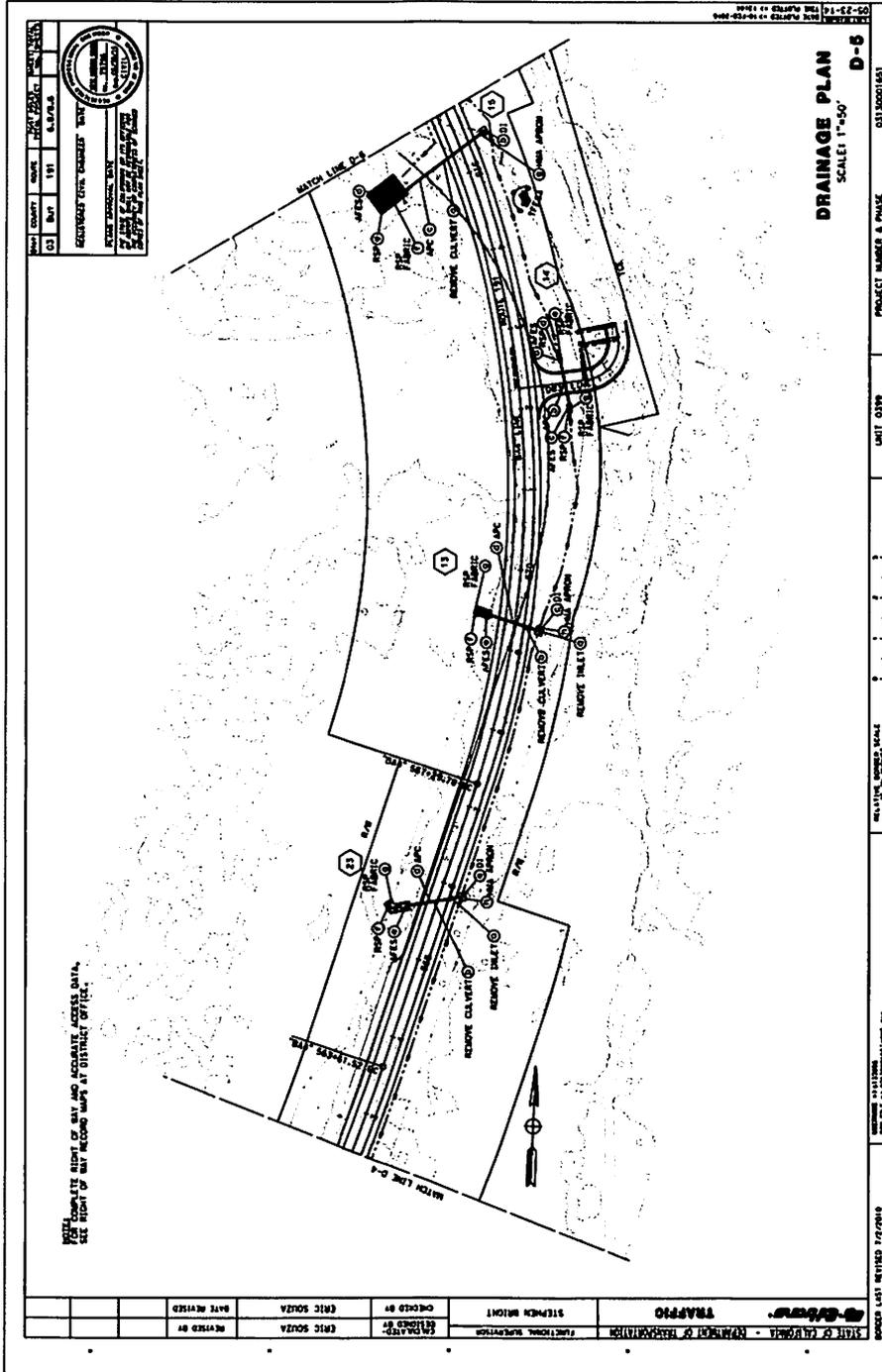




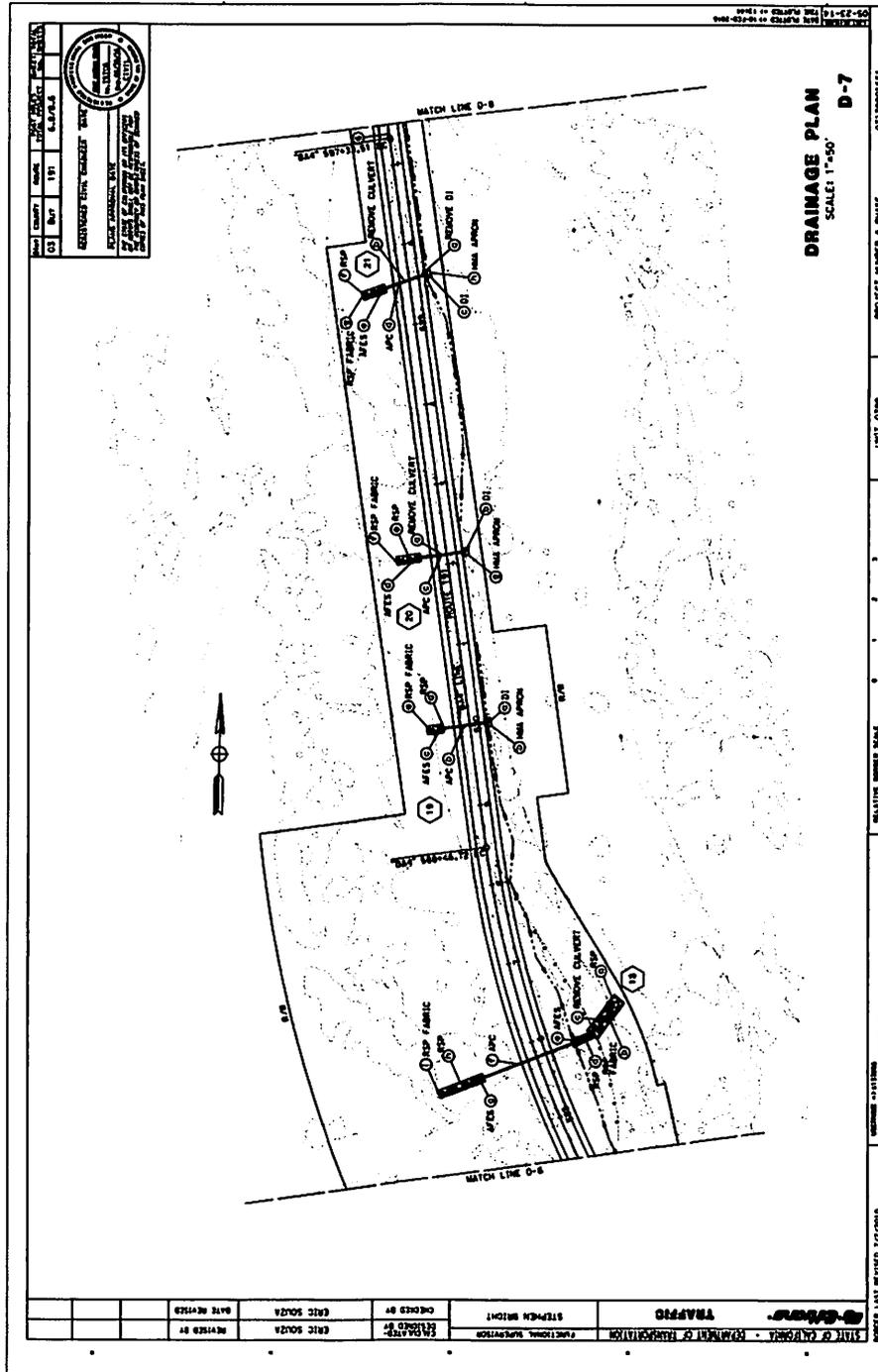












DATE	DESCRIPTION	BY	APP'D
03/11/16	ISSUE FOR PERMIT	ERIC SOLZA	[Signature]
03/11/16	ISSUE FOR PERMIT	ERIC SOLZA	[Signature]

**DRAINAGE PLAN**  
 SCALE: 1"=50'  
**D-7**

PROJECT NUMBER & PHASE: 0310001661 UNIT 0398

DESIGNED BY	ERIC SOLZA	DATE REVISED	
CHECKED BY	ERIC SOLZA	REVIEWER BY	
DATE			

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 TRANSPORTATION  
 STEPHEN MICHOT  
 ERIC SOLZA





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

June 23, 2016

Regulatory Division (SPK-2016-00280)

California Department of Transportation  
Attn: Mr. Matt Solano  
703 B Street  
Marysville, California 95901

Dear Mr. Solano:

We are responding to your request for a Department of the Army permit for the State Route 191 Realignment/ Curve Correction Safety Improvement project. The approximately 61-acre project site is located between post miles 6.8 and 8.6 of State Route 191, Latitude 39.704041°, Longitude -121.615576°, Butte County, California.

Based on the information you provided to this office, the State Route 191 Realignment/ Curve Correction Safety Improvement project involves the construction of Curve realignment along approximately 2 miles of state route 191, in accordance with the *Impact Map - Sheets 1 through 8, Caltrans District 3, Paradise Road Realignment/Curve Correction project, Butte 191 PM 6.80-8.60, EA 03-3F760* plans, dated June 14, 2016. This project will result in the permanent loss of approximately 0.24 acres of seeps and intermittent and ephemeral streams and indirect impacts to 0.19 acres of seep-fed intermittent stream.

We have determined activities in waters of the U.S. associated with the project are authorized by Nationwide Permit Number (NWP) 14, Linear Transportation Projects. However, this authorization is denied without prejudice until water quality certification under Section 401 of the Clean Water Act has been issued or waived for the activities requiring a permit from this office. Once you receive water quality certification or waiver thereof, the activities are authorized and the work may proceed subject to the conditions of the water quality certification, and the terms and conditions of NWP 14.

You must comply with all terms and conditions of the NWP, applicable regional conditions, and project-specific special conditions. Information about the NWP and regional conditions are available on our website at [www.spk.usace.army.mil/Missions/Regulatory/Permitting/NationwidePermits.aspx](http://www.spk.usace.army.mil/Missions/Regulatory/Permitting/NationwidePermits.aspx). In addition, your work must comply with the following special conditions:

1. To mitigate for the direct loss of 0.24 acres of seep wetlands and ephemeral and intermittent streams and indirect effects to an additional 0.19 acres of a seep-fed intermittent stream, you shall purchase 0.86 aquatic resource credits from the

National Fish and Wildlife Foundation's (NFWF) Sacramento District California In-Lieu Fee Program for the Northeast Sacramento River Watershed Service Area. Contact information for NFWF can be found on their website at: [www.nfwf.org/ilf](http://www.nfwf.org/ilf). Evidence of this purchase shall be provided to the Corps prior to initiation of construction activities within waters of the U.S.

2. You shall notify the Corps of the start and completion dates for the authorized work within 7 calendar days of initiation of construction activities within waters of the U.S. and 14 calendar days following completion of construction activities.
3. Within 60 days following completion of the authorized work or at the expiration of the construction window of this permit, whichever occurs first, you shall submit as-built drawings and a description of the work conducted on the project site to this office for review. The drawings shall be signed and sealed by a registered professional engineer and include the following:
  - a. The Department of the Army Permit number.
  - b. A plan view drawing of the location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed in the same scale as the attached permit drawings. The drawing should show all "earth disturbance," wetland impacts, structures, and the boundaries of any on-site and/or off-site mitigation or avoidance areas. The drawings shall contain, at a minimum, 1-foot topographic contours of the entire site.
  - c. Ground and aerial photographs of the completed work. The camera positions and view-angles of the ground photographs shall be identified on a map, aerial photograph, or project drawing.
  - d. A description and list of all deviations between the work as authorized by this permit and the work as constructed. Clearly indicate on the as-built drawings the location of any deviations that have been listed.
4. You shall employ a wetland scientist to continuously monitor construction activities in the vicinity of waters of the U.S. to ensure against unauthorized activity during construction. The monitor shall be on-site during all construction activities within 50-feet of avoided waters of the U.S.
5. You shall clearly identify the limits of disturbance in the field with highly visible markers (e.g. construction fencing, flagging, silt barriers, etc.) prior to commencement of construction activities within waters of the U.S. You shall maintain such identification properly until construction is completed and the soils have been stabilized. You are prohibited from any activity (e.g. equipment usage or materials storage) that impacts waters of the U.S. outside of the permit limits (as shown on *Impact Map - Sheets 1 through 8, Caltrans District 3, Paradise Road Realignment/Curve Correction project, Butte 191 PM 6.80-8.60, EA 03-3F760*, dated June 14, 2016).

Within 30 days after completion of the authorized work, you must sign the enclosed Compliance Certification and return it to this office.

This verification is valid until March 18, 2017, when the existing NWP's are scheduled to be modified, reissued, or revoked. Furthermore, if you commence or are under contract to commence this activity before the date the NWP is modified, reissued, or revoked, you will have 12 months from the date of the modification, reissuance or revocation to complete the activity under the present terms and conditions. Failure to comply with the general and regional conditions of this NWP, or the project-specific special conditions of this authorization, may result in the suspension or revocation of your authorization.

We would appreciate your feedback on this permit action including your interaction with our staff. At your earliest convenience, please tell us how we are doing by completing the Corps' Regulatory Program national customer service survey found on our website at [www.spk.usace.army.mil/Missions/Regulatory.aspx](http://www.spk.usace.army.mil/Missions/Regulatory.aspx).

Please refer to identification number SPK-2016-00280 in any correspondence concerning this project. If you have any questions, please contact William Ness at 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email at [William.W.Ness@usace.army.mil](mailto:William.W.Ness@usace.army.mil), or telephone at 916-557-5268.

Sincerely,



Paul Maniccia  
Chief, Enforcement and Special Projects  
Unit

Enclosure

cc: (w/o encl)

Robert Meade, California Department of Transportation, [robert.meade@dot.ca.gov](mailto:robert.meade@dot.ca.gov)  
Kelli Angell, California Department of Transportation, [kelli.angell@dot.ca.gov](mailto:kelli.angell@dot.ca.gov)

---

**Central Valley Regional Water Quality Control Board**

7 June 2016

Mr. Matt Solano  
Caltrans  
703 B Street  
Marysville, CA 95901

**CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY  
CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE  
PARADISE ROAD REALIGNMENT – BUTTE 191 CURVE CORRECTION SAFETY PROJECT  
(WDID#5A04CR00257), PARADISE, BUTTE 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 Order serves as a Water Quality Certification (Certification) action that 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 the California Code of Regulations (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 § 3855(b) of the California Code of Regulations, 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 §3833 of the California Code of Regulations.
4. This Certification is no longer valid if the project (as described) is modified, or coverage under § 404 of the Clean Water Act has expired.

**TECHNICAL CERTIFICATION CONDITIONS:**

In addition to the above standard conditions, the Applicant shall satisfy the following:

1. The Applicant shall notify the Central Valley Regional Water Quality Control Board (Central Valley Water Board) in writing at least **seven (7) days** in advance of the start of any work within waters of the United States. The notification shall include the name of the project and the WDID number, and shall be sent to the Central Valley Water Board Contact indicated in this Certification.
2. Except for activities permitted by the U.S. Army 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 Applicant shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed Project shall be adequately informed and trained regarding the conditions of this Certification.
4. The Applicant shall perform surface water sampling:
  - a) when performing any in-water work;
  - b) in the event that project activities result in any materials reaching surface waters; or
  - c) when any activities result in the creation of a visible plume in surface waters.

The monitoring requirements in Table 1 shall be conducted upstream out of the influence of the Project, and approximately 300 feet downstream of the work area. The sampling frequency may be modified for certain projects with written approval from Central Valley Water Board staff.

**Table 1:**

Parameter	Unit	Type of Sample	Minimum Sampling Frequency	Required Analytical Test Method
Turbidity	NTU	Grab <sup>(1)</sup>	Every 4 hours during in-water work	(2,4)
Settleable Material	mL/L	Grab <sup>(1)</sup>	Every 4 hours during in-water work	(2)
Visible construction related pollutants <sup>(3)</sup>	Observations	Visual Inspections	Continuous throughout the construction period	—
Temperature	°F (or as °C)	Grab <sup>(1)</sup>	Every 4 hours during in-water work	(2,4)

pH	Standard Units	Grab <sup>(1)</sup>	Every 4 hours during in-water work	(2,4)
Dissolved Oxygen	mg/L & % saturation	Grab <sup>(1)</sup>	Every 4 hours during in-water work	(2,4)

<sup>(1)</sup> Pollutants shall be analyzed using the analytical methods described in 40 Code of Federal Regulations Part 136; where no methods are specified for a given pollutant.

<sup>(2)</sup> Visible construction-related pollutants include oil, grease, foam, fuel, petroleum products, and construction-related, excavated, organic or earthen materials.

<sup>(3)</sup> A hand-held field meter may be used, provided that the meter utilizes a USEPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. A calibration and maintenance log for each meter used for monitoring required by this Certification shall be maintained at the Project site.

As appropriate, (e.g. Lakes) Surface water monitoring shall occur at mid-depth. A surface water monitoring report shall be submitted to the Central Valley Water Board Contact indicated in this Certification within two weeks of initiation of sampling and every two weeks thereafter. In reporting the monitoring data, the Applicant shall arrange the data in tabular form so that the sampling locations, date, constituents, and concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the Project complies with Certification requirements. The report shall include surface water sampling results, visual observations, and identification of the turbidity increase in the receiving water applicable to the natural turbidity conditions specified in the turbidity criteria below.

If no monitoring is conducted, the Applicant shall submit a written statement to the Central Valley Water Board Contact indicated in the Certification stating, "No monitoring was required." with the Notice of Completion.

5. The Central Valley Water Board adopted a *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised June 2015 or *Water Quality Control Plan for the Tulare Lake Basin, 2nd Edition* (Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Turbidity, settleable matter, temperature, pH, and dissolved oxygen limits are based on water quality objectives contained in the Basin Plan and are part of this Certification as follows:

- a) Activities shall not cause turbidity increases in surface water to exceed:
  - i. where natural turbidity is less than 1 Nephelometric Turbidity Units (NTUs), controllable factors shall not cause downstream turbidity to exceed 2 NTU;
  - ii. where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU;
  - iii. where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
  - iv. where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;

- v. 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 NTUs over background turbidity. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be used with prior approval of the Central Valley Water Board staff.

- b) Activities shall not cause settleable matter to exceed 0.1 mL/L in surface waters as measured in surface waters within approximately 300 feet downstream of the Project.
  - c) Activities shall not cause temperature in surface waters to increase more than 5°F above natural receiving water temperature for waters with designated COLD or WARM beneficial uses.
  - d) Activities shall not cause pH to be depressed below 6.5 nor raised above 8.5 in surface water.
  - e) Activities shall not cause dissolved oxygen to be reduced below 5.0 mg/L for waters designated with the WARM beneficial use, and 7.0 mg/L for waters designated with the COLD or SPWN beneficial uses, in surface water.
6. The Applicant shall notify the Central Valley Water Board immediately if the above criteria for turbidity, settleable matter, temperature, pH, dissolved oxygen or other water quality objectives are exceeded.
7. Refueling of equipment within the floodplain or within 300 feet of the waterway is prohibited. If critical equipment must be refueled within 300 feet of the waterway, spill prevention and countermeasures must be implemented to avoid spills. Refueling areas shall be provided with secondary containment including drip pans and/or placement of absorbent material. No hazardous materials, pesticides, fuels, lubricants, oils, hydraulic fluids, or other construction-related potentially hazardous substances should be stored within a floodplain or within 300 feet of a waterway. The Applicant must perform frequent inspections of construction equipment prior to utilizing it near surface waters to ensure leaks from the equipment are not occurring and are not a threat to water quality.
8. The Applicant shall develop and maintain onsite a project-specific Spill Prevention, Containment and Cleanup Plan outlining the practices to prevent, minimize, and/or clean up potential spills during construction of the Project. The Plan must detail the Project elements, construction equipment types and location, access and staging and construction sequence. The Plan must also address the potential of responding to a spill or prevention of spills occurring within the Project site.

9. This Certification does not allow permanent water diversion of flow from the receiving water. This Certification is invalid if any water is permanently diverted as a part of the Project.
10. The Applicant shall apply for a name change or amendment to this Certification should any of the following occur: (a) a change in the ownership or all or any portion of the Project; (b) any change in the Project description; (c) any change involving discharge amounts, temporary impacts, and/or permanent impacts; and/or (d) amendments, modifications, revisions, extensions, and/or changes to the United States Army Corps of Engineers' Nationwide Permit #14, the United States Fish and Wildlife Service decision document(s), and/or the California Department of Fish and Wildlife Streambed Alteration Agreement.
11. The Applicant shall submit a copy of the final, signed and dated Lake or Streambed Alteration Agreement issued by the California Department of Fish and Wildlife within 14 days of issuance to the Central Valley Water Board Contact indicated in this Certification.

The Applicant shall comply with all California Department of Fish and Wildlife requirements, including, but not limited to, those requirements described in the Lake or Streambed Alteration Agreement.

12. The Conditions in this water quality certification are based on the information contained in the Applicant's application and in the attached "Project Information Sheet." If the Project, as described in the application and the attached Project Information Sheet, is modified or changed, this Certification is no longer valid until amended by the Central Valley Water Board.
13. The Applicant shall implement each of the mitigation measures specified in the approved Mitigated Negative Declaration for the Project, as they pertain to biology, hydrology and water quality impacts as required by § 21081.6 of the Public Resource Code and § 15097 of the California Code of Regulations.
14. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable State or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, process or sanctions constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this Order.
  - a) If Caltrans or a duly authorized representative of the project fails or refuses to furnish technical or monitoring reports, as required under this Order, or falsifies any information provided in the monitoring reports, the applicant is subject to civil monetary liabilities, for each day of violation, or criminal liability.
  - b) In response to a suspected violation of any condition of this certification, Central Valley Water Board may require the holder of any federal permit or license subject to

this certification to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports (Water Code, §§ 1051, 13165, 13267 and 13383). In response to any violation of the conditions of this certification, the Central Valley Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

- c) Caltrans shall allow the staff of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the Project premises for inspection, including taking photographs and securing copies of Project-related records, for the purpose of assuring compliance with this Certification and determining the ecological success of the Project.

15. The Applicant shall provide evidence of all on-site and off-site compensatory mitigation requirements, including, but not limited to, the payment of in-lieu fees as required by the United States Army Corps of Engineers prior to commencing construction to the Central Valley Water Board.

Compensatory mitigation must comply with the effective policy at the time of Certification, which ensures no overall net loss of wetlands for impacts to waters of the State.

Evidence of compliance with compensatory mitigation requirements include providing in-lieu fee recipient. The letter must: (a) be on the in-lieu fee recipient's letterhead; (b) be signed by an authorized representative of the in-lieu fee recipient; (c) indicate the United States Army Corps of Engineers' SPK number; (d) describe the Project name and location; and (e) detail the type of in-lieu fees paid for the Project's impacts.

#### **STORM WATER QUALITY CONDITIONS:**

The Applicant shall also satisfy the following additional storm water quality conditions:

1. During the construction phase, the Applicant must employ strategies to minimize erosion and the introduction of pollutants into storm water runoff. These strategies must include the following:
  - a) the Storm Water Pollution Prevention Plan (SWPPP) must be prepared during the project planning and design phases and before construction;
  - b) an effective combination of erosion and sediment control Best Management Practices (BMPs) must be implemented and adequately working prior to the rainy season and during all phases of construction.
2. The Applicant must minimize the short and long-term impacts on receiving water quality from the Project by implementing the following post-construction storm water management practices:

- a) minimize the amount of impervious surface;
  - b) reduce peak runoff flows;
  - c) provide treatment BMPs to reduce pollutants in runoff;
  - d) ensure existing waters of the State (e.g., wetlands, vernal pools, or creeks) are not used as pollutant source controls and/or treatment controls;
  - e) preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones;
  - f) limit disturbances of natural water bodies and natural drainage systems caused by development (including development of roads, highways, and bridges);
  - g) use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected pollutant load increases in surface water runoff;
  - h) identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion/ sediment loss;
  - i) control post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat.
3. The Applicant shall provide the Central Valley Water Board Contact indicated in this Certification a Notice of Completion (NOC) no later than 30 days after the Project completion. The NOC shall demonstrate that the project has been carried out in accordance with the project description in the Certification and in any amendments approved. The NOC shall include a map of the project location(s), including final boundaries of any on-site restoration area(s), if appropriate, and representative pre and post construction photographs. Each photograph shall include a descriptive title, date taken, photographic site, and photographic orientation

**REGIONAL WATER QUALITY CONTROL BOARD CONTACT PERSON:**

George Day, Senior Water Resource Control Engineer  
Central Valley Regional Water Quality Control Board  
364 Knollcrest Drive, Suite 205, Redding, California 96002  
gday@waterboards.ca.gov  
(530) 224-4859

**WATER QUALITY CERTIFICATION:**

I hereby issue an Order certifying that any discharge from Caltrans, Paradise Road Realignment–Butte 191 Curve Correction Safety Project (WDID# 5A04CR00257) 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 compliance with conditions of this Certification, the Caltrans application package, and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the *Water Quality Control Plan for the Sacramento River and San Joaquin River*, Fourth Edition, revised June 2015 (Basin Plan).

Any person aggrieved by this action may petition the State Water Quality Control Board to review the action in accordance with California Water Code § 13320 and California Code of Regulations, title 23, § 2050 and following. The State Water Quality Control Board must receive the petition by 5:00 p.m., 30 days after the date of this action, except that if the thirtieth day following the date of this action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Quality Control Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: [http://www.waterboards.ca.gov/public\\_notices/petitions/water\\_quality](http://www.waterboards.ca.gov/public_notices/petitions/water_quality) or will be provided upon request.

  
(for) Pamela C. Creedon  
Executive Officer

SAZ:reb

Enclosure: Water Quality Order No. 2003-0017-DWQ

cc w/o  
enclosures: Ms. Leah Fisher, U.S. Army Corp of Engineers, Sacramento  
Department of Fish and Wildlife, Region 2, Rancho Cordova  
U.S. Fish and Wildlife Service, Sacramento  
Mr. Bill Jennings, CALSPA, Stockton

cc w/o  
enclosures  
by email: Mr. Bill Orme, SWRCB, Certification Unit, Sacramento  
U.S. EPA, Region 9, San Francisco

## PROJECT INFORMATION

**Application Date:** 23 March 2016

**Application Deemed Complete:** 26 May 2016

**Applicant:** Mr. Matt Solano  
California Department of Transportation  
703 B Street  
Marysville, CA 95901

**Project Name:** Paradise Road Realignment (Butte 191 curve Correction Safety Project)

**Application Number:** WDID No. 5A04CR00257

**Type of Project:** Road Realignment.

**Project Location:** Section 2 and 11, Township 21 North, Range 3 East  
Latitude: 39.702° and Longitude: -121.611°

**County:** Butte County

**Receiving Water(s) (hydrologic unit):** Unnamed tributary to West Branch of Clear Creek.  
Butte Creek Hydrologic Unit No.521.10 – Upper Dry Creek HA

**Water Body Type:** Streambed

**Designated Beneficial Uses:** The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised June 2015 (Basin Plan) has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include, but are not limited to: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Hydropower Generation (POW); Groundwater Recharge (GWR); Water Contact Recreation (REC-1); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); and Wildlife Habitat (WILD). A comprehensive and specific list of the beneficial uses applicable for the project area can be found at [http://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.shtml).

**Project Description (purpose/goal):** The Paradise Road Realignment (Butte 191 curve Correction Safety Project) is located on State Route 191 in Butte County between post mile 6.8 and 8.6. This is a curve correction/safety project that will realign portions of SR-191 within a length of just under 2 miles. Twelve roadside culverts along with associated ephemeral drainages and two wetland/seep areas will be impacted. Twenty-three new culverts will be put in place to catch roadside drainage; twelve of these are jurisdictional and contain waters of the State. The project is scheduled to take approximately two work seasons. Minimization measures include placing the new culverts in existing drainage paths, work windows outside of rainy season, if feasible, slopes steepened to avoid any additional fill amounts, avoiding wetland/seep areas where feasible, creating Environmentally Sensitive Areas (ESAs) if necessary, and re-vegetation of temporarily disturbed areas during construction. The project will permanently impact 0.17 acre(s)/2,902 linear feet of waters of the United States.

**Preliminary Water Quality Concerns:** Construction activities including soil disturbance, excavation, cutting/filling, and grading activities could result in increased erosion and sedimentation and may impact surface waters with increased turbidity and settleable matter.

**Proposed Mitigation to Address Concerns:** The California Department of Transportation will implement Best Management Practices (BMPs) to control sedimentation and erosion. All temporary affected areas will be restored to pre-construction contours and conditions upon completion of construction activities. The California Department of Transportation will conduct turbidity and settleable matter testing during in-water work, stopping work if Basin Plan criteria are exceeded or are observed.

**Fill/Excavation Area:** Approximately 6,228 cubic yards of rock slope protection, soil, concrete and will be placed into 0.17 acres of waters of the United States.

**Dredge Volume:** N/A

**California Integrated Water Quality System Impact Data:** The Project will permanently impact 0.17 acre/2,902 linear feet of wetland/streambed from fill activities.

**Table 1: Impacts from Fill and/or Excavation Activities**

Fill Type	Permanent			Temporary		
	Acres	Linear Feet	Cubic Yards	Acres	Linear Feet	Cubic Yards
Wetlands						
Wetlands Total	0.07	97	--	--	NA	--
Stream Channel						
Stream Total	0.10	2,805	--	--	--	--
<b>Total Impacts</b>	<b>0.17</b>	<b>2,902</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

Notes  
NA Not Applicable

**United States Army Corps of Engineers Permit Type:** Nationwide Permit #14 (Linear Transportation Projects).

**Department of Fish and Wildlife Lake or Streambed Alteration Agreement:** The California Department of Transportation applied for a Lake or Streambed Alteration Agreement on 24 March 2016.

**Possible Listed Species:** No Federally or California Department of Fish & Wildlife -threatened or -endangered species are listed in the Section 401 Water Quality Certification.

**Status of CEQA Compliance:** The California Department of Transportation is the Lead Agency responsible for compliance with the California Environmental Quality Act for the Paradise Road Realignment (Butte 191 Curve Correction Safety Project) Project pursuant to § 21000 et seq. of

the Public Resources Code. The California Department of Transportation approved the Mitigated Negative Declaration on 18 May 2015. The California Department of Transportation filed a Notice of Determination with the State Clearinghouse on 19 June 2015 (State Clearinghouse Number 2015032068).

**Compensatory Mitigation:** As required by the United States Army Corps of Engineers, the Applicant will pay in-lieu fees in the amount of \$43,150.00 for 0.17 acres of wetland/ephemeral drainages to mitigate for 0.17 acres of impacts to waters of the United States. Evidence of this payment shall be provided to the Central Valley Water Board prior to proceeding with the activity authorized by this Certification.

**Application Fee Provided:** An application fee of \$20,534.00 was submitted on 28 March 2016. A total fee of \$20,534.00 has been submitted to the Central Valley Water Board as required by § 3833(b)(3)(A) and § 2200(a)(3) of the California Code of Regulations.

# Memorandum

*Serious drought.  
Help Save Water!*

**To:** MR. STEVE WRIGHT  
Branch Chief  
North Region Design

**Date:** March 28, 2016

**File:** 03-BUT-191 PM 6.8/8.6  
Paradise Road Realignment  
EA# 03-3F760  
EFIS ID# 0313000165

**Attn:** Mr. Eric Souza  
Project Engineer

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

**Subject:** Geotechnical Design Report

## 1.0 INTRODUCTION

This Geotechnical Design Report (GDR) is prepared for the Paradise Road Realignment project located on the State Route (SR) 191 from PM 6.8 to 8.6 in Butte County, California, as shown in Plate 1 Project Site Vicinity Map. We understand that the project will realign the existing SR 191 to provide curve corrections and widen the existing paved shoulders within the project limits.

The purpose of this GDR is to provide design and construction related geotechnical engineering recommendations for the project. Work performed by OGDN consisted of reviews of available pertinent publications, performances of site subsurface investigations, performance of engineering studies and preparation of this report.

Previously, OGDN prepared a District Preliminary Geotechnical Report (DPGR) dated January 17, 2014.

## 2.0 EXISTING FACILITIES AND PROPOSED IMPROVEMENTS

At the time of our field exploration, SR 191 consisted of a two-lane (one for each direction), asphalt concrete (AC) paved roadway. The width of each travel lane was 11-feet. The shoulders within the project limits consisted of both AC paved sections and unpaved sections. The paved shoulders were varied from about 6-inch to 3-feet wide and the unpaved shoulders were about 2-feet to 15-feet wide. Culvert structures were observed crossing beneath the route at several locations. The route runs generally in a north-south direction. Moderately steep to steep hillside topographies bound the east and west sides of the existing route alignment, with the west side being predominantly downslope and the east side being predominantly upslope.

A few private residential developments are located at or near the top of the existing hillsides on the east side of the current route alignment and two associated AC paved driveways connect to SR 191 on the east side at approximate project stations of 420+00 and 463+00. An unpaved private access road exists on the west side and connects to SR 191 at approximate project station of 428+00. Overhead utility lines were observed crossing SR 191 at approximate project station of 425+50 with a high tension power pole located at the top of the existing cut slope.

### **3.0 PROJECT SITE PHYSICAL SETTING**

#### **3.1 Climate**

Climate information was obtained from the Western Regional Climate Data Center at <http://www.wrcc.dri.edu>. The nearest weather station is COOP located in Paradise, CA approximately three miles north of the project location. The Western Regional Climate Center includes monthly climate records for this location from 1957 through March 2013. The average annual maximum temperature is 71°F, with the maximum for the warmest month, July, averaging 92°F. The average annual minimum temperature is 50°F, with the minimum for the coldest month, December, averaging 38°F. The average annual precipitation recorded by the Paradise COOP is approximately 55 inches, with the majority falling between October and May. Annual snowfall is reported as 2.2 inches and typically occurs between months of December through March; however, there is a significant elevation difference between the project location and the town of Paradise, and it is anticipated that the lower elevation of the project site would have a decreased snowfall potential.

#### **3.2 Topography and Drainage**

According to the USGS quadrangle reviewed, the existing highway within the project area roughly trends north/south. The highway is bounded on the east by upward trending slopes and on the west by moderately steep downward trending slopes. The existing highway alignment trends uphill from south to north. Elevation along the current alignment varies between approximately 800 feet on the south end to 1200 feet above mean sea level on the north end of the project limits. An un-named stream flowing from north to south is depicted just west of the existing highway alignment. A small manmade lake is shown on the map just west of the southern portion of the project limits and an area of springs are shown just east of the current alignment in the northern portion of the project limits. Surface drainage within the project limits is generally west and southwest towards the un-named stream channel with some local variations. No water was observed flowing in any of the drainages or emanating from springs or seeps within the existing cuts during our site visit in December 2013. Native vegetation in the project area includes abundant grass/weeds, moderate brush, trees and pasture land.

### 3.3 Regional Geology

The project is located in northern Butte County, on the eastern edge of the Great Valley geomorphic province. This geologic province is characterized as being an "asymmetrical synclinal trough" created by the uplift of the Sierra Nevada mountains to the east and the Coast Range Mountains to the west. Northern Butte County is dominated by marine and non-marine (volcanic) deposits underlain by igneous rocks. (R. Norris and R. Webb)

### 3.4 Site Geology

According to the geologic maps reviewed, the site is mapped within Pliocene aged; Tuscan Formation. Rock types associated with the Tuscan Formation include; lahars, volcanoclastic sediments, basaltic/andesitic flows and tuff deposits. Rock outcrops observed during our site exploration appeared to be primarily moderately weathered lahars consisting of volcanoclastic; sandstone, conglomerate and mudstone. Rock outcrops observed in the field compare favorably with those described in the maps and documents reviewed. A portion of the Geologic map utilized for this report is attached in Plate 2 Geology Map.

### 3.5 Seismicity

Based on the Caltrans ARS Online Tool Version 2.3.06, the nearest active fault for the site is the Foothills Fault System – northern reach section (Swain Ravine fault zone) (Fault ID No. 71) with a maximum magnitude (M<sub>Max</sub>) of 6.5. The fault is referred as a normal fault dipping 50 degrees to the west and is located south southeast of the project site. The closest distance to the fault rupture plane from the site is estimated to be about 15.5 miles.

Based on the geologic map and our subsurface investigation, a  $V_{S30}$  (weighted shear wave velocity for the top 100 feet of subsurface materials) of about 1840 feet per second is judged to be applicable for the site. Based on the "Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations, November 2012" and the estimated  $V_{S30}$ , a peak ground acceleration (PGA) of 0.21g is recommended for the site.

### 3.6 Naturally Occurring or Imported Asbestos (NOA)

We have reviewed the State of California, Air Resources Board (ARB) Map of California Showing Principal Asbestos Deposits, 2000 and the Caltrans DOT "Asbestos Location Map, District 3", 2001. According to both maps, the site is not in an area of naturally occurring asbestos. In addition, during our site reconnaissance the presence of serpentine was not observed in the rock exposed at the site.

#### 4.0 FIELD EXPLORATIONS

The site subsurface conditions were investigated by a combination of exploratory borings and seismic refraction testing.

##### 5.1 Drilling and Sampling

Three exploratory test borings, R-15-001, R-15-002 and RC-15-003 were performed at the site. The borings were advanced with a rotary wireline drilling method using the Caltrans Mobile B47 (Equipment ID 3174758) for RC-15-001 and the Caltrans CS 2000 drill rig (Equipment ID 0536831) for RC-15-002 and RC-15-003. At selected intervals, Standard Penetration Tests (SPT) were performed and soil/rock samples were collected. The samples were visually classified onsite and were transported to Caltrans headquarter Core Room for storage. The boreholes were backfilled with cement grout upon completion in accordance with Butte County requirements. Table 1 below summarizes the borings information. The station information was based on interpretation from the Right of Way Appraisal Index map provided to us and should be considered approximate.

**Table 1 Subsurface Exploration Boring Summary**

Boring No.	Appr. Station (BA4 Line)	Boring Depth (ft)	Completion Date
R-15-001	533+82	100	10/29/2015
R-15-002	563+61	100	11/3/2015
R-15-003	583+22	93	11/6/2013

Records of the Borings are provided in the Appendix of this report. Boring locations are shown in Plate 3 Approximate Boring Location Map.

##### 5.2 Seismic Refraction Survey

Eleven seismic refraction survey lines were completed during November 2016 at selected cut locations. The lines were located at the top of proposed cut areas, roughly parallel to the proposed alignment and directly above areas likely to be cut. Additionally, the lines were completed on top of rock outcrops selected by representatives of our Office that were considered to consist of the hardest (most difficult to excavate) rock that could be encountered throughout the project limits. Selection of cuts where seismic refraction lines were completed was based on field observation and the following criteria: locations where significant (thickest exposure) of rock material was observed in the existing highway cuts adjacent to the proposed new cuts, and/or locations where new significant thru cuts would be completed. The primary purpose of these surveys was to determine if “hard rock” material difficult to excavate with conventional excavation techniques would be encountered in the project proposed cuts and provide information to potential bidders regarding the hardness of materials they could encounter during excavations activities. Plates 4 & 5 attached

depict general locations where seismic refraction lines were completed. Table 2 below summarizes results of the survey data collected. Seismic velocities provided in the table below are an average velocity of the rock material and its included fractures and discontinuities and does not represent the solely rock material between the discontinuities.

**Table 2 Seismic Refractions Results**

SITE	APPR. POST MILE	PROPOSED WORK WITH APPR. PROJECT STATIONING*	SEISMIC LINE#	AVERAGE VELOCITY (Feet/Second)	RIPPABILITY**
1	6.88	Proposed cut east of existing alignment. Approximate project sta: 516+00 – 517+00	9	4059	MD
2	7.30	Proposed thru cut west of existing alignment. Approximate project sta: 532+00 – 537+00	1	5324	DR
			2	6025	DR
			3	6705	NR
			4	4489	MD
			5	4327	MD
			6	3361	MD
3	7.68	Proposed cut east of existing alignment. Approximate project sta: 559+00 – 561+00	10	5315	DR
4	7.99	Proposed cut east of existing alignment. Approximate project sta: 577+00 – 579+00	11	8288	NR
5	8.41	Proposed cut east of existing alignment. Approximate project sta: 000+00 – 000+00 for line 7 Approximate project sta: 589+00 – 591+00 for line 8	7	5194	DR
			8	6567	NR

\*Project stationing based on project layout plans provided by District 3 Design, Dated 7/2/2010

\*\* See section 7.0 below for further description of abbreviated terms

## 5.0 GEOTECHNICAL CONDITIONS

### 5.1 Subsurface Materials

The subsurface materials encountered in the exploratory borings were primarily sedimentary rock consisting primarily of Sandstone, Siltstone and Conglomerate derived from volcanic source material. These rock appeared to be decomposed to materials consisting of cobbles, gravels, sands, silts and their mixtures. Minor clay content was observed in a few localized zones of the granular material matrix. The materials appeared to be medium dense to very dense with the Standard Penetration Test (SPT) values recorded in the materials varying from 12 blows per 1-foot penetration to 50 blows for 0 penetration (hammer refusal).

## 5.2 Groundwater

Groundwater was not encountered in the exploratory borings. We reviewed California State Department of Water Resources (DWR) "Water Data Library" for the project area. Based on our review, the closest groundwater monitoring well (Well ID 21N03E22C001M) is located approximately 2.2 miles south of the project site. The ground surface elevation of the well is about 382 feet, which is more than 400 feet below the lowest elevation point within the project limits. Data collected in the well between March 2001 and September 2015 indicates that groundwater levels varied from near the ground surface to about 30 feet below the ground surface at the well location.

Due to the elevation difference between the project site and the reviewed DWR well location as well as the project site local topography, it is our opinion that groundwater, if encountered, will be transient at shallower depths and flowing within the contact zone between the soil mantle and the underlying bedrock. In addition, some localized groundwater may be encountered within confined fractures of the underlying bedrock. It should be noted that groundwater conditions change over the passage of time and will vary depending on local conditions including weather, precipitation, and human activities.

## 5.3 Existing Slopes

Within the project limits SR 191 is bounded to the east by predominantly cut slopes. The cut slopes varied in slope ratio from 1/2H:1V to near vertical in the lower rock portions of the cut, rounding to 1H:1V through the soil mantels in the upper portions of the cut. Existing highway cuts within the project limits have a maximum vertical slope height of about 80 feet. The existing cuts within the project limits are comprised of relatively thin veneer (0 to <10 ft.) of soil overlying sedimentary rock derived from volcanic sources. Bedrock outcrops observed in the existing cut consist of the following:

1. From thinly bedded to massive, hard to very hard, moderately weathered, very slightly fractured conglomerate. Typically observed as very thick to massive cap stones at the top of cuts or as thin to thick beds in cut faces. In both cases due to its hardness this rock type typically forms near vertical to overhanging sections within the existing cuts. Seismic lines 7-8 & 10-11 represent direct velocities results of this rock type.
2. From very thinly bedded to very thickly bedded, from moderately hard to very hard, intensely to moderately weathered, from moderately to very slightly fractured sandstone. Seismic line 9 represents a direct velocity of this material type. Typically observed as forming near vertical faces in existing cuts on occasion observed as cap stone.
3. Laminated to moderately bedded, soft to moderately soft, from decomposed to moderately weathered, very slightly fractured to unfractured siltstone. Typically observed as eroded sections below overhanging sandstone/conglomerate blocks. In other areas appears as a decomposed soil on the existing cut face.

The existing cut slopes appeared performing well with regards to global slope stability. Localized rockfall was observed occurring at some steeper cut areas (steeper than  $\frac{3}{4}H:1V$ ) where hard rock is underlain by soft materials and the soft materials has been eroded over time resulting the hard rock collapsing along the weathered fracture planes.

Within the project limits SR 191 is bounded to the west by predominantly fill slopes. The fill slopes varied with slope ratios of 1.5H:1V or flatter with a maximum vertical slope height of about 65 feet. The fill slopes appeared performing well in regards to global stability.

A majority of the slopes were vegetated except for the cut slopes that are steeper than 1H:1V. The steeper cut slopes appeared to be un-vegetated. Localized erosion in the form of sheet rills was observed on both the cut and fill slopes. Localized face erosion and loose rock blocks were observed on the cut slopes. Localized scour channels and minor slumps were observed on the fill slopes.

## **6.0 GEOTECHNICAL DISCUSSION, CONCLUSIONS, & RECOMMENDATIONS**

### **6.1 Cut Slope**

Based on the cross sections provide to our Office by District 3 Design, Dated July 2, 2010, the District proposed to preform portions of the widening by cutting further into the existing cuts located on the eastern side of the existing highway. Additionally, realignment portions of the project will require completing new thru cuts by cutting into (decreasing elevation of) existing native ground. Based on the information provided by the District, the new cuts will have slope ratios that will vary from as flat as 3H:1V to as steep as 1H:1V. In addition, the new cuts will have slope heights that vary in maximum vertical height from a few feet to a maximum of 60 feet.

As stated above, the existing highway cuts with maximum vertical heights and slope ratios that exceed those proposed by the District are performing well with regards to global stability. It is our Office's opinion that the new cuts proposed by the District will perform in similar nature to the existing cuts. Cut slopes should be construct per Section 19 of the standard specifications. Due to the rocky nature of the subsurface materials that will be encountered in excavation, our Office recommends that at the discretion and direction of District Construction, that the final cut slope faces can be hand scaled to remove any loose rock blocks remaining on the final face if needed. Our Office recommends where soil material is encountered in the upper portions of the cuts, slope rounding to 1.5H:1V ratio be completed to reduce erosion potential of the soil material overlying the bedrock.

It should be noted that the flatter than existing slope ratios will expose a larger surface area of slope face to be impacted by rainfall. Due to the soft nature of the siltstone it is more susceptible to erosion. It is recommended that District Landscape Architecture be consulted to provide recommendations for erosion control on the cut slope faces where large areas of siltstone is exposed. Re-vegetation of cut face areas comprised of sandstone and conglomerate will likely not be successful due to the hardness of the material, however, these two rock types are less susceptible to erosion. In addition, our Office recommends that District Hydraulics be consulted to provide

recommendations to limit concentrated sheet flow from coming off the native slopes onto the cut faces to help reduce erosion potential.

## 6.2 Rippability and Excavation Characteristics

The direct correlation of the seismic velocities encountered in the surveyed areas does not apply for all material anticipated to be encountered in the excavation below the area where the surveys were completed, as each excavation will contain multiple layers of varying thickness volcaniclastic sedimentary rock (sandstone, siltstone etc.). In addition, each rock type and layer will likely vary in hardness, fracturing and cementation. The results of the seismic surveys completed represent direct velocities of the material they were completed on and do not represent velocities (hardness) of underlying rock materials.

Rock Rippability is dependent on rock type, quality (fracture and discontinuity spacing) and ripping equipment. A rippability assessment provided in Table 3 below is taken from the Handbook of Ripping, 12<sup>th</sup> Edition by Caterpillar based on a Caterpillar D10R ripper. Bedrock material encountered in the project cuts should be equivalent to the Sandstone, Shale and Conglomerate listed in the table below.

**Table 3 Rippability with D10R Ripper (Caterpillar, 12<sup>th</sup> Edition)**

Rock Type	Seismic Wave Velocity (fps)	Rippability
Metamorphic Schist	< 7600	Rippable
	7600 – 9500	Marginally Rippable
	> 9500	Non-Rippable
Sandstone	< 8500	Rippable
	8500 – 10900	Marginally Rippable
	> 10900	Non-Rippable
Shale	< 9000	Rippable
	9000 – 10900	Marginally Rippable
	> 10900	Non-Rippable
Breccia <sup>1</sup>	< 9000	Rippable
	9000 – 11500	Marginally Rippable
	> 11500	Non-Rippable
Conglomerate <sup>(1)</sup>	< 9200	Rippable
	9200 – 11500	Marginally Rippable
	> 11500	Non-Rippable

(1) No data is available for tuff. Average scales for breccia and conglomerate may be used for approximation for a D10R ripper.

Table 4 provides the Caltrans Geophysics Branch rippability chart correlating rock rippability with seismic wave velocity based on the Caterpillar D9 series tractor (Owen, 2005).

**Table 4 Caltrans Rippability Chart <sup>(1)</sup> (Owen, 2005)**

<b>Seismic Wave Velocity (f/s)</b>	<b>Rippability</b>
< 3500	Easily Ripped
3500 – 5000	Moderately Difficult
5000 – 6500	Difficult
> 6500	Not Rippable

(1) Based on the Caterpillar D9 Series Tractor

Based on the above tables and the results of the seismic refraction data collected, rock encountered in excavations for the project should be considered rippable utilizing excavation equipment comparable to a Caterpillar D10.

The concept of excavatability is here defined as whether subsurface materials can be excavated (moved from the existing slope) and reduced to a block size that can be reasonably lifted and hauled from one location to another. In this case determining excavatability of subsurface materials requires the field mapping of discontinuities and block sizes, correlating them to observed velocities, and extrapolating the results to unexposed bedrock. At the District request, our Office did not complete detailed mapping of discontinuities and rock types at each proposed cut locations. Based on our limited observations of rock outcrops and their fracture/discontinuities exposed in the existing highway cuts, it is our opinion that contractors and bidders should anticipate having to work with hard rock blocks up to 12x12x12 feet in size. If these blocks sizes need to be reduced to accommodate equipment handling capabilities, it is our Office opinion that “Hard Rock” excavation techniques will be required to reduce the block sizes. Hard rock excavation techniques or Office is aware of include the use of hoe-rams, chemical expanders, hydraulic wedges and blasting. Contractors may be aware of additional techniques and may propose to utilize them with constructions approval.

If the District elects to allow blasting as a hard rock excavation/block reduction method, our Office would recommend that “Controlled Blasting” be utilized due to the presence of residential structures and/or historical monuments in the vicinity of some of the proposed cuts. Our Office should be contacted by District OE to assist in writing a Non-Standard Special Provision (nSSP) and provide a concurrence memo if blasting will be allowed for this project.

### 6.3 Earthwork Factor

Earthwork factor is defined as the “ratio of embankment to excavation volume”, it is affected by the materials characteristics and the construction quality. Table 5 provides approximate earthwork factors for sedimentary rocks in relation to their seismic velocities (Stephens, 1978).

**Table 5 Approximate Earthwork Factors**

<b>Seismic Velocities (f/s)</b>	<b>App. Earthwork Factor</b>
1000	0.87
2000	0.97
3000	1.03
4000	1.07
5000	1.09
6000	1.12
7000	1.13
8000	1.15
9000	1.17
10000	1.18

For the purposes of estimation, a cumulative grading factor of 1.05 may be used for the materials to be excavated from the proposed cuts and to be used as fill with standard 90% relative compactions providing the fill construction is conducted in accordance with Caltrans Standard Specifications 2010 Section 19 Earthwork.

### 6.4 Rockfall

Our Office is not aware that there has been any historic issues with rockfall reaching the travel lanes along the existing highway alignment. As stated above during our field reconnaissance, we observed the presence of rockfall within the unpaved shoulder/drainage ditches. In addition, limited loose rock blocks with the potential to fall were observed on the existing cut faces in particular in areas where vegetation (trees) root growth has occurred within rock discontinuities.

Based on the plans and cross-sections, the District is proposes to reduce (flatten) the cut ratio compared to existing, the new maximum cut height will be less than existing and the proposed unpaved and pave shoulder widths will be greater than existing. Completion of all of these items will reduce the potential for rockfall to reach the traveled way over existing conditions.

It is our Office’s opinion that since rockfall is not a known hazard along the existing alignment and the work proposed by the District has a net decrease in rockfall hazard potential, that additional rockfall recommendations are not warranted at this time. After completion of the project, should

rockfall become a concern along all or any portion of the alignment, our Office should be contacted to evaluate the new conditions and provide rockfall mitigation alternatives at that time.

## 6.5 Fill Slopes

A majority of the materials encountered in the exploratory borings were essentially granular in nature and appear suitable for being used as embankment fill provides the materials are broken down and re-conditioned to satisfy the criteria in the 2010 Standard Specification, Section 19-5 Compaction and Section 19-6 Embankment Construction. The following soil parameters may be used for the fill materials prepared as discussed above.

Unit Weight, $\gamma$	125	pcf
Internal Friction Angle, $\phi$	34	degree
Cohesion, $c$	0	psf

The fill materials and the in-situ materials receiving the fills are essentially granular in nature. As such, upon load application, these materials settle as result of particles reorientation and subsequent volume change, the settlement mostly occur during and shortly after the load application. Based on the proposed fill slope construction, the settlements associated with the proposed fill placements are estimated to be on the order of 2 to 6 inches. The settlement is anticipated to occur mostly during and shortly after construction, a long (3 month or more) waiting period is not anticipated.

Based on our communication with your Office and the typical cross-sections provided to us, it is our understanding that the fill slopes will be built with a slope ratio of 1.5H:1V or flatter. A global slope stability analysis was performed for the proposed fill slope using the standard fill materials discussed above, a maximum slope ratio of 1.5H:1V for the finished ground, a conservative slope ratio of 1H:1V for the original ground, and a conservative groundwater condition assuming the phreatic surface along the original ground surface thus the entire native ground is saturated. The analysis also considered a standard traffic load of 240 pounds per square foot and a horizontal seismic load using 50% of the PGA discussed above. The result indicates that the embankment will satisfy a minimum factor of safety of 1.5 against global stability. A plot of the two dimensional analysis model is provided in Plate 6, "Two Dimensional Global Slope Stability Analysis Model."

The soil portions of the fill material will be susceptible to erosion and should be protected, particularly during the first post-construction raining season. The Office of Landscape Architecture should be contacted for recommendations on erosion protection.

## 7.0 CONSTRUCTION CONSIDERATIONS

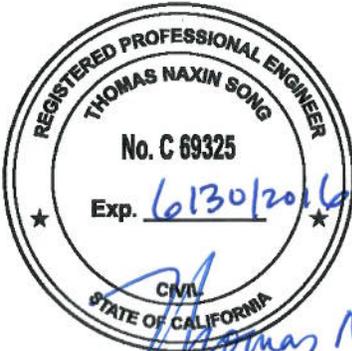
### 7.1 Cut Slope Construction

1. Hard rock excavation techniques maybe required to excavate and/or reduce oversize material created during ripping of the existing material anticipated to be encountered in the cuts or for handling purposes.
2. Hand scaling of final cut slope faces maybe needed to remove loose rock blocks left on the slope after excavation is completed.
3. Slope rounding of cuts to a 1.5H:1V slope ratio with soil mantles in the upper 10 feet is recommended.
4. Concentrated sheet flow over the crest of the cuts should be mitigated.
5. Re-vegetation of large exposures of siltstone in the cut faces is recommended to reduce erosion.

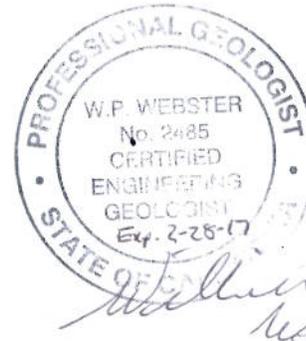
### 7.2 Fill Slope Construction

1. The granular in-situ materials as encountered in the exploratory borings are suitable for being used as embankment fill provide the materials are broken down and re-conditioned to satisfy the 2010 Standard Specification, Section 19-5 Compaction and Section 19-6 Embankment Construction.
2. Based on the groundwater condition discussed above, significant subdrainage is not anticipated. However, depending on actual conditions exposed during construction (such as local seepages, local springs, etc.), subdrainage may be required. If encountered, recommendations can be provided by this Office upon request.
3. Excessive wet (over-optimum) soil conditions may be encountered, depending on the actual local conditions, as well as during and shortly after heavy precipitations. Such conditions can make fill placement and compaction difficult. If such condition is encountered, mitigation recommendations can be provided by this Office upon request.
4. The areas receiving the fill slopes shall be properly prepared including clearing and grubbing in accordance with the 2010 Standard Specification, Section 16 Clearing and Grubbing. Benching maybe necessary if adverse conditions, such as steep original ground, are encountered during construction. If encountered, recommendations can be provided by this Office upon request.

The discussions and recommendations contained in this report are based on specific project information provided to us prior to this memorandum being issued. If any changes are made in the final designs and constructions, this Office should review the changes to determine if the discussions and recommendations still apply. If you have any questions regarding this memorandum, please contact Bill Webster at (916) 227-1041 or Thomas Song (916) 227-1000.



Thomas N. Song, PE 69325  
Senior Transportation Engineer  
Office of Geotechnical Support



William Webster, CEG 2485  
Senior Engineering Geologist (Acting)  
Office of Geotechnical Design - North



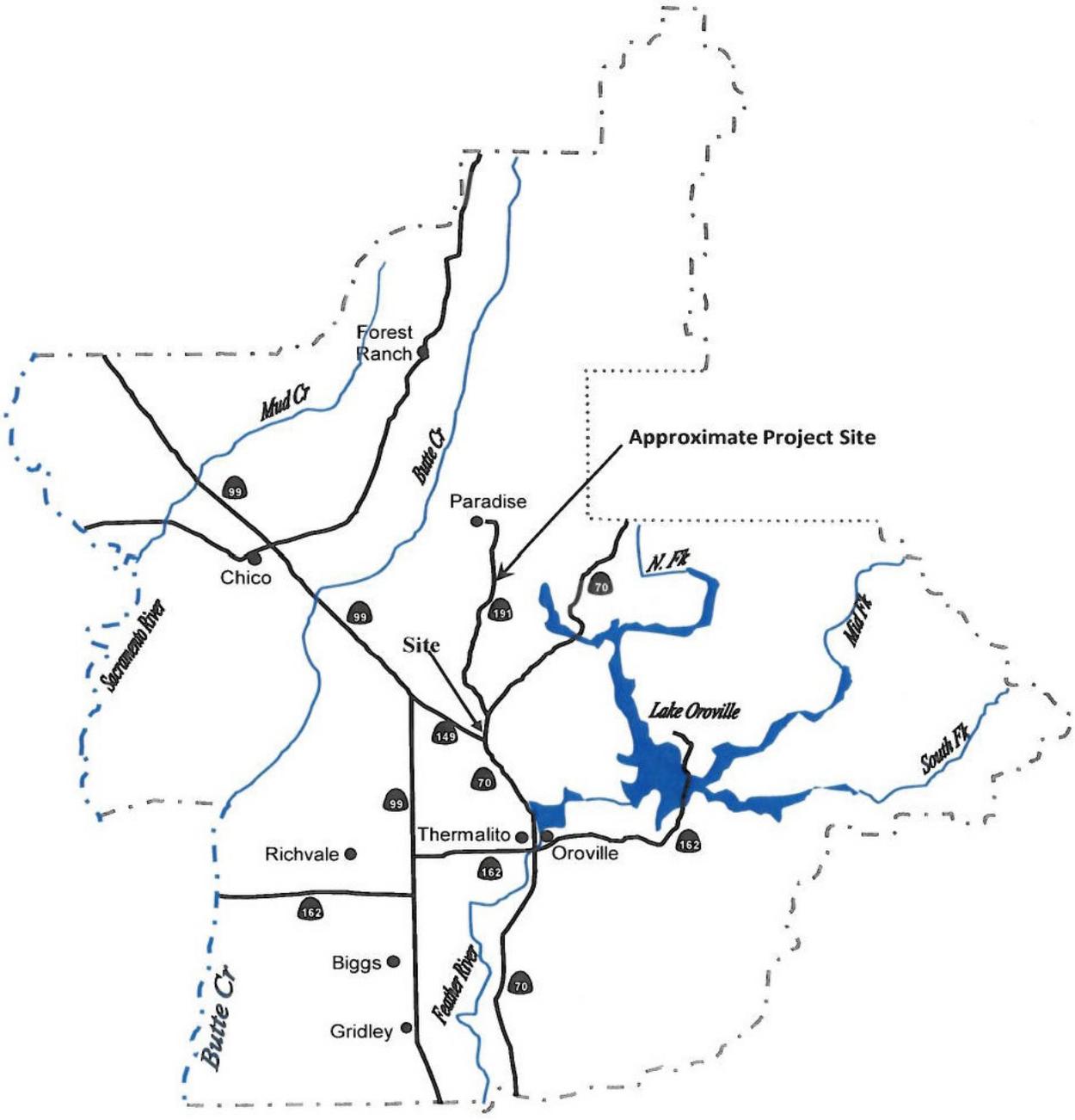
Reza Mahallati, PE 49374  
Senior Materials and Research Engineer  
Office of Geotechnical Design - North

- c: District Project Engineer  
District Material Engineer  
Geotechnical Archive

# **Appendix**

## **Plates**

### **Boring Records**



NO SCALE

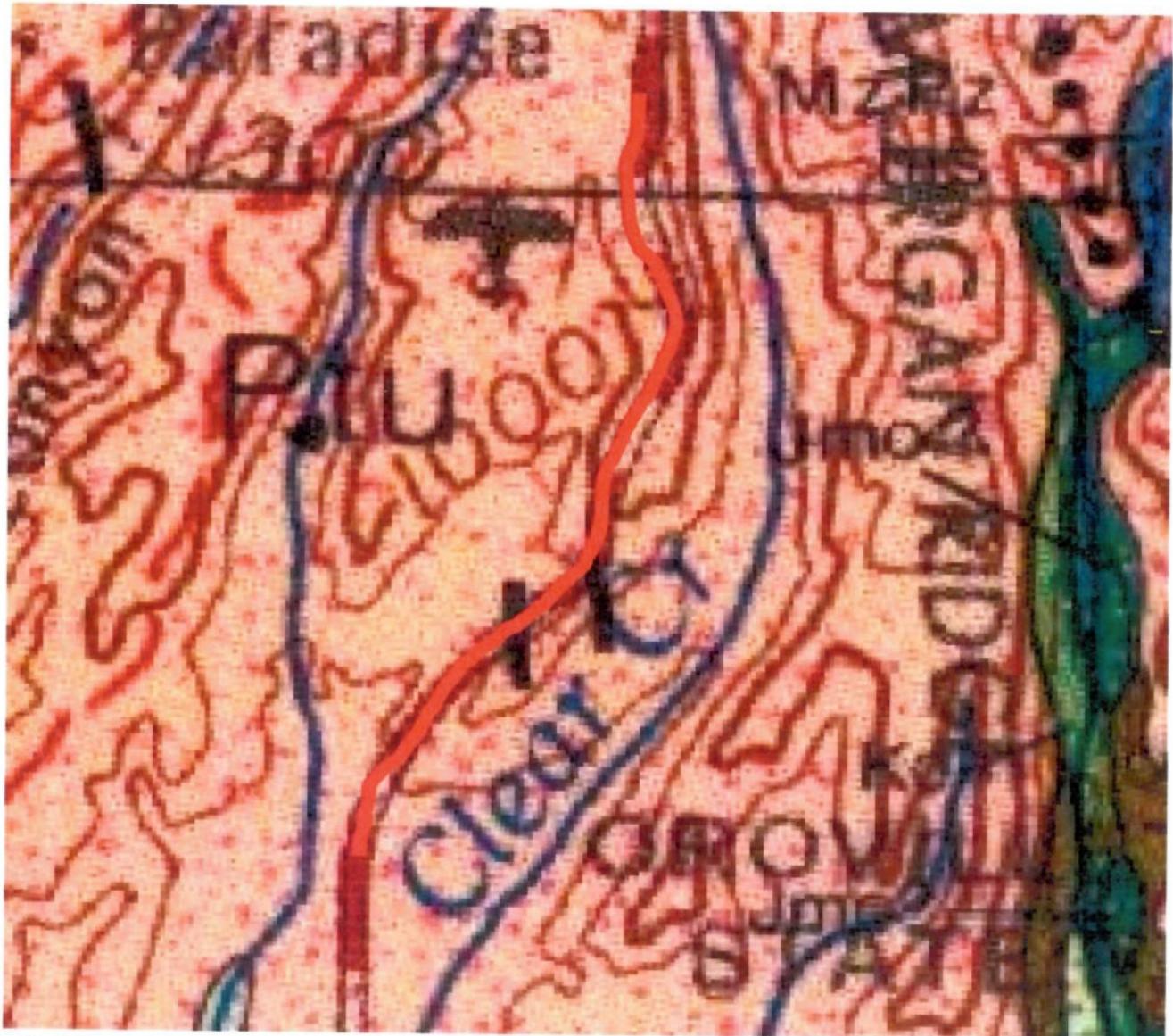


EA/ EFIS No.	03-3F760 0313000165
DATE:	2/24/2016

**Project Site Vicinity Map**  
 BUT-191 PM6.8/8.6  
 Paradise Road Realignment

**DEPARTMENT OF TRANSPORTATION**  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North (OGDN)

Plate
1



Source: D.L. Wagner, C.W. Jennings, T.L. Bedrossian and E.J. Bortugno, California Geologic Survey (CGS), "Geologic Map of the Sacramento Quadrangle", Scale 1:250,000 1987

**Legend**



Approximate Project Limits

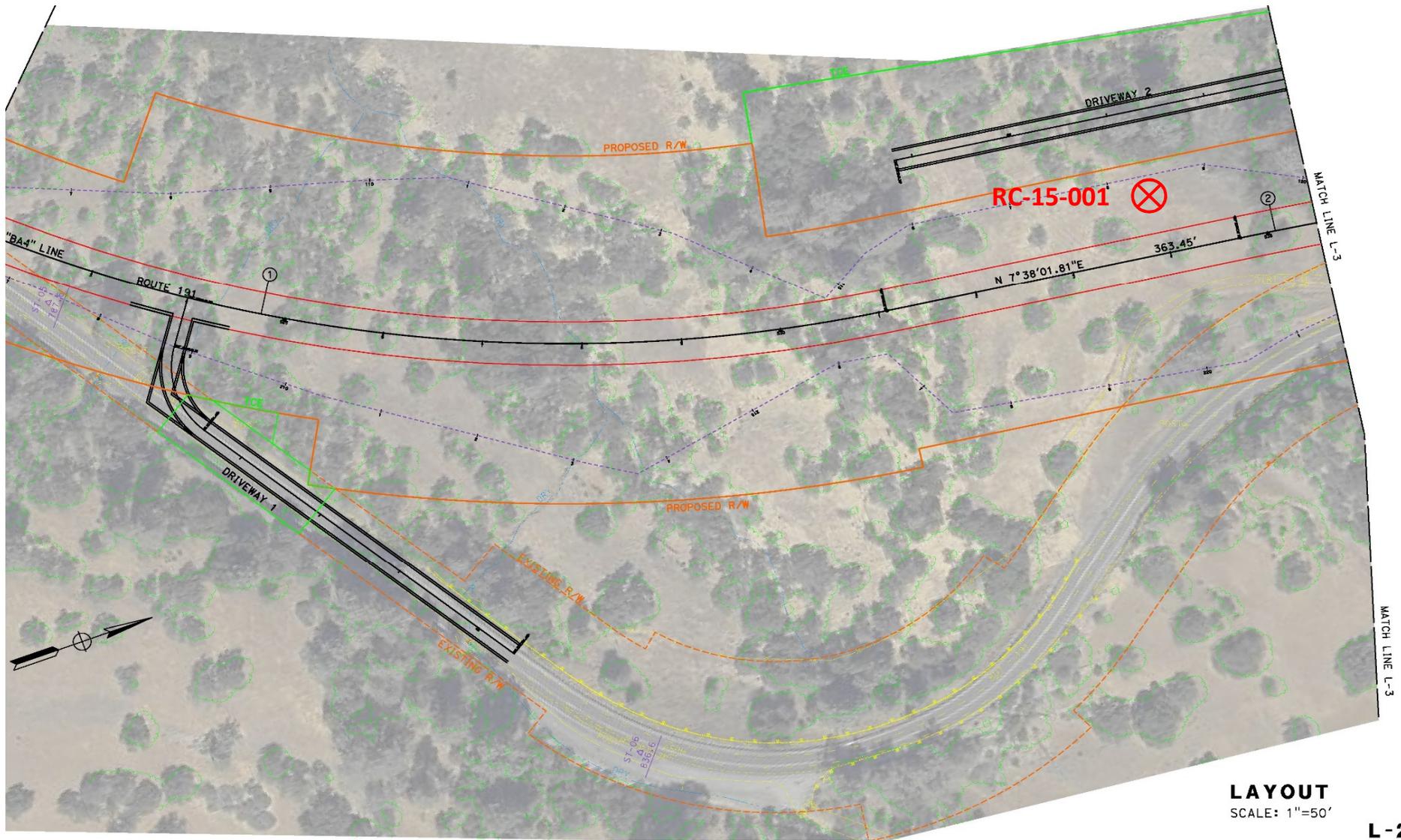


Tuscan Formation (*Lahars, volcaniclastic sediments, and tuff*)  
 Pnt-Nomlaki Tuff



NO SCALE

	EA/EFIS No.	03-3F760 0313000165	<b>Geology Map</b> BUT-191 PM6.8/8.6 Paradise Road Realignment
	DATE:	2/24/2016	
	<b>DEPARTMENT OF TRANSPORTATION</b> Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North (OGDN)		



**LAYOUT**  
SCALE: 1"=50'

**L-2**



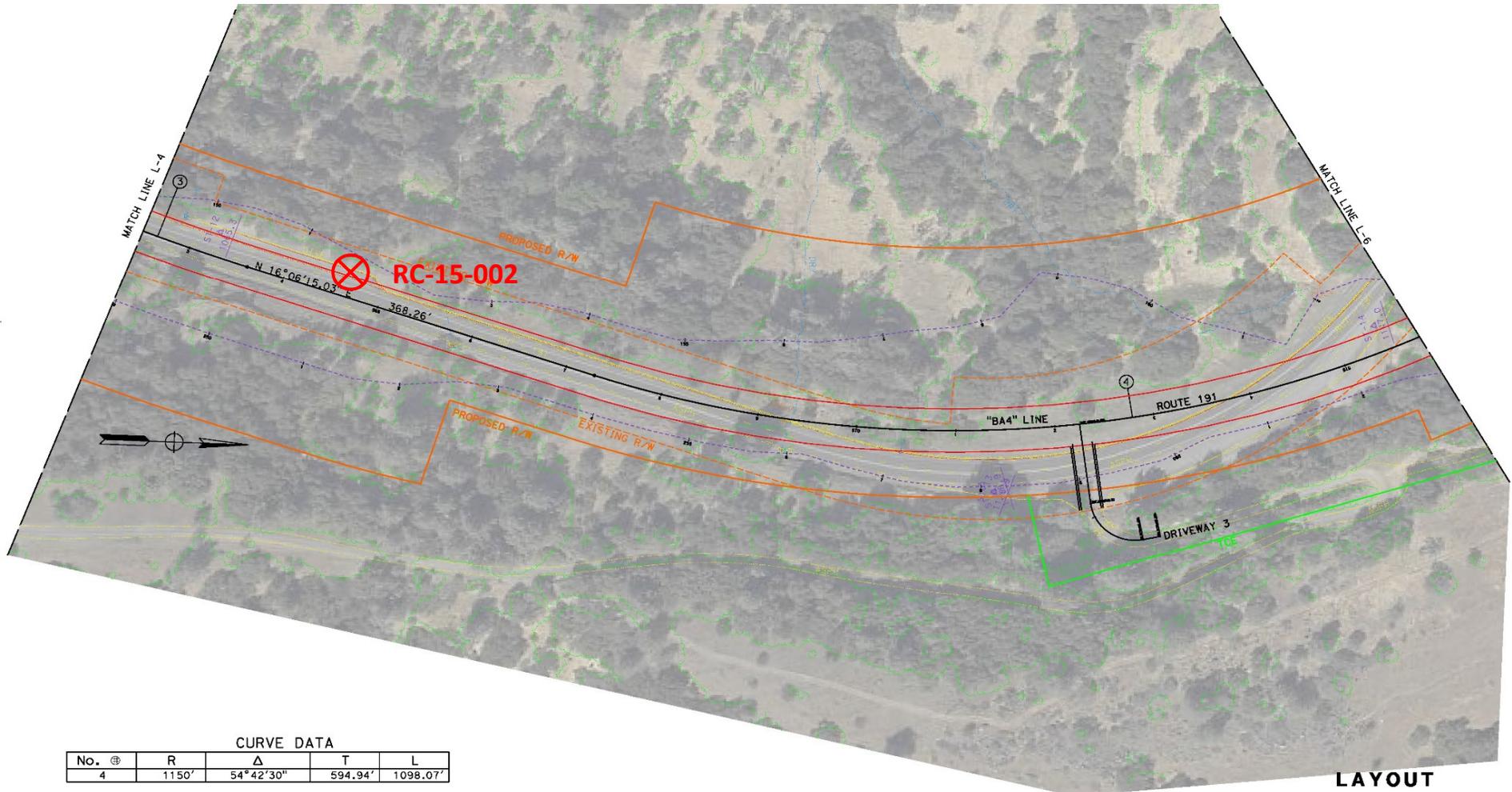
**DEPARTMENT OF TRANSPORTATION**  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North  
 (OGDN)

EA:	03-3F760
EFIS:	0313000165
DATE:	2/24/2016

BUT-191 PM 6.8/8.6  
 Paradise Road Realignment

**Approximate Boring Location Map**

Plate  
 3A



CURVE DATA

No.	⊕	R	Δ	T	L
4		1150'	54°42'30"	594.94'	1098.07'

**LAYOUT**  
SCALE: 1"=50'

**L-5**



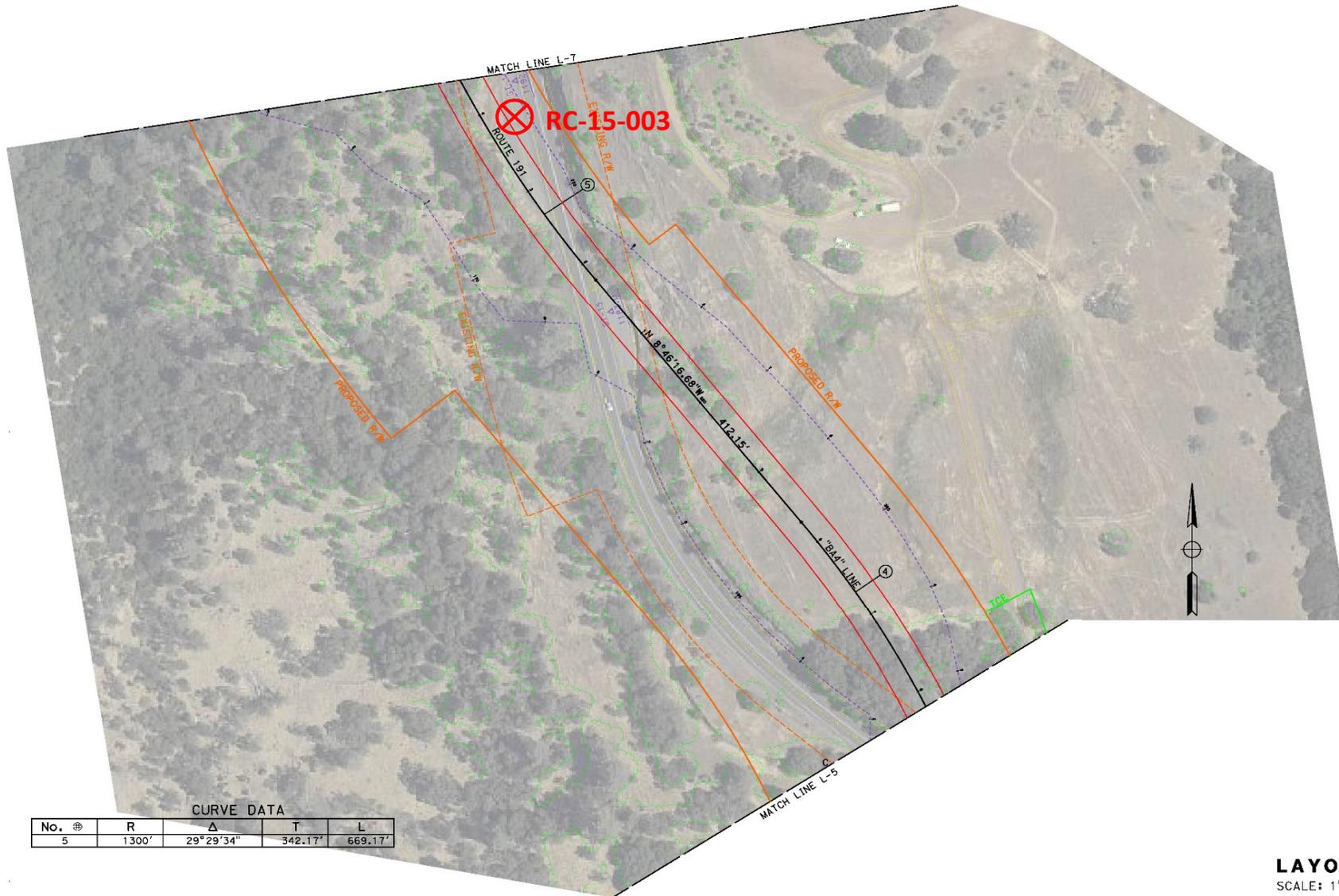
**DEPARTMENT OF TRANSPORTATION**  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North  
 (OGDN)

EA:	03-3F760
EFIS:	0313000165
DATE:	2/24/2016

BUT-191 PM 6.8/8.6  
 Paradise Road Realignment

**Approximate Boring Location Map**

Plate
3B



**LAYOUT**  
SCALE: 1"=50'  
**L-6**

CURVE DATA				
No.	⊕	R	Δ	L
5		1300'	29°29'34"	669.17'



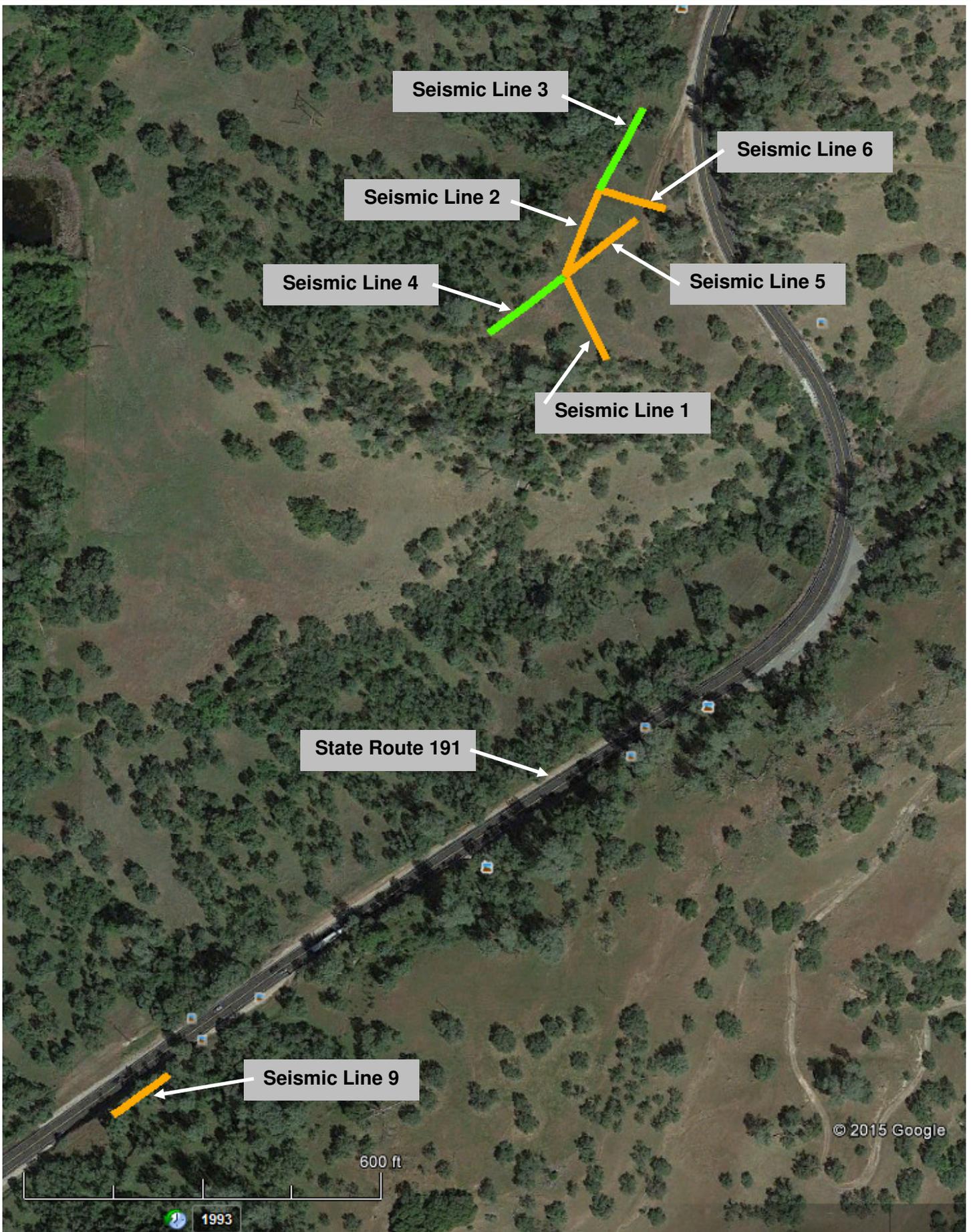
**DEPARTMENT OF TRANSPORTATION**  
Division of Engineering Services  
Geotechnical Services  
Office of Geotechnical Design - North  
(OGDN)

EA:	03-3F760
EFIS:	0313000165
DATE:	2/24/2016

BUT-191 PM 6.8/8.6  
Paradise Road Realignment

**Approximate Boring Location Map**

Plate
3C



Division of Engineering Services  
 Office of Geotechnical Support  
 Geophysics and Geology Branch

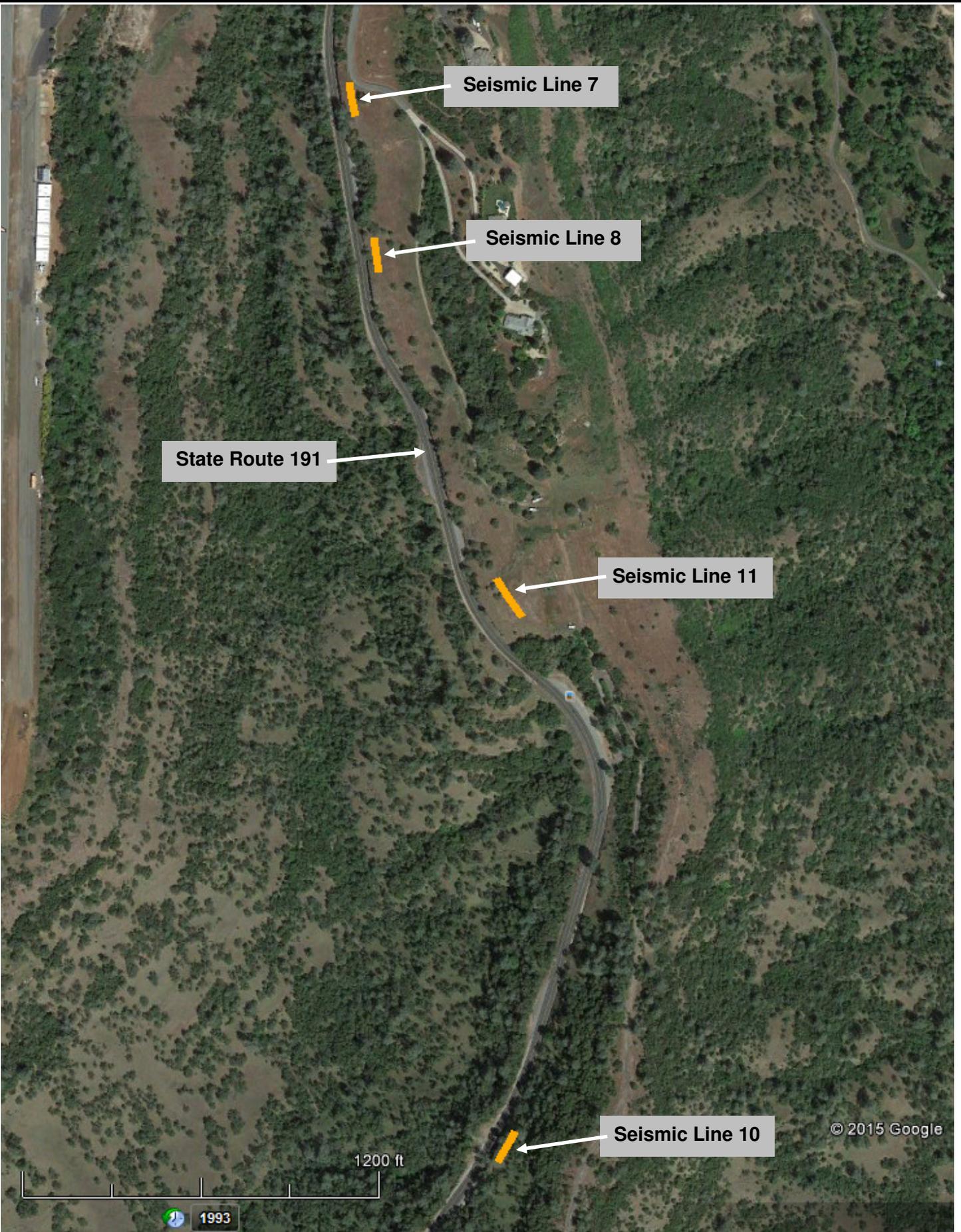
EA: 03-3F760

Project ID:  
 0313000165

BUT-191 PM 6.8 Paradise Realign 03-  
 BUT-191-6.8

**Seismic Refraction Location Map South**

Plate  
 No. 4



Division of Engineering Services  
 Office of Geotechnical Support  
 Geophysics and Geology Branch

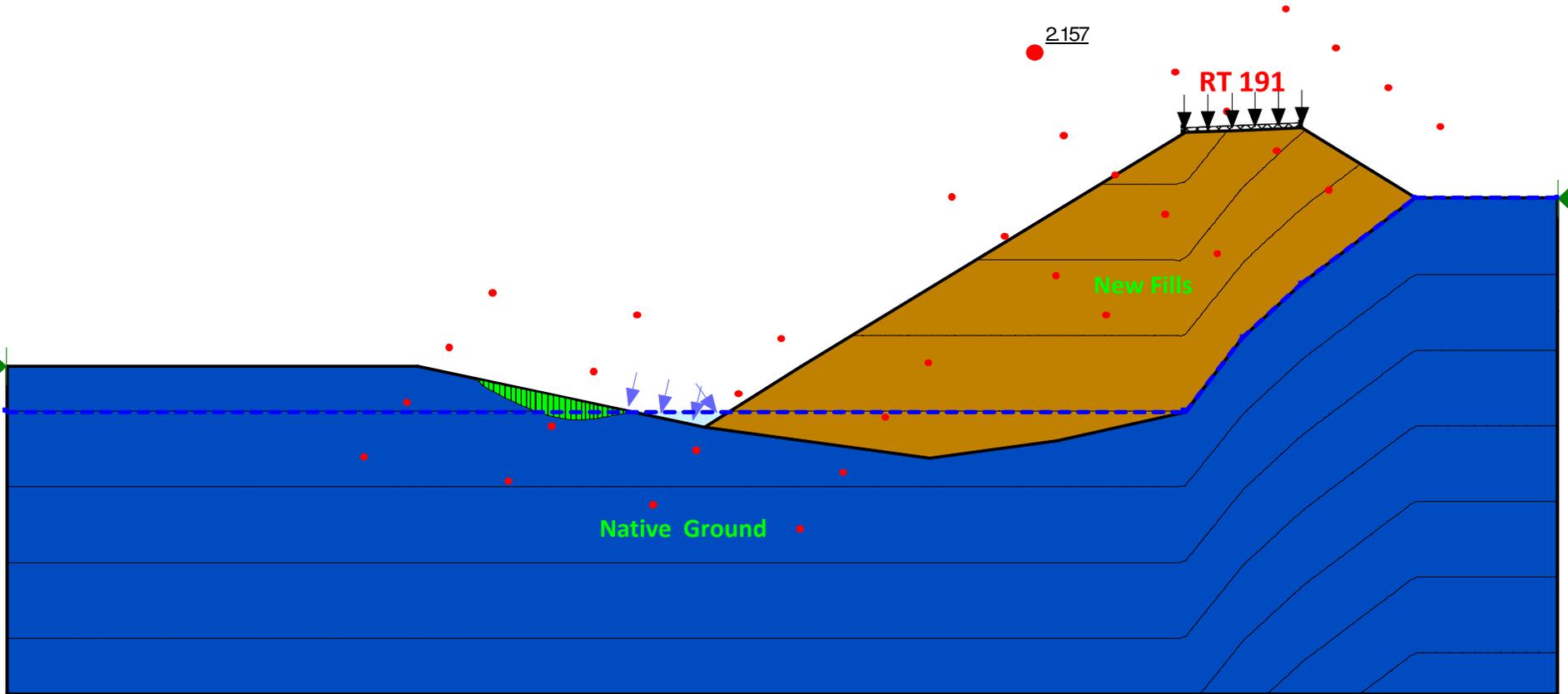
EA 03-3F760

Project ID  
 0313000165

BUT-191 PM 6.8 Paradise Realign 03-  
 BUT-191-6.8

**Seismic Refraction Location Map North**

Plate  
 No. 5



No Scale



DEPARTMENT OF TRANSPORTATION  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North  
 (OGDN)

EA:	03-3F760
EFIS:	0313000165
DATE:	2/24/2016

BUT-191 PM 6.8/8.6  
 Paradise Road Realignment

Two Dimensional Global Stability Analysis Model

Plate
6

LOGGED BY <b>B. Dawa/T. Song</b>	BEGIN DATE <b>10-27-15</b>	COMPLETION DATE <b>10-29-15</b>	BOREHOLE LOCATION (Lat/Long or North/East and Datum) <b>39° 41' 46" / -121° 36' 52"</b>	HOLE ID <b>RC-15-001</b>
DRILLING CONTRACTOR <b>Caltrans/Kleinfelder</b>			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION <b>~894.0 ft</b>
DRILLING METHOD <b>Rotary Wire-Line</b>			DRILL RIG <b>Mobile B47</b>	BOREHOLE DIAMETER <b>4 in</b>
SAMPLER TYPE(S) AND SIZE(S) (ID) <b>SPT (1.4")</b>			SPT HAMMER TYPE <b>Standard 140# Manual</b>	HAMMER EFFICIENCY, ERI <b>59%</b>
BOREHOLE BACKFILL AND COMPLETION <b>Grouted with neat cement.</b>			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING <b>100.0 ft</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
889.00	5		Poorly graded SAND (SP); brown and gray-brown; slightly moist; mostly fine to coarse SAND; trace fine to coarse, subangular to subrounded GRAVEL; trace fines. SEDIMENTARY ROCK (SANDSTONE); grayish brown and gray; decomposed; moderately hard to hard; (Poorly graded SAND with GRAVEL (SP), very dense, slightly moist, mostly fine- to coarse-grained SAND, little fine to coarse, subangular to subrounded GRAVEL, trace non-plastic fines, with cobble-sized rock pieces).		1	Ref		78	68						SPT hammer refusal due to rock pieces
884.00	10		- trace light brown clay lenses at 11 feet.		2	14 22 22	44	80	63						
879.00	15					Ref		20	0						SPT hammer refusal due to rock pieces
874.00	20		SEDIMENTARY ROCK (CONGLOMERATE/SANDSTONE); gray and grayish brown; decomposed; moderately hard to very hard; (Poorly graded GRAVEL with SAND (GP), very dense, slightly moist, mostly fine to coarse, subangular to subrounded GRAVEL, some fine- to coarse-grained SAND, trace non-plastic fines, with cobble-sized rock pieces).					20	0						
869.00	25		- reddish brown cobble-sized MUDSTONE pieces at 25 feet.					7	0						
864.00	30		SEDIMENTARY ROCK (SANDSTONE); grayish brown; decomposed; (Poorly graded SAND with SILT (SP-SM), dense, mostly fine- and medium-grained SAND, few to little non-plastic SILT, with cobble-sized rock pieces).					33	0						SPT hammer refusal due to rock pieces
859.00	35		SEDIMENTARY ROCK (SILTSTONE); gray and dark gray; decomposed; (Sandy SILT (ML-SM), very dense, some fine-grained SAND, trace CLAY). SEDIMENTARY ROCK (SANDSTONE/SILTSTONE); brownish gray and dark gray; decomposed; moderately hard; (Silty SAND (SM-SP), dense, mostly fine-grained SAND, some SILT, trace CLAY).						100	0					

(continued)

5 BR - STANDARD BUT 191 PARADISE REALIGN GPJ CALTRANS LIBRARY (FEB 2013) GLB 3/30/16



Department of Transportation  
Division of Engineering Services  
Geotechnical Services  
Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>RC-15-001</b>
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>191</b>	POSTMILE <b>6.8/8.6</b>	PROJECT ID <b>0313000165-1</b>
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign Project</b>				
BRIDGE NUMBER		PREPARED BY		DATE <b>10-30-15</b>
				SHEET <b>1 of 3</b>

5 BR - STANDARD BUT-191 PARADISE REALIGN GPJ CALTRANS LIBRARY (FEB 2013) GLB 3/30/16

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	40		SEDIMENTARY ROCK (Sandstone/Siltstone) (continued).					55	25						
849.00	45		SEDIMENTARY ROCK (SILTSTONE); gray and dark gray; decomposed; (Sandy SILT (ML-SM), very dense, some fine-grained SAND, trace CLAY).					85	20						
844.00	50		SEDIMENTARY ROCK (SANDSTONE); grayish brown; decomposed; (Poorly graded SAND with SILT (SP-SM), dense, mostly fine- and medium-grained SAND, few to little non-plastic SILT, with cobble-sized rock pieces).	⊗	3	31 50/2"	50/2	92	13						
839.00	55					Ref		95	20						SPT hammer refusal due to rock pieces
834.00	60		SEDIMENTARY ROCK (SANDSTONE/CONGLOMERATE); grayish brown and dark brown; decomposed; moderately hard to very hard; (Poorly graded SAND with GRAVEL (SP-GP), very dense, mostly fine- to coarse-grained SAND, some fine to coarse, subangular to subrounded GRAVEL, with cobble-sized rock pieces).					97	67						
829.00	65							0	0						
								100	0						
824.00	70			⊗	4	50/5"	REF	63	0						
819.00	75			⊗	5	50/4"	REF	23	0						
814.00	80			⊗	6	31 50/3"	50/3	56	0						
								83	0						
809.00	85			⊗	7	36 50/3"	50/3	63	0						

(continued)



Department of Transportation  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>RC-15-001</b>
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>191</b>	POSTMILE <b>6.8/8.6</b>	PROJECT ID <b>0313000165-1</b>
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign Project</b>				
BRIDGE NUMBER		PREPARED BY		DATE <b>10-30-15</b>
				SHEET <b>2 of 3</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
804.00	90		SEDIMENTARY ROCK (Sandstone/Conglomerate) (continued).					63	0						SPT hammer refusal due to rock pieces
			SEDIMENTARY ROCK (SANDSTONE); reddish brown and brown, mottled with white; decomposed; (Poorly graded SAND (SP), very dense, mostly fine- to coarse-grained SAND, trace fine, subangular to subrounded GRAVEL, weak cementation).		Ref			100	0						
799.00	95								40	0					
794.00	100		Bottom of borehole at 100.0 ft bgs Groundwater was not encountered. This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
789.00	105														
784.00	110														
779.00	115														
774.00	120														
769.00	125														
764.00	130														
759.00	135														



Department of Transportation  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>RC-15-001</b>	
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>191</b>	POSTMILE <b>6.8/8.6</b>	PROJECT ID <b>0313000165-1</b>	
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign Project</b>					
BRIDGE NUMBER		PREPARED BY		DATE <b>10-30-15</b>	SHEET <b>3 of 3</b>

LOGGED BY <b>Berhanu Dawa</b>	BEGIN DATE <b>11-2-15</b>	COMPLETION DATE <b>11-3-15</b>	BOREHOLE LOCATION (Lat/Long or North/East and Datum) <b>-44324683.0 ft / 14471424.0 ft</b>	HOLE ID <b>R-15-002</b>
DRILLING CONTRACTOR <b>CALTRANS/KLEINFELDER</b>	BOREHOLE LOCATION (Offset, Station, Line) <b>~22.0' Rt Sta ~563+61</b>			SURFACE ELEVATION <b>~1058.0 ft</b>
DRILLING METHOD <b>Rotary Wire-Line</b>	DRILL RIG <b>CME 750</b>			BOREHOLE DIAMETER <b>4"</b>
SAMPLER TYPE(S) AND SIZE(S) (ID) <b>1.4" SPT Sampler</b>	SPT HAMMER TYPE <b>140 # Safety Automatic Hammer Drop 30"</b>			HAMMER EFFICIENCY, ERI <b>93%</b>
BOREHOLE BACKFILL AND COMPLETION <b>Backfilled with cement grout upon completion</b>	GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS			TOTAL DEPTH OF BORING <b>100.0 ft</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
1053.00	5		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from fine gravel to cobble size conglomerate; massive; light brown with speckled gray and black; slightly weathered; moderately hard; moderately fractured; (The matrix is composed of poorly graded SAND(SP), medium to very dense; light to dark brown; medium grained; strongly cemented; the clasts are comprised of Igneous rock; (Gabbro and Basalt); varying shades of gray; slightly weathered; hard to very hard).		1	7 9 16	25	80	53						
1048.00	10				2			75	17						
1043.00	15				3	28 42 32	74	83	0						
1038.00	20		SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; very thickly bedded; dark gray; intensely weathered to decomposed; soft to very soft; (Poorly graded SAND(SP) with some SILT; dense to very dense; dark gray; fine to medium SAND; weakly cemented).		4	12 20 25	45	20	0						
1033.00	25				5	18 21 28	49	60	0						
1028.00	30				6	18 29 35	64	37	0						
1023.00	35		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from coarse gravel to cobble size conglomerate; massive; light gray; slightly weathered; extremely hard; intensely fractured; (The matrix is composed of poorly graded SAND(SP), very dense; light to dark gray; medium to coarse grained; weakly cemented; the clasts are comprised of Igneous rock (Gabbro and Basalt); dark gray; slightly weathered; hard to very hard).		7	24 35 47	82	25	0						
1018.00	40				8	Ref		63	0						
1013.00	45		SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; massive; grayish brown; decomposed; hard to moderately soft; intensely fractured; (Poorly graded SAND(SP) with some SILT; very dense; dark gray; fine to medium SAND; weakly cemented).		9	29 44 46	90	25	0						
1008.00	50				10	21 31 49	80	67	0						
1003.00	55				11	22 36 44	80	67	0						
60	60														

(continued)

5 BR - STANDARD IS PARADISE CUT BRIDGE.GPJ CALTRANS LIBRARY (FEB 2013).GLB 3/2/16



Department of Transportation  
Division of Engineering Services  
Geotechnical Services  
Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>R-15-002</b>	
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>SR-191</b>	POSTMILE <b>R6.8/R8.6</b>	PROJECT ID <b>0313000165-1</b>	
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign</b>					
BRIDGE NUMBER		PREPARED BY		DATE <b>11-23-15</b>	SHEET <b>1 of 2</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	60		(continued).		12	30 47 48	95	37	0						
993.00	65				13	18 28 36	64	50	0						
988.00	70				14	Ref		70	0						
983.00	75				15	Ref		83	0						
978.00	80		SEDIMENTARY ROCK (SANDSTONE); from fine to coarse grained; massive; moderate reddish brown; intensely weathered to decomposed; moderately hard; (Well graded SAND with SILT (SW-SM); medium dense to very dense; moderately redish brown; from fine to coarse grained SAND; weakly cemented).		16	Ref		72	0						
973.00	85				17	Ref		72	20						
968.00	90					18			28	28					
963.00	95					19			95	0					
958.00	100		Bottom of borehole at 100.0 ft bgs		20										
953.00	105		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
948.00	110														
943.00	115														
938.00	120														
933.00	125														
928.00	130														



Department of Transportation  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>R-15-002</b>	
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>SR-191</b>	POSTMILE <b>R6.8/R8.6</b>	PROJECT ID <b>0313000165-1</b>	
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign</b>					
BRIDGE NUMBER		PREPARED BY		DATE <b>11-23-15</b>	SHEET <b>2 of 2</b>

LOGGED BY <b>B.Dawa/T.Song</b>	BEGIN DATE <b>11-3-15</b>	COMPLETION DATE <b>11-5-15</b>	BOREHOLE LOCATION (Lat/Long or North/East and Datum) <b>-44326004.0 ft / 14473246.0 ft</b>	HOLE ID <b>R-15-003</b>
DRILLING CONTRACTOR <b>CALTRANS/KLEINFELDER</b>			BOREHOLE LOCATION (Offset, Station, Line) <b>~34.0' Rt Sta ~583+22</b>	SURFACE ELEVATION <b>~1189.0 ft</b>
DRILLING METHOD <b>Rotary Wire-Line</b>			DRILL RIG <b>CME 750</b>	BOREHOLE DIAMETER <b>4"</b>
SAMPLER TYPE(S) AND SIZE(S) (ID) <b>1.4" SPT Sampler</b>			SPT HAMMER TYPE <b>140 # Safety Automatic Hammer Drop 30"</b>	HAMMER EFFICIENCY, ERI <b>93%</b>
BOREHOLE BACKFILL AND COMPLETION <b>Backfilled with cement grout upon completion</b>			GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS	TOTAL DEPTH OF BORING <b>93.0 ft</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
1184.00	5		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium gravel to cobble size conglomerate; very thickly bedded; dark reddish brown; intensely weathered; from moderately soft to very hard; very intensely fractured; The matrix is comprised of poorly graded SAND(SP); dense (estimated); dark reddish brown; from fine to coarse; weakly cemented; The clasts are comprised of Igneous rock (Gabbro and Basalt); dark gray; slightly weathered; extremely hard to very hard.		1	35 44 Ref		93	0						
1179.00	10		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from thickly bedded to massive; dark gray brown; slightly weathered to decomposed; soft to very hard; very intensely fractured; The matrix is comprised of well graded SAND(SW); dense to very dense; dark gray brown; from fine to coarse grained; weakly cemented; The clasts are comprised of Igneous rock (Gabbro and Basalt); dark gray; slightly weathered; extremely hard to very hard.		2	18 19 21	40	67	0						
1174.00	15		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from thickly bedded to massive; dark gray brown; slightly weathered to decomposed; soft to very hard; very intensely fractured; The matrix is comprised of well graded SAND(SW); dense to very dense; dark gray brown; from fine to coarse grained; weakly cemented; The clasts are comprised of Igneous rock (Gabbro and Basalt); dark gray; slightly weathered; extremely hard to very hard.		3	23 32 47	79	67	10						
1169.00	20		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from thickly bedded to massive; dark gray brown; slightly weathered to decomposed; soft to very hard; very intensely fractured; The matrix is comprised of well graded SAND(SW); dense to very dense; dark gray brown; from fine to coarse grained; weakly cemented; The clasts are comprised of Igneous rock (Gabbro and Basalt); dark gray; slightly weathered; extremely hard to very hard.		4	Ref		67	18						
1164.00	25		SEDIMENTARY ROCK (DECOMPOSED SANDSTONE); fine to coarse grained; very thickly bedded; grayish brown; decomposed; soft; (Well graded SAND (SW), very dense; brown; from fine to coarse SAND; weakly cemented).		5			100	0						
1159.00	30		SEDIMENTARY ROCK (DECOMPOSED SANDSTONE); fine to coarse grained; very thickly bedded; grayish brown; decomposed; soft; (Well graded SAND (SW), very dense; brown; from fine to coarse SAND; weakly cemented).		6			100	50						
1154.00	35		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium sand to coarse gravel size; very thickly bedded to massive; light gray with speckled black and brown; moderately to slightly weathered; moderately hard; slightly to very slightly fractured (intensely fractured zone); The matrix is comprised of poorly graded SAND(SP); dense; light to dark gray; medium to coarse; strongly cemented; The clastics are composed of Igneous rock (Gabbro and Basalt); dark gray; fresh; extremely hard to very hard.		7			100	90						
1149.00	40		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium sand to coarse gravel size; very thickly bedded to massive; light gray with speckled black and brown; moderately to slightly weathered; moderately hard; slightly to very slightly fractured (intensely fractured zone); The matrix is comprised of poorly graded SAND(SP); dense; light to dark gray; medium to coarse; strongly cemented; The clastics are composed of Igneous rock (Gabbro and Basalt); dark gray; fresh; extremely hard to very hard.		8			100	72						
1144.00	45		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium sand to coarse gravel size; very thickly bedded to massive; light gray with speckled black and brown; moderately to slightly weathered; moderately hard; slightly to very slightly fractured (intensely fractured zone); The matrix is comprised of poorly graded SAND(SP); dense; light to dark gray; medium to coarse; strongly cemented; The clastics are composed of Igneous rock (Gabbro and Basalt); dark gray; fresh; extremely hard to very hard.		9			100	92						
1139.00	50		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium sand to coarse gravel size; very thickly bedded to massive; light gray with speckled black and brown; moderately to slightly weathered; moderately hard; slightly to very slightly fractured (intensely fractured zone); The matrix is comprised of poorly graded SAND(SP); dense; light to dark gray; medium to coarse; strongly cemented; The clastics are composed of Igneous rock (Gabbro and Basalt); dark gray; fresh; extremely hard to very hard.		10			100	88						
1134.00	55		SEDIMENTARY ROCK (MATRIX SUPPORTED CONGLOMERATE); from medium sand to coarse gravel size; very thickly bedded to massive; light gray with speckled black and brown; moderately to slightly weathered; moderately hard; slightly to very slightly fractured (intensely fractured zone); The matrix is comprised of poorly graded SAND(SP); dense; light to dark gray; medium to coarse; strongly cemented; The clastics are composed of Igneous rock (Gabbro and Basalt); dark gray; fresh; extremely hard to very hard.		11			100	80						

(continued)



Department of Transportation  
Division of Engineering Services  
Geotechnical Services  
Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>R-15-003</b>
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>SR-191</b>	POSTMILE <b>R6.8/R8.6</b>	PROJECT ID <b>0313000165-1</b>
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign</b>				
BRIDGE NUMBER		PREPARED BY		DATE <b>11-23-15</b>
				SHEET <b>1 of 2</b>

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	60		(continued).		12			100	53						
1124.00	65				13			70	0						
1119.00	70				14			27	0						
1114.00	75				15				7						
1109.00	80				16			97	73						
1104.00	85				17			98	47						
1099.00	90				18			62	10						
			Bottom of borehole at 93.0 ft bgs		19			97	25						
1094.00	95														
1089.00	100		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
1084.00	105														
1079.00	110														
1074.00	115														
1069.00	120														
1064.00	125														
1059.00	130														



Department of Transportation  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North

REPORT TITLE <b>BORING RECORD</b>				HOLE ID <b>R-15-003</b>	
DIST. <b>03</b>	COUNTY <b>BUT</b>	ROUTE <b>SR-191</b>	POSTMILE <b>R6.8/R8.6</b>	PROJECT ID <b>0313000165-1</b>	
PROJECT OR BRIDGE NAME <b>03-BUT-191 Paradise Realign</b>					
BRIDGE NUMBER		PREPARED BY		DATE <b>11-23-15</b>	SHEET <b>2 of 2</b>